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SCIENCE, TECHNOLOGY AND UTOPIAS

IN THE WORK OF CONTEMPORARY WOMEN ARTISTS

by

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ABSTRACT OF THE DISSERTATION

Science, Technology and Utopias in the Work of Contemporary Women Artists

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This dissertation examines the work of artists Alice Aycock, Agnes Denes, Martha Rolser and Carolee Schneemann, created between the late 1960s and the mid-1980s, which incorporated science and technology as subject and media. It represents the first focused examination of the conceptual use of science and technology by American women artists during the Cold War. I argue that, for these artists, science and technology represented a realm of investigation replete with negative associations in the wake of the Vietnam War, but also ripe with opportunities for change. Motivated by the contemporary American women's movement, these artists leveraged theories in physics, cosmology and systems, as well as new technologies such as video, in order to subvert modernist, male-centered, heroic, painterly styles, in addition to the traditional economic structures of the gallery, museum and dealer. This study sheds new light on conceptual art by re-centering the use of technology, generally treated as a conservative trend and excised from avant-garde histories, as a means for critique of Cold War society and as a method for imagining alternative concepts of human community. At stake in this investigation are domains of knowledge and power from which women have been historically excluded.

Informed by New Left and counter-culture criticism of nuclear weapons and the Vietnam War arising from influential theorists, such as Herbert Marcuse and Lewis Mumford, these artists associated the industries of science and technology with the military-industrial complex, which was reviled as representative of a closed, mechanistic "technological society." However Marcuse, the media-acknowledged guru of the New Left (a left-wing international movement composed of social activist groups formed in the 1960s), also inspired the counter-culture to imagine an alternative society in which "science and technology are the great vehicles of liberation." Thus, while these artists subjected the patriarchal institutions and industries of science and technology to withering attack, they also redeployed their implicit notion of progress in feminist utopian visions of a different future.

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My project dealt with living artists and therefore relied heavily on extensive, in-person interviews with Alice Aycock, Agnes Denes, Martha Rosler and Carolee Schneemann, all of whom generously invited me into their studios to discuss their works in person. I wish to thank the artists for their thoughtful, introspective answers to all of my questions, and for kindly offering continued conversation through email, phone and in person.

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Fig. 78	Agnes Denes, <i>Syzygy"The Moment of</i> ", 1972-73. Reproduced from Agnes Denes, Jill Hartz, ed., <i>Agnes Denes</i> (Ithaca, N.Y.: Hebert F. Johnson Museum of Art, Cornell University, 1992).
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Science, Technology and Utopianism in the Work of Contemporary Women Artists Christine Filippone

Introduction

"intensified progress seems to be bound up with intensified unfreedom. Concentration camps, mass exterminations, world wars, and atom bombs are no 'relapse into barbarism,' but the unrepressed implementation of the achievements of modern science, technology and domination."¹

--Herbert Marcuse, 1955

"science and technology are the great vehicles of liberation."² --Herbert Marcuse, 1969

The imperatives of the Cold War cast a long shadow over all levels of American society, from the proxy wars in Southeast Asia, to the space race, even to the creature comforts offered by middle-class suburban living. Many American artists on the left maturing in the late 1960s responded to the popularization of science and technology by creating works critical of military, domestic and communication technologies or by highlighting failed applications of absolutist scientific theories. I propose that artists Alice Aycock, Agnes Denes, Martha Rosler and Carolee Schneemann used science³ and technology⁴ as subject and media to mount a critique on Cold War American society as they saw it—

¹ Herbert Marcuse, *Eros and Civilization: a Philosophical Inquiry into Freud* (Boston: Beacon Press, 1955), 4.

² Herbert Marcuse, An Essay on Liberation (Boston: Beacon Press, 1969) 12.

³ When not directly linked to the historical views of specific individuals, such as Marcuse and Lewis Mumford, science in this dissertation refers to forms of knowledge, such as cosmology, physics and systems theory, as well as to applied science such as atomic weaponry and nuclear power.

⁴ My definition of technology in this dissertation follows that of scholar Judy Wajcman who suggests that a definition of technology has three parts. First, it is a form of knowledge, as evidenced by different disciplines, for example, mechanical, structural, electrical and aeronautical engineering. Technology also encompasses human practices, such as the creation of objects, including computers or cars. Finally, technology refers to objects themselves, such as vacuum cleaners, tanks, television sets, guns and cameras. Judy Wajcman, *Feminism Confronts Technology* (University Park, PA: Pennsylvania State University Press, 1991), 14-15.

conservative and constricting.⁵ At the same time, these artists also embraced these domains of knowledge and practice as expressions of hope for a better future. Informed by New Left and counter-culture criticism of nuclear weapons and the Vietnam War arising from influential theorists cited by the artists, such as Lewis Mumford and Herbert Marcuse, these artists associated the industries of science and technology with the military-industrial-complex, which was reviled as representative of a closed, mechanistic "technological society" bent on domination of agrarian, third-world nations.⁶ However Marcuse, the media-acknowledged 'guru' of the New Left, ⁷ a left-wing international

⁵ This dissertation relies on the research of numerous scholars whose groundbreaking work has illuminated the relationships between science, technology and art including, Linda Henderson, Caroline Jones and Peter Gallison. I am indebted to the work of scholars who have investigated the influence of science and technology on art created during the Cold War including the incisive survey by Marga Bijvoet, Edward M. Shanken's research on systems theory in Jack Burnham's writing, Anne Collins Goodyear's investigation of the links between artists, engineers and scientists in the years following the launch of Sputnik, and Margot Lovejoy's survey of digital art. This study is especially indebted to the scholars who have examined the role of science and technology in the works of the artists considered here, including Howard Fox, Jonathan Fineberg, Stuart Morgan, Edward Fry, Eugenie Tsai, Janet Kardon, and especially Robert Hobbs, all of whom have offered significant contributions on the work of Alice Avcock; Donald Kuspit, Hobbs, Peter Selz and Eleanor Heartney have provided valuable insights into the work of Agnes Denes; Alexander Alberro, Annette Michelson, Benjamin Buchloh, Mark Godfrey, Brian Wallis have contributed greatly to an understanding of the work of Martha Rosler; and Kristine Stiles, Robert Morgan, Dan Cameron, Pamela Lee and Alexandra Juhasz have offered penetrating analyses of the work of Carolee Schneemann.

⁶ Herbert Marcuse, *One Dimensional Man; Studies in the Ideology of Advanced Industrial Society* (Boston,: Beacon Press, 1964); Lewis Mumford. *The Myth of the Machine*. vol. 1 and 2. 1st ed. (New York,: Harcourt, 1967)

⁷ In his introduction to *One Dimensional Man*, Douglas Kellner wrote, "The book also generated much controversy, however, especially when Marcuse was presented in the media as a 'guru of the New Left.' For a generation of young radicals took up Marcuse's texts as essential criticism of existing forms of thought and behavior, and Marcuse himself identified with the New Left and defended their politics and opposition." Marcuse, *One Dimensional Man*, xxxvi. See also Herbert Marcuse: The New Left and the 1960s, edited by Douglas Kellner. Six vols. Vol. Three, *Collected Papers of Herbert Marcuse* (London; New York: Routledge, 2005). Paul Durbin also described the impact of Marcuse's writing on activists in the 1960s. "Marcuse's Marxist thought became more influential, and more threatening to the science establishment, than the ideas of other intellectuals because it was adopted by "New Left" radicals of the 1960s bent on disrupting, among other things, scientific professional meetings." Paul T. Durbin and Jerome R. Ravetz. *A Guide to the Culture of Science, Technology, and Medicine*. 1st Free Press pbk. ed. (New York; London: Free Press; Collier Marcuillan, 1984), xxiii.

movement of social activist groups formed in the 1960s, also inspired the counterculture to imagine an alternative society in which "science and technology are the great vehicles of liberation."⁸ Thus, the long-held, cultural belief in the progressive and transformative power of science and technology retained meaning for the left and for the artists as well.

New Left rhetoric and ideology informed the contemporary American women's movement, which provided the context for a sustained feminist utopianism that was both critical of science and technology in a patriarchal context and embraced in a deconstructive, feminist context through the mid-1980s-- the beginning of the end of the Cold War.⁹ Indeed, in 1974 Marcuse declared that with the liberation of the woman, "technical progress, the chief vehicle of productive aggressiveness, would be freed from its capitalist features and channeled into the destruction of the ugly destructiveness of capitalism."¹⁰ The artists considered here created work critical of the mechanism inherent in the modern scientific world-view, born of Newtonian physics and embodied, during the Cold War, by the military-industrial-complex. But science and technology were integral to the artists' critical strategies employed in order to open up new possibilities. They found alternatives: in new technologies, such as video used for feminist aims; in the scientific theory of open systems, which emphasized the interrelationship of all living organisms with the physical and social environment; and in new scientific theories such as quantum theory, probability and cosmological evolution, which undermined the belief inherent in Newtonian physics-that the behavior of all

⁸ Marcuse, An Essay on Liberation, 12.

⁹ Though the Cold War officially ended in December 1989, when President H.W. Bush and Gorbachev declared its cessation at a summit meeting in Malta that year, it had begun a steady decline in the mid-1980s when Gorbachev began focusing on economic reforms in the U.S.S.R. ¹⁰ Herbert Marucse, "Marxism and Feminism," *Women's Studies* 2, no. 3 (1974): 286.

natural forces could be predicted with precision and certainty. The notion of openness and uncertainty upon which these theories are premised provided the flexibility needed to imagine alternatives to current society. I suggest that the artists' complex dystopian and utopian approaches to these forms of knowledge and practice are best understood as feminist utopian expressions, as theorized by political theorist Lucy Sargisson.¹¹ Sargisson developed her theory by analyzing women's fiction and feminist theory written in the same period in which the four artists were working. This dissertation represents the first known application of her theory to visual works of art.

Feminist utopias in literature, and, I argue visual art, of this period addressed power hierarchies that determined how meaning, value and truth were constructed in society.¹² Pre-eminent among these power hierarchies were science and technology, from which women had been historically excluded. Since the tumult of the late 1960s, science and technology were closely associated with communist and fascist societies, deemed perfectworld utopias, and with capitalist societies, also perceived as closed, industrial and often destructive. In the wake of criticism levied against these societies, from the right and the left, the word utopia itself was expunged from the canon of critical thought. This dissertation attempts to recover utopias of a different sort that remained intact in New Left discourse and later within feminist utopian yearnings for diverse concepts of human community. The feminist utopias inherent in the works of these artists simultaneously

¹¹ Sargisson's utopianism is based on the premise that the classic view of utopia, as a place, state or condition that is ideally perfect with respect to politics, laws, customs and conditions *is mistaken*. Lucy Sargisson, *Contemporary Feminist Utopianism, Women and Politics* (London: NY: Routledge, 1996), 2.

¹² Science fiction works such as Ursula LeGuin's, *The Disposessed* (1974) and Octavia Butler's, *Patternist* series (1976) are notable literary examples.

criticize associations of perfect-world utopias with technological and scientific progress, and re-imagine these forms of practice and their products as integral to a new, less-restrictive social order in which both genders contribute equally to an ongoing process that "works to change the present rather than programme a future."¹³ It is the cultural notion of progress inherent in science and technology that privileges these domains of knowledge as subjects for investigation. The notion of feminist utopianism is rooted in the idea that the classic, previsualized, perfect-world utopias historically determined by men are in fact a nightmare for women.

Feminist utopian art functions as a challenge to existing society often offering a political critique of patriarchal culture, a subversion of categories and a deconstruction of power roles. According to Sargisson, feminist utopian works are speculative and meditative, emphasizing flexibility, process and change, rather than a specific, previsualized alternative. They may be transformative, subversive or oppositional.¹⁴ They are open-ended and disjunctive, often offering multiple alternatives to the world that exists. Sargisson argued that feminist utopias open new conceptual spaces, frequently through metaphor, in order to imagine other possible worlds. Sargisson wrote,

All feminist utopias are political... All are concerned to some extent with power relations, all with sexual power, some also with the exploitative relation between patriarchy and nature.¹⁵

¹³ Sargisson, 51. Sargison here acknowledges the work of Margaret Whitford. Margaret Whitford, *Luce Irigaray: Philosophy in the Feminine* (London: Rutledge, 1991), 20.

¹⁴ Sargisson, 47.

¹⁵ Sargisson,17.

The utopianism in the artists' works surely extends beyond science and technology, but analysis of their conflicting views toward these systems of knowledge and power sheds light on what they wish to change and why. For them, science and technology were linked to the social problems they confronted, but also offered a means to overcome them. Thus, while the patriarchal institutions and industries of science and technology were subject to withering attack, the notion of progress implicit in them was redeployed in feminist utopian visions of a different future.

Despite their shared concerns, the artists discussed in this dissertation have rarely been linked in critical discussion, nor has their work been contextualized within the histories of the Cold War. Instead, rigid, superficial boundaries that favored formal interpretation, inserted their works into art historical categories including land art, earth art, pop and feminist art. Rosler's and Schneemann's critiques of technology have been obscured due to an abundance of critical attention given to their feminist concerns and to the cultural blind spot hindering identifications of women with the use of technology.¹⁶ Meanwhile, Denes's and Aycock's critiques of science have not been contextualized in terms of the women's movement. As liberal feminists, they embraced science in part as a means to be

¹⁶ The field of women and gender studies has given careful attention to women's historical exclusion from scientific, industrial and technical processes. Laurie Smith Keller discusses the disparity in perception that has resulted from this exclusion, namely, that women are inherently non-technological and non-scientific. Scholars such as Ruth Oldenziel, Wajcman and Steven Lubar assert that mainstream histories of technology have ignored women's experience of new technologies, and address the discrepancy. Feminist studies of science have examined how gender constructions affect science. Evelyn Fox Keller studies the ways in which the gendered attitudes of research communities affects how knowledge develops. Sandra Harding argues that knowledge itself changes according to the perspective of the investigator, and that it may appear differently when viewed from the position of a socially marginalized group. Wajcman, *Feminism Confronts Technology*; Sandra G. Harding, *Whose Science? Whose Knowledge? : Thinking from Women's Lives, Science Question in Feminism* (Ithaca, N.Y.: Cornell University Press, 1991); Nina E. Lerman, Ruth Oldenziel, and Arwen Mohun, *Gender & Technology : A Reader* (Baltimore: Johns Hopkins University Press, 2003).

taken seriously by an all-male art system and to shed associations with the essentialism of the early Feminist Art Movement. I situate each of the artists in relation to a broader definition of conceptual art, due to their critiques of science and technology as institutions infused with cultural and political power.¹⁷

These artists were chosen for this project, from among many working with these systems of knowledge and practice, because each developed an informed critique of science and technology; each expressed a commitment to social or political engagement; and each developed an extensive body of writing intended to illuminate her work.¹⁸ Each artist incorporated her own words, written or spoken, inextricably into her visual work, as one among many components. Aycock and Denes both created extensive artists' statements intended to explicate the work, their own intentions and the methods used. Aycock and Denes sometimes created stories around their works, invoking imagined historical or future functions. Rosler and Schneemann created performances in which their own words, usually laced with passionate political critique, accompanied their performative actions. Rosler, Schneemann and Denes also authored their own works or those of their contemporaries.¹⁹ Many of the artists' creations were ephemeral in nature,

¹⁷ I refer here to Robert Morgan's definition of conceptual art, "at its best—[is] a statement capable of articulating forceful ideas in a world where invisible systems seem to prevail. This is what makes Conceptual Art significant. Robert Morgan, *Conceptual Art : An American Perspective* (Jefferson, N.C.: McFarland, 1994), 128. As well as Lippard's notion of art as idea, discussed below. Lucy Lippard. "The Dematerialization of Art." (*Art International* 12, no. 2. 1967): 31-36. Found in Alexander Alberro, *Conceptual Art; A Critical Anthology*. (Cambridge, Mass: London: MIT Press, 1999).

¹⁸ In addition, each artist received a liberal arts, college education.

¹⁹ All white, middle to upper middle-class women, each artist enjoyed the benefits conferred upon the privileged and do not represent a diverse racial or economic perspective.

including performances and temporary earthworks, so that analysis must often be executed using only surviving photographic documentation, along with the artists' recollections and descriptions. The artists' own words, in the form of contemporary explications, attendant narratives and later recollections, are incorporated into this study to aid in analysis and probe the artists' intentions. I have conducted my own interviews with each of the artists, which serve to extend or modify the historical perspective offered by earlier texts.

These women also shared a common community. They spent formative years in the art world hub, New York City. They ingested ideas disseminated in widely read publications like *ArtForum*, which helped to form a tightly-knit artist community. The artists came of age during this broader period: the heyday of Fluxus, reconsiderations of Russian Constructivism and Dada, the nascent women's movement, and Experiments in Art and Technology, an organization that brought together engineers and artists for the purpose of experimentation and creative exchange. Their works responded to the Cold War and the space race, which encompassed the cultural reification of science and technology as well as the growing countercultural aversion to them.

Through extensive, taped, personal interviews with each artist conducted over the past three years; discussions with scholars and curators familiar with them such as Robert Hobbs, Howard Fox and Brian Wallis; studio visits; careful analysis of their works and statements; and extensive archival research at the Los Angeles County Museum of Art, Los Angeles Museum of Contemporary Art, the Smithsonian American Art Museum, The Hirshhorn Museum and Gallery, the National Air and Space Museum, International Center of Photography and CEPA Gallery in Buffalo, New York, I explicate the curious paradox of a dystopian approach to science and technology and a utopian embrace of their association with progress and change. I use these interviews to determine the artists' intentions, to illuminate individual works, and as a means to characterize contemporary attitudes toward science and technology more generally.

This dissertation reconstructs Cold War rhetoric centering on science and technology arising from influential theorists such as Mumford, Marcuse, Jacques Ellul and others to reveal the climate in which the artists' thinking developed, or as historian Daniel Belgrad referred to it, the *mentalité* of the period. Not a reductive, singular distillation of the many viewpoints, the present project seeks to reconstitute the discursive context of the Cold War period, providing the social, cultural and intellectual history that frames the intersections of science, technology and gender. It is important to note that in most cases, direct lines may be drawn from these critics and cultural theorists to the artists themselves; the artists, as we shall see, have identified them as critical to the development of their work. Still, I approach each of these artists as subjects with agency who synthesize these ideas in the development of new bodies of work.

Growing scholarship in the field of science, technology and gender, recently summarized by scholar Judy Wajcman in *TechnoFeminism* (2004), offers a firm basis for a study of women artists' relationship to these disciplines of knowledge and power.²⁰ Scientist and gender studies scholar Sandra Harding argues that knowledge may appear differently

²⁰ Judy Wajcman, *Technofeminism* (Cambridge, UK ; Malden, MA: Polity, 2004).

when viewed from the position of a socially marginalized group.²¹ Literary scholar Angelika Bammer's argument follows Harding's. She claims that the utopian impulse in the work of those who have been designated, other, from the perspective of a hegemonic culture, is potentially the most radical.²² Utopianism permeated the counter-culture and the art world in the late 1960s and early 1970s, as is evident in the writing of contemporaneous, influential critics and curators like Jack Burnham and Lucy Lippard. Burnham was an important influence for Aycock, and Denes, and Rosler also knew his work. Lippard helped define conceptual art as a movement.

In her groundbreaking 1968 essay, "The Dematerialization of Art," Lippard claimed that conceptual artists sought to "liberate the idea" and she remarked that the newer work "[offered] a curious kind of Utopianism."²³ Lippard described conceptual art as superseding the autonomous, reductive and inward-looking art championed by Clement Greenberg.²⁴ The new art, she said, engaged the viewer in a process of gradual discovery of the inherent idea and was concerned with "opening up rather than narrowing down." She implied that conceptual art offered an expansion of possible meanings through reference to the broader world, rather than to other art exclusively (Greenberg). Lippard's

²⁴ Lippard, the "Dematerialization of Art", in Alberro, *Conceptual Art: A Critical Anthology*, 47. Lippard's lineage is drawn from Composer Joseph Schillinger's book, The Mathematical Basis of Art (1943), which divides the historical evolution of art into zones concluding with: #5. Scientific, post-aesthetic (which makes possible the manufacture, distribution and consumption of perfect art production) characterized by a fusion of art forms and materials. And #6. a 'disintegration of art', the abstraction and liberation of the idea. Lippard situated Conceptual art between the Scientific post-aesthetic and its dematerialization.

²¹ Sandra G. Harding, *Whose Science? Whose Knowledge? : Thinking from Women's Lives, Science Question in Feminism* (Ithaca, N.Y.: Cornell University Press, 1991).

²² Angelika Bammer, *Partial Visions: Feminism and Utopianism in the 1970s* (London ; New York: Routledge, 1991) 3.

²³ Lucy Lippard. "The Dematerialization of Art." (*Art International* 12, no. 2. 1967): 31-36.
Found in Alexander Alberro, *Conceptual Art; A Critical Anthology*. (Cambridge, Mass: London: MIT Press, 1999), 47.

notion of art as idea relied on Sol Lewitt's 1967 essay, "Sentences on Conceptual Art," but her concept of utopianism in this essay was her own.²⁵ By the time she wrote her essay "Introduction to 557,087" in 1970, she spoke stridently about the importance of "social comment" in works of art and she quoted Marcuse as follows, "capitalist progress reduces the environment of freedom, the 'open space' of human existence, but also the "longing," the need for such an environment."²⁶ She also quoted Burnham's definition of open systems that encompass the environment, "art…resides…in relations between people and between people and the components of their environments."²⁷ Reference to the broader world and engagement with social contexts were integral to her utopianism as to that of Marcuse. For Lippard, the idea was liberated so that it could engage the outside world and be shared with others.

Thus, Lippard's utopianism implies the open communication of new ideas by artists to viewers. Describing conceptual art as "opening up," she referred to the opening of meaning. If an idea is good, she explained later in her essay, "it is fertile and open enough to suggest *infinite possibilities*." [italics mine] By embracing infinite possibilities, Lippard's utopianism negates the standard, previsualized, closed utopia. Neither the form of the new art, nor the ideas it expressed were restrictive. On the contrary, the deemphasis on form and emphasis on idea, allowed viewers to provide multiple interpretations.

²⁵ Frances Colpitt, "The Formalist Connection and Originary Myths of Conceptual Art," in Michael Corris, *Conceptual Art : Theory, Myth, and Practice* (New York: Cambridge University Press, 2004), 28.

²⁶ Lucy Lippard, "Introduction to 557,087," in Alexander Alberro and Blake Stimson, *Conceptual Art : A Critical Anthology* (Cambridge, Mass. ; London: MIT Press, 1999), 183, 179.

²⁷ Lucy Lippard, "Introduction to 557,087," in Alberro, *Conceptual Art : A Critical Anthology*, 183.

In his seminal essay "Conceptual Art 1962-1969: From the Aesthetic of Administration to the Critique of Institutions," published in 1990, Benjamin Buchloh repudiated Lippard's characterization, claiming that the type of utopianism to which she referred was "manifestly absent from Conceptual Art throughout its history."²⁸ Here, Buchloh claims that Lippard attempted to resuscitate the utopianism of earlier avant-garde movements asserting instead that "from its inception Conceptual art was distinguished by... its lack of totalizing vision." But as we have already seen, Lippard's utopianism was anything but totalizing. In fact, it suggested the reverse. The utopianism that Lippard describes, is rooted in the real world. In addition, Buchloh does not specify to which avant-garde movement he refers: Futurism, Constructivism, Dada or another. Neither does he clarify what he means by utopia, how he understands it.

Art historian Alexander Alberro recently contributed to the debate, by taking issue with Buchloh's dismissal of utopianism in Conceptual art, claiming that "Although the refusal of a transcendental dimension characterizes key aspects of early conceptual art, other aspects were charged with as much utopianism as the historical avant-garde."²⁹ Thus Alberro correctly suggests that the refusal of a transcendental dimension, and utopianism, need not be mutually exclusive, but, unfortunately, he does not clarify what he means by utopianism and to what avant-garde movement(s) he refers. In his book, *Conceptual Art*

²⁸ Benjamin H. D. Buchloh. "Conceptual Art 1962-1969: From the Aesthetic of Administration to the Critique of Institutions." (*October* 55, no. Winter, 1990): 105-43. In his article, Buchloh quoted from Lippard's "Introduction" to the 1970 exhibition 955,0000, though he certainly would have been aware of the essay she wrote with John Chandler's "Dematerialization of Art" three years earlier.

²⁹ Alexander Alberro, *Conceptual Art and the Politics of Publicity* (Cambridge, Mass.: MIT Press, 2003), 172.

and the Politics of Publicity, Alberro links the emergence of conceptual art with advanced capitalism and seeks to unveil its political dimension. He said, "…conceptualism was given a utopian gloss not only by some of its early practitioners and art critics, but also by a newly constituted public around the Art Workers Coalition in 1969, who found in its practices a parallel to their revolutionary vision."³⁰ Here he points to a utopianism tied to a belief in social change. The Art Workers Coalition, of which Schneemann was a member, was an activist group that strove to enact reforms for artists through protest and other means.³¹ Alberro's association of utopianism with artists who were politically engaged, as those in the Art Workers Coalition had been, is apt. Utopian studies scholar Peter Fitting declared, "utopia and dystopia by their very nature remind us of their connection with the real, and it seems foolish and obtuse to ignore the deliberate engagement of these works with contemporary issues."³² Artists aligned with political movements of the 1960s and 70s, like Schneemann and Rosler, combined utopianism with political critique.

My dissertation is largely concerned with this political dimension. I concur with the claim made by art historian Michael Corris that the social and political intention of conceptual artists has been overlooked or periodized, which is to say robbed of its more complex meanings in order to better accommodate university syllabii.³³ He explained that the political content of their work was siphoned out by art historians so that it would

³⁰ Alberro, Conceptual Art and the Politics of Publicity, 172.

³¹ Lucy R. Lippard. *Get the Message?: A Decade of Art for Social Change*. 1st ed. (New York: E.P. Dutton, 1984) 11.

³² Peter Fitting. 142-143

³³ Michael Corris, *Conceptual Art : Theory, Myth, and Practice*. (New York: Cambridge University Press, 2004) 1.

fit neatly into art historical master narratives, which for decades counted conceptual art as the last gasp of modernism.³⁴ The limited association of conceptual art with modernist avant-gardes, which themselves were lumped into one amorphous transcendental, utopian category derives in part from a misunderstanding of the markedly different utopianism in conceptual art. At stake in this debate are the obfuscations that result from a blanket association of the standard view of utopia with all forms of Modernist art, and the mistaken correlation of science and technology with this same standard definition. By 1968, there were other definitions of utopia circulating in the U.S., having an enormous influence on the counterculture movement, by which the artists considered here were either affected or with which they were directly associated. New notions of utopianism filtered into the circles of the politically-engaged as well as into popular culture by philosophers, political theorists, activists and artists alike. This text recontextualizes this utopianism into the cultural and historical context from which it emerged.

Art, Science and Technology during the Cold War

In the paragraphs that follow, I situate the artists within the events and discourses of the Cold War centering on science and technology, and I consider the relationships between the artists and their milieu, such as Fluxus and Experiments in Art and Technology, as

³⁴ Corris, *Conceptual Art : Theory, Myth, and Practice*, 1. Carolee Schneemann has similarly noted, "There is also a pervasive prejudice about the sixties, that we could be impulsive, just get it on, and could do whatever we wanted. There is a calibrated ignorance aimed at depoliticizing work done in the sixties, substituting an artificial heroics of singular achievement in place of activist social structures that formed interconnected communities of resistance. There are very few art historians able to deal with those political works that were provoked by the Vietnam War." Interview with Carl Heyward," originally published in *Art Papers* 17:1 (1993). Found in *Carolee Schneemann: Imaging Her Erotics: Essays, Interviews, Projects* (Cambridge, MA: MIT Press, 2002) :200

well as their engagement with the ubiquitous notion of Systems Theory, a humanistic outgrowth of cybernetics.

In the 1950s, military and systems technologies became associated with government and corporate bureaucracies, while physics was linked to Armageddon-like destruction, as images of mushroom clouds over Hiroshima and Nagasaki continued to loom large in the public imagination,³⁵ but big science received a positive facade in the form of nuclear power.³⁶ In 1951, the Atomic Energy Commission announced the production of the first useful electric power generated by an atomic reactor, and in 1952, the *New York Times* reported on President Truman's inauguration of the first atomic submarine, the Nautilus.³⁷ In his dedication, the president hailed the submarine as "the forerunner of nuclear power for everyday use in an ultimate golden age."³⁸ Truman also praised the progress and ingenuity evident in the first "working power plant for peace," and announced confidently, "Today, we stand on the threshold of a new age of power."³⁹ The International Atomic Energy Agency, a secretariat of the United Nations, was established

³⁵ On August 6, 1945, the uranium bomb Little Boy was dropped on Hiroshima, Japan by the Enola Gay. On August 9, 1945, another B-29 plane dropped an implosive plutonium bomb, code-named Fat Man, on Nagasaki. Daniel J. Kevles, *The Physicists / the History of a Scientific Community in Modern America* (Cambridge, Mass.: Harvard University Press, 1995), 341.

³⁶ The term "big science" was coined by physicist Alvin Weinberg in 1962. Referring to the sheer number of government research laboratories at MIT, Weinberg noted that science and engineering had become big business. Historian Stuart Leslie notes that the bulk of the funding came from the military and that MIT was the nation's largest nonindustrial defense contractor with \$17 million worth of separate contracts at the end of World War II. Stuart W. Leslie, *The Cold War and American Science : The Military-Industrial-Academic Complex at MIT and Stanford* (New York: Columbia University Press, 1993), 1.

³⁷ The reporter noted that Truman dedicated "a deadly instrument of war." "Electricity Made By Atomic Reactor" *New York Times*, December 30, 1951, 1.

³⁸ Anthony Leviero, "Truman Assails 'Cut-Rate' Security as He Dedicates Atomic Submarine," *New York Times*, June 15, 1952.

³⁹ "Text of Truman Speech Dedicating the First Atomic Submarine as Harbinger of New Age," *New York Times*, June 15, 1952.

in 1957 as the world's "Atoms for Peace" organization.⁴⁰Aycock remembered the positive applications of nuclear power at that time, particularly because her father worked in the industry. "[My father] was involved in energy. After the devastation of WWII and the bomb, there were the good uses, the peaceful uses of the atom and all of that. And he was part of that utopian idea."⁴¹

Attitudes toward technology and science became optimistic in Europe and the U.S. in the late 1950s and early 1960s, due in large part to the inauguration of the Mercury Space Program, which competed with the Soviets to put a man in space.⁴² The first successful American manned space flight was completed by Alan Shepherd in 1962. A few months later, President Kennedy announced his goal of placing a man on the moon, marking the beginning of the Apollo program.⁴³ Government funding for scientific research, a reflection of changing national priorities, had increased from \$48 million to \$500 million during World War II, and climbed to almost \$15 billion by 1965.⁴⁴ This period saw the rise of movements like Op-Art, Kinetic Sculpture and Light Art, all with roots in Constructivist and Bauhaus experimentation. In 1960, Swiss artist Jean Tinguely

⁴⁰ "The 'Atoms for Peace' Agency," International Atomic Energy Agency.

http://www.iaea.org/About/index.html (accessed February 5, 2008)

⁴¹ Unpublished Interview with the Artist, New York, NY, July 16, 2007.

⁴² The objective of Project Mercury (1959-1963) was to put a man in space. The purpose of the Apollo Program (1961-1975) was to place a man on the moon. Project Gemini, which ran after Mercury, intended to develop techniques for advanced space travel, specifically a two-person spacecraft that could be used for project Apollo.

⁴³ The first human spaceflight was *Vostok 1* on April 12, 1961; Soviet cosmonaut Yuri Gagarin made one orbit around the earth. Alan Shepard manned the first U.S. space flight which launched May 5, 1961. The Sputnik program, which preceded the Vostok program, was a series of unmanned satellites launched by the Soviet Union, beginning with the launch of *Sputnik 1* on October 4, 1957. The surprise launch of *Sputnik 1*, coupled with the failure of the first two Project Vanguard launch attempts, unsettled the United States, which responded with a number of early satellite launches.

⁴⁴ Kevles, 341, 387.

embraced kinetic art for its anarchic freedom. He said, "I want only to involve myself in the moving object that forever transforms itself."⁴⁵ Later Tinguely made assemblage machines made from old automobile parts that explored the irrational and destructive purposes of technology. His famed Neo-Dada work *Homage to New York* (1960) was built to self-destruct, and did so in its intended location, the garden at MOMA. Dada enjoyed renewed attention in this period due to the presence of Marcel Duchamp in New York, as well as to the movement's famously iconoclastic relationship to technology and war, its founding premise. The Neo-Dada movement, Fluxus, celebrated randomness and chance, important aspects of quantum physics.⁴⁶ These movements provided inherently subversive means of response to the dominance of Abstract Expressionism, which had come to represent the commodification of art and the glorification of the male artist. Aycock was exposed to Fluxus ideas in the late 1960s while at Douglass College, affiliated with Rutgers University. There she took classes with Geoff Hendricks and Robert Watts, both deeply involved in Fluxus.

Founded in the early 1960s, the word Fluxus comes from the Latin word meaning to flow, indicating a commitment to process, manifested in their events, Happenings and performances. They espoused playful chance events and an anti-art or anti-art-as-

⁴⁵ Daniel Wheeler, *Art since Mid-Century : 1945 to the Present* (New York: Vendome Press : Distributed by Rizzoli International Publications, 1991), 239.

⁴⁶ For Fluxus promoter George Maciunas's interest in physics see Hendricks, Geoffrey, Mead Art Museum (Amherst College), and Mason Gross School of the Arts (Rutgers University), *Critical Mass: Happenings, Fluxus, Performance, Intermedia, and Rutgers University, 1958-1972* (New Brunswick, N.J.: Rutgers University Press, 2003), 36. Physics also held a fascination for Duchamp. Art historian Linda Henderson suggests he was familiar with quantum physics, though, she explained, it was less important to his work than the fourth dimension and electromagnetism. Linda Dalrymple Henderson, *Duchamp in context: science and technology in the Large Glass and related works* (Princeton, New Jersey: Princeton University Press, 1998), 155, 222.
commodity sensibility inherited from Dada, along with the use of found materials and new technologies (The terms multi-media and Intermedia were coined by these artists).⁴⁷ The Fluxus community of artists in and around Rutgers University was enmeshed in the still small, tightly-knit but growing New York avant-garde.

Aycock's early exposure to Fluxus via Hendricks and Watts, her sculpture teacher, helped to introduce her to notions of chance and experimentation with materials and they also imbued a sense of the importance of technology and science.⁴⁸ She remembers her teachers as being at the center of the New York art world, hungry in their careers. Aycock noted that they provided their students with direct access to important ideas,

they were messing around with things that were very hot at that time. So you got this immediate exposure to what is really the zeitgeist at that moment. That was the other thing you were plunged right into to it. You weren't off thinking about it, you were right there.⁴⁹

Artist Allan Kaprow's interest in technology is perhaps less well-known. A Rutgers professor from 1953 – 1961, Kaprow played an influential role for Fluxus artists Watts and George Brecht as well as for Schneemann. Her first contact with Kaprow was by letter when she was still in Illinois. She wrote him to describe a Happening she had

⁴⁷ Hendricks, *Critical Mass*, x. Hendricks points out that Project in Multiple Dimensions, authored by Watts, Kaprow and Brecht, incorporated the word and concept multi-media, while Dick Higgins coined the word Intermedia.

⁴⁸ Whitman also evoked entropy in relation to his work as early as 1959. Associated with the second law of thermodynamics, the concept of entropy played an important role in the discourse of late 1960s minimalist and conceptual art. Joan Marter, "The Forgotten Legacy: Happenings, Pop Art, and Fluxus at Rutgers University" in Joan M. Marter, Simon Anderson, and Newark Museum. *Off Limits : Rutgers University and the Avant-Garde, 1957-1963* (Newark, N.J. New Brunswick, N.J.; London: Newark Museum; Rutgers University Press, 1999), 19.

⁴⁹ Unpublished Interview with the Artist, New York, NY, April 5, 2004.

created and Kaprow replied with a postcard, encouraging her to meet with him when she came to New York.⁵⁰ A highly regarded theoretician for the American avant-garde, whom Rosler frequently cites, Kaprow emphasized the blurring of the boundaries between art and life, an important component of his later Happenings, as well as Fluxus performance.⁵¹ He enlisted the help of Watts for the creation of his 1958 proto-Happening environment entitled "Total Art" created at New York's Hansa Gallery.⁵² Watts, who had studied mechanical engineering, was able to design random lighting effects for Kaprow's work. In 1957, the year the Russian satellite Sputnik and the Space Race were launched, Watts, Kaprow and Brecht collaborated on a grant proposal seeking funds to create a research laboratory with "electro and electro-mechanical devices, sound and recording devices," along with an exhibition space and funds for performances.⁵³ In the proposal, the authors compared the inventive scientist with the inventive artist, claiming

The true artist is also a discoverer... Since the turn of the century artists and scientists have, in reality, become close allies in an examination of form and structure... the scientist now has a considerable edge on the artist because of the financial aid afforded by industry.⁵⁴

⁵⁰ "Interview with N.D." Carolee Schneemann, *Imaging Her Erotics : Carolee Schneemann : Essays, Interviews, Projects* (Cambridge, Mass.: MIT Press, 2002).

⁵¹See for example, Martha Rosler, *Decoys and Disruptions : Selected Writings, 1975-2001* (Cambridge, Mass.: MIT Press in association with International Center of Photography, New York, 2004), 65, 68-69, 74, 76.

⁵² Marter, Off Limits : Rutgers University and the Avant-Garde, 1957-1963, 28-29.

⁵³ Allan Kaprow, Robert Watts and George Brecht, "Project in Multiple Dimensions" reproduced in Marter, *Off Limits: Rutgers University and the Avant-Garde*, 1957-1963, 153-159.

⁵⁴ Kaprow, Watts and Brecht, "Project in Multiple Dimensions," in *Off Limits: Rutgers University and the Avant-Garde, 1957-1963*, 153. I am grateful to historian Aaron Alcorn for introducing me to the notion of the inventive scientist in American culture, a paragon against which his fascinating study of the inventive boy is based. See Aaron Alcorn, "Modeling Behavior: Boyhood, Engineering, and the Model Airplane in American Culture," Ph.D. Dissertation, Case Western Reserve University, August 2008.

The artists sought to examine contemporary technological advances in order to uncover new forms of artistic expression. They also attempted to align art with scientific theory. Brecht extended the discussion to science using terms associated with relativity and quantum theory. He wrote,

When this art... is examined... in terms of basic concepts such as space-time, causality, etc., it is found to be consistent with the corresponding concepts in physical science... In this sense, it seems to me, it would be possible to show how this art reflects fundamental aspects of contemporary vision, by examining it in terms of space-time, inseparability of observer-observed, indeterminacy, physical and conceptual multi-dimensionality, relativity and field theory, etc. ⁵⁵

The artists' efforts to forge connections between art, technology and science were taken up by Experiments in Art and Technology (E.A.T.), founded by Billy Klüver, Robert Rauschenberg and Fluxus artist Robert Whitman in 1966.⁵⁶ The aims of E.A.T. were incubated in the planning of *The 9 Evenings: Theater and Engineering*, attended by Aycock, a ten-day event held in October 1966 at the 69th Regiment Armory in New York, which paired thirty engineers with ten artists in the creation of new works of art.⁵⁷ Despite disparaging reviews, the organizers felt the event was successful in its primary aim, to establish relationships between engineers and artists and ease artists' trepidation

⁵⁵ Kaprow, Watts and Brecht, "Project in Multiple Dimensions" in *Off Limits : Rutgers University* and the Avant-Garde, 1957-1963, 159

⁵⁶ The artists' interest in linking science and technology with art was theoretical in part, a revised version of similar efforts made by their Russian Constructivist and Dada forebears, but now with a special interest in electrical technologies. Their efforts though, were also pragmatic. The proposal was submitted to the Carnegie Corporation, reflecting their awareness of unprecedented funding given to support research in science and technology in the postwar period.

⁵⁷ Robert Carleton Hobbs and Alice Aycock. *Alice Aycock : Sculpture and Projects* (Cambridge, Mass.: MIT Press, 2005), 35.

about utilizing technology.⁵⁸ Subsequently, E.A.T. drew up a charter and successfully raised funds from corporations for art projects.⁵⁹

In 1966, Los Angeles County Museum of Art (LACMA) curator Maurice Tuchman began his own Art and Technology project on the west coast, linking artists with corporations for the creation of works of art.⁶⁰ Tuchman's project culminated in a show in 1971 at LACMA. While Yvonne Rainer, Deborah Hay, Simone Whitman and Lucinda Childs participated in *Nine Evenings*, no women were invited to participate in Tuchman's Art & Technology project. Rosler recalled the show with indignation,

[There was a] feminist response against [that show], because it was an all men's show, and the idea that only men can work with science, and scientists, and it was really gross.⁶¹

In his introduction to the catalogue, Tuchman mentioned that the museum received many unsolicited proposals from artists wishing to participate, "a high proportion" of which were from "women artists." In the end, all unsolicited proposals were rejected. Tuchman

 ⁵⁸ Billy Klüver, "Theater and Engineering: An Experiment." *Artforum* 5, no. 6 (1967): 26-33.
 ⁵⁹ Klüver's aim was: "to provide a link between the engineering world and interested artists. It is

apparent to us that ultimately the problems of the artists must be handled by industrial laboratories and that the development of the problems must be paid for by industry itself. It is the purpose of EAT to convince industry to accept problems posed by artists. Billy Klüver, "Theater and Engineering: An Experiment," 33. E.A.T. was ultimately criticized by many artists for putting fundraising before the aim of helping artists, and for favoring well-known, established artists.

⁶⁰ Los Angeles County Museum of Art, Art and Technology Program, and Maurice Tuchman, *A Report on the Art and Technology Program of the Los Angeles County Museum of Art, 1967-1971* (Los Angeles,: Los Angeles County Museum of Art, 1971), 9.

⁶¹ Unpublished interview with the Artist, Brooklyn, NY, August 23, 2007.

commented, "Generally, the unsolicited proposals were made by relatively unknown artists."⁶²

Curator Pontus Hultén held his exhibition *The Machine as Seen at the End of the Mechanical Age* in 1968 at MoMA, and E.A.T. was invited to hold a concurrent show examining the role of technology in art in contemporary society, which they titled *Some More Beginnings*. Hultén's show was a major success, documenting what he saw as a critical transition for technology from industrial machinery to information and systems technologies. He wrote,

...the mechanical machine—which can most easily be defined as an imitation of our muscles—is losing its dominant position among the tools of mankind; while electronic and chemical devices—which imitate the processes of the brain and nervous system—are becoming increasingly important.⁶³

Aycock was impressed by this exhibition, which surveyed attitudes toward machines beginning with the Greeks, paying special attention to the nineteenth century, a period of scientific and technological discovery that she later examined closely in her work. According to Hultén, optimism toward technological progress in the nineteenth century gave way to anxiety over the exploitation of man and earth for the sake of technological advance and profit in the 20th century. The curator also expressed concern over the specialization of science and its increasing remove from the humanities. He made the humanist argument, echoing the utopianism of Burnham as well as cultural critic Marshall McLuhan, that art must leaven the unavoidable impact of technology into the

⁶² Tuchman, A Report on the Art and Technology Program of the Los Angeles County Museum of Art, 1967-1971, 19.

⁶³ K.G. Pontus Hulten, *The Machine as Seen at the End of the Machine Age* (New York: Museum of Modern Art, 1968), 3.

future, where its pervasive influence is inevitable. He said, "In planning for such a world, and in helping to bring it into being, artists are more important than politicians, and even than technicians."⁶⁴

By the time Neil Armstrong and Buzz Aldrin landed on the moon on July 20, 1969, public attitudes toward science had become increasingly conflicted.⁶⁵ Vietnam War protests increased in 1968, after the Mai Lai Massacre, and reached a height in 1969.⁶⁶ Technology and U.S. policy were viewed as interdependent by the counter-culture, for whom the "military-industrial-complex," a phrase first coined by President Eisenhower who cautioned the country to beware the immense power contained in the newly formed triad of industry, military and government, became a derisory term.⁶⁷ Influential countercultural critics, including Marcuse, Ellul, Mumford and Theodore Roszak characterized American society as ruled by scientific and technological rationalism,

⁶⁴ Hulten, 11

⁶⁵Curator Jack Burnham discussed the connection between the Vietnam War and negative attitudes toward art and technology. See also Jack Burnham, "Art and Technology: The Panacea that Failed," in Kathleen M. Woodward, Myths of Information : Technology and Postindustrial Culture, Theories of Contemporary Culture (Madison, Wis.: Coda Press, 1980), 240. Consumed with Cold War fears of the spread of Communism throughout Indochina, the U.S. government spent many years attempting to establish a strong anti-Communist government in South Vietnam. In response to North Vietnam's efforts to unite North and South Vietnam under Communist leadership, President Lyndon Johnson augmented U.S. military presence in early 1965, and by late April, declared all of Vietnam a combat zone. Between 1965 and 1968, the number of U.S. military personnel in South Vietnam rose from 29,100 to over half a million.⁶⁵ Edward Doyle and Samuel Lipsman, The Vietnam Experience: America Takes Over (Boston: Boston Publishing Company, 1982), 18. The television networks constructed additional telephone lines between Vietnam and Hawaii to facilitate increased coverage, and by mid-summer 1965, all three television networks had sent a full-time correspondent to Saigon in South Vietnam. Other television and magazine reporters followed, helping to establish Vietnam as the first 'Living Room War.' "In the four months between April 1 and July 31, 1965, *Time* and *Newsweek* each ran four cover stories on the war." Doyle, 8.

⁶⁶ The Mai Lai Massacre occurred on March 13, 1968. The Kent State killings occurred on May 4, 1970.

⁶⁷ Public Papers of the Presidents, Dwight D. Eisenhower, 1960, p. 1035- 1040. http://coursesa.matrix.msu.edu/~hst306/documents/indust.html (accessed, March 12, 2007)

exemplified by the military-industrial-complex, which insidiously undermined all human agency and jeopardized individual happiness.⁶⁸ These critics, along with anti-war groups, increasingly conflated science and technology with the use of military weaponry as a means of Western control and dominance and they decried the closed, technological society the U.S. had become.⁶⁹ Others, like well-known counterculture writers Paul Goodman and Ken Kesey along with Kesey's fellow Merry Prankster and Whole Earth Catalogue founder, Stewart Brand, supported a departure from the repression of industrial society in the form of communalism, a separate life with family or friends, away from society was an acutely perceived consequence of the atomized technocracy of American Cold War culture. The countercultural rhetoric against technological society was so fervid, that the communalist alternative entailed a rejection of technology and all the trappings of industrialism. Rosler characterized the period in a recent interview.

⁶⁸ Jacques Ellul, *The Technological Society* 1st American ed. (New York,: Knopf, 1964); Mumford, *The Myth of the Machine*, 3; Marcuse, *One Dimensional Man*, 228-229; Theodore Roszak, *Where the Wasteland Ends; Politics and Transcendence in Postindustrial Society*, 1st ed. (Garden City, N.Y.,: Doubleday, 1972), 21. Theodore Roszak, *The Making of a Counterculture: Reflections on the Technocratic Society and Its Youthful Opposition* (Garden City, N.Y.: Doubleday, 1969).

⁶⁹ Kevles, 395. Kevles pointed out, "By the end of the decade, in the tumultuous years of the war in Vietnam, millions of Americans doubted the social responsibility of any groups so closely identified with the military industrial complex as the nation's physical scientists." Also "Pollsters found pubic confidence in scientists rapidly falling, down by 1971 to a "very favorable" rating of only 37 percent." Kevles, 399. See also C. Wright Mills, *The Power Elite* (New York: Oxford University Press, 1956), 216. As early as 1956, prominent sociologist C. Wright Mills warned, "Scientific and technological development, once seated in the economy, has increasingly become part of the military order, which is now the largest single supporter and director of scientific research... as large dollar-wise as all other American research put together." In 1960, Mills called for a leftist counter-culture movement to oppose the authoritarianism of middle class society and government.

⁷⁰ Sociologist and social critic Paul Goodman, author of *Growing Up Absurd* (1960) and the essay "Can Technology Be Humane?" (1969), was a Leftist co-founder of Gestalt Therapy in the 1960s. Brand joined Kesey on one of many road trips across the country in which the band of self-proclaimed "merry pranksters" established their own form of creative, spontaneous communal living aboard the vehicle during their travels.

You know technology was *always* in question because what the counterculture was in general. Questions of getting off the grid. This was a really important issue for counterculture people. So I spent a lot of time thinking, How far off the grid can I get? ... I was only too happy to try to be as untechnologized as I could get away with.⁷¹

Artists like Rosler and Schneemann engaged in early criticisms of the Vietnam War informed by New Left arguments, including those of Marcuse, who criticized the oppression of technology in a capitalist society based on exploitation, but embraced new technologies as central to the creation of a new social system.⁷² Schneemann's kinetic theater work *Snows*, 1967, the first single artist's work to be supported by E.A.T., was a direct criticism of U.S. engagement in Vietnam.⁷³ Rosler had seen *Snows* the year she began her series *Bringing the War Home*, in which she also employed montage to question the war. Rosler explained that while "the household was turning into a machine

⁷¹ Unpublished Interview with the Artist, Brooklyn, NY, August 23, 2007.

⁷² Rosler and Schneemann were familiar with Marcuse's ideas. Rosler attended Marcuse's lectures in the early 1970s at University of California at San Diego. Unpublished Interview with the Artist, Brooklyn, NY, August 23, 2007. Schneemann also knew of Marcuse, who was a featured speaker at the Congress of Dialectics of Liberation in 1967 where Schneemann had been invited to perform. See "Letter to Jan Van der Marck," June 12, 1967 in Kristine Stiles, Correspondence Course, an Epistolary History of Carolee Schneemann and Her Circle, forthcoming from Duke University Press, 2010. Kristine Stiles generously shared an early version of the manuscript with me. All of the letters that I had the opportunity to read may not be in the final version and the page numbers have also changed. Thus I will not quote page numbers. Furthermore, if the letter quoted does not appear in the published book, it may be found in the Getty Research Center in the Carolee Schneemann archive. Marcuse was well-known within the art world by this time. For evidence, see Jack Burnham, "Art in the Marcusean Analysis" in Penn State Papers in Art Education, edited by Paul Edmonston (University Park: The Pennsylvania State University, 1969), 1-21; Kynaston McShine, Museum of Modern Art (New York N.Y.), and International Council of the Museum of Modern Art (New York N.Y.), Information (New York,: Museum of Modern Art, 1970); Gregory Battcock, "Marcuse and Anti-Art," Arts Magazine 43, no. 7 (1969): 17-19; and Lucy Lippard, "Introduction" 955,000. (Vancouver: The Vancouver Art Gallery, January 13 - February 8, 1970).

⁷³ Schneemann believes that E.A.T., which was co-founded by Billy Klüver, elected to support *Snows* due to Klüver's friendship with Schneemann's partner James Tenney, with whom Klüver also worked at Bell Labs. Interview with the Author, January 15, 2007, Springtown, NY.

for living," echoing Le Corbusier's phrase, "Women were turning into... household appliances." She shared her thinking behind this series in a recent interview,

the home is integrated especially to the penetration of technologies of information, which is completely suffused with all the external trappings of war and war fighting and jingoism and so on. You can't close the door and escape that. One of the things about modernism is that it also literally, physically brought the ideas of industrialization into the home... It's the design of the factory coming into the home with ideals of efficiency.⁷⁴

Thus, in this series, Rosler revealed the cultural relationships between military technologies and domestic technologies. For Rosler and Schneemann, cultural and avantgarde enthusiasm for technology during the 1960s, on which the founding of E.A.T. was predicated, was tempered by a critical awareness. These artists looked beneath the bright veneer of the Space Program, and later, the Moon Landing, toward the deleterious uses of technology by the U.S. during the Cold War. They saw the root causes for oppression as integral to exploitation, inherent in the capitalist system. Thus E.A.T.'s optimism toward an experimental fusion of art and technology, also evident in the conception of Tuchman's Art and Technology project, was mitigated by escalating criticism of technology associated with the Vietnam War.

Another object of leftist criticism was the science of systems theory, an outgrowth of cybernetics and information theory, which gained notoriety in the 1960s for its relation to the war industry for which it was developed. The counterculture, including artist Robert Smithson, equated systems and cybernetics with closed, entropic, mechanical gadgets like clocks, which once wound, grind on and on in the same constant predictable pattern.

⁷⁴ Interview with the Author, Thursday, August 23, 2007, Brooklyn, NY.

Burnham was influenced by New Left arguments against the role of technology in a capitalist system, but, I argue that he (along with Rosler and Schneemann), was motivated by Marcuse's and McLuhan's optimism regarding technology's role in the new social order. Burnham simply wished that Marcuse had afforded art a greater role in the process of social change. In his paper, "Art in the Marcusean Analysis," Burnham argued that by linking art with technology in a systems-based approach, art could help to humanize technology and facilitate the revolution.⁷⁵ Inspired by McLuhan's claim that new electric technologies would ultimately create an interconnected, democratized or tribalized society without hierarchies, Burnham sought to connect counterculture ideals to new technologies, positioning art as the driving force.⁷⁶

In 1968 Burnham wrote several articles appearing in *ArtForum* advocating a movement in sculpture toward a systems esthetic. Based on the science of systems theory, Burnham's systems esthetic favored the consideration of interdependent relationships between organic and non-organic systems comprised of material, energy and information.⁷⁷ In these articles and in his book, *Beyond Modern Sculpture* (1968), Burnham embraced the application of systems theory to art as a means to revitalize art and make it relevant to society, calling for sculpture as "an extension of technical methodology."⁷⁸ He even suggested the possibility that the systems esthetic could

⁷⁵ Burnham, "Art in the Marcusean Analysis," 13.

⁷⁶ Burnham, *Beyond Modern Sculpture*, 13. Burnham commented, "Art is technique in the driver's seat."

⁷⁷ Jack Burnham, "Systems Esthetics" in *Great Western Salt Works; Essays on the Meaning of Post-Formalist Art* (New York,: G. Braziller, 1974), 16-17.

⁷⁸ Jack Burnham, *Beyond Modern Sculpture; the Effects of Science and Technology on the Sculpture of This Century* (New York,: G. Braziller, 1968), 376.

prepare humanity for a transformation to a "posthuman" biological and technological hybridization, a kind of "self-inflicted evolution."⁷⁹

Exhibitions including Jasia Reichardt's *Cybernetic Serendipity* (1968) at the ICA London and Kynaston McShine's *Information* (1970) at MoMA, also began to explore the related sciences of systems theory, information theory and cybernetics. McShine noted in his essay that the works in his exhibition reflected a rebelliousness resulting from social and political upheaval in South America and Indochina. He asked, what seemed to him, an obvious question in this context, "What can a young artist do that seems relevant and meaningful?" His answer was the creation of more cerebral work, amenable to the rapid exchange of ideas and information via communications systems such as "photographs, documents, films and ideas."⁸⁰ He pointed out that the intellectual climate, which embraced the likes of "Marshall McLuhan, the Beatles, John Cage and Herbert Marcuse," added to the complexity of the situation.

Burnham's utopianism for a systems esthetic fueled the early practice of Aycock and Denes who believed that art could provide a unifying nexus for disparate disciplines and heal the fractures caused by specialization. In the late 1960s, Denes abandoned painting which she found conceptually limiting, and became a member of E.A.T.⁸¹ In 1970, she was one of few women artists included in Burnham's *Software* exhibition, where she

⁷⁹ Burnham, *Beyond Modern Sculpture*, 373.

⁸⁰ Kynaston McShine, Museum of Modern Art, and International Council of the Museum of Modern Art, *Information* (New York,: Museum of Modern Art, 1970), 138 and Acknowledgements (n.p.)

⁸¹ Ruth White Gallery, "Agnes Denes: Sculpture and Paintings 'Evolution.' February 18 – March 8, 1969, Press release, found in Agnes Denes file, the National Air and Space Museum, Smithsonian Institution.

showed work from her Hegelian inspired series *Dialectic Triangulations*, which represented her first public declaration of her departure from painting.⁸²

Despite renewed enthusiasm for science and technology, many within the counterculture continued to mistrust the technocracy, which they believed was inherent in a fusion of art and technology.⁸³ Both *Nine Evenings* and Burnham's *Software* show were panned by critics for reasons that, though they continue to be debated, largely centered on functional problems: the technology simply failed to perform as planned. But Max Kozloff's review of Tuchman's show *Art and Technology* was particularly harsh and reflective of leftist suspicions toward the triad of science, government and industry.⁸⁴ Kozloff called the sponsors, "a rogue's gallery of the violence industries." He reprinted some of the business activities in which the sponsoring companies, including Rand, Lockheed Aircraft and TRW Systems Group were engaged. Printed in the catalog along with their corporate logos, these included: "runs seminars on nuclear weapons" "[designs] high-performance jet engines for military aircraft," and "Builds submarines, amphibious assault ships, and advanced guidance and fire control systems." He continued, "Subsidized decisively by the American government, [these companies] had grown to

⁸³ The word "technocracy," from the Greek *techne*: skill and *cracy*: power, originated in the 1920s or 30s as a name applied to a social movement led by engineers who sought to resolve the economic problems during the great depression through efficient engineering. Buckminster R. Fuller, *Utopia or Oblivion: The Prospects for Humanity* (New York: Overlook Press, 1969). The word became a pejorative in the 1940s after the publication of James Burnham's book, *Managerial Revolution*. Later, Roszak used the term to rally the youth movement of the 1960s against "a power structure wielding vast material influence… a veritable mystique that is endorsed by the populace." Roszak, *The Making of a Counter Culture*. Roszak's first chapter is titled "Technocracy's Children."

⁸² "Agnes Denes 1968-1980," Hayden Gallery, (Cambridge, MA: Massachusetts Institute of Technology, 1980).

⁸⁴ Max Kozloff, "The Multimillion Dollar Art Boondoggle" Artforum (October, 1971): 71-76.

their present bulk through the business of slaying."⁸⁵ Echoing an increasing number of his contemporaries, Kozloff lumped all technology and science within the category of corrupted tools developed by a capitalist system. Even Tuchman noted in his essay that he had expected "resistance from artists... on 'moral' grounds—opposition, that is, to collaborating in any way with the temples of Capitalism, or more particularly, with militarily involved industry." He went on to write,

I suspect that if Art and Technology were beginning now [the year of his essay, 1971] instead of in 1967, in a climate of increased polarization and organized determination to protest against the policies supported by so many American business interests and so violently opposed by much of the art community, many of the same artists would not have participated.⁸⁶

By the early 1970s, the optimism of the counterculture movement in society, which had been motivated by great strides in the Civil Rights movement and anti-Vietnam War protests in the mid-1960s, suffered severe blows in the wake of the assassinations of Martin Luther King Jr. and Robert Kennedy as well as increased U.S. violence in Vietnam. Schneemann ruminated on her own loss of hope resulting from the events.

The leaders were assassinated one after another and there was no amelioration.... We turned into an assassination culture. Robert Kennedy was assassinated the day before Warhol got shot by Valerie or the day after. The walls were tumbling down. Martin Luther King, Black Panthers, radicals in Philadelphia.⁸⁷

⁸⁵ Kozloff, "The Multimillion Dollar Art Boondoggle," 76.

⁸⁶ Tuchman, A Report on the Art and Technology Program of the Los Angeles County Museum of Art, 1967-1971), 17

⁸⁷ Unpublished interview with the Artist, Springtown, NY, January 15, 2007.

While many artists were disillusioned by the confluence of these events, they also served as motivation for a spate of work by artists like Rosler, Denes and Aycock in the 1970s who continued to embrace systems theory, but made an important distinction between closed and open systems.

The science of open systems, presented by biologist Ludwig von Bertalanffy in 1968, investigated the flow of energy and information within and across environments. Some inorganic systems and all living organisms are open systems, Bertalanffy explained, because they exchange energy with the environment, grow, and increase in complexity over time. Bertalanffy's open systems, which were later promoted by British anthropologist, social scientist and cyberneticist Gregory Bateson, encouraged a synthesis of otherwise disparate fields of knowledge and required consideration of the environment together with social and political realities.⁸⁸ For Aycock, the inclusiveness of open systems provided a means by which to unite philosophical and scientific ideas in order to gain a broader understanding of the world. Using systems and information theory, she offered a profusion of information about each work drawing from many different disciplines including physics, literature and philosophy, thereby amplifying interpretative strategies. The desire to open up the meaning of a work of art was in part the result of a change in the way artists were educated. Aycock characterized the period as follows.

And perhaps there was a kind of arrogance on the part of artists who were working at that time... that we could actually step into these deep waters and really even understand it.... I think that arrogance grew out of the fact that this was a group of artists that had had liberal arts educations. They had not been educated in art school.

⁸⁸ Gregory Bateson, *Steps to an Ecology of Mind; Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology*, Chandler Publications for Health Sciences (San Francisco: Chandler Pub. Co, 1972).

They had been educated in the university, so they had a taste of all these different disciplines. And they fancied themselves intellectuals.⁸⁹

Denes also attempted to synthesize science, art and philosophy.⁹⁰ She rigorously studied mathematics and cosmology in an effort to creatively engage them from an artistic point of view. Belgrad claims that the postwar period saw a shift in the definition of the intellectual as a social type. That public intellectuals, or people who place value on more complex forms or fields of knowledge, no longer defined themselves as intellectuals per se, but rather as artists, poets or musicians.⁹¹

Rosler adopted the concept of open systems as validation for the creation of work engaged with the social and political environment. Works like the *Bowery in Two Inadequate Descriptive Systems* (1974) called attention to the limitations of systems of representation such as photography and language. In the work, which depicts the slums of the New York's bowery known for homelessness and alcoholism, Rosler encouraged viewers to recognize poverty as a systemic social problem that everyone allows to continue.

⁸⁹ Unpublished interview with the Artist, New York, NY, July 16, 2007. Hobbs also pointed out that Aycock's generation of artists were "among the first to be educated in college art programs." Hobbs, 150.

⁹⁰ Donald Kuspit has compared Denes to Leonardo da Vinci. Donald Kuspit, "Agnes Denes: The Ironies of Comprehension." Arts Magazine (1981): 152.

⁹¹ Daniel Belgrad, *The Culture of Spontaneity: Improvisation and the Arts in Postwar America*. (Chicago; London: University of Chicago Press, 1998), 6.

By 1974,⁹² science and technology lost currency in the arts due in large part to public concerns over big science, implicated in the war because of its sizeable military contracts and the prominent advisory roles of physicists in national security.⁹³ In 1972, cultural critic Roszak published his popular book *Where the Wasteland Ends*, a scathing assessment of American technocratic politics and modern science, the combination of which, Roszak exhorted, could only result in "the thermonuclear Armageddon, the death of the seas, the vanishing atmosphere, the massacre of the innocents, the universal famine to come…"⁹⁴ For Roszak and many within the counter-culture, science was linked to the environmental crisis as well as to government overreach and war.⁹⁵ Economic recession exacerbated by the oil crisis of 1973, resulted in reduced federal funding for defense, and thus for physics in the early 1970s.⁹⁶

⁹² Art historian Marga Bijvoet suggested the year, 1974, as the end of art world acceptance of art and technology as a movement, "with the exception of video art (which also remained marginal)." Marga Bijvoet, *Art as Inquiry : Toward New Collaborations between Art, Science, and Technology*, American University Studies Series Xx, Fine Arts, 32 (New York: Peter Lang, 1997), 73. Though Bijvoet does not associate the termination of the Vietnam War with the end of art and technology, it bears mentioning that The Paris Peace Accord, which effectively ended active U.S. involvement in Vietnam, was signed in 1973. The war ended officially in 1975.
⁹³ Kevles commented, "What brought [the physicists] to power is, to a considerable degree, what kept them there for most of the last half century—the identification of physics with national security… Throughout the Cold War they were crucial figures in maintaining American superiority in arms, advising defense policy in relationship to technical possibilities, training students who joined the weapons laboratories, and carrying out basic research under military contracts." Kevles, ix.

⁹⁴ Roszak, Where the Wasteland Ends, ixx.

⁹⁵ Mumford, *The Myth of the Machine*, 3; Marcuse, *One Dimensional Man*, 228-229. For historical perspective, see for example Fred Turner, *From Counterculture to Cyberculture : Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2006).

⁹⁶In spite of these negative effects on the industries of science, by the early 1970s cosmological evolution, which derived from groundbreaking discoveries centering on the origin of the universe, offered hope for a full understanding of the fate of the cosmos, while the standard model of particle physics, which effectively unified relativity theory and quantum theory, provided a functional (though somewhat deficient and inelegant) unified field theory of matter.

In the late 1970s, peace activists and environmentalists found common cause in the struggle against nuclear power.⁹⁷ The March 1979 partial melt-down at the Three Mile Island nuclear power plant near Middletown, Pennsylvania and the coincidental release of the movie *The China Syndrome* (1979), dramatizing the attempted cover-up of a full-scale nuclear melt-down, sparked heated national debates about the catastrophic dangers of nuclear energy.⁹⁸ Aycock had grown up near Three Mile Island and, as Hobbs has noted, she responded to the accident and the potential disasters it presaged.⁹⁹ She commented in a recent interview,

When your home town is threatened with radioactive meltdown it's pretty scary...My father was so involved in the industry that he had all kinds of devices that registered the [radiation levels], you know what was in the air... The only good thing about Three Mile Island is that my father didn't work on it.¹⁰⁰

Described as a "Taste of Doomsday" and a "nightmare demonstration" of the dangers of nuclear power, the meltdown at Three Mile Island, to which a number of artists responded, had a profound effect on public attitudes toward science.¹⁰¹ By the early 1980s, both Aycock and Denes had turned their attention squarely toward nuclear and space technologies.

⁹⁷ See for example, Kenneth A. Briggs, "Churches Turning to Arms Race as Top Social Issue for the 1980s." *New York Times*, March 25, 1979. "The Evangelical Covenant Church in Missoula, MA sent a delegation to Rocky Flats, Colo., last year to protest against a proposed nuclear power plant. The congregation [also] plans a prayer vigil at a nearby missile site during Holy Week."

⁹⁸ "The accident at the Three Mile Island Unit 2 (TMI-2) nuclear power plant near Middletown, Pennsylvania, on March 28, 1979, was the most serious in U.S. commercial nuclear power plant operating history." Fact Sheet on the Accident at Three Mile Island, http://www.nrc.gov/readingrm/doc-collections/fact-sheets/3mile-isle.html (accessed 4/27/06). The film *The China Syndrome*, starring Jane Fonda, was released on March 16, 1979, twelve days before the incident at Three Mile Island.

⁹⁹ Hobbs, 228.

¹⁰⁰ Unpublished interview with the Artist, New York, NY, July 16, 2007.

¹⁰¹ "Taste of Doomsday in Pennsylvania Nuclear Accident." *New York Times*, April 1 1979.

Shortly after the Soviets invaded Afghanistan in December 1979, President Carter increased federal research and defense funding. When President Reagan entered office in 1981, he argued for a \$33 billion increase in military appropriation over the Carter budgets through 1982, and seven percent increase per year through the mid-1980s, justifying the need to "rebuild the industrial base of the nation's military-industrial complex."¹⁰² By 1983, Reagan announced the Strategic Defense Initiative—a multibillion dollar project to develop a space-based, comprehensive defense against attack by nuclear missiles that was quickly dubbed the "Star Wars" program.¹⁰³ Not coincidentally, NASA's long-stalled space shuttle program, first authorized in the early 1970s, received an infusion of federal funds in this period, resulting in the first successful space shuttle flight into orbit on April 12, 1981 by Columbia.¹⁰⁴ The Defense Department was a primary funder of the space shuttle, spending as much if not more than NASA's annual \$6 billion budget to send military test equipment into space.¹⁰⁵ Rosler's video, Fascination with the (Game of the) (Exploding) (Historical) Hollow Leg (1983), investigated the insidious connection between Reagan's Star Wars defense system and video war games for children. The video began with a pan of a simulated war room, strewn with maps and descriptive material on nuclear weapons, while the theme from the movie Star

¹⁰² Hedrick Smith, "U.S. Priorities: Basic Reversal: Budget Placing Military above Domestic Needs." *New York Times*, March 5 1981.

¹⁰³ The term "Star Wars" was initially a derogatory term referring to the Pentagon's research on laser weaponry for use in space then undertaken by its agency, Defense Advanced Research Projects Agency (DARPA). William J. Broad, "Star Wars: Pentagon Lunacy." *New York Times*, May 13 1982. See also, The Associated Press "Reagan's Panel Is Said to Back Space Weapons," *New York Times*, October 19 1983.

¹⁰⁴ The Space Shuttle program was formally launched in 1972 by Richard Nixon. The Enterprise was the first shuttle to successfully complete gliding missions in 1977, but it never went to space. Columbia's flight marked the 20th anniversary of the first manned space flight by Soviet cosmonaut Yuri Gagarin.

¹⁰⁵ Charles Mohr, "It's a Long Way to Star Wars: Shuttle's Military Potential Is Rather Prosaic," *The New York Times*, June 27 1982. See also John Noble Wilford, "Space and the American Vision," *New York Times*, April 5 1981.

Wars (1977) resounded, intercut with the voice of Ronald Reagan renouncing the Soviets, "They are the focus of evil in the modern world."

The artists' hopes for creating a transformed society did not waiver in the wake of shifting cultural attitudes. By the 1970s, Schneemann and Rosler employed video for explicitly feminist aims, seeking to raise consciousness, through expanded distribution, and undermine notions of artistic mastery. Aycock and Denes continued to incorporate science and technology in their work, though by the late 1970s and early 1980s, they did so much more critically. The mid-1980s also marked the conservative, backlash against feminism and a return to the commodified art object evident in the rise in value and critical attention to painting, whether neo-abstract expressionist or pattern. In spite of the resurgence of conservatism, though, the artists retained their hope and continued to press for change.

In 2007, I asked Rosler whether she found hope for change in the social revolution of the 1960s and she responded, "Oh yes, I still do."¹⁰⁶ She recounted a recent panel discussion about feminism and representations of women in which a young woman raised her hand to ask "Why did we lose?" To which Rosler responded, "You're here. We didn't lose." "The story," she assured her, "is not ended." ¹⁰⁷

¹⁰⁶ Unpublished Interview with the Artist, Brooklyn, NY, August 23, 2007.

¹⁰⁷ Unpublished Interview with the Artist, Brooklyn, NY, August 23, 2007.

Chapter Outlines

In the first chapter, "Classic Utopias and Feminist Utopianism in Art, Science and Technology," I discuss utopias in relation to twentieth century art movements like Constructivism, Futurism and Dada that incorporate science and technology, and distinguish between classic utopias and revolutionary political ones born of socialism and Marxism. I then discuss a marked shift in the notion of utopia articulated by philosopher Ernst Bloch who argued for the importance of utopianism, which he defined as a yearning for change, in revolutionary movements. I argue that Bloch's utopianism was shared by Marcuse, who like the artists, held a dystopian view of science and technology in the context of capitalism, and, paradoxically extended a utopian embrace toward these practices in the context of a new society. Finally, I discuss the ways in which scholars Tom Moylan, Angelika Bammer and Sargisson link this same utopian impulse to feminism and feminist aims, and I explicate its relevance to the work of these artists.

Chapter two, "Tactics of Transgression, Traces of Hope: Technology and Feminist Utopianism in the Work of Martha Rosler and Carolee Schneemann," examines Schneemann's and Rosler's simultaneously dystopic and utopic, early feminist critique of military, domestic and communications technologies in the context of 1960s counterculture. I study the critiques of technology and capitalism put forth by Marcuse as a lens through which to analyze the artists' early work. I also examine their notion of change as an ongoing, imperfect process, counter to classic utopias of progress toward a perfect end. I use Sargisson's contemporary feminist utopianism to draw parallels between the works of both artists, analyzing the use of metaphor, disjunction and performance space.

Chapter three, "A Metaphor for Change: The Aesthetics of Open Systems in the Works of Aycock, Denes and Rosler," deals with systems theory in the artists' works. The concept of *open* systems, theorized by Norbert Wiener, but particularly by von Bertalanffy, was applied in second-order cybernetics and sociology, and by definition interacts with the surrounding environment, permitting feedback.¹⁰⁸ Burnham theorized the relationship of systems theory to art in the 1960s and 70s. Consistent with many aspects of feminist theory, open systems undermined mechanistic production, rational corporate culture, and the Newtonian world-view associated with causal relationships. Open systems were instead characterized as complex, interdependent, organic assemblages that transform energy imported from the environment into fuel for organized growth. Building on historian Paul Edward's construction of Cold War American society as closed and circumscribed, I will investigate open systems as a counter-narrative to the closed, "technological society" in contemporary discourse.¹⁰⁹ Open systems became a strategy of social critique for these artists, offering a transformative, open-ended

¹⁰⁸ Norbert Wiener, *Cybernetics: Or the Control and Communication in the Animal and the Machine* (Cambridge, MA: MIT Press, 1948). Norbert Wiener, *The Human Use of Human Beings: Cybernetics and Society* (Boston: Houghton Mifflin, 1950). Ludwig von Bertalanffy, *General Systems Theory* (New York: G. Braziller, 1968).

¹⁰⁹ Donna M. De Salvo, Johanna Burton, Mark Godfrey, Boris Groys, and Tate Modern (Gallery), *Open Systems: Rethinking Art C.1970.* (London: Tate Modern Gallery, 2005). Paul N. Words, *The Closed World: Computers and the Politics of Discourse in Cold War America, Inside Technology.* (Cambridge, Mass.: MIT Press, 1996). Influential philosophers and cultural critics Ellul, Marcuse, Martin Heidegger and Mumford each discussed American society of the 1960s as technological and closed or driven by technique (efficiency). See Ellul, *The Technological Society*; Marcuse, *One Dimensional Man*; Martin Heidegger, *The Question Concerning Technology, and Other Essays* (New York: Garland Pub., 1977), Mumford, *The Myth of the Machine.*

conceptual model for society and substantiation for social subversion in the midst of the feminist movement and social revolution of the late 1960s and 1970s. Sargisson states clearly that feminist utopias reject closure, and are instead characterized by fluid boundaries, a notion central to open systems.

In the final chapter, "Unmasking the Myth of the Machine: Physics and Cosmology in the Works of Alice Aycock and Agnes Denes," I will examine works by Aycock and Denes made from the late 1960s to the mid-1980s in the context of deepening ecological concerns and anxieties over nuclear power. These artists created works that explored concepts in physics and cosmology that subverted (a term I use figuratively throughout the dissertation) the absolutist constraints of scientific theories like Newtonian physics, which purported to explain the behavior of all natural forces through cause and effect relationships, in favor of quantum physics and probability theory, which abandoned certainty in favor of relativism and chance. For both Aycock and Denes, chance and uncertainty implied the existence of new conceptual spaces in which alternatives to American society could be imagined.

Chapter 1 *Classic Utopias and Feminist Utopianism in Art, Science and Technology*

"I believe utopia cannot be removed from the world in spite of everything, and even the technological, which must definitely emerge and will be in the great realm of the utopian" ¹¹⁰

--Ernst Bloch, 1964

In her 1979 article "Farewell to Modernism," art historian Kim Levin described modern art as imbued with an abiding faith in progress, objective truth, human-made forms and the technological future.¹¹¹ Many art historians have focused on the relationship between art, science and technology in relationship to modernist movements such as Futurism, Constructivism and Dada.¹¹² Some have discussed the often euphoric attitudes held by artists who hoped to reform society through their work, and chart the cultural forces that led to what they deemed the artists' positivist, progressive views, usually implicating

¹¹⁰ Molly Nesbit, Hans Olrich Obrist and Rirkrit Tiravanija, "What is a Station?" Utopia Station, http://www.e-flux.com/projects/utopia/about.html (accessed September 15, 2006). Quoted from "Something's Missing: A Discussion between Ernst Bloch and Theodore Adorno on the Contradictions of Utopian Longing," in Ernst Bloch, *The Utopian Function of Art and Literature: Selected Essays.* Translated by Jack Zipes and Frank Mecklenburg, *Studies in Contemporary German Social Thought.* (Cambridge, Mass.: MIT Press, 1988), 15.

¹¹¹ Kim Levin, "Farewell to Modernism," Arts Magazine 54 (October 1979): 90-92.

¹¹² Including but not limited to: Nancy Troy, *The DeStijl Environment* (Cambridge, Mass.: MIT Press, 1983); Marianne Martin, *Futurist Art and Theory 1909-1915* (New York: Hacker Art Books, 1978); Richard Stites, *Stalinism and the Restructuring of Revolutionary Utopianism* in Hans Gunther, *The Culture of the Stalin Period* (New York: St. Martin's Press, 1990); Christina Lodder, *Russian Constructivism* (New Haven, Conn.: Yale University Press, 1983); Charles Harrison and Paul Wood, *Art in Theory, 1900-2000 An Anthology of Changing Ideas* (Malden, MA: Oxford: Blackwell Publishers Ltd., 2003), 358; Daniel Wheeler, *Art Since Mid-Century: 1945 to Present*, 1991; Peter Selz in Chipp, *Theories of Modern Art a Source Book by Artists and Critics, California Studies in the History of Art ; 11* (Berkeley,: University of California Press, 1968), 456; and Solomon R. Guggenheim Museum, *The Great Utopia: The Russian and Soviet Avant-Garde, 1915-1932* (New York: Guggenheim Museum : Distributed by Rizzoli International Publications, 1992).

science and technology.¹¹³ This chapter investigates those associations with a critical consideration of the various possible meanings of the word "utopia" and the roots of its association with science, technology and progress in the 20th century. An appraisal of important differences between classic, idealist utopias and revolutionary political ones will prove useful in parsing out the aims of modernist movements. More importantly, distinguishing between two types of revolutionary political utopias: one that envisions a specific new society that *may be* established, such as the Marxist models, and one that agitates for change without prescribing a particular alternative, will illuminate the cultural shift in notions of utopia that took place in the 1960s and 1970s. I demonstrate that this latter definition coincides historically with the work of Alice Aycock, Agnes Denes, Martha Rosler and Carolee Schneemann, and remains essential to understanding how their works function conceptually.

My project starts from the premise that the works of these artists manifested a revised notion of utopianism, one that is rooted in New Left and feminist thought. Scholar Fredric Jameson recently addressed the demise of modernism and utopia, alluded to by

¹¹³ Lodder, Russian Constructivism, 1; Jaroslav Andel, "The Constructivist Entanglement: Art into Politics, Politics into Art" in Henry Art Gallery, Art into Life Russian Constructivism, 1914-1932 (New York; Seattle: Rizzoli; Henry Art Gallery, 1990), 224; Sarah Ganz Blythe, Edward D. Powers, Centre Georges Pompidou, National Gallery of Art and Museum of Modern Art, Looking at Dada (New York, NY: The Museum of Modern Art, 2006), 20; Richard Andrews, Introduction, Art into Life, 12; Peter Selz, Beyond the Mainstream Essays on Modern and Contemporary Art, Contemporary Artists and Their Critics (Cambridge, U.K.; New York: Cambridge University Press, 1997), 80; Benjamin H. D. Buchloh, "Open Letters, Industrial Poems," October, vol. 42 (Autumn, 1987): 68. I believe there was a synthesis made of socialist or Marxist, collectivist notions of Utopia, which sought to transform society, with the idealist, autonomous definitions of utopia associated with the work of Gabo, Pevsner, Mondrian, van Doesburg and in the criticism of Clement Greenberg. This tendency to synthesize and oversimplify the meaning of utopia finds expression in, and was perhaps exacerbated by, George Rickey's overly broad and formalist treatment of Constructivism in Constructivism; Origins and Evolution (New York,: G. Braziller, 1967). Into this broad definition of utopia, he collapsed the work of Gabo, Pevsner, hard-edge and post-painterly abstraction as pointed out by Lodder.

Levin above, explaining that during the Cold War utopia became associated with Stalinism and Fascism, the Old Left. Jameson wrote that this concept of utopia "betrayed a will to uniformity and the ideal purity of a perfect system that always had to be imposed by force on its imperfect, reluctant subjects."¹¹⁴ Kim Levin's overly generalized concept exemplifies the backlash against utopias beginning in the 1930s and 40s with books like Karl Popper's *Open Society and Its Enemies* (1945), which rejected positivist utopian views of history that identified past events as leading inexorably to twentieth-century authoritarian regimes, a backlash that was quickly internalized within the field of art history.¹¹⁵ Jameson, however, argued that utopian thought had in fact survived in a changed form throughout the Cold War period.¹¹⁶ Following Jameson, literary scholar Angelika Bammer claimed that in the 1960s, the New Left "radically redefined the utopian" in an effort to distance itself from the Old Left.¹¹⁷ Further, she agued that feminism picked up historically where the Left had left off, asserting that when utopianism was pronounced dead in the 1970s, it was in fact vibrantly alive in the modern

¹¹⁴ Fredric Jameson, *Archaeologies of the Future : The Desire Called Utopia and Other Science Fictions* (London ; New York: Verso, 2005), xi. Jameson asserted that during the Cold War utopia had become a synonym for Stalinism. In this book, Jameson argued against antiutopianism, claiming that utopias and utopianism are valuable at the very least for making us aware of our ideological imprisonment, xiii.

¹¹⁵ Notable exceptions to this position in the fields of art history and literature include T.J. Clark, *Farewell to an Idea: Episodes from a History of Modernism* (New Haven: Yale University Press, 1999) and Fredric Jameson, *Marxism and Form; Twentieth-Century Dialectical Theories of Literature* (Princeton, N.J.,: Princeton University Press, 1972).

¹¹⁶ He is concerned with the "repression of the utopian imagination." Fredric Jameson, "Progress Versus Utopia; or, Can We Imagine the Future?" *Science Fiction Studies* 9:2 (Jul 1982): abstract. ¹¹⁷ Angelika Bammer, *Partial Visions : Feminism and Utopianism in the 1970s* (London ; New York: Routledge, 1991), 49. Bammer follows Jameson in her argument. She explains, "In the debates over the place and function of the utopian within the context of the Left that were sparked by the political movements of the 1960s two strategies were seen as equally necessary: (1) reclaiming utopianism as an essential element of radical politics; and (2) redefining it in such a way that it was freed of its repressive function as signpost to a set future on an equally set path from which deviations were not allowed. In pronouncing the liberation of the imagination of one of its main goals, the New Left radically redefined the utopian." They accomplished this, she asserted, by engaging a different Marx... and by invoking a variety of sources including Third World Liberation Struggles and Freudian and Post-Freudian psychoanalysis.

American women's movement.¹¹⁸ She explained that insofar as feminism was based on women's liberation, "it was – and is – not only revolutionary but radically utopian."¹¹⁹ She wrote,

Moreover, as feminists not only expressed the belief that "reality" should and could be changed, but acted on the basis of that assumption, the very concepts "revolutionary" and "utopian" were transformed. Revolution was defined in terms of process.¹²⁰

Bammer speaks here about two central tenets of feminist utopianism: the belief in the possibility of change, and the notion of utopia based on process, by which is meant the gradual transformation of society over time.¹²¹ These tenets, coupled with a rejection of uniformity and perfection associated with the Old Left, as described by Jameson above, are central to the feminist utopianism that I observe in visual works by Aycock, Denes, Rosler and Schneemann. These artists do not prescribe a specific, alternative to American society, rather their works are imbued with a hopeful belief that alternatives might exist. The association of utopian thought with perfection and progress has a long and complex history in Western thought.

Utopia and its Origins

Utopian thought may be found in most cultures, but historically it has had greatest expression in the West, with the most pronounced forms emerging from Plato, Aristotle and Judeo-Christian belief in a paradisiacal Garden of Eden on earth and a heaven

¹¹⁸ Bammer, 6

¹¹⁹ Bammer, 2

¹²⁰ Bammer, 2

¹²¹ Bammer indicates that the transformation of society occurs without any preconception of the end result.

beyond.¹²² The word *Utopia* was introduced in 1516 by the English humanist scholar, Thomas More whose novel by the same name described an ideal, imaginary island-nation operating under a liberal political system, quite different from his own. "Utopia" derives from the Greek words *ou-topos*, meaning no place and *eu-topos*, meaning good place – the good place that is no place. Many writers after More constructed utopias, most following his concept of a previsualized, perfect-world, including Thomas Campenalla's *City of the Sun*, 1602 and Francis Bacon's *The New Atlantis*, 1626. The nineteenth century saw a profusion of systemic utopias that arose from or advocated political action. The most well-known of these include the French and English socialist utopias of Charles Fourier, Robert Owens and Henri Saint-Simon,¹²³ all calling for a perfectly restructured polity where the crises of humanity's capacity to find satisfaction in its work and emotional relationships would be resolved.¹²⁴ Utopia as a genre began to receive critical attention in the eighteenth century,¹²⁵ and in the 1960s, utopian studies became an academic field.¹²⁶

Today, utopian studies scholars generally define the classic or standard utopia as the good place that is no place, as exemplified by Thomas More's *Utopia*, and will hereafter be referred to as such.¹²⁷ Utopian studies scholars Tom Moylan and Raffealla Baccolini

 ¹²² Frank and Fritzie Manuel, *Utopian Thought in the Western World* (Belknap Press, 1979).
 ¹²³Scholar Neil McWilliam has investigated ways in which artists responded to the ideas of Fourier and Saint-Simon in the mid-nineteenth century. Neil McWilliam, *Dreams of Happiness: Social Art and the French Left, 1830-1850* (Princeton, N.J.: Princeton University Press, 1993).
 ¹²⁴ Manuel, 4.

¹²⁵ Manuel, 10.

¹²⁶ Ruth Levitas, *The Concept of Utopia*. 1st ed, Utopianism and Communitarianism. (Syracuse, N.Y.: Syracuse University Press, 1990).

¹²⁷ Lucy Sargisson, *Contemporary Feminist Utopianism*, *Women and Politics* (London; New York: Routledge, 1996), 50.

have offered a more detailed definition of the classic utopia: "a non-existent society described in considerable detail and normally located in a time and space that the author intended the contemporaneous reader to view as considerably better than the society in which that reader lived."¹²⁸ I assert that it is this understanding of the classic utopia that is typically (and often mistakenly) associated with early twentieth century modernist beliefs in science and technology as the unequivocal harbingers of a great new society.¹²⁹

The assumption within art history, that science and technology are necessarily complicit with perfect-world utopias, is overly simplistic and obscures a richer, contextualized reading of modernism and postmodernism.¹³⁰ For example, Futurist artist Umberto Boccioni may have viewed the bicycle as intrinsic to a dynamic, mechanistic future, in stark contrast to the cultural malaise he despised in early twentieth century Italy. It is not so clear, however, that Russian Constructivist Alexandr Rodchenko envisioned a perfect polity *other than* the one arising around him. In his hanging constructions of 1920-21, comprised of concentric geometric forms cut from plywood, Rodchenko examined how industrial materials would serve the new Communist ideology and way of life, to which

¹²⁸ Tom Moylan and Raffaella Baccolini, *Dark Horizons : Science Fiction and the Dystopian Imagination* (New York ; London: Routledge, 2003).

¹²⁹ See for example, Lodder, *Russian Constructivism*, 1; Peter Selz in Chipp, *Theories of Modern Art*, 457; R. L. Rutsky, *High Technåe : Art and Technology from the Machine Aesthetic to the Posthuman, Electronic Mediations ; V. 2.* (Minneapolis, MN ; London: University of Minnesota Press, 1999), 102; Victor Margolin, *The Struggle for Utopia : Rodchenko, Lissitzky, Moholy-Nagy : 1917-1946* (Chicago: University of Chicago Press, 1997). Robert Hobbs, *Alice Aycock Sculpture and Projects* (Cambridge, Mass.: MIT Press, 2005), 324. Hobbs refered to the utopian projects of Russian Constructivists. He also cited them as an important influence for Aycock's work, comparing the euphoria inherent in their industrial forms to her work.

¹³⁰ For example, Chipp, *Theories of Modern Art*, 457. They refer to Trotsky's essay, "Literature and Revolution." Rutsky, on the other hand, claimed that although the Italian Futurists, Soviet Constructivists and architects of the German Werkbund tended to view technology positively, each had very different views of what technology is. Rutsky, *High Technåe : Art and Technology from the Machine Aesthetic to the Posthuman, Electronic Mediations*, 48.

they were integral.¹³¹ Perhaps Boccioni did imagine an Italy quite different from the one he occupied, consistent with the standard definition of utopia, but Rodchecko already saw the beginnings of what he believed to be a successful revolution in his lifetime. Rodchenko's is an example of a specific revolutionary political utopia, whose form, he believed, was realizable. Boccioni's hovers between a revolutionary utopia and a classic idealist utopia. It bears relationship to perfect-world utopias because it was not achievable, yet unlike classic utopias, its final form was not predetermined.¹³² The utopias of each artist, however, entailed deep criticism of his political system; and for both artists, technology was integral to the formation of a utopian solution.

Weimar Dada's relationship to technology was more ambiguous still. The belief in an ideal, perfect-world utopia does not apply to artists like Raoul Haussmann, John Heartfield and Hannah Hoch, all working in the Weimar Republic between the world wars. Dadaists associated technology with the unprecedented destructiveness of the Great

¹³¹ Though made of wood, Rodchecko viewed his hanging constructions as practical "tectonic" structures that would serve the needs of the new, post-revolutionary society. He and Stepanova laid out the terms for these structures in the 'Programme of the First Working Group of Constructivists,' and described them as follows, "Tectonics or the tectonic style is tempered and formed on the one hand from the properties of communism and on the other from the expedient use of industrial material." Trans. Christine Lodder and reprinted in *Art in Theory, 1900-2000: An Anthology of Changing Ideas*, Charles Harrison and Paul Wood, eds. (Malden, MA: Oxford: Blackwell Publishers Ltd., 2003) 341-342. Lodder correctly pointed out that these works were not, in themselves, useful objects, but rather abstract projections of an unfulfilled ideological program. The artist intended, however, that the objects materially and formally be ideologically consistent with the tenets of the revolution, then in progress.

¹³² Futurist Scholar Giovanni Lista adamantly claimed that Futurism was not utopian, because it did not posit an ideal. Instead, he aligns it with the philosophy of Henri Bergsson, arguing that the Futurist revolution was always "becoming." See Giovanni Lista, *Futurism* (Paris: Terrail, 2001). While the alignment of Futurist aspirations with Bergsson is important, I disagree with Lista's assertion that Futurism was not utopian, because I suggest a more complex assessment of how utopias function in art. Utopianism as a process of becoming may indeed have roots in Bergsson, a notion that deserves further investigation.

War, but it was also an essential tool of the anarcho-communism they celebrated.¹³³ Hausmann's sculpture *The Spirit of Our Time – Mechanical Head* (1919), for example, suggests a rejection of the bourgeoisie's blind, mechanistic thinking.¹³⁴ Similarly, Höch's invocations of technology are by no means completely positive, as art historian Maud Lavin has pointed out. For example, in the artist's work *Dada Ernst* (1920-21), a bow-like machine part cuts through the center of the photomontage, appearing to sever a woman's legs near the crotch, suggesting at the least, a conflicted view of technology.¹³⁵ Weimar Dada, like Russian Constructivism, was fueled in large part by Marx's attitudes toward technology.

The notion of utopia as fused with technology developed in the wake of nineteenthcentury industrialization and found greatest expression in the thought of Karl Marx. In the *Communist Manifesto* (1848), Marx declared that, under capitalism the proletarian becomes "an appendage of the machine" and the working man remains enslaved by technology and its bourgeois manufacturers.¹³⁶ But like the Saint-Simonians before him, Marx strongly believed in the potential of technological development to minimize manual

¹³³ Richard Huelsenbeck, From "En Avant Dada: A History of Dadaism," 1920. Reprinted in Chipp, *Theories of Modern Art*, 377-382. Huelsenbeck's influential essay was translated into English and reprinted in Robert Motherwell's *The Dada Painters and Poets: An Anthology* (New York: Wittenborn, 1951).

¹³⁴ William Stanley Rubin, Museum of Modern Art, Los Angeles County Museum and Art Institute of Chicago, *Dada, Surrealism, and Their Heritage* (New York,: Museum of Modern Art; distributed by New York Graphic Society, Greenwich, 1968).

¹³⁵ Maud Lavin and Hannah Höch, *Cut with the Kitchen Knife : The Weimar Photomontages of Hannah Höch*, (New Haven: Yale University Press, 1993), 6. Importantly, Maud Lavin discussed the evidence of Höch's optimism toward the expanded role of women (post-suffrage) in the Weimar Republic, using Ernst Bloch's theory of utopianism to characterize it.

¹³⁶ Karl Marx, *Manifesto of the Communist Party*, Edited by Fredrick Engels, 28th printing of the 100th Anniversary Edition, 1989 ed. (New York: International Publishers, 1948), 16.

labor in his own vision of communist society.¹³⁷ According to utopian theorists Frank and Fritzie Manuel, "Total technology is the ineradicable signature of the Marxist utopia."¹³⁸ Communist thought was a critical impetus for both Russian Constructivism and Weimar Dada, but neither movement adhered to the classic or standard view of utopia, *the good place that is no place*. Constructivists like Rodchenko embraced technology in the context of the Russian Revolution in progress in the mid to late 1920s, and eventually did apply art to technology in graphic and product design and up to a point, architecture. Weimar Dada remained ambivalent or critical, but kept a hopeful eye toward the potential of technology in a transformed society.

In the wake of the same bourgeois malaise, reviled by Weimar Dada,¹³⁹ German Marxist philosopher Ernst Bloch attempted to redefine the notion of utopia from *the good place that is no place*, to an attainable state of being, but one that is not fixed in time and space. Bloch's goal was to animate postwar humanity with hope and belief in the possibility of change. Counter to the escapism inherent in the "no place" of the classic utopia, Bloch called for a reconsideration of utopia as an impulse or longing, based on Freud's notion of human drives.¹⁴⁰ Bloch, however, refuted Freud's view that the basic drives (libido

¹³⁷ Karl Marx, 30. Marx was also influenced by the socialist utopian Charles Fourier. Fourier's notions of sensual dynamism and sexual freedom enjoyed a revival in the 1960s and he was an important influence for New Left philosopher Herbert Marcuse. Manuel, *Utopian Thought in the Western World*, 799

¹³⁸ Manuel, Utopian Thought in the Western World, 715.

¹³⁹ Richard Huelsenbeck, From "En Avant Dada: A History of Dadaism," 1920. Reprinted in Chipp, *Theories of Modern Art*, 377-382

¹⁴⁰ Ernst Bloch, *The Principle of Hope*. 3 vols. (Oxford: Blackwell, 1986). Written in the U.S. 1938-1947, revised 1953 and 1959, and originally published as *Das Prinzip Hoffnung*, 1959 by Suhrkamp Verlag, Frankfurt am Main, Federal Republic of Germany.

and, later, death) were primal and absolute.¹⁴¹ Instead, he claimed that the most basic drive is self-preservation, which is historically contingent and never absolute. Self-preservation is so fundamental, he insisted, that it sets the other drives in motion.¹⁴² Bloch wrote further, "Economic interest forms the final instance in the historically existing framework of drives, but even this... has its changing historical forms, the changes in the mode of production and exchange."¹⁴³ The philosopher asserted that hope, or the dream of a better life, is a long-term expectant emotion that also has its drive-intention in this world, not in a past world. Thus Bloch reconstituted Freud and put him to the service of Marx's social vision. He replaced Freud's notion of the preconscious with the *not-yet-conscious*.¹⁴⁴

First developed during World War I in his book *Spirit of Utopia*, Bloch's notion of the *not-yet-conscious* found expression in the day dream, which, he believed was the stepping stone to art, and was characterized by the journey toward fulfillment.¹⁴⁵ He

¹⁴¹ Douglas Kellner, Illuminations: Ernst Bloch, Utopia and Ideology Critique,

http://www.uta.edu/english/dab/illuminations/kell1.html (accessed March, 15, 2006). "He [Bloch] also conceptualizes "man as a quite extensive complex of drives" (47ff.) and constantly emphasizes cravings, wishing, desiring, and hoping for a better life opposed to Freudian emphases on castration, repression, and the conservative political economy of the instincts which are more characterized by repetition, excitation-release, and ultimately entropy (the death instinct) than the development of new drives, impulses, and tendencies and possibilities for change and transformation such as one finds at the center of Bloch's theory whereas Freud tends to present a fixed view of human nature."

¹⁴²Bloch, *The Principle of Hope*, 64.

¹⁴³ Bloch, *The Principle of Hope*, 69.

¹⁴⁴ Bloch, *The Principle of Hope*, 116. For a discussion of Bloch's idea of anagnorisis see Martin Jay, "Reflections on Marcuse's Theory of Remembrance" in Andrew Feenberg, Charles Webel, and Robert B. Pippin, *Marcuse : Critical Theory and the Promise of Utopia* (London: Macmillan Education, 1988), 39-40.

¹⁴⁵ Bloch's concept of the net-yet-conscious was first examined in *Geist der Utopie* first published in 1918. Ernst Bloch, *Geist der Utopie* (Berlin: Paul Cassirer, 1923). For the English translation, see Ernst Bloch, *The Spirit of Utopia*, trans. Anthony Nassar (Stanford, CA: Stanford)

wrote, "The content of the night dream is concealed and disguised, the content of the day fantasy is open, fabulously inventive, anticipating and its latency lies ahead."¹⁴⁶ The important point where Bloch departed from the good place that is no place of classic utopias is precisely in his choice of words: not-*yet*-conscious. Rather than indicating a good place that is no place, the philosopher encouraged a notion of utopianism that imagined an *achievable* goal existing in the future. He summarized the functions of utopia as follows: "*protest* against the status quo; the *anticipation* of the possibilities of radical change;" and the insistence on their realization.¹⁴⁷ Here, however, he was not concerned with articulating its form, perfect or otherwise, as past utopians like Saint Simon and Marx had done before. His notion of change was rooted in the process itself.¹⁴⁸

Art was an integral part of Bloch's utopia.¹⁴⁹ He began to connect his notion of the notyet-conscious or not-yet-become with art as a means of criticizing existing social conditions.¹⁵⁰ Scholar Jack Zipes wrote of Bloch, "he maintained his optimistic belief in the potential of art to provide not only hope for a better future but also illumination

University Press, 2000). See also Translators Preface in *Principle of Hope*, xx. It was elaborated in *The Principle of Hope*, 86.

¹⁴⁶ Bloch, *The Principle of Hope*, 99.

¹⁴⁷ Alain Martineau and Herbert Marcuse, *Herbert Marcuse's Utopia* (Montreal: Harvest House, 1986), 81. Martineau's summary was taken from Pierre Furter and Laennac Hurbon.

¹⁴⁸ It has been noted that there is a contradiction in Bloch's philosophy of process. While process was central to his philosophy, he also believed that Marxism was the only solution – the only means toward utopia. Ernst Bloch, *The Utopian Function of Art and Literature : Selected Essays, Studies in Contemporary German Social Thought*, translated by Jack Zipes and Frank Mecklenburg (Cambridge, Mass.: MIT Press, 1988), 19-20.

¹⁴⁹ Bloch, *The Principle of Hope*, 14. See also Sargisson, 12, According to Bloch, the utopian impulse is present in art, architecture, politics, economy, literature, even medical science. ¹⁵⁰ Bloch, *The Utopian Function of Art and Literature*, xv.

toward the realization of this goal."¹⁵¹ Bloch wrote his three-volume opus, *The Principle* of Hope from 1938 to 1947 while in exile in the U.S.¹⁵² Zipes explained that in this work, the philosopher expressed that art could be a means of instilling "…hope in viewers or readers and provide the impetus for individual and collective change."¹⁵³

Thus Bloch introduced a new concept of utopia. His ideas influenced his well-known colleagues such as Frankfurt School philosophers Walter Benjamin and Theodor Adorno who once referred to him as the composer of "the Great Blochian Music;"¹⁵⁴ and I argue, Frankfort School theorist and cultural critic Herbert Marcuse, who would have a significant impact on the U.S. counter-culture movement of the 1960s.¹⁵⁵

¹⁵¹ Bloch, The Utopian Function of Art and Literature, xii.

¹⁵² Bloch, *The Principle of Hope*. Bloch published this work in German in 1959. It was translated to English in 1986.

¹⁵³ Bloch, The Utopian Function of Art and Literature, xxiii.

¹⁵⁴ Bloch, *The Principle of Hope*, xxii

¹⁵⁵ Marcuse knew Bloch and respected him (See Martineau, 22), but they differed on key points regarding Freud, such as the issue of memory. Still, Bloch's Principle of Hope was the preeminent discussion of an achievable utopia based on Freud's notion of drives that was available to Marcuse. See Martineau, Herbert Marcuse's Utopia. See also Stephen Eric Bronner, "Between Art and Utopia: Reconsidering The Aesthetic Theory of Herbert Marcuse" in Feenberg, Marcuse : Critical Theory and the Promise of Utopia, 121. Bronner writes "Marcuse's concern with emancipation also provided a demand for extending the intellect through the need for a critical encounter with those repressed longings of humanity's cultural past. These repressed hopes constitute what Ernst Bloch called the "underground history of revolution." And it is this which provides an ever-expanding content to that utopian condition which Marcuse attempted to formulate." For Marcuse's influence within the art world see Jack Burnham, "Art in the Marcusean Analysis," Penn State Papers in Art Education, edited by Paul Edmonston, 1-21 (University Park: The Pennsylvania State University, 1969); Gregory Battcock, "Marcuse and Anti-Art." Arts Magazine 43:7 (1969): 17-19; and Lucy Lippard, "The Dematerialization of Art," Art International 12,:2 (1967): 31-36. Found in Alexander Alberro, Conceptual Art; A Critical Anthology. (Cambridge, Mass: London: MIT Press, 1999), 47. Rosler's familiarity with Marcuse is addressed at length in chapter two. Rosler attended U Cal San Diego while Marcuse was on faculty there. Schneemann was an invited participant in the Congress of the Dialectics of Liberation in 1967, where Marcuse was a featured speaker.

By the mid-1960s, Marcuse rose to prominence among the New Left shortly after the publication of his book One Dimensional Man: Studies in the Ideology of Advanced Industrial Society (1964), a diagnosis of Western nations, particularly the U.S. In his book, he asserted that a society based on technological rationalism left no room for critique, and whatever criticisms were made would quickly become subsumed by the system. The slavish acceptance of technological rationality, he warned, characterized the one-dimensional thought of Western man.¹⁵⁶ For Marcuse, technology, in its broad connection to rationalism as well as its specific connection to consumer products, was inextricably linked to labor and leisure in consumer capitalism. Philosopher Douglas Kellner summarized Marcuse's views as follows, "Marcuse describes what has become known as the "technological society," in which technology restructures labor and leisure, influencing life from the organization of labor to modes of thought."¹⁵⁷ The notion of technological society had been examined by Marcuse's mentor, German philosopher Martin Heidegger. Heidegger believed that man was unaware that he was complicit in the systemic ordering of the world made possible by science and machine technology, which he saw, like Marcuse, as mutually dependent on one another.¹⁵⁸ Kellner

¹⁵⁶ Instead, he encouraged the development of multi-dimensional thought, which would enable individuals to grasp the ways in which their thoughts and actions were limited by the social structure.

¹⁵⁷ Marcuse, *One Dimensional Man; Studies in the Ideology of Advanced Industrial Society*, xii. In his introduction to Marcuse's book *One Dimensional Man*, Further Paul Durbin described the impact of Marcuse's writing on activists in the 1960s. "Marcuse's Marxist thought became more influential, and more threatening to the science establishment, than the ideas of other intellectuals because it was adopted by "New Left" radicals of the 1960s bent on disrupting, among other things, scientific professional meetings." Paul T. Durbin, and Jerome R. Ravetz. *A Guide to the Culture of Science, Technology, and Medicine*. 1st Free Press pbk. ed. (New York; London: Free Press; Collier Macmillan, 1984), xxiii.

¹⁵⁸ Martin Heidegger, *The Question Concerning Technology, and Other Essays*, (New York: Garland Pub., 1977). Importantly, Heidegger's translator, scholar William Lovitt argued in his preface to the book that Heidegger sees our technological world as a "closed system." Heidegger,

explained, "Rather than seeing these developments as beneficial to the individual, Marcuse sees them as a threat to human freedom and individuality in a totally administered society."¹⁵⁹

Marcuse, however, also celebrated the emancipatory potential of technology, if employed for purposes of eliminating class difference and freeing humankind from drudgery in a revised, more humanist version of Marx's vision.¹⁶⁰ He said, "Is it still necessary to repeat that science and technology are the great vehicles of liberation, and that it is only their use and restriction in the repressive society which makes them into vehicles of domination?"¹⁶¹ In a speech entitled "Liberation from the Affluent Society" given at the 1967 Congress Dialectics of Liberation in London, Marcuse outlined what he saw as the union of science, technology and art in a new "aesthetic" reality – society as a work of art" in which "creative imagination and play [become] forces of transformation." He extolled "Utopian tendencies" such as "the convergence of technique and art, the convergence of work and play, the convergence of the realm of necessity and the realm of freedom." "This" he explained, "is the most Utopian, the most radical possibility of

xvi. French philosopher Jacques Ellul published his book *The Technological Society* the same year *One Dimensional Man* was published in the U.S., 1964.

¹⁵⁹ Marcuse, One Dimensional Man, xii.

¹⁶⁰ Marcuse, along with contemporaries Wilhelm Reich and Geza Roheim (both of whom were also revered by the New Left), were referred to as Freudo-Marxists. They attempted to synthesize the social and political aims of Marx with Freud's ideas about what motivates and drives the individual. Their utopianism was influenced by Freud, but they departed from him, significantly, in their political radicalism, commitment to social change and their belief in the individual's inherent drive for wish fulfillment. In their consideration of aspects of Freud's theories together with those of Marx, they were anticipated by Bloch. Marcuse and Reich both articulated their firm belief that utopianism could and should fuel revolution in the United States. They believed that sexual repression was a key strategy of political domination, and that sexual freedom was critical to social revolution and to the success of a transformed American society.

¹⁶¹ Marcuse, An Essay on Liberation (Boston: Beacon Press, 1969), 12.
liberation today."¹⁶² Echoing Bloch, Marcuse encouraged others to take a critical stance in assessing American life, in which alternatives - "a freer and happier mode of existence" may be realized.¹⁶³

By the early 1970s, the utopianism inherent in the civil rights and anti-war movements that Marcuse had championed seemed to have evaporated in the wake of The Mai Lai massacre and the assassination of Martin Luther King, Jr. Marcuse, however, believed that utopianism persisted in the contemporary women's movement. In 1974, Marcuse gave an invited lecture at Stanford University, one so important it was the only outside lecture he gave that year, which he began with the following remark, "I believe the Woman's Liberation Movement today is, perhaps the most important and potentially the most radical political movement that we have."¹⁶⁴ In this lecture, Marcuse advocated a feminist socialism somewhat different, and indeed more radical than Marxian socialism, in that it did not contain the same emphasis on efficiency and prowess. ¹⁶⁵ In feminist socialism, he saw the possibility of making life "an end in itself, for the development of the senses and the intellect for pacification of aggressiveness, the enjoyment of being, for

¹⁶² David Cooper, ed. The Dialectics of Liberation (Blatimore: Penguin, 1968): 185-186. Schneemann participated in this conference. Schneemann was an invited participant at this congress.

¹⁶³ Marcuse, *One Dimensional Man*, xi. There are, it seems to me, questions about Marcuse's new society, which sees technology as central. For example, if all of humankind is liberated and free of drudgery, who actually builds, runs and services the transformative technologies? Are these tasks, among other unpleasant functions like garbage collection, shared equally by all citizens as in George Bellamy's 19th century socialist utopia, *Looking Backward: 2000-1887* (Boston: Ticknor, 1888)? If so, Marcuse never explains. His primary objective, similar to Bloch's, was to motivate in others a belief in the possibility of social change.

¹⁶⁴ Herbert Marcuse, "Marxism and Feminism." *Women's Studies* 2, no. 3 (1974): 279-88.) 279 ¹⁶⁵ Marcuse, "Marxism and Feminism," 286. Marxian socialism retained elements of what Marcuse called the Performance Principle, a social reality in which "efficiency and prowess" are emphasized." Marcuse explained that he saw these elements in "the emphasis on the ever more effective development of the productive forces, the ever more productive exploitation of nature, the separation of the "realm of freedom" from the work world."

the emancipation of the senses and of the intellect from the rationality of domination." In this revised socialism, Marcuse saw the liberation of the woman as, indeed, central to the transformation of society. ¹⁶⁶ Thus, the utopianism inherent in New Left thought, was commuted to the then more vital American women's movement in the form of feminist utopianism. Lucy Sargisson observed a revolutionary utopianism in novels by women in this period, which exhibited a criticism of dominant power structures together with an anticipatory hope in the possibility of change.

Sargisson's contemporary feminist utopianism, characterized as criticism of the status quo and a yearning for change relies on that of Bloch.¹⁶⁷ She seeks to broaden the classic definition of utopia as static and closed to include feminist utopianism, which resists closure and is characterized by an anticipatory belief in the possibility of change through process. Her own theory was meant to revitalize the women's movement, which by the 1990s, she observed had been curtailed by conservative backlash and as a result, as having retreated to the achievement of small political goals.

Sargisson also relied on the research of Moylan who, in 1986, marked a revival of utopian writing in the late 1960s and early 1970s, and who, importantly, linked feminism and feminist aims with a departure from the notion of classic utopias. Emerging from the

¹⁶⁶ He claimed, "the liberation of the woman would indeed appear... as the revolutionary function of the female in the reconstruction of society."

¹⁶⁷ Sargisson, 1. Sargisson's theory, published in 1996, also relies on Bammer, whose book *Partial Visions : Feminism and Utopianism in the 1970s* was published in 1991. Bammer noted the relevance of Bloch in the ways feminist utopian literary works of this period functioned. She wrote, "The work of women writers, for example, is often centrally informed by what the philosopher Ernst Bloch has called an "anticipatory consciousness": a consciousness of possibilities that have not yet been—but could eventually be-realized." Bammer, 3.

oppositional political culture, he characterized these works as critical utopias, critical in the Enlightenment sense of critique, marking a postmodern attitude of self-reflexivity.¹⁶⁸ Moylan explained,

A central concern in the critical utopia is the awareness of the limitations of the utopian tradition, so that these texts reject utopia as blueprint while preserving it as dream... [the works] focus on the continuing presence of difference and imperfection within utopian society itself and this renders more recognizable and dynamic alternatives.¹⁶⁹

Moylan's observation of utopianism in works from the period, includes a rejection of blueprint utopias (so called modernist utopias), in favor of an expressed longing for alternatives. Moylan claimed that the new oppositional vision is deeply influenced by autonomy and democratic socialism (the politics of New Left thought), ecology, and especially feminism and represented a transformation from the limitation of ideal, classic utopias.¹⁷⁰ He said, "Whatever the particular set of social images each [work] sets forth, the shared quality in all of them is a rejection of hierarchy and domination and the celebration of emancipatory ways of being as well as the very possibility of utopian longing itself."¹⁷¹ Moylan suggested that these critical utopias were shaped by the politics and rhetoric of the counter-cultural movement.

Inspired by the movements of the 1960s and finding new imagery in the alternatives being explored in the 1970s, the critical utopia is part of the political practice and visions shared by a variety of autonomous oppositional movements that reject the

¹⁶⁸ Tom Moylan, *Demand the Impossible : Science Fiction and the Utopian Imagination* (New York: Methuen, 1986), 10.

¹⁶⁹ Moylan, *Demand the Impossible*, 10.

¹⁷⁰ Moylan and Baccolini, Dark Horizons : Science Fiction and the Dystopian Imagination.

¹⁷¹ Moylan, *Demand the Impossible*, 12.

domination of the emerging transnational corporations and post-industrial production and ideological structures. $^{\rm 172}$

Here Moylan associated critical utopias with the domination of industrial capitalism, both of which were inextricably linked with technology and science in the leftist language of the counterculture, to which all of the artists in this dissertation were exposed and which some openly embraced.

Bammer provided a helpful context for comprehending how the concept of feminist utopianism was shaped by the women's movement. She explained that the debate over feminist utopianism was framed by two seemingly (conceptually and strategically) antithetical positions: Helene Cixous's call for women to 'write her self' into history and Susan Gubar's concept of The Blank Page – women's refusal to be appropriated by male dominated culture.¹⁷³ Bammer argued that it is the space between these two poles where utopian thinking and social action rest, "For Cixous and others, the utopian gesture is not substitutive but transformative... not a movement away, but rather the ability to move within and against existing structures." ¹⁷⁴ Although Bammer's argument, like Sargisson's focused on literary fiction, she claimed it influenced and shaped women's efforts in other creative fields.¹⁷⁵

¹⁷² Moylan, Demand the Impossible, 10-11

¹⁷³ Bammer, 5. Bammer cites Cixous' *Laugh of the Medusa* (1975) and Susan Gubar's *The Blank Page* (1982) as the opposing examples.

¹⁷⁴ Bammer, 7.

¹⁷⁵ Bammer, 5.

In her 2003 article "Utopias and Universals," art historian Alison Green commented, "Idealisms are implicit in art." She asserted that, "What seems more interesting than arguing them away is seeing how they function." ¹⁷⁶ She stepped gingerly around myriad terms and ideas associated with utopias, but ultimately decided upon a definition similar to Sargisson's and Moylan's,

Perhaps the idea of utopia would seem more palatable if one considered it as a drive rather than a place... Art's utopian function could be similar to its *critical function*: to be different enough from the master narratives of culture and its bureaucracies that alternate possibilities become apparent. Art objects could be seen as representations that evoke future experiences, even as substitutions for the impossibility of utopia itself.¹⁷⁷

Like Sargisson, Green proposed a utopianism characterized by a drive toward something else, not a specific place, but something better.

Here I have argued for a more nuanced understanding of utopia, and for its reconsideration as a critical tool in art analysis. The notion of utopianism as a yearning for an ongoing process of change, conceived by Bloch and disseminated by Marcuse during the Cold War, was relevant to the New Left, countercultural and feminist movements seeking social revolution, but at the same time, differentiation from notions of the 'perfect society' associated with the Old Left and with post-industrial capitalist society. Integral to the notion of utopia since the nineteenth century, science and technology remained symbols of perfection and tools of destruction within capitalist and

¹⁷⁶ Alison Green, "Utopias & Universals." (Art Monthly vol. 265. Apr. 2003): 10.

¹⁷⁷ Green, 265. Italics mine.

fascist societies for the New Left, but they continued to associate these forms of knowledge and practice with the progress necessary for the realization of a new, everevolving social order. Influenced by the American women's movement and the counterculture, the works of Aycock, Denes, Rosler and Schneemann similarly resisted the closure of classic, blueprint utopias associated with science and technology, and created works infused with feminist utopian desire for progressive change.

Chapter 2 Tactics of Transgression, Traces of Hope: Technology and Feminist Utopianism in the Work of Martha Rosler and Carolee Schneemann

"There's a time when the operation of a machine becomes so odious, makes you so sick at heart, that you can't take part, you can't even passively take part. And you've got to put your bodies upon the gears and upon the wheels, upon the levers, upon all the apparatus, and you've got to make it stop. And you've got to indicate to the people who run it, to the people who own it, that unless you're free, the machine will be prevented from working at all."

--Mario Savio, 1964

This chapter explores technology as subject, media and process in the works of Martha Rosler and Carolee Schneemann made between the mid-1960s and the mid-1970s. These artists engaged in dystopic, political critiques of technology associated with war, the military and mass communication, and they examined the relationships between technology and women's lives. Technology for them was an instrument of oppression in capitalist society, but at the same time a tool for liberation. Within a different kind of societal structure, they believed it could facilitate positive change. They embraced new technologies as art-making media or content, seeking to question social structures, loosen social strictures and open new conceptual spaces. In the works of these artists, I observe

¹⁷⁸ Mario Savio, Leader of the Free Speech Movement at Sproul Hall, Berkley. Spoken before 5,000 students on December 2, 1964. Free Speech Movement Archives. <u>http://www.fsm-a.org/stacks/mario/mario_speech.html</u> (accessed February 9, 2008)

utopian feminist aspirations, inspired by the women's movement, fueling conceptual art practices in which they challenged technological society and its products.¹⁷⁹

The desire to expose the role of mechanism (self-operating causal relationships) as a controlling force in American society pervaded the rhetoric of the counterculture, of which Rosler and Schneemann were a part. For both artists, mechanism, a euphemism for the technological society described by philosophers Martin Heidegger, Herbert Marcuse and others, was more than an allegory for bureaucracy, it also comprised military and communications technologies that embodied the system, perpetuated its ideals of control and remained frustratingly invisible to the larger populace. Activist Mario Savio's machine metaphor, quoted in the epigraph above, resonated with thousands at the dawn of the Berkley Free Speech Movement in 1964, an event heralded widely as the beginning of Left-leaning student activism of the 1960s.¹⁸⁰ In his famous speech given at the steps of Sproul Hall, the administration building where more than three thousand students joined to protest the denial of their right to engage in political activism, Savio evoked a mechanized society in which human beings were nothing more

¹⁷⁹ Timothy S. McElreavy "Paradise Lost/Paradox Found: Materializing a History of Conceptual Art," *Art Journal* 61 (Winter 2002): 107-111. McElreavy commented on the idealistic aspirations of conceptual artists. "But it is the notion of purity, or at least its possibility, that seemed to drive many Conceptual artists, especially those whose work dominates this anthology, further and further from the production of art objects to something they claimed to be a more precise, "purer" definition of art itself. Thus, Adrian Piper could assert, in 1967, "I think 'conceptual art' is the most adequate way of liberating the creative process so that the artist may approach and realize his work-- or himself-on the purest possible level." Adrian Piper quote taken from Alexander Alberro and Blake Stimson, *Conceptual Art : A Critical Anthology* (Cambridge, Mass.; London: MIT Press, 1999), 37.

¹⁸⁰ Sheldon S. Wolin, and John H. Schaar, *The Berkeley Rebellion and Beyond: Essays on Politics & Education in the Technological Society* (A New York Review Book, 1970); On the cultural importance of this speech, see also Fred Turner, *From Counterculture to Cyberculture : Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2006), 11.

than obedient servants of bureaucratic systems of power. These notions reached their height in the late 1960s and early 1970s, at the peak of the Vietnam War, when science and technology were most closely identified with government military objectives. Schneemann's works *Viet-Flakes*, 1966 (**fig**. 1) and *Snows*, 1967 (**fig**. 2) and Rosler's *Bringing the War Home* series, 1967-72¹⁸¹ (**fig**. 3) manifest the concern that rationalized technological society had imposed its ideological will not only at home, but abroad.¹⁸² Rosler commented on her perceptions of technology and science in relation to the Vietnam War and the Cold War,

technology was used as the engine of superiority to drive the war-fighting effort and then to maintain global hegemony. And the worst day for the U.S. government was when Sputnik was launched and they were forced to launch a science initiative in American schools and to create a space program so that they had some public face on the advance of the militarization of space and other guidance technologies and missile technologies the same way that the nuclear power industry was designed to be a kind of a public cover for the production of nuclear weapons and so on.¹⁸³

A decade older than Rosler, Schneemann became sensitized the U.S. occupation in Vietnam in 1960.¹⁸⁴ By the early 1970s, both artists were active, vocal feminists who

¹⁸¹ Rosler had seen *Snows*, which featured a film montage of photographic documents depicting the horrors of the Vietnam War and the suffering of the Vietnamese people at the hands of U.S. forces, the same year she began her photomontage series *Bringing the War Home*, which deals with similar themes. Unpublished Interview with the Artist, Brooklyn, NY, August 23, 2007.

¹⁸² Many intellectuals of the period believed the U.S. government, in its occupation of Vietnam, was asserting imperialist control over a third world country. In 1963, French Anthropologist, Claude Levi Strauss published *Structural Anthropology*, which helped popularize the notion that Western civilization was not privileged and unique, and that the "savage mind," as he termed it, was equal to the civilized mind. Possessing a broad appeal for alienated intellectuals; these ideas permeated the work and writing of many artists in the 1960's. These artists questioned the forced proliferation of U.S. ideology throughout the world and many women artists, like Rosler and Schneemann questioned the means of proliferation, the motive and also the very source of that ideology.

¹⁸³ Unpublished interview with the Author, Brooklyn, NY, August 23, 2007.

¹⁸⁴ Carolee Schneemann, *Imaging Her Erotics : Carolee Schneemann : Essays, Interviews, Projects* (Cambridge, Mass.: MIT Press, 2002), 188.

sought to expose and subvert social structures deemed patriarchal. Works by Schneemann such as her performance *Americana I Ching Apple Pie*, 1974 (**fig**. 4) and Rosler's photomontage series *Body Beautiful or Beauty Knows no Pain*, 1966-72 (**fig**. 5) and her video, *Semiotics of the Kitchen*, 1975 (**fig**. 6) question the manufacture and advertising of domestic technologies that reinforce associations of women with the home. These works were simultaneously formally expressive and agitational, seeking to alter perceptions and raise consciousness. The criticism inherent in these works may at first glance render them dystopian, but such a prescription is overly simplistic. In their magnum opus *Utopian Thought in the Western World*, literary scholars Frank and Fritze Manuel explained that the foundation of every utopia is a dystopia, and in many dystopias is a hidden utopia.¹⁸⁵ In other words, most utopias begin as dystopias, reflecting dissatisfaction with the present, and a yearning for alternative possibilities. These works engage the reader in a process of reconsideration, presenting dystopic reality in order to inspire a longing for change.

The Technological Society

Both Savio's metaphor and the role of technology in the artists' works must be interpreted within the context of leftist 1960s political rhetoric, which was shaped by a number of theorists who characterized technology as interdependent with U.S. policy. Influential cultural critics including Theodore Roszak, Lewis Mumford and Herbert Marcuse believed that new technologies were developed and used by the U.S. for the

¹⁸⁵ Frank and Fritzie Manuel, *Utopian Thought in the Western World* (Belknap Press, 1979), 6. The authors assert, "If in the background of every utopia there is an anti-utopia, the existing world seen through the critical eyes of the utopia-composer, one might say conversely that in the background of many a dystopia there is a secret utopia."

control of others, such as the North Vietnamese, and for strengthening social and gender hierarchies at home.¹⁸⁶ For Marcuse, the U.S. had become a technological society, in which belief in the cause-and-effect nature of mechanism had become a ruling social principle. Rosler attended Marcuse's lectures in the early 1970s at University of California at San Diego.¹⁸⁷ She reported in a recent interview, "Everyone attended [Marcuse's] classes...his lectures. And then because I was part of the anti-war movement, we got to know him personally."¹⁸⁸ Schneemann also knew of Marcuse, who was a featured speaker at the Congress of Dialectics of Liberation in 1967,¹⁸⁹ **Fig**.7 where she had been invited to perform by her friend, the distinguished psychotherapist Joseph H. Berke, a conference organizer.¹⁹⁰ Held in London, the aim of the congress was "to create a genuine revolutionary consciousness by fusing ideology and action on the

¹⁸⁶ Lewis Mumford, *The Myth of the Machine*, 1st ed. (New York: Harcourt, 1967); Theodore Roszak, *The Making of a Counter Culture : Reflections on the Technocratic Society and Its Youthful Opposition* (Garden City, NY: Doubleday, 1969); Herbert Marcuse, *An Essay on Liberation* (Boston: Beacon Press, 1969).

¹⁸⁷ Marcuse was on faculty at University of California at San Diego from 1965-1976. Rosler received her MFA from the school in 1974.

¹⁸⁸ Unpublished Interview with the Artist, Brooklyn, NY, August 23, 2007.

¹⁸⁹ At the congress, Marcuse joined several of the most influential and outspoken voices of the counterculture, including Stokley Carmichael, R.D. Laing, Paul Goodman and Gregory Bateson. ¹⁹⁰ "Letter to Jan Van der Marck," June 12, 1967 in Kristine Stiles, *Correspondence Course, an* Epistolary History of Carolee Schneemann and Her Circle, forthcoming from Duke University Press, 2010. Kristine Stiles generously shared an early version of the manuscript with me. All of the letters that I had the opportunity to read may not be in the final version and the page numbers have also changed. Thus I will not quote page numbers. Furthermore, if the letter quoted does not appear in the published book, it may be found in the Getty Research Center in the Carolee Schneemann archive. Schneemann had many possible routes to New Left thought, for example through Jewish-Austrian psychiatrist and psychoanalyst Wilhelm Reich, a member of the Austrian Communist Party, whose ideas regarding social and sexual freedom were embraced by the New Left. Schneemann said, "In the early sixties my personal relationships were sustaining, as well as the writings of Reich, Artaud, de Beauvoir." "Interview with Linda Montano" Originially publ. in Flue Magazine, 1982. Cited in Schneemann, Imaging Her Erotics : Carolee Schneemann : Essays, Interviews, Projects (Cambridge, Mass.: MIT Press, 2002), 133. On Reich and the Communist Party, see Paul A. Robinson, The Freudian Left : Wilhelm Reich, Geza Roheim, Herbert Marcuse, 1st ed. (New York: Harper & Row, 1969), 39. The Constructivist imagery on the cover of the book documenting the congress is indicative of the organizers' sensitivity to the relationships between aesthetics and social activism.

levels of the individual and of mass society."¹⁹¹ Its premise was that liberation need no longer be deferred, but was possible in the present, a hallmark of utopianism.¹⁹² Marcuse's speech was titled, "Liberation from the Affluent Society."

In his multivalent critique of technological society, Marcuse implicated both the closed, Western ideology of technological rationalism and the use of domestic, military and communication technologies as instruments of social control both at home and abroad.

Marcuse wrote,

In the face of the totalitarian features of this society, the traditional notion of the 'neutrality' of technology can no longer be maintained. Technology as such cannot be isolated from the use to which it is put; the technological society is a system of domination which operates already in the concept and construction of techniques.¹⁹³

Marcuse cautioned against the "neutrality" of technology and the technological object, which appear as value-free instruments within society, the "object-world."¹⁹⁴ These instruments are associated with work, leisure, production and consumption. He claimed

¹⁹¹ David Cooper, ed. *The Dialectics of Liberation*, (Harmondsworth: Baltimore: Penguin, 1968) Back cover.

¹⁹² David Cooper wrote in his introduction to the book documenting the Congress "There is always some sort of spurious messiah who arouses hope and then disappoints hope. This is not the 'fault' of the 'messiah' -it is the fault of 'hope'. Hope has to have another appointment. Not now and not then, but some other time, its own time - *which is our time*. [italics mine]" David Cooper, ed. *The Dialectics of Liberation* (Harmondsworth/Baltimore: Penguin, 1968).

¹⁹³ Herbert Marcuse, One Dimensional Man: Studies in the Ideology of Advanced Industrial Society (Boston: Beacon Press, 1964), xlviii.

¹⁹⁴ Marcuse, *One Dimensional Man*, 218. For Marcuse, the object-world referred to the chosen ideological framework on which society is based. It represented a determinate choice, among many possibilities, by which human beings selected to organize their world. It should be seen in contrast to the *Lebenswelt* or life-world, which for Marcuse was the "aesthetic universe," where freedom could be cultivated. See Marcuse, *An Essay on Liberation* (Boston: Beacon Press, 1969), 31 for his discussion of the *lebenswelt*. Rosler often discussed the object-world in her essays, referring usually to the detritus resulting from capitalist consumer society. See her essay, "Video: Shedding the Utopian Moment."

that Americans have organized their reality this way by choice, and through it, have achieved a system of domination.

In *Essay on Liberation* (1969), Marcuse also spoke of the unique role to be played by artists in facilitating positive social change, believing that art, along with philosophy, was the means by which alternatives could be imagined, and that art and technology were key to the functioning of that new society.¹⁹⁵ In his book, he seems to exhort artists to create transgressive work that does not capitulate to consumerism by assimilating its forms. He expresses concern that art had not yet managed to reject absorption into the marketplace. He wrote,

Just like the more and more organized "happenings," like the ever more marketable pop art, this ambiance creates a deceptive "community" within the society. The conquest of this immediate familiarity, "the mediations" which would make the many forms of rebellious art a liberating force on the societal scale (that is to say, a subverting force) are yet to be attained.

His observation that art had not yet achieved liberation is leavened by his confident assertion that subversive or "anti-art of today" anticipates a stage in society where the construction of the real world would be akin to the construction of art in "a union of liberating art and liberating technology."

¹⁹⁵ Marcuse, *One-Dimensional Man*, xvii. Kellner wrote of Marcuse, "Marcuse believes that great philosophy and art are the locus of these potentialities and critical norms, and he decodes the best products of Western culture in this light." It is important to note that Marcuse's writing on this subject developed over time and was often misunderstood. He did, however, consistently uphold Surrealism as an example capable of transcending the object-world, leading to a reality formed by the aesthetic sensibility of man. Rosler (and others) disagreed with him on this point, believing that Surrealism represented an escape, rather than an engagement with the world. While she departed from him on this specific point, I argue that his broader theoretical criticism of American technological society continued to inform and inspire her work into the 1980s. For Marcuse's view on the role of art in the political struggle see Herbert Marcuse, *An Essay on Liberation*, 12 and 27-32.

Thus, Marcuse's project was also one of liberation. He taught, lectured and published his critique of capitalism because he meant to inspire a desire for change among intellectuals and youth. Philosopher and activist, Angela Davis, whom Rosler also knew in San Diego, was a student of Marcuse's.¹⁹⁶ She wrote of her teacher, "One of the most salient and persistent aspects of Marcuse's work is his concern with the possibilities of utopia."¹⁹⁷ While Marcuse saw technology in the U.S. as an insidiously neutral instrument of capitalist domination bound up with war, consumerism, advertising and mass culture, he also saw it as necessary for the transformation and liberation of society and the individual.¹⁹⁸ Marcuse's views were widely disseminated through the New Left, which claimed him as their philosophical father.¹⁹⁹

The U.S. New Left was founded with the purpose to sustain a democratic and egalitarian socialist movement and focused initially on racial bigotry and nuclear weapons. It arose in part as a response to an open letter written by sociologist C. Wright Mills in 1960 in which he argued for a shift from traditional leftism toward a countercultural, social activist organization.²⁰⁰ In 1962, New Left activists formed the Students for a Democratic Society (SDS), a student movement committed to non-violent civil disobedience. Initially

 ¹⁹⁶ Benjamin Buchloh, "A Conversation with Martha Rosler, in Martha Rosler," in M. Catherine de Zegher, and Ikon Gallery. *Martha Rosler : Positions in the Life World* (Birmingham, England, Vienna, Austria, Cambridge, Mass.: Ikon Gallery ; Generali Foundation ;MIT Press, 1998), 32.
¹⁹⁷ Douglas Kellner, ed. *Herbert Marcuse: The New Left and the 1960s*. Six vols. Vol. Three,

Collected Papers of Herbert Marcuse (London; New York: Routledge, 2005), vii. and ix. ¹⁹⁸ Marcuse, *One Dimensional Man*, xv.

¹⁹⁹ In his introduction to *One Dimensional Man*, Douglas Kellner explained that Marcuse was presented in the media as a 'guru of the New Left.' Marcuse. *One Dimensional Man*, xxxvi. See also Alain Martineau and Herbert Marcuse, *Herbert Marcuse's Utopia* (Montreal: Harvest House, 1986).

²⁰⁰ C. Wright Mills, "Letter to the New Left," *New Left Review*, no. 5 (1960).

calling for participatory democracy and civil rights, the SDS grew dramatically in 1965, after the introduction of ground combat troops in Vietnam focused the group's efforts on ending the war. While issues of race and class were central to the SDS overall agenda of reforming American society, women's issues were not within its scope. As women worked diligently within the movement, they became increasingly alarmed that their concerns were not being addressed. In 1967, the SDS National Council subsumed women's issues under the broader issue of "building the anti-imperialist movement within this country."²⁰¹ Women within the movement protested and eventually broke from it to stage their own anti-war protests, on their terms. On January 15, 1968, the group Women Strike for Peace (WSP), motivated by the goal of recruiting huge numbers of American women to protest the war, staged an all-woman protest against the Vietnam War.²⁰² In many ways, the anti-war movement helped to define the American women's movement: giving women the skills and experience to organize, the consciousness and will to fight existing societal norms, and the opportunity to see the marginalizing effects of patriarchal political organization within their own movement.

In the 1960s, both Rosler and Schneemann embraced New Left policies, which rejected prevailing authority structures and decried the ills of affluent society including the expansion of systems of global capitalism.²⁰³ When I asked Schneemann recently

²⁰¹ Barbara L. Tischler, "All Power to the Imagination! Antiwar Activism and Emerging Feminism in the Late 1960's" *America, the Vietnam War, and the World: Comparative and International Perspectives*, ed. Andreas W. Daum, Lloyd C. Gardner, and Wilfried Mausbach (Washington D.C.: Cambridge: New York: Cambridge University Press, 2003), 329.

²⁰² Ruth Rosen, *The World Split Open: How the Modern Women's Movement Changed America* (New York: Viking, 2000), 201.

²⁰³ Kellner, ed. *Herbert Marcuse: The New Left and the 1960s*, 3.

whether she saw herself as politically engaged with New Left ideas at that time she replied,

You betcha! Yeah. How else would this happen? We were subversive. We were "dangerous" as thoughtful radical people are. We knew some of the Weather Underground... There was this wonderful mixture. It was very rich and sinister at the time.²⁰⁴

While there may be advantage in aligning herself with the counterculture in hindsight, the artist had discussed her anti-war stance and leftist sympathies many times in the 1960s.²⁰⁵ Similarly, Rosler submitted photomontages critical of the Vietnam War to New Left journals in the 1960s and early 1970s. In the late 1960s, she joined the Women's Liberation Front at the University of California at San Diego, which was involved in women's rights and the anti-war movement.²⁰⁶

By the late 1960s, Roszak had repackaged as countercultural Marcuse's ideas on technocratic social forms in his widely-read book *The Making of a Counter Culture:*

²⁰⁴ Unpublished interview with the Artist, Springtown, NY, January 15, 2007.

²⁰⁵ Schneemann lamented the lack of activism among artists in New York in response to the war in a letter written in 1966, "Something soft happens here…like the helpless, apathy over, what is now, our Dirty War; there is almost no motion towards political engagement, statement, by the advanced artists here." Carolee Schneemann and Bruce R. McPherson, *More Than Meat Joy* : *Performance Works and Selected Writings*. 2nd ed. (Kingston, NY: McPherson & Co., 1997), 119. The artist concluded notes, written in 1966, for her performance work *Snows*, as follows, "Movement, Mass Murder Vietnam Peace Parade Committee Commitment." Schneemann and McPhereson, *More than Meat Joy*, 121. Schneemann commented in 1980 in a panel discussion with Lucy Lippard, "There wasn't a marked division at that time, for me, between the street movement—organizing sensitivity awareness to police intrusions on group gatherings—that social situation, that political commitment was related to any kind of esthetic groundwork being explored. It was all more of a piece. It was a much smaller world. It was more unified. At this point I no longer know who my audience is." *Time and Space Concepts in Art*, Edited by Marilyn Belford and Jerry Herman (New York: Pleiades Gallery, 1980), 28.

²⁰⁶ Unpublished Interview with the Artist, Brooklyn, NY, August 23, 2007. The journals included the feminist journal *Goodbye to All That*, *Mayday* and *Canada*. The artist also handed out Xeroxes of the images at demonstrations. Rosler said she joined the Women's Liberation Front in either 1968 or 1969.

Reflections on the Technocratic Society and its Youthful Opposition (1969), in which he devoted an entire chapter to Marcuse, entitled "The Dialectics of Liberation." Roszak characterized American society as a technocracy (a term used often by Schneemann to describe her country), which he defined as follows.²⁰⁷

[American] society [is one] in which those who govern justify themselves by appeal to technical experts who, in turn, justify themselves by appeal to scientific forms of knowledge. And beyond the authority of science, there is no appeal.²⁰⁸

In his definition, Roszak implicated scientific forms of knowledge, which he viewed as

mechanistic and all encompassing. He continued,

So subtle and so well rationalized have the arts of technocratic domination become in our advanced industrial societies that even those in the state and/or corporate structure who dominate our lives must find it impossible to conceive of themselves as the agents of a totalitarian control.²⁰⁹

He further warned his readers that the technocracy renders itself "ideologically invisible,"²¹⁰ a concern Rosler echoed in the following recent remark.

one had to be cognizant of the technologies in use and of the role of technology and the tendency to bureaucratize in relationship to technological developments.... For example, the way that knowledge was being instrumentalized and all kinds of educational elements were being instrumentalized because the possibilities of data management were increasing and so everything could be turned into numerical data

²⁰⁷ Roszak has claimed that he coined the term "counterculture" in 1968. While he did popularize the term, it had been in limited use within the field of sociology earlier in the 1960s. Theodore Roszak, Book Review, "When the Counterculture Counted," The San Francisco Chronicle, Sunday, December 23, 2001. p. RV-3. For sociological uses of the term see J. Milton Yinger, "Contraculture and Subculture," *American Sociological Review*, Vol. 25, No. 5 (Oct., 1960), pp. 625-635; and David J. Bordua, "Delinquent Subcultures: Sociological Interpretations of Gang Delinquency," *Annals of the American Academy of Political and Social Science*, Vol. 338, Teen-Age Culture (Nov., 1961), pp. 119-136

²⁰⁸ Theodore Roszak, *The Making of a Counter Culture : Reflections on the Technocratic Society and Its Youthful Opposition* (Garden City, N.Y.: Doubleday, 1969), 7-8.

²⁰⁹ Roszak, *The Making of a Counter Culture*, 9.

²¹⁰ Roszak, *The Making of a Counter Culture*, 8.

steps. And we've seen that multiplied to the point that quantification is a ruling idea in our lives.²¹¹ [italics mine]

Rosler here talks about technology as a system of oppression, a system about which responsible and informed citizens must remain aware. She described it as the means by which American society was organized according to rationalized, bureaucratic systems based on cause-and-effect relationships.

Despite their strong critiques of war and the American military-industrial-complex, Rosler and Schneemann sought out 'new' technologies like film, photography and later video for the creation of their work. They chose these technologies for several reasons. First, by the late 1950s, younger artists began chafing against the monolith of abstract expressionism, or, as art historian Thomas McEvilley referred to it, "the traditional maleheroic genre of easel painting."²¹² Theorized at the time by critics such as Clement Greenberg, abstract expressionism commanded an iconic status, its creators possessing an almost shamanistic ability to reveal the essence of human emotion. Work by many abstract expressionist artists became coveted commodities, which undermined its supposed spiritual purity. Marketed abroad by the CIA as the first truly American art movement, works by Jackson Pollock and Willem DeKooning commanded large sums in American galleries.²¹³ In response to the hypocrisy of art as rarified but also

²¹¹ Unpublished interview with the Artist, Brooklyn, NY, August 23, 2007.

²¹² Reprinted in Peter Selz, "Agnes Denes: The Artist as Universalist" in Agnes Denes, Jill Hartz, ed., Intro. Thomas W. Leavitt., Donald Kuspit Essays by: Robert Carleton Hobbs, Peter Selz, Lowry Stokes Sims., and Herbert F. Johnson Museum of Art. *Agnes Denes*. (Ithaca, N.Y.: Hebert F. Johnson Museum of Art, Cornell University, 1992).

²¹³ Greg Barnhisel wrote, "the United States-primarily through the Central Intelligence Agency (CIA), the United States Information Agency (USIA), and the cultural officers of the State Department-undertook an effort to "increase cultural understanding" between Europe and itself,

commodified, Schneemann and Rosler along with many of their peers, heeded artist and theorist Allan Kaprow's call in 1959 for a blurring of the boundaries between art and life by utilizing technology-based media, film and photography respectively, that subverted the high art media of painting.²¹⁴

Photography and film, long the poor step-children of the 'fine' arts, offered a means of expression that subverted painting and sculpture as well as the structure of the commodity-driven art market, because images could be reproduced relatively cheaply, and these media eschewed the notion of the direct touch of the heroic male artist. Schneemann, who discussed film in the same context Rosler spoke of video, taught all the film and video courses at Rutgers University from 1976-1978, as the art department's first female artist on faculty.²¹⁵ When asked whether Super 8 offered her particular advantages Schneemann responded, "Yes indeed for me – because it was "too slight" for MEN; since they didn't want it we could have it. And it is not proscribed with masculine aesthetic traditions."²¹⁶ In the late 1960s and early 1970s, many artists believed that these media represented a subversion of 'high' art categories, a means of undermining the

an effort centered on the construction of an image of the U.S. with an intellectual and cultural life equal to, and in dialogue with, Europe's, an image which the U.S. then aggressively marketed to those skeptical European leftists." Greg Barnhisel, "Perspectives USA and the Cultural Cold War: Modernism in Service of the State." *Modernism/Modernity* 14, no. 4 (2007): 729-54): 729) He wrote further, "A depoliticized modernism, identified as "modernist" by virtue of formal and stylistic characteristics (including difficulty), presented as the work of heroic individualists working in a free society, and used as evidence "that American society was so free ideologically that no form was too experimental or abstruse for toleration and even support," was a key component of cold-war era rhetoric." Barnhisel, 735.

²¹⁴ Allan Kaprow, "Assemblages, Environments and Happenings," 1959, a portion of which is reprinted in Charles Harrison and Paul Wood, *Art in Theory, 1900-1990 : An Anthology of Changing Ideas* (Oxford, UK ; Cambridge, Mass., USA: Blackwell, 1993)

 ²¹⁵ Hendricks, *Critical Mass : Happenings, Fluxus, Performance, Intermedia, and Rutgers University, 1958-1972*, ix. See also "A letter from Schneemann to Daryl Chin," 1975 in Stiles, "Correspondence Course, an Epistolary History of Carolee Schneemann and Her Circle," 348.
²¹⁶ Kristine Stiles, "Introduction," in Kristine Stiles, *Correspondence Course*.

elevated status of the artist as an exalted purveyor of meaning, and of broader engagement with the public outside the gallery system. These media were all the more compelling because they had already infiltrated the lives of the American public in the form of movies, advertising and news photography.

Gender, Technology and War in the Early Work of Martha Rosler

Born in Brooklyn, Rosler attended Yeshiva as a child, which encouraged her to question received knowledge and fostered in her a sense of social responsibility. She majored in art in high school where she was interested in futurism and surrealism. As a teenager in New York in the 1960s, she saw *Potemkin* by Russian director Sergei Eisenstein, whose political montage technique influenced her own early photomontage. Born of apolitical parents (her father was a lawyer and her mother a public school teacher) she was radicalized in high school, becoming involved in anti-nuclear protests at the invitation of older schoolmates. But, she explained some years ago, "It was really the Vietnam War that pushed me decisively to the Left."²¹⁷ Rosler befriended poets in Brooklyn and wrote her own poetry, but she was always interested in science. She was a physics major at Brooklyn College of the City University of New York and an avid science fiction reader.²¹⁸ In 1968, she moved to San Diego, where she was introduced to the west coast art community by poet David Antin and artist Eleanor Antin, both of whom she had

²¹⁷ Buchloh, "A Conversation with Martha Rosler," in Rosler and Zegher, *Martha Rosler: Positions in the Life World*, 23.

²¹⁸ Rosler told me that she was a physics major in college. Unpublished Interview with the Artist, Brooklyn, NY, August 23, 2007. She told Bucholoh that she was an art major in high school. Bucholoh, "Interview with Martha Rosler," in Rosler and Zegher, *Martha Rosler: Positions in the Life World*, 23. Alexander Alberro, "The Dialectics of Everyday Life: Martha Rosler and the Strategy of the Decoy" in Rosler and Zegher, *Martha Rosler : Positions in the Life World*, 23. Alberro wrote of her interest in science fiction.

befriended in New York.²¹⁹ Through David Antin and poet Jerome Rothenberg, she was led to the work of Fluxus, Yoko Ono and Carolee Schneemann.²²⁰ In 1971, she entered the MFA program at University of California, San Diego, where Marcuse and Fredric Jameson were on faculty. She met regularly with a literary group organized by Jameson and sat in on Marcuse's lectures. It was during her teen years in Brooklyn that she began her photomontage series *Body Beautiful, Beauty Knows Know Pain*, 1966-72 and *Bringing the War Home*, 1967-72, which she completed while in San Diego.

In *Body Beautiful* or *Beauty Knows no Pain*, 1966-72 (**figs**. 5, 8, 9) Rosler juxtaposed advertisements of domestic technologies taken from *Vanity Fair* and other women's journals with clippings of women's body parts taken from pornographic magazines in order to reveal how women were presented as both object of the male gaze and as keeper of the home. By selecting her images from magazines marketed to men *and* to women she showed the objects women purchased, as well as the ways in which women were "consumed," in capitalist society. These works bring an overtly feminist approach to montages of advertising images created by Richard Hamilton, such as *Just What Is It that Makes Today's Homes So Different, So Appealing*, 1956. In *Hot Meat*, 1966-72 (**fig.** 8), Rosler superimposed a profile image of a nude woman's upper body and enormous breast onto the front of a white electric oven. Conflating the female body with the mechanical appliance, the artist creates a cyborgian image in which the detached breasts are emphasized as the most important, humanoid parts. The artist observes that large and perfectly-shaped breasts are marketed for consumption in two disparate print media,

²¹⁹ Schneemann also knew the Antins. See Kristine Stiles, *Correspondence Course*.

²²⁰ Martha Rosler, "Statement," in Alexander Alberro and Blake Stimson, *Conceptual Art : A Critical Anthology* (Cambridge, Mass. ; London: MIT Press, 1999), 486.

designed for two very different gender markets. Women are encouraged to covet them, and to buy clothing to accentuate them for the benefit of others, just as they are urged to purchase the latest kitchen appliances, in order to serve their family. The title "Hot Meat," a double entendre, refers to a readily available staple of the middle and upper class American diet and to the apparatus used to cook it, the oven. The title also alludes to a non-autonomous physical body available for use by others: "meat" and to the sexualization of that body, "hot."²²¹ Rosler's montage, completed in the early 1970s, engenders a rational response to the equation of women, particularly "hot" or physically attractive women, with meat, available for consumption and sexual gratification.

In this and other works from the series, women appear as fragmented, headless body parts or objects, sexualized figures intended to entice. Rosler's photomontage *Damp Meat*, 1966-72 (**fig.** 9) depicts cellulite-free, female buttocks plastered to the side of a dishwasher. The lid of the dishwasher is tilted open, inviting the viewer to voyeuristically observe, or help himself to, the contents inside. The word damp, another double-entendre, refers to the function of the machine, to wash dishes, and, presumably, to the lubricated hindquarters of a woman, ready for the taking.

²²¹ The notion of meat as a sexual body was earlier explored by Schneemann in her well-known 1964 performance, *Meat Joy*, in which the artist and her fellow performers ebulliently explored their physicality and sensuality through interactive movement, accentuated by raw fish, chicken and hot dogs strewn across the actors' bodies. *Meat Joy* was influenced in part by beat poet Michael McClure's existentialist poems published in his book *Meat Science Essays* (1963). Like Schneemann's performance, McClure emphasized the physical body over the rational mind (We are all "meat.") and the importance of making sensory connections to the outside world and to others, an imperative mandated by our sexuality.

The artist suggested that in consumer society, dominated by advertising, the American woman is restricted to two primary roles: she exists for the titillation of the male audience and for the consumption of a limited range of technologies. As subject, woman is targeted by companies as the purchaser of household goods appropriate to her domain, the household. In her article, "Man the Maker, Woman the Consumer: The Consumption Junction Revisited," gender and technology scholar Ruth Oldenziel argued that in consumption-based society, women were viewed as technology's passive consumers and end-users only.²²² Similarly, historian Ruth Schwartz Cowan contended that women interacted differently with technology, as workers confined to the home and, ideologically, as people excluded from participation in modern scientific technology.²²³ With acute perception of the way manufacturers and their advertisers perpetuated stereotypes of gender and technology to consolidate their markets and sell their products in the 1960s, Rosler associated the objectified feminine with, arguably, the only technological appliances deemed acceptable for women's use. The notion of a gendered, domestic technology is an important and often overlooked part of Rosler's commentary on the restriction of women to the home or private sphere, an early second-wave feminist analysis famously raised in the post-war period by Betty Freidan.²²⁴

²²² Ruth Oldenziel, "Man the Maker, Woman the Consumer: The Consumption Junction Revisited," in Angela N. H. Creager, Elizabeth Lunbeck, and Londa L. Schiebinger, *Feminism in Twentieth-Century Science, Technology, and Medicine* (Chicago: University of Chicago Press, 2001). Oldenziel's argument has been contested by scholars who have documented greater agency on the part of women in this period.

²²³ Ruth Schwartz Cowan, More Work for Mother : The Ironies of Household Technology from the Open Hearth to the Microwave (New York: Basic Books, 1983).

²²⁴ Betty Friedan and Sallie Bingham Center for Women's History and Culture *The Feminine Mystique* (New York: Norton, 1963).

Rosler's photomontage series *Bringing the War Home*, 1967-72 (**fig.** 3, 10, 11, 12, 13) challenged a simple dichotomy of public and private spheres, pointing out that systems of production and consumption blur the traditional dividing lines.²²⁵ In the series, the artist connected the war, capitalism and technology, which were viewed as integrated systems by Marcuse and the New Left. She juxtaposed battlefield scenes of the Vietnam War taken from *Life* magazine with images of upper-middle class home interiors that had appeared in *House Beautiful*.²²⁶ Rosler selected *House Beautiful* magazine in order to question the ideals of beauty and taste reproduced by editors who chose the images for publication. Once selected, these interiors were carefully manipulated to conform more closely to perceived ideals of beauty. Publications like *House Beautiful* were targeted precisely to the white, middle class, suburban woman who was expected to run a moderately-sized, single-family home and who was believed to require new time and labor-saving appliances, furniture and the proper decorative touches, to make her home suitable for entertaining.

Rosler chose to cull images from *Life* magazine explicitly to question the truth value of documentary photography.²²⁷ Next to televised coverage, *Life* magazine was probably the most popular source of visual imagery of the Vietnam War. Founded in 1936 with the mission,

²²⁵ Art historian Brian Wallis noted of this series, "This version of domestic isolationism is perfectly consistent with the massive reorganization of wealth, property and urban public space that has taken place over the past 20 years (a development that Rosler documented in her three-part exhibition *If You Lived Here*..." Brian Wallis, "Living Room War." *Art in America* 80, no. 2 (1992): 107.

²²⁷ Martha Rosler "In, around, and Afterthoughts (on Documentary Photography)." In *Decoys and Disruptions*, edited by Martha Rosler, 151-206 (Cambridge, MA: MIT Press, 2003): 151-206.

To see life; to see the world; to witness great events... to take pleasure in seeing; to see and be amazed; to see and be instructed; thus to see, and to be shown, is now the will and new expectancy of half mankind.²²⁸

Life magazine was a conservative publication, sympathetic to U.S. government concerns. It sold 8.5 million copies a week at its peak.²²⁹ Following a corporate model, specialists who sought to appeal to a conservative, middle-class American readership edited the publication. After World War II, the government released restrictions on wartime coverage that had prevented depictions of American dead or allied wrongdoing. Smaller cameras and faster films allowed photographers into the thick of the fighting. The Vietnam War was among the first to be depicted with color photographs, which served to heighten the immediacy and the tragedy of war.²³⁰

By selecting her images from mass media publications, the artist revealed its role in reinforcing gender stereotypes. In *Cleaning the Drapes*, 1967-72 (**fig. 3**), a photomontage from her *Bringing the War Home* series, Rosler depicted a woman with a vacuum cleaner pulling back her curtain to a very different and threatening world outside – a Vietnam War battlefield. The image reveals the woman as caretaker of the home. Safe within her domain, she opens the drapes and looks onto a world she took little part in making, but had taken no action to alter. The juxtaposition of an ideal American living

²²⁸ Robert Hirsch, *Seizing the Light: A History of Photography* (Boston: McGraw Hill, 2000), 319.

²²⁹ Hirsch, 319.

²³⁰ Hirsch, 334. While many politicians claimed these images fed the anti-war movement, war photographer Phillip Jones Griffiths gave the following account, "I would say 99 percent of all journalists in Vietnam approved of the war and 85 percent approved of the way the war was being fought... In fact, for the most part, the press in those early years was instrumental in making the war continue because most of what was recorded by the press was very, very pro military intervention there."

room with a sinister zone of combat represents a clash between the American utopia (in the traditional sense) of suburban living and its dystopic underside. Here, technology is enveloped in a multivalent critique of consumption. The woman holds the vacuum hose at a diagonal, which functions as a mirror image of the gun near the soldier on the other side of the curtain. Together, gun and vacuum hose form a compositional pyramid that joins military and domestic technologies, both of which reinforce gender roles. According to Marcuse, these objects also served to perpetuate limitations on human freedom. The woman remained enslaved by technological instruments that improved her ability to support her home and family according to society's standards. At the same time, American society remained enslaved by wars fought to uphold capitalist ideals.

In this series, Rosler played upon the moniker of the Vietnam War as the first 'living room war,' as noted by art historian Brian Wallis, implying that for the first time, Americans were able to experience live-action footage of the war from the comfort of their homes.²³¹ The presence of the curtain in *Cleaning the Drapes*, which otherwise separated the woman from the war, unveiled the action as a staged drama. This, Rosler asserted, is another form of capitalist consumption. The broadcasting of the war into America's living rooms separated Americans from the devastation wrought by the U.S. upon other countries. Safe within their homes, Americans consumed a foreign war served up by broadcast television for their entertainment. The distribution of visual

²³¹ Brian Wallis, "Living Room War." *Art in America* 80, no. 2 (1992): 107. See also Edward Doyle and Samuel Lipsman, *The Vietnam Experience: America Takes Over* (Boston: Boston Publishing Company, 1982), 8. By mid-summer 1965, all three American television networks had a full-time correspondent in Saigon, South Vietnam. Other television and magazine reporters followed, helping to establish Vietnam as the first 'Living Room War.' "In the four months between April 1 and July 31, 1965, *Time* and *Newsweek* each ran four cover stories on the war in Vietnam."

evidence of the war via television and *Life* Magazine perpetuated the dominance of U.S. culture via its military. The artist commented on the work in a recent interview,

the home in a way is also a military technology. If you think of the public and the private as increasingly intertwined so that it's no longer a haven in a heartless world, but rather it's two halves of one society, of production and reproduction, which of course is feminist insight... Then the home itself is a militarized technology and of course we see more and more that that's the case.²³²

Rosler's comment notes a conflation of the two spheres in a systematic relationship, illustrated by the adaptation of military technologies (and the infrastructures used to build them) to commercial use following the war.²³³ The artist also referred to the suburban home as an outgrowth of war.

The suburban home represented an escape from the city; the long held locus of public life, to the private domain where class and race conflict could be avoided.²³⁴ After WWII, increasing industrialization provided ample job opportunities to returning veterans, accompanied by housing shortages. In response, the government established federal housing programs to stimulate the development of mass-produced suburban homes to accommodate working class GI's and their families. FHA long term, low interest mortgage rates allowed GI's to afford dwellings in housing projects built outside urban industrial areas. According to scholar Dolores Hayden, many of these suburbs were based on the popular Levittown model of the suburban home as a haven for the male worker's family.

²³² Unpublished interview with the Author, Brooklyn, NY, August 23, 2007.

²³³ Examples include nuclear power, computer systems, flight technologies and Buckminster Fuller's project to apply military technologies to the building of energy efficient, affordable, mass-producible homes.

²³⁴ Dolores Hayden, *Redesigning the American Dream: the Future of Housing, Work, and Family Life* (New York: W.W. Norton, 1984), 12.

In Rosler's comment above and in this series, she questioned accepted notions of the home as the converse of the public sphere, the place where American men could retreat from the worries of public life to the comfort of their wife and children. Single-family, suburban homes were designed and marketed as the ideal escape for white, middle, working-class families, and they were particularly marketed to white-middle class women who had understood since the nineteenth century that their place was in the home.²³⁵ In *Cleaning the Drapes*, Rosler called attention to the division between the spheres, but then emphasized the breach. The soldiers invade the space of the home. The soldier on the left, for example, seems to gaze into the window as the woman looks out. The rocks that surround and protect the men become much larger in the foreground, seeming to spill into the living room as if the curtains can no longer contain them. The point is reinforced in *Red Stripe Kitchen* (fig. 13), in which two soldiers literally trudge through a pristine, white kitchen (made chic by a broad, undulating red brushstroke) peering around corners for the enemy. The artist suggested that the separation between spheres is a ruse reinforced by the government and the mass media: the government sought to shield constituents from its military objectives, while the mass media perpetuated gendered stereotypes in order to maintain, and thus cater to, segmented markets. With their roles clearly defined, the soldier, the implied man of the family, and the housewife, were all both pawns in a larger game. In effect, Rosler held a mirror to the pacified woman consumer, urging her to recognize her complicity with the system. The artist suggested that thick, richly patterned designer draperies should no longer, and could no longer, shield women from political realities.

²³⁵ Hayden, 42.

The artist raised similar concerns in *Beauty Rest*, 1967-72 (fig. 10), in which she depicted a young, upper-middle class American family, lounging on a Beauty Rest mattress. In the montage, the sumptuous, top-of-the-line, king-sized bed and box spring float on rising water in the midst of a bombed out shell that, ostensibly, once housed a Vietnamese family. The curtains are in tatters, the walls and window ledges pockmarked by debris. Meanwhile, the young father in his silk pajamas demonstrates the capabilities of a toy fighter plane for his small, blond son, while the perfectly-coifed mother reads her magazine (Is it Life Magazine?), seemingly unaware of the interaction taking place beside her. She is in a world of her own while the father and son share their mutual appreciation for the tools of war. Here again, Rosler sought to expose the interrelationships between public and private uses of technology. She explained that there is a continuum between the ideals of society and the ideals of the home, where the notion of military force is normalized. It is the continuum she sought to expose. She commented, "For example it's perfectly normal for little boys to have ever larger militarized toys and to dress infants in camouflage... there's still this ego ideal for the males."²³⁶ In this image, Rosler suggested that military technology is deemed a masculine instrument, made and used by men who, through their technologies, succeed in segregating women from the society *they* have designed.

As an active, radical feminist who placed her photomontages in feminist magazines, Rosler sought to alert women to their own subjugation in a social structure that reified technology and associated its conception and construction with men. Not only did these

²³⁶ Unpublished interview with the Artists, Brooklyn, NY, August 23, 2007.

images call attention to defacto associations of men and military technologies, they also implicated women. By including images of blissfully unaware, upper-middle class women in *Cleaning the Drapes* and *Beauty Rest*, the artist sought, in a sense, to shame them for their collusion in a social system that marginalized them. These images were a visceral call to action for all Americans with conscience to face the inequity and repression in capitalist society. Consider the woman in *Cleaning the Drapes*. She is surely aware of the limited opportunity afforded women to participate in public life. Rosler may in fact impugn her for her denial of the consequences of the war and for her unwillingness to participate in the political debate that allowed it to continue. The artist explained that she saw a commitment to feminism as "necessitating a principled criticism of economic and social power relations and some commitment to collective action."²³⁷

In other montages from this series, the artist featured not American, but Asian women, presumed victims of the war, meant to shame all Americans for the violence enacted in Vietnam. In these images, Rosler showed the impact of U.S. intervention on civilians. In *Balloons*, (**fig.** 11) a small Asian woman stands within a pristine, well decorated home, a pile of balloons from a recent festivity conspicuously deflated in the corner. Dressed simply and humbly, the woman is clearly out of place in her surroundings which evoke wealth and comfort. She holds a limp, partially clothed, unresponsive infant and her face expresses anxiety or concern. The surprisingly small scale of the pair compared to the wall, window and furniture in the room, indicates their tenuousness. The woman is clearly engulfed by her surroundings. The shelf immediately behind her, on which the

²³⁷ Martha Rosler, "The Private and the Public: Feminist Art in California," *Artforum* 8 (April 1975): 46.

plant sits, is not perpendicular to the wall but at a raking angle, with the corner, like the tip of an arrow, pointed directly at her head. Thrust into the foreground against a ledge, she leans precariously backward. Her legs are not visible to the viewer, further undermining her stability. Visually, she is swallowed by the home. The woman with her child, seen through Christian eyes, may evoke the image of Mary with the child Jesus, or perhaps the older Mary holding her adult son after his removal from the cross. Within the context of the feminist movement, the image of the woman with her child may also symbolize the Moral Mother as Ruth Roach Pierson described in her essay, "Women in War, Peace and Revolution." Within the feminist movement of the 1970's the Moral Mother opposed woman as warrior, promoting instead nurturant and compassionate woman, a symbol of life and all its vulnerability.²³⁸

In a world in which gender is a principle articulator of the social order, and in which it is men who wage war, women may take on a particular objectified importance as 'the protected,' or even as the custodians of the social values that the men are fighting for.²³⁹

Because soldiers were often goaded to achieve by superior officers who compared them to women or girls when they performed poorly, feminists saw warfare as bound up with violence against women.²⁴⁰ Militarism, like patriarchy from which it was derived, was a social construction and it also perpetuated gender norms.²⁴¹

²³⁸ Sharon Macdonald, Pat Holden, Shirley Ardener, ed. *Images of Women in Peace and War:* Cross Cultural and Historical Perspectives (London: Macmillan Education Limited, 1987), 223. ²³⁹ MacDonald, 15.

²⁴⁰ MacDonald, 16.

²⁴¹ MacDonald, 224.

In Tron (Amputee) (fig. 12), a young Asian girl with her lower leg removed stands in the foreground of a well-appointed, upper, middle-class American living room, complete with sectional sofa and television. Like the mother in *Balloons*, the amputee is also at the edge of the picture plane, extending her right arm beyond it. Whether she is being pulled *into* the spacious American living room, or seeks a way *out*, the artist seems to indicate that she, like her forlorn counterpart, is uncomfortable in her surroundings. The octagonal shape of the room, rushing back to a vanishing point, creates another discordant space in which a rib of the ceiling vault seemingly penetrates the girl at the neck. In these montages, Rosler suggests that the lush domestic environs, like American capitalism, were being imposed upon these women through the American occupation. She makes clear, as had Marcuse, that both societies are bound to the machinations of war and domination made possible by technology. War served the needs of the status quo and of industry, and simultaneously enforced western dominance over non-western nations. By including women as victims of war, the artist highlighted the magnitude of the problem, hoping to induce her audience to take action and protest. She said,

over there and over here are inextricably linked. *We* are doing this. In other words there are a couple ways to think about how these montages operate, not just by saying that the war is inside our homes, but that even if it weren't, it is tied to us because it's our society. *We* are doing this. This is a democracy and this is our responsibility.²⁴²

Rosler rallied against the imposition of American ideology and consumerism on the Vietnamese, which she saw as another form of victimization. By subverting expectations, placing a woman of a perceived race and class in an unexpected context, Rosler also challenged notions of class and race. At the same time, she reaffirmed the

²⁴² Unpublished Interview with the Artist, Brooklyn, NY, August 23, 2007.

expectations of her predominantly American viewers, whom she sought to inform and persuade, that Vietnamese women and children were merely helpless innocents within the conflict. Unlike the American women in her montages, who remain largely aloof to the upheaval around them, the suffering Indo-Chinese are intended to provoke a sympathetic response. In order to visually characterize the U.S. as a controlling force indiscriminately exerting its will, the declared foe must be presented as meek, undeserving of the abuses heaped upon them and therefore morally above the fray.

Rosler shared Marcuse's view that technology is an instrument of the capitalist system of domination. Perhaps more importantly, she shared his view of technology as emancipatory.²⁴³ Rosler's utopianism was similar to Marcuse's vision for a transformed society in which technology served to eradicate class divisions rather than perpetuate and deepen them as he believed capitalism had done. Referring to her works as agitational propaganda, Rosler sought to shock the viewer into conceiving her own alternative to the existing world.

While many view her work as critical only, as completely dystopian, she believed that through confrontation, her work urged viewers to conceive their own solutions. She was careful not to specify the solution herself, because she saw change as an ongoing process. She commented in an interview in 1998,

One of the things I have never wanted to do, and I hope I have never done, is to tell people what to do. I'd rather be saying, "here is the problem—why don't you come

²⁴³ New Museum, "Martha Rosler: Positions in the Life World"

http://www.newmuseum.org/more_exh_m_rosler.php (accessed August 22, 2006).

up with a solution?'... if someone shows you where the door is and points to the handle, they are saying that it may be closed, but you can open it and walk through, and maybe you'll be able to do something really great.²⁴⁴

While Rosler's work seems didactic in its presentation of social issues that she felt needed to be remedied, the artist did not seek to mandate a prescribed solution. In this way, it is consistent with feminist utopianism. Her work is meant to initiate a dialogue about issues, and encourage viewers to address them through an ongoing participatory process.

Simply by choosing the medium of photomontage, Rosler has made evident her motive to provoke recognition of the problem and a desire for change. Photomontage is inherently disjunctive, and therefore a medium particularly well suited to question social norms. By juxtaposing images taken from two sources that conformed to conservative American values: *Life* magazine and *House Beautiful*, Rosler revealed her intent to convey a message, or more accurately a set of messages, with many layers of meaning. The artist's use of photomontage is a conscious reference to Dada artists such as John Heartfield, an important influence for her.²⁴⁵

Heartfield, a vocal member of the Communist party in Berlin, combined images culled from advertising and newspapers to question the excesses of the Weimar Republic, and later, the National Socialist Party. Just as Heartfield had juxtaposed image and text to imitate newspaper accounts that communicated a dominant view, Rosler used

²⁴⁴ Buchloh, "Interview with the Artist" in Rosler and Zegher, *Martha Rosler : Positions in the Life World*.

²⁴⁵ Martha Rosler, *Decoys and Disruptions : Selected Writings, 1975-2001* (Cambridge, Mass.: MIT Press in association with International Center of Photography, New York, 2004), 279.

photomontage to similar ends. Like her Dada predecessors, she incorporated documentary photographs from newspapers, purported purveyors of "truth;" and advertising images that embody American consumption into her work as reflexive critiques of both media. She viewed documentary photography and advertising as instruments that perpetuate the ideology of capitalist society by bombarding the viewer and dissipating critical thought.

Rosler was also strongly influenced by the German playwright Bertolt Brecht, whose works she saw at the Living Theatre in New York in the 1960s.²⁴⁶ Brecht pursued a Marxist-based understanding of human society in his epic theater of the early 20th century. In his 1964 publication, "Theatre for the Scientific Age," Brecht argued that, since the Renaissance, the ruling class had prevented the analysis of social relations by scientific reason, in order to preserve its own social dominance. In other words, society functioned according to rational, scientific principles, which as such, could not be questioned. A case in point was his 1940 play *Galileo*, based on the philosopher/scientist's later life that examined the tension between the Catholic Church and science. The play was published and shown first in the U.S., where the playwright lived briefly during the 1940s.

Brecht created his Marxist theatre in order to expose the hidden power relations that were obscured by the seemingly natural social ideologies upon which capitalist society was

²⁴⁶ Telephone Conversation with the Artist, April 30, 2005. See also Buchloh, "Interview with the Artist" in Rosler and Zegher, *Martha Rosler : Positions in the Life World*, 26. Rosler told Buchloh that she had seen Brecht's plays produced at the Living Theater in the 1960s.

based.²⁴⁷ He sought to encourage his audience to change existing power relationships by appealing to their intellect rather than to more easily manipulated emotions. He minimized impassioned or sentimental involvement by having his actors dissociate from their roles, and remain physically, emotionally and verbally detached from the narrative.²⁴⁸ Consistent with Brecht's theory of epic theater, Rosler kept her viewers at an emotional distance from her work so they would engage in a rational, self-reflective and critical reading. By combining obviously incongruent, photomontaged images, she reminded the viewer that her works were representations or metaphors of reality, not reality itself. For example, in *Cleaning the Drapes*, it is apparent that the image of the housekeeper and the battlefield are disparate, in fact their contrast is so striking that the viewer is left to intellectually determine their connection and the meaning of the whole. While surprise may be the first response, a rational urge to analyze the relationship between the two soon follows.

In the tradition of Brecht and Heartfield, Rosler rejected the role of authoritative narrator, joining obviously disparate photographic images and allowing the viewer to come to her own conclusions. The artist claimed that one of the reasons she chose photomontage was so that the images would appear made, in the hope that others would feel they could do it too and thus become politically involved.²⁴⁹ Exposure of the process involved in making the work, rather than unveiling a perfect, finished product, subverted what was viewed by

²⁴⁷ Colin Counsell, *Signs of Performance: An Introduction to Twentieth Century Theatre* (New York: Routledge, 1996).

²⁴⁸ John Willett, ed. and trans., *Brecht on Theatre: The Development of an Aesthetic*, (New York: Hill and Wang, 1964).

²⁴⁹ Unpublished lecture by the artist at Mason Gross School of Art, Rutgers University, New Brunswick, NJ, April 14, 2004.
the counterculture as closed, deceitful practices associated in part with the surreptitious origin of the war in Vietnam in the late 1950s, several years before the declared beginning in 1965.²⁵⁰

Nearly the entire body of Rosler's work can be seen as the perpetuation of social struggle. The artist was explicit about her aims in an 1981 interview.

I very much believe in the idea of liberation, which I see as a personal project within a social project. I think it's possible to gain some degree of self-determination within a capitalist system. But ultimately there is no liberation without a complete change in society.²⁵¹

Rosler's critique of technology is an important, yet often overlooked component of her political project, but concern with technology is afforded even less attention in the work of Schneemann.

Carolee Schneemann: War and Gender in Film and Performance

Schneemann grew up in rural Illinois, the daughter of a country doctor. As a teenager, she was compelled to care for her siblings during her mother's depression and through the experience of taking on responsibilities for the family, determined by her gender, her feminist consciousness was raised.²⁵² She was awarded a full scholarship to Bard College in upstate New York, where she studied with German philosopher and poet Heinrich Blucher, husband of political theorist Hannah Arendt, who fostered her interest

²⁵⁰ Robert C. Morgan, "Carolee Schneemann's Viet-Flakes (1965)," in Carolee Schneemann,

Imaging Her Erotics : Carolee Schneemann : Essays, Interviews, Projects, 86. Morgan explained that the artist felt the Vietnam War was a clandestine war being fought without the full knowledge of the American people.

²⁵¹ Jane Weinstock, "Interview with Martha Rosler," *October* (Summer 1981): 87.

²⁵² Kristine Stiles, "Introduction," in Kristine Stiles, Correspondence Course.

in Marxism.²⁵³ On leave from Bard, she studied painting at Columbia University, where she met her first husband Jim Tenney, then at Julliard. She returned with Tenney to the mid-West to pursue her MFA at the University of Illinois, but by 1962, the pair was back in New York. Tenney, a composer of experimental music, had been offered a position at Bell Labs where he befriended physicist Billy Klüver, a founder of Experiments in Art and Technology (E.A.T.). Through Klüver, Schneemann met artists Claes and Patty Oldenberg, Robert Rauschenberg, and Fluxus artist George Brecht. She quickly became entwined with the New York avant-guard, meeting Marcel Duchamp, Yvonne Rainer, Robert Morris, Simone Forti and Fluxus artist Robert Whitman.²⁵⁴ During this period, she created sculptural assemblages, films and her kinetic theater pieces, including *Eye Body*, 1963, *Meat Joy*, 1964 (**fig**. 14), *Fuses*, 1965 (**fig**. 15), *Viet-Flakes*, 1966 (**fig**. 1) and *Snows*, 1967 (**fig. 2**), for which she is best known.

Schneemann often collaborated with members of Fluxus on projects, but because she dealt with the nude female body in what were deemed overtly theatrical performances, she was excommunicated from the group in the mid-1960s by the self-proclaimed leader of Fluxus George Maciunas.²⁵⁵ She is commonly categorized as a performance artist with an interest in exploring sexual taboos from a woman's perspective. Arguably, the mere fact that so much of her work has dealt with sexually-explicit content, has dissuaded

²⁵³ Kristine Stiles, "Introduction," in Kristine Stiles, Correspondence Course.

²⁵⁴ Schneemann and McPherson, *More Than Meat Joy*, 148.

²⁵⁵ Kristine Stiles, "Anomaly, Sky, Sex and Psi in Fluxus" in Geoffrey Hendricks, Mead Art Museum (Amherst College), and Mason Gross School of the Arts (Rutgers University) *Critical Mass : Happenings, Fluxus, Performance, Intermedia, and Rutgers University, 1958-1972*, 69.

critics and historians from assessing other important aspects of her work.²⁵⁶ Her work is not normally viewed as dealing with science and technology, in spite of the fact that she was one of the first post-war American artists to use film and video as experimental media, and was one of the first artists to be supported by E.A.T.²⁵⁷

Schneemann's early films, like Rosler's montages, by examining the medium itself, sought to undermine notions of perfection. Art historian and filmmaker Kate Haug discussed the artist's physical manipulation of the substrate in *Fuses*, 1965 (**fig**. 15), a film depicting the artist and Tenney engaged in montaged episodes of lovemaking: "Schneemann not only employs an experimental production strategy; she also engages the material properties of film by baking it, painting it, and making its tenuous structure visible (such as including splices as visible facets of the film's montage)."²⁵⁸ Schneemann's manipulations not only disrupted the clarity of the substrate, but they also lent the work an expressionistic sensibility, an important influence for the artist.

²⁵⁶ Art historian Kristine Stiles has noted, "The celebration of sexual liberation that came to a crashing end with the widely perceived failure of "The Sixties" in the mid-1970s, followed by the advent of the HIV-AIDS epidemic in the early 1980s, occurred precisely during the period when Schneemann's art began to be widely known and respected for its pioneering feminism. But that sexuality would also then be associated with the "mess" of the 1960s, the embarrassment of "hippie" sensual expressivity, and the residual relationship of such eroticism to the epidemic contagion of AIDS, all of which reached a peak in the "culture wars" of the late 1980s and 1990s, repercussions that Susan Faludi analyzed in *Backlash: The Undeclared War Against Women*, 1981. In a puritanical nation increasingly dominated by conservative and evangelical "values" in the 1980s and 1990s, Schneemann was unjustly associated with an unacceptable promiscuity, while younger artists, working from her tradition and example, rose to unprecedented acclaim." Stiles, "Introduction," in Kristine Stiles, *Correspondence Course*.

²⁵⁷ Unpublished Interview with the Artist, Springtown, NY, January 15, 2007. See also "On the Making of Snows," Schneemann and McPherson, *More Than Meat Joy: Performance Works and Selected Writings*, 148.

²⁵⁸ Haug, 20.

Curator Dan Cameron has described Schneemann's early appropriation of the basic principles of abstract expressionism as subversive. I argue that her appropriation of technology as a compositional element that must be destabilized, such as her film surfaces, was subversive of the polished impeccability that characterized technology in commercial and military use. For example, in her early assemblages such as *Gift Science*, 1964 (**fig**. 16), the artist inserted slides, mirrors, moving lights and other motorized parts into a tri-partite wooden box, containing them like keepsakes similar to those of Louise Nevelson and Joseph Cornell, a friend of Schneemann's. The artist commented on these works,

people had been disturbed by my having transformed the function and look of mechanical parts—lights, clocks, motors—including them in constructions where they no longer resembled what they 'really' were.²⁵⁹

The artist's effort to transform the function of technology in her work was persistent throughout her career. I contend that her endeavor to inculcate new kinetic uses for machine parts became entwined with her views of technology in relation to gender. Art historian Robert Morgan discussed the persistence of themes of gender and kineticism in Schneemann's work as an outgrowth of her concern with the problem of the mind-body split, exacerbated by modern technology. Clarifying this point, Schneemann said in an interview in 1991, "I'm very suspicious of our inherited kinds of science, its masculinist authority and righteous will to power and fixed meanings."²⁶⁰

²⁵⁹ Schneemann and McPherson, *More Than Meat Joy*, 148.

²⁶⁰ Schneemann. Imaging Her Erotics: Carolee Schneemann: Essays, Interviews, Projects, 120.

Schneemann's interference with the seamlessness of technological properties continued in her film montage, *Viet-Flakes*, 1965-1966 (**Figs**. 1, 17 & 19), comprised of newspaper and magazine photographs dealing with the war, which the artist had collected over a period of six years. Schneemann spread the images on the floor in selected combinations and filmed them with her Bolex camera. In this film, both subtle and dominant marks slice through her imagery, serving to disrupt its clarity. Schneemann discussed her practice of destabilizing and degrading her technologies in a recent interview.

Viet-Flakes (1965), in itself is so mysteriously failing in the expected aspects of film technology. That's also where its power grows, why it's so affecting, because it doesn't have that surface of resolution and predictability. It's rough, it's disruptive, it's in and out of focus, it sort of bleeds into its own focus, into its own black and whiteness. So I think in all my technologies I have to destabilize it. For instance in all of my prints, I *degrade* the prints.²⁶¹ [my italics]

Thus, the artist sought to transform the properties of technology in her work, causing the viewer to question its very nature.

Morgan explained that the name *Viet-Flakes*, itself a type of montage of the words Vietnam and Corn Flakes, referred to the notion of instant consumption, equating Americans' ingestion of prepackaged breakfast cereals with their passive reception of the war. ²⁶² Like Rosler, who had seen *Viet-Flakes* prior to completing her *Bringing the War Home* series, Schneemann montaged media images in a reflexive critique of the ways pictures of the Vietnam War were consumed by Americans.²⁶³

²⁶¹ Unpublished interview with the Artist, Springtown, NY, Monday, January 15, 2007.

²⁶² Robert C. Morgan, "Carolee Schneemann's Viet-Flakes (1965)", in Schneemann. *Imaging Her Erotics : Carolee Schneemann : Essays, Interviews, Projects*, 86.

²⁶³ Robert C. Morgan, "Carolee Schneemann's Viet-Flakes (1965)", in Schneemann. *Imaging Her Erotics : Carolee Schneemann : Essays, Interviews, Projects*, 86.

A barrage of image, sound and text, *Viet-Flakes* depicts armed American soldiers sometimes towering over Vietnamese workers in fields, and sometimes marching ominously, oblivious to mothers in the streets who wail over crying infants. At one point in the film, the camera pans across a newspaper headline reading "Lyndon Johnson" "OK," while the camera shifts to a photo of Johnson touching thumb to forefinger as if to reassure the American people that all is well in Vietnam. Schneemann thwarted this assertion, consistently showing the Vietnamese man-handled, pushed, pulled and dragged. She depicted an amputee dead in the street and children lying bloody in the grass. The Vietnamese people were treated lovingly by her camera, their features lingered over. The children plead wide-eyed, while U.S. soldiers remain faceless, their features hidden by helmets.

The artist explained that the images that comprise *Viet-Flakes*, 1965-66 (**fig**. 1) portray the horrors of war, featuring individuals that have been tied up, tortured or killed.²⁶⁴

...abstract motions and shapes converge into the terrified frozen expression of people burning, dragged, drowning; a pointillism of falling black specks with focus becomes bombs dropping; the blurred face of American soldiers emerge leading girls from a shadowed hiding place...²⁶⁵

Viet-Flakes is overlayed with music composed by Tenney consisting of montages of Mozart, Bach, pop tunes, as well as Chinese, Vietnamese and Laoation folksong.²⁶⁶

²⁶⁴ Schneemann and McPherson. *More Than Meat Joy*, 131.

²⁶⁵ Schneemann and McPherson. *More Than Meat Joy*, 131.

²⁶⁶ Schneemann. Imaging Her Erotics: Carolee Schneemann: Essays, Interviews, Projects, 75-76.

Figure 1 shows a film still from *Viet-Flakes*, 1965-66 in which a figure is tied to the back of a tank by the ankles. The tank occupies more than two thirds of the image, utterly dominating the small individual who, without shoes or weapons, is portrayed as a helpless victim of war. Here technology becomes an impersonal, malevolent specter of violence. The star on the tank and mark 'B-21' reveal the machine to be American. The figure, presumably having been dragged bodily through the dirt, evidenced by the bunched clothing hovering around its waist, is at the mercy of this ruthless war machine.

Figure 17, shows a crying Vietnamese mother sitting barefoot on the road cradling her infant child in front of a row of small, thatched-roof homes. She covers her eyes with one hand in a gesture of desperation, while fully-armed American soldiers walk blithely by, ignoring her. The anguish of the woman sets her apart within the composition. She seems oddly out of place in this setting, displaced within her own neighborhood. Like Rosler's anxious mother in *Balloons* (fig. 18), she is a victim of forces beyond her control. Similarly thrust into the foreground, below the horizon line, she is dominated by the soldiers whose lock-step strides, full packs and long rifles lend them an air of militarism and indifference. Like Rosler's luxurious living room, Schneemann's soldier-dominated street invokes the stark cultural opposition between the technologically, well-equipped soldiers and the simply clothed, defenseless mothers and infants.

Schneemann began creating Kinetic Theater in the 1960s. Her Kinetic Theater combined free-form body movement akin to modern dance with multi-media presentations that eventually incorporated film and sculptural objects made of industrial materials that were often motorized. Schneemann described herself as a painter first, concerned with formal relations, and she saw her work as interconnected with her audience.²⁶⁷ Morgan discussed the difference between Schneemann's Kinetic Theatre and the earlier Happenings of Kaprow, Whitman and Oldenberg in terms of her creative role in conceiving it, and importantly, her direct, participation in the work. He said, "Schneemann intended to express her actions from the point of view of a woman."²⁶⁸ I contend that she also sought to express contemporary attitudes toward technology, and its potential role in social transformation, from the same perspective.²⁶⁹

For her kinetic theater piece *Snows*, 1967 (**Fig**. 2), another protest work centered on the Vietnam War, Schneemann used *Viet-Flakes* as the concluding filmic backdrop (**Fig**. 20). The performance began with a five minute 1947 silent newsreel showing a series of war catastrophes that the artist had come across by accident. Schneemann described the film as follows,

The newsreel opens with a ship exploding; next comes a scene of tiny figures massed in a riot; then more tiny figures, these red Chinese being shot by a battalion of national guard; then it cuts to the pope blessing surging crowds....²⁷⁰

²⁶⁷ "A letter from Schneemann to Margaret Fisher," July 17, 1974, in Stiles, *Correspondence Course*. Schneemann said, "I do not perform/consider the effect of what I'm doing on those present; but their presence effects everything I do; they have changed the nature of the space. I feel spectators as energy receivers and transmitters, as units of density, warmth, solids dispersed, specifically situated and moving (since in my work they move at will)."

²⁰⁸ Robert C. Morgan, *Conceptual Art : An American Perspective* (Jefferson, N.C.: McFarland, 1994), 17-19.

²⁶⁹ Standpoint theory, famously embraced by philosopher of science Sandra Harding, privileges the perspective of women in revealing masculine bias. Sandra G. Harding, *Whose Science? Whose Knowledge? : Thinking from Women's Lives, Science Question in Feminism* (Ithaca, N.Y.: Cornell University Press, 1991). This position is often criticized for a seeming alliance with essentialist feminist theory, which tends to neglect the diversity of women's experience. While it is appropriately applied here as such, historically, because it is precisely how Schneemann viewed her own role in her work at the time, I apply it as a socially constructed standpoint.
²⁷⁰ Schneemann. *Imaging Her Erotics: Carolee Schneemann: Essays, Interviews, Projects*, 75.

For the work, Schneemann incorporated hand-held light beams, two large strobe lights, tranceivers, photoresistors, floor mikes, swivel head 16mm projectors and motors donated by E.A.T. ²⁷¹ Sculptor Larry Warshaw created a revolving light machine composed of small motors that moved mirrors and colored foil. The light machine sat atop what Schneemann referred to as an illuminated water lens, a 20' x 15' x 4' gridded, rear wall construction into which plastic sacks filled with colored water were inserted.²⁷²

The stage action opens with special lighting effects behind the water lens, revealing the forms of silhouetted performers. Led by Schneemann, the actors crawl onto the stage through openings in the water lens and begin to crowd one another until all become entangled. The men stand and turn toward the women. One picks up a woman and slowly, gently puts her down, while strobe lights flash on her face, alternately revealing and concealing her. The actors then divide into pairs, with each member applying white, thick face make-up to his or her partner until all are covered. The partner pushes and prods the paste, creating temporary expressions that gradually fade as the face relaxes.²⁷³ Bodily movement is sensual and slow as the men begin to manipulate the women like pliable mannequins. The roles are then reversed as the women move the men like figural sculptures made of wire. The figures exchange power roles again, based on gender, as the men place the women in a pile and sculpt them as a group. Soon, gender is difficult to discern as some actors lay in fetal positions, pushed and prodded by others. At first, it

²⁷¹ Schneemann and McPherson. *More Than Meat Joy*, 148. For the piece, EAT donated roughly \$4,000 worth of materials.

²⁷² Schneemann. *Imaging Her Erotics*, 82.

²⁷³ Schneemann first incorporated face-covering in her kinetic theater piece *Ghost-Rev*, which was also her first work to combine film and performance.

seems a supportive act, a helpful gesture meant to revive. An animated, aggressive struggle then ensues between two figures over an unconscious third.

The interaction on stage was meant to be viewed in conjunction with the film, which was projected onto the actors' bodies. The cameras, sound and light machines were triggered by audience movement. As audience members shifted in their seats, for example, the lights overhead were triggered, gradually brightening or dimming. While the actors followed a general script, Schneemann directed them to respond to these technological cues. This added an element of unpredictability to the performance that undermined the rationality of the machines, and at the same time revealed the agency of human activity, the audience that controlled them.

The artist explained in prose evocative of New Left concerns that the objective of *Snows* was "to concretize and elucidate the genocidal compulsions of a vicious disjunctive technocracy gone berserk against an integral, essentially rural culture."²⁷⁴ She also sought to expose the role played by technology as a means of undermining its neutrality.²⁷⁵ Rather than mask the cords, switches, machines and the technicians who monitored them, allowing the audience to focus on the performance itself, the artist preferred to show how the work was made, to reveal the components and the process. She discussed the project,

²⁷⁴ Schneemann and McPherson. *More Than Meat Joy*, 129. The language she uses here is reflective of Heidegger's critique of technology, "The essence of technology, as it has endured over time, is man's need (desire) to control nature." Heidegger, *The Question Concerning Technology, and Other Essays*, (New York: Garland Pub., 1977), 4.

²⁷⁵ Carolee Schneemann, *Imaging Her Erotics*, 75.

Whenever possible I wanted the technicians to be interchangeable with performers... And I had the wish that technicians and machinery could actively evolve their roles by discoveries of functions that the 'personality' of the machines, and the emotions of the technicians could realize in active relationship with performers—a total sense of the situation which they shape; *the process of collaboration freely transforming their presumed use*."²⁷⁶ [My italics]

Schneemann's efforts to expose the components and the process of works like *Snows* were part of a then-common, activist strategy, also used by Rosler, meant to encourage others to join in their own form of dissent.²⁷⁷ If a work were perfectly polished, hiding its components, it would remain shrouded in mystery. If the process were transparent, audience members would be empowered to create their own works of protest because they could see how it was done. Schneemann also spoke about the process of collaboration, above, as transforming the "presumed use" of the machines, implying that through joint effort and activism, inspired by the artist and her work, the perception and function of technology could change –hinting at the liberatory power of technology in a new social order.

During the performance, technicians sat on silver planks which extended from the stage into the audience, to the back wall of the theater, and sometimes they interacted with the audience. The technicians and the technology were part of the total environment of the work, which the artist explained as follows, "I wanted the mechanical gestures of machine parts to equal performers' movements—exposed as part of the total environment to which they contribute particular effects."²⁷⁸ By highlighting its presence, she asked

²⁷⁶ Schneemann and McPherson, *More Than Meat Joy*, 148-149.

²⁷⁷ Schneemann said, "I prefer my work process to be as exposed as possible." Schneemann, *Imaging Her Erotics*, 75.

²⁷⁸ Schneemann and McPherson. More Than Meat Joy, 148-149

the audience to be aware of its role in the work, in war and in the lives of those that the nation affects.

Schneemann commented on the relationship between technology and war in *Snows* and the connection she perceived to the corporate commodification of late industrial capitalism.

there is something about corporate commodification, fascism, that all want this perfectibility. The surface has to shine, it has to reveal the most advanced, slick aspect of the technology. A lot of artists are like this. Our technologies blow up, they burn themselves out, they fizzle, they shatter glass, they're really there to alarm you as to the underlying, priability, and dangerousness and delusionary principles of technology advanced and simple. So that when one of the NASA rockets blows up, in the cultural unconscious, most people are saying, "Oh I knew it. I knew it just couldn't do all that." And the other part of the population is saying, "You know we're going to make it perfect, it's really going to work." But the degree of perfectibility is constantly used to subvert human life, to make our existence as fragile and threatened and paranoid as possible.²⁷⁹

Here Schneemann described her manipulation of technology as a means to criticize its association with perfection, a dangerous connection made in capitalist and fascist societies. Consistent with Marcuse's notion that technology was rendered stream-lined in capitalist society in order to disguise its role in systematic cultural and economic domination, Schneemann warned against perceiving technology as "slick," "perfect" or in other words, faultless. The artist also linked corporate commodification with fascism and saw both as subverting humanity, a powerful New Left argument.

²⁷⁹ Unpublished interview with the Artist, Springtown, NY, January, 2007.

Often poetic, her contemporaneous notes make evident her view that the U.S. had imposed its technological culture upon the agrarian Vietnamese people. She caustically described the U.S. in 1966,

Country without vital nerve center: cut, chopped, lobotomized in self-interest-greed. Consciousness hacked into paranoid bits of shifting evil...turn on yourself—monster, show your violence, impotence—bombing, flaming game ritualized machine that you become: your 'culture' as vapid, paternalistic, frenetic and corrupt as your angry lusts...²⁸⁰

The metaphors Schneemann used to describe her country conjure a diabolical and bellicose mechanized society seeking to devour all in its path, all cultures that appear ripe for exploitation. The artist expressed extreme anger toward the excesses of capitalist America motivated only by "self-interest-greed." In her statement, notions of patriarchy, capitalism and technology are entwined in a vicious critique of American culture, starkly similar to that of Marcuse. She wrote further in 1966,

Vietnam a vegetable culture which leaves no garbage. Misery America---- been gone wild vogue of nuclear power plants pollution delirious cut off from ecology from living relations between organic parts: the new sex book ('definitive'), Dow Chemical earnings, 'mass art,' when there is no 'mass'; fragmentations, desexualization, de-sensualization and they're going crazy alone together, take shine and plastic onto into their half-starved bodies. Feeling low between 'highs'.....And some of us work, scramble, clear ways to unity, joy a plateau.²⁸¹

In the quote above, Schneemann revealed her disdain for the packaging of technology as a force of good and a sign of progress, noting American "shine" and "plastic" being forced upon, consumed by the "half-starved" Vietnamese bodies. The image of force-

²⁸⁰ Carolee Schneemann, "Notes on and Around *Snows*," 1966. Found in Schneemann and McPherson, *More Than Meat Joy*, 121.

²⁸¹ Carolee Schneemann, "Notes on and Around *Snows*," 1966. Found in Schneemann and McPherson, *More Than Meat Joy*, 120.

feeding the Vietnamese sharp metals and plastics evokes a dichotomy between technology and the organic, between the mechanically rigid and the biologically sensual, that is maintained in the artist's work throughout her career. Schneemann also expressed concern over the disconnect between lived, sensual experience and technologically mediated experience, where "mass art," communications and the profits of corporations like "Dow Chemical," steeped in the war industry, take precedence. The threat posed to nature is further evinced in her apprehension over the deleterious effects of nuclear power on the environment. But the artist ended on a euphoric note rooted in her own activist hopes for change, as she "scrambles" to "clear a way to unity" and "joy."

Schneemann's juxtaposition of the organic and technological is also evident in the sound recorded for *Snows*. Created by Tenney, she described it as follows. "…trains shunting, whistling, moving in and out of an Illinois depot, overlaid with sounds of orgasm."²⁸² The orgasm was also an important element in her film, *Fuses*, made the same year, in which she montaged many episodes of lovemaking with Tenney.²⁸³ In *Snows*, the sound and movement of the trains, essential tools in the industrialization of the United States, embody the hard, driving incessant nature of war. The interweaving of the noise of trains with orgasm, one of the most primal human sounds, served to metaphorically conjoin the human body with technology, suggesting that it has become our very essence or life-blood.

²⁸² Schneemann. *Imaging Her Erotics : Carolee Schneemann : Essays, Interviews, Projects*, 75.
²⁸³ The orgasm was also central to scientist Wilhelm Reich's cosmological theory of Orgonomy, a physical substance that he believed comprised the essence of all matter. Reich's view that a free and open sexual life was essential for successful political struggle and social emancipation was championed by Marcuse and the New Left. Wilhelm Reich, *Character-Analysis* 3d, enl.ed. (New York: Noonday Press, 1949). It is interesting that Schneemann and Tenney montaged the sounds of the train with those of orgasm, essentially juxtaposing Reich's notion of the essence of social emancipation with technology.

Schneemann augmented the convergence of the human and technological by establishing unconventional relationships between the camera, sound and light machines and her audience. During the performance, for example, two technicians sat at the edge of the performing area holding swivel head 16mm projectors, which they swung across the performance space, casting the horrific scenes of the Vietnam War onto walls, floors and the actors themselves (Fig. 20).²⁸⁴ Art historian Julia Ballerini described the metaphoric clash between human and machine in Snows as follows, "It is also in bombardment that the technological is most actively pitted against the human."²⁸⁵ Much of Schneemann's work, including Viet-Flakes, 1965-66, Snows, 1967, Eve Body, 1963, Noise Bodies, 1965, Illinois Central, 1968 and Electronic Activation Room, 1970-71, juxtaposed the human body and technology considered in its broadest sense as tools or technics as suggested by Mumford, whose expanded definition included arrowheads, hearths and baskets, any means by which man attempted to master nature. Mumford's views were published in his two-part volume, The Myth of the Machine: Technics and Human Development (1967) and Pentagon of Power: The Myth of the Machine, an abbreviated version of which appeared as a four-part series in The New Yorker throughout the month of October 1970.²⁸⁶ Like Marcuse, Mumford claimed that tools were coopted by the ruling elite to enforce its will and reinforce its power. Schneemann said of her later work, Vesper's Pool, that "it was an example of how I take soft subjects and grind them, shape them,

²⁸⁴ Schneemann and McPherson, *More Than Meat Joy*, 131.

²⁸⁵ Julia Ballerini, "Carolee Schneemann: Recent Work" in Carolee Schneemann and Max Hutchinson Gallery, *Carolee Schneemann* (New Paltz, NY: Documentext ; Max Hutchinson Gallery, 1982), 42-43.

²⁸⁶ See Lewis Mumford, "Reflections: The Megamachine," Parts I-IV, *The New Yorker* (Oct. 10, 17, 24, 31, 1970).

sieve them through some kind of hard technology."²⁸⁷ In Snows, the technology is integrated with the 'natural,' physical bodies, and is an important part of the visual, auditory and tactile aspects of the work.

Like Rosler, Schneemann saw both the destructive power and transformative potential of technology. The film Viet-Flakes was shown at the culmination of Snows, just after several performers, designated 'Victims', were dragged, pushed, hung from looped rope, and rolled into cocoons of aluminum foil (figs. 21, 22). The bound performers were then "rescued," freed from their bondage. Now liberated, they gathered and collapsed into a cathartic pile (fig. 23). Finally, the snow machine dispensed its white flakes upon the actors and the entire stage.

Schneemann explained that the snow was a metaphor for "purification and clarification and homogenization."²⁸⁸ It may also refer to the artist's adopted last name, which she took early in her career. Schneemann means 'Snow Man' in German, and indicates the artist's role in purifying the injustice of the war, made evident in the violence, struggle and unequal power relationships depicted in the work. Technology in Snows was revealed to viewers for its participatory function. An important part of the performance, it may be viewed as an instrument of Schneemann's critique of technocratic culture and the wars it wages, and yet, it is simultaneously part of the purification of that culture. Thus,

 ²⁸⁷ <u>http://www.makemagazine.net/articlespage/cs.html</u> (accessed 4/2/2005).
 ²⁸⁸ Schneemann and McPherson, *More Than Meat Joy*, 129.

through her performance, the artist successfully transformed the "presumed use" of technology, as she had put it, from violent and dominant to peaceful.²⁸⁹

For Schneemann, the transformation of how technology is perceived and used was integral to the transformation of society, a concern that Rosler shared. Other thematic similarities in the artists' works of the 1960s, including war protest and exposure of the role of technology in American culture persist in their performances, film and video works of the 1970s and early 1980s when their attitudes toward technology became more closely tied to their feminist concerns.

The Feminist Film and Video Movement

The feminist film and video movement, which began in the late 1960s, was marked by an examination of the ways these media reproduce notions of gender and power. The movement included artists like Joan Jonas, Lynn Hershman, and Dara Birnbaum, whose video *Technology/Transformation: Wonder Woman*, 1978, for example, examined the exploitation of the female body by mass media.²⁹⁰ Societies and festivals helped unify the movement as well as a belief in the power of the technologies to reach broader audiences. Media studies scholar Alexandra Juhasz recently documented the movement, who

²⁸⁹ Schneemann and McPherson. *More Than Meat Joy*, 129.

²⁹⁰ John G. Hanhardt and Maria Christina Villasenor, *Video/Media Culture of the Late Twentieth Century*, Art Journal 54:4 (Winter, 1995): 23.

adopted what she termed "feminist alternative media" as a "significant site of personal, social, and political action for American women."²⁹¹

Juhasz explained that artists in her study used these technologies to critique inequitable power relations that limit women, and she discussed their common belief in the ability of communications technology to subvert those power structures.

In their interviews, these women explain how they express their personal, political and artistic commitments through a concurrent commitment to technologies that record and then re-present movement and ideas in time... All are motivated by the desire to speak to and alter the world; all believe that the media are a most powerful tool with which to effect the changes that matter most.²⁹²

Rosler and Schneemann were explicit in forging relationships between their choice of media and the social realties they engaged in their work. Their early social activism informed their commitment to feminism, which in turn shaped the content and function of their work. They embraced video in the early 1970s, in part, because it promised new and expanded modes of distribution. After the invention of the hand-held, battery-operated Portapak in 1968, video became relatively cheap, easy to manipulate and reproduce. Video represented a subversion of the traditionally male, modernist media: painting and sculpture, and it also promised new means of distribution outside the gallery system. Rosler used video, as she had photography, to question the ways print media and broadcast television (also dominated by relatively few wealthy, conservative men) perpetuated gender stereotypes, but perhaps more importantly, to interrogate the systems that controlled those media. I asked Rosler whether video had a particular use for her in

²⁹¹ Alexandra Juhasz, *Women of Vision : Histories in Feminist Film and Video, Visible Evidence*; v. 9 (Minneapolis ; London: University of Minnesota Press, 2001), 1.

²⁹² Juhasz, 3.

terms of her feminist critique, "I made what I considered to be feminist works using video. It gave me a woman, a nobody, a chance to comment by example on the narratives of broadcast television and movies and plays and so on." ²⁹³ For Rosler, Schneemann and other women artists, these technologies offered a liberatory means of artistic expression alternative to those traditionally gendered male.²⁹⁴

Schneemann's sculpture and video *War Mop*, 1983 (**fig**. 24) addressed concerns similar to those in *Viet-Flakes*, but now in a more stridently feminist tone. In this work, an ordinary mop extending from a motorized Plexiglas fulcrum repeatedly rises and falls, striking the top of a television set that depicts montaged news images of the remains of Lebanon after the Israeli invasion in 1982. The video begins with images of decimated buildings from the city of Damour, which was bombed by the Israelis in April of that year. Burnt-out car shells and mangled steel and rubble line the streets. The video stops abruptly, periodically, in seeming mimicry of the beating mop, pounding the monitor. A harsh, grating sound accompanies the imagery, echoing the roar of an igniting tank. Images of war are inter-cut with photographs from the Lebanese tourist bureau, before the Israeli invasion. These depict monuments along with local people in the midst of daily routine, including four women working in a field, hunched over like Millet's *Gleaners*. The word "souvenir" reappears periodically on the screen, implying the exoticism and primitivism of a country ripe for invasion. The video segues to images of

²⁹³ Unpublished interview with the Author, Brooklyn, NY, August 23, 2007.

²⁹⁴ "Letter from Schneemann to Carol Wikarska," January 28, 1975, in Kristine Stiles, *Correspondence Course*. Schneemann noted of an article that she read, "A long review for Super 8 Filmmaker magazine touches on the questions of Super 8 having some particular attractions/advantages to women. See also "Interview with Carl Heyward" in *Imaging her Erotics*, 207. Schneemann said, "But the brush belonged to abstract expressionist male endeavor, the brush was phallic."

a Palestinian woman, wearing a white hijab and polka-dotted, red dress. She is walking through the rubble of what must have been her home, the camera pans to her sofa, bookshelves and lamp. She waves her arms over her head in rage and protest against the violence or perhaps against the cameras photographing her, consuming her. She screams silently, for there is no live sound. We are diverted to images of crowded restaurants and well-trafficked roads in a town center. The thriving urban economy of Beirut during peacetime is interrupted by an enormous column of smoke rising from a building following a bomb blast. The last image shows a flock of geese, flying over a boat, towards the word "souvenir" written vertically down the right side of the screen, as if all of Lebanon, its wars included, is nothing but a souvenir for the American viewer.

The artist wrote that she began to research Lebanon, as she had Vietnam, through its poetry, "where the political takes its voice, in a culturally specific way, and where the feminine aspects of the culture are situated."²⁹⁵ She explained further in language reminiscent of that used for *Viet-Flakes*,

our victim cultures are preindustrial compared to our potentially decimating superior technological forces and international machinations. Expansionist power, weapons, war mechanics displace negotiation, conciliation. This imbalance suggests another metaphor for the iconic feminine beaten to shreds, without boundaries. The "enemy" is demonized even to the extent that it cannot match force or violence of the invading powers.²⁹⁶

In her comments above and in this work, the artist continued to associate technological power with American cultural hegemony, but now, she more pointedly implicated

²⁹⁵ Schneemann, *Imaging Her Erotics*, 187.

²⁹⁶ Schneemann, *Imaging Her Erotics*, 188.

gender, with references to the Western conflation of the primitive, marked by lack of technology, with the feminine. She wrote further,

Male photographers constantly demonstrate an unconscious, irresistible attraction to the injury of women and children—predominant subjects are civilian victims dying or wounded or blown apart (also because the victims are evidence). Often the valorous, unspeakable shattering of the enemy will be characterized by images of women and children in ruins.²⁹⁷

She implied in these statements that both women and preindustrial cultures are weak *because* they do not possess technology. They must be exterminated because they represent weakness, implying that technological, industrial society fears weakness. She suggested that the masters of war and technology, despise and fear them for their weakness, which in turn justifies their brutality. This argument is embedded in post-colonial theory of the early 1970s, with which the artist was certainly familiar, but the evocation of technological dominance harkens back to the New Left, a theoretical well-spring with continuing resonance for feminists in this period. Throughout the video, the insistently banging mop, a domestic tool, or technic to use Mumford's term, long associated with women's work, urges the television to cease its garish demonstration, one that is passively consumed by Americans without understanding. In this work, the mop wields the power, bombarding the scenes of destruction, just as Israeli bombs decimated Lebanon.

Schneemann's video Americana I Ching Apple Pie, 1973 (fig. 4), also incorporated domestic tools in a critique of patriarchal dominance. In this work, the artist addressed the segregation of women to the domestic realm in her recipe for apple pie, which

²⁹⁷ Schneemann, *Imaging Her Erotics*, 190.

confounded convention and the restrictions of traditional cooking instruction. The *I Ching* is an ancient Chinese cosmology and text that attempts to find order in chance events. It fascinated Western audiences after the discovery in 1970 of original *I Ching* texts in Chinese tombs from the second century B.C.E. Schneemann's recipe became a cooking demonstration that the artist incorporated into her 1973 performance *Cooking with Apes.* She turned it into an independent work one year later, performing *Americana, I Ching Apple Pie* at the Greene Street Women's Festival in New York.

In this work, the tools associated with women's work such as colanders, strainers and whisks, were confounded with those associated with men's work, hammers, nails and ball bearings, as the artist approached the traditionally female task of cooking, with anger and aggression. Choosing nails, hammers, an arrow, flower pot, ball bearings as her cooking utensils, the artist wielded these tools in her performative kitchen space "with defiant joyful anger," as stipulated in her recipe. She proceeded to act out her own instructions taken "From the Liberated Cook Book for Women and Others...

On this scruffy battleground you will lay down the cookbook forever. You will cease competition with untold legions of sublimated female psyches engaged over the centuries in pursuit of excellence through flour grease onion turnips pots blenders colanders strainers boilers mincers graters choppers fork whiskers beaters. **Desist Stop Stop Now!** ...Liberation through joyous aggression. The abandonment of false illusions. You are in the kitchen because you do not have a penis. Keep this in mind as you crush garlic with the heel of your shoe. You are in this kitchen because you might or might not have a baby.²⁹⁸

Here, Schneemann incorporated the notion of chance as a ruling cosmological principle, associated with the *I Ching*, to free women from the confines of both the kitchen and the

²⁹⁸ Schneemann, *Imaging Her Erotics*, 142.

rational recipe. She wrote, "if any ingredients fall on the floor just pick them up and put them where they should have gone...people eat about 3 lbs. of dirt every year."²⁹⁹ The artist choses her cooking tools randomly, using chance and eastern philosophy to undermine rigid western gender boundaries. Importantly, Schneemann criticized the traditional association of women's tools with women's work, suggesting that the tools were gender coded. Because of their sex, women were bound to domestic technologies. Schneemann resisted subjugation to the domestic sphere, with anger. The feminist theme Schneemann addressed in this work, women's aggression toward association with domestic space and technologies, was also taken up by Rosler.

Rosler's embrace of video in the early 1970s was part of a utopian impulse to transform the art distribution system through the use of mass communication technology, but she also used the medium in a criticism of the ways broadcast television perpetuated cultural ideologies, particularly with regard to gender. *Semiotics of the Kitchen* as well as *Budding Gourmet*, 1974 and *The East is Red, the West is Bending*, 1977 (**fig**. 25) parody television cooking shows that serve to reinforce stereotypes of women's roles. Her video performance *Semiotics of the Kitchen*, 1975 (**fig. 6**) showed a woman in a kitchen, bedecked with apron, engaged in a cooking demonstration. In the video, the artist methodically lifts kitchen utensils and technological appliances and names them, in descending alphabetical order. She begins the process passively, but gradually her voice escalates with rising anger. She pounds the table rhythmically with a chopper and stabs a knife into the air with emphatic jerks. Increasingly animated, she shakes a quart bottle with full-body gyrations and ends by grasping a fork in her right hand and a knife in her

²⁹⁹ Schneemann, *Imaging Her Erotics*, 143.

left to form the last six letters of the alphabet like an airplane traffic cop, thrusting her arms in the air. The seven-minute video shows routine food preparation, specifically denoted by domestic tools, masking the violent frustrations felt by women at being confined to the home. The artist wields the tools indignantly, as signs or symbols of her perceived enslavement. In an interview, Rosler spoke of the expression of anger in this performance as a necessary step for women toward resistance and change. Responding to an interviewer in the mid-1980s who noticed the utopianism in her work, she said, "Yes, it might involve an implicit utopianism."³⁰⁰

In these videos, Rosler highlighted the connections between the public world of global commerce and travel (the economic inspiration for early cooking shows like *The French Chef* with Julia Child {1963-73}) and private suburban homes, where commodities like fine, foreign food prepared by properly domestic, white, middle-class women were internalized. Rosler used video to implicate the role of broadcast television, along with the white, wealthy, male elite who owned the stations, in perpetuating cultural ideologies through capitalist consumption. She used video to criticize broadcast television in order to unveil for her viewers the technological process by which ideological messages are disseminated.

In her 1984 essay, "Video: Shedding the Utopian Moment," Rosler discussed the birth of video art in the late 1960s as the direct result of dissatisfaction with Western social systems. In her essay, she asserted, "As with earlier modern movements, video art has

³⁰⁰ Jane Weinstock, "Interview with Martha Rosler." October (Summer 1981): 86.

had to position itself in relation to 'the machine'—to the apparatuses of technological society, in this case, electronic broadcasting."301 [quotations hers] For her, video art was a social criticism of the domination inherent in all of mainstream Western industrial and technological culture and epitomized in the parent technology of broadcast television. She explained, "This act of criticism was carried out itself through a technological medium, one whose potential for interactive and multisided communication ironically appeared boundless."³⁰² She positioned her video "in relation to 'the machine" in order to show that those apparatuses, those technologies, were not neutral.

At the same time, her work evinced a paradoxical belief in the potential of new technologies, such as video, for liberation. As she commented above, her "[act] of criticism was carried out... through a technological medium, one whose potential for interactive and multisided communication ironically appeared boundless." So while her process of turning the medium on itself in a reflexive criticism of its insipid dangers was quintessentially dystopian, it was also utopian, in that she used that same medium to communicate to new, expanding audiences her argument that the current system was not acceptable, and that a new one could be, must be, devised. Rosler was explicit about her aims in an interview. "I very much believe in the idea of liberation, which I see as a personal project within a social project."³⁰³

³⁰¹ Rosler, "Video: Shedding the Utopian Moment," reprinted in *Decoys and Disruptions* : Selected Writings, 1975-2001, 55. This essay was originally delivered as a talk, "Shedding the Utopian Moment: The Museumization of Video," at the conference "Video '84" (Universite de Quebec a Montreal), and published in Rene Payant, ed., Video (Montreal: Artexte, 1986). ³⁰² Rosler, Decovs and Disruptions : Selected Writings, 1975-2001, 54.

³⁰³ Weinstock, "Interview with Martha Rosler," 87.

In her essay, Rosler acknowledged Marcuse's critique of western capitalism. She wrote, "Marcuse traces the use of culture by dominant elites to divert people's attention from collective struggles to change human life..."³⁰⁴ But Rosler's work also manifested Marcuse's claim, in his *Essay on Liberation* (1969), that "science and technology are the great vehicles of liberation."³⁰⁵ Marcuse explicitly celebrated the utopian potential of art to bring social change, a change made possible by extant technological forces. He said, "...art can and will draw its inspiration and its very form, from the then prevailing revolutionary movement – for revolution is the substance of art."³⁰⁶ Rosler criticized the existing social order and the technology that perpetuates it, in a call to action – to seek alternatives to the existing dystopic social reality that subjugated women. For Rosler, video was a new technology that she embraced in order to undermine television, a tool of domination under capitalism. She wrote in 1977,

Although video is simply one medium among several that are effective in confronting real issues of culture, video based on TV has this special virtue; it has little difficulty in lending itself to the kind of 'crude thinking.' As Brecht used this phrase, that seems necessary to penetrate the waking daydreams that hold us in thrall. *The clarification of vision is a first step toward reasonably and humanely changing the world*.³⁰⁷ [My italics]

³⁰⁴ Rosler, *Decoys and Disruptions : Selected Writings*, 1975-2001, 75.

³⁰⁵ Herbert Marcuse, An Essay on Liberation, 12.

³⁰⁶ Herbert Marcuse, "Art and Revolution," *Partisan Review* (Spring 1972): 178. Here and in *An Essay on Liberation*, Marcuse held Surrealism as the example to be followed, with which Rosler patently disagreed, believing Surrealism to represent an escape, rather than engagement with the world. As can be seen from her quotation of his remarks in her essay, however, his broader theoretical criticism of American technological society informed and inspired her work.

³⁰⁷ Martha Rosler. "Statement" in Alberro and Stimson, eds. *Conceptual Art : A Critical Anthology*, 369. Rosler said, "to argue for a video of representation. To argue for a video against the mythology of everyday life."

For both Marcuse and Rosler, technology carried covalent meanings: it was simultaneously an instrument of domination, and a tool for liberation. Rosler adopted new technologies for the making of her work precisely to redirect attention to the problems she saw as inherent in them, and her objective, like Marcuse's, was to raise consciousness and instill a desire for change.

The artists' criticisms of military, domestic and communication technologies were part of feminist utopian strategies of political resistance to policies of domination enacted by a technological society that had infiltrated Vietnam, the home and women's bodies. As noted by Rosler, military and domestic technologies were integral to the foreign and domestic agenda of the U.S. government during the Cold War, a point expounded by the New Left whose ideology informed the works of these artists. The shine and gloss of technologies, perfected in the rhetoric of progress that praised streamlined, efficient systems that ran like clock-work, were broadly disseminated by broadcast television, providing an insidious target for feminist criticism. The artists sought to expose the sheen of perfection in their dystopian works, and through this criticism, they expressed feminist utopian longing for social change, as well as a paradoxical belief in the ability of technology, with its long-held associations with progress, to aid in the process. Theorist Lucy Sargisson's characterization of feminist utopianism as a discontent or wariness toward perfection, itself derives from New Left philosophy. The New Left protest against existing mechanistic social structures continued in the women's liberation movement, which associated the production of military, domestic and communications technologies

with patriarchy.³⁰⁸ Rosler and Schneemann exposed the connections between those patriarchal social structures and the lived experience of women. Both artists transgressed notions of perfect-world utopias by exposing the seams used to join disparate images, or by abrading otherwise crisp, clean surfaces to reveal the reality that lay beneath. In this way, they undermined the neutrality, the invisibility, of technology and its dystopian role in reinforcing the social order.

The artists also addressed classic utopian notions of perfection: social ideals of women, defined by the purchase and proper use of domestic technologies. The dystopias depicted in works like *Cleaning the Drapes* (**fig. 3**) and *Americana, I Ching Apple Pie* (**fig. 4**), for example, reflect back upon the viewer the exaggerated societal ideal of the perfect homemaker. Sargisson described this feminist utopian tactic "that reflects a vision of the current situation that is just as exaggerated as is the presentation of an actual utopian ideal or dystopian mirror," which creates an opportunity for debate and thus for change.³⁰⁹ She explained, "Like the queen's in the story of Snow White, this mirror is not compliant, rather it tells the viewer that the fairest of them all is actually elsewhere, and may or may not say where."³¹⁰ The startling juxtaposition of the "happy" homemaker with the Vietnam battlefield in Rosler's work was the dystopian mirror that the artist presented to the society that permitted the situation to occur-- and had the ability to change it. Likewise, Schneemann presented a homemaker who breaks from the rules

³⁰⁸ Herbert Marcuse and Biddy Martin, "The Failure of the New Left?" *New German Critique* no. 18 (Autumn, 1979): 5.

³⁰⁹ Lucy Sargisson, *Contemporary Feminist Utopianism*, *Women and Politics* (London ; New York: Routledge, 1996), 40.

³¹⁰ Sargisson, 40.

of the recipe, tossing in arbitrary ingredients and preparing it with tools that subvert gender expectations.

The artists maintained a link to political realities in their work, but at the same time, they created new spaces in their performances-- alternatives to lived space in which new possibilities and relations to technology could be imagined. ³¹¹ Schneemann's inclusion of the film *Viet-Flakes*, for example, composed of actual photographic footage of the Vietnam War, served to pointedly connect the performance space of *Snows* to a technologically dystopic reality. Ultimately, Schneemann purified and thus transformed her space with snow created by an overtly exposed machine, but the artist expressed disappointment in the reception of the work. "Almost nobody gets it... any of that fantastic metaphor, sensory arena... the touching, carrying transforming we do."³¹² Her comments indicate that she had a specific intention to be communicated. She created a metaphor for war combining documentary footage of the violence with living bodies engaged in struggle, which she then purified creating an entirely new sensory arena.

In all of the works discussed here, the artists presented a dystopia meant to confront viewers with an untenable reality, with the hope that they would act to change it. Their works, however, were not nihilistic. Social change was their end goal. Schneemann commented on the function of her work in 1980, "Fuses and other areas of my work have a messianic alarm motivating their formation; to show, indicate, point towards what you

³¹¹ Sargisson claimed that "new and inventive languages can best be imagined and employed in a new space, as can different social, sexual and symbolic relations." Sargisson, 41.

³¹² "A letter from Schneemann to Joseph Berke," February 14, 1967 in Kristine Stiles, *Correspondence Course*.

call "another choice" to take the "voyeur's ecstasy" as one's own power, complement, recognition."³¹³ Neither artist prescribed a specific alternative. Instead, they opened new conceptual spaces in order to imply that many alternatives to the rigid social system were possible.

Rosler drew attention to the mechanism of the social system through the juxtaposition of the individual and her environment, which she described as follows,

it is always dialectical. It is always x plus y—the person and the setting, what do they mean? Can we distinguish them? How does one shape the other? How much of this is determined not by the individual... but by a society that offers certain fixed paths.³¹⁴

Taken separately, Rosler's images revealed precisely those "fixed paths" to which she refers above: the woman with the vacuum cleaner, the grieving Vietnamese mother, and the boys carrying guns in a foreign land. These were the "fixed paths" created by a rationalized, technological, capitalist system (comprised of government, military and industry) that perpetuated social roles, asserting control invisibly through the military, domestic and communication technologies that it created and disseminated. The notion of a closed, mechanistic society offering fixed paths is precisely what the artists struggled against. Aesthetic strategies of resistance, ironically informed by science, will be addressed in the chapter that follows.

³¹³ "A letter from Schneemann to John Duncan," October 23, 1980 in Kristine Stiles, *Correspondence Course*.

³¹⁴ Buchloh, "Interview with the Artist" in Rosler and Zegher, *Martha Rosler : Positions in the Life World*. 49

Chapter 3 A Metaphor for Change: The Aesthetics of Open Systems in the Work of Alice Aycock, Agnes Denes and Martha Rosler

"A sort of *machine a gouverner* is thus now essentially in operation on both sides of the world conflict, although it does not consist in either case of a single machine which makes policy, but rather of a mechanistic technique which is adapted to the exigencies of a machine-like group of men devoted to the formation of policy."³¹⁵ --Norbert Wiener, 1967

"The mechanistic world view, taking the play of physical particles as ultimate reality, found its expression in a civilization which glorifies physical technology that has led eventually to the catastrophes of our time."³¹⁶ --Ludwig von Bertalanffy, 1967

"At stake is our very life, and we shall need all the energy, inventiveness, imagination, goodness, and strength we can muster to triumph in our predicament. While waiting for the specialists to get on with their work on behalf of society, each of us, in his own life, must seek ways of resisting and transcending technological determinants." ³¹⁷ --Jacques Ellul, 1964

Systems theory, probably the most influential scientific theory for artists working in the late 1960s and early 1970s, considers how mutually dependent variables function as a unit. The theory may be applied to mechanical, biological, social or physical systems, such as wheels and gears within a spring-loaded watch, predator and prey within an ecosystem, or matter and energy in the universe. Along with Marcusean and New Left imaginings of a changed world, systems theory afforded Alice Aycock, Agnes Denes and

³¹⁵ Norbert Wiener, *The Human Use of Human Beings : Cybernetics and Society* (New York: Avon Books, 1967), 182 first published in 1950.

³¹⁶ Ludwig von Bertalanffy, *General System Theory; Foundations, Development, Applications* (New York, G.Braziller, 1968), 49.

³¹⁷ Jacques Ellul, *The Technological Society*, 1st American ed. (New York,: Knopf, 1964), xxxii.

Martha Rosler an alternative means of conceiving social and environmental relationships, and undermining a hierarchical and patriarchal social structure. It also afforded these liberal arts educated artists a scientific framework with which to integrate disparate bits of new-found knowledge from various fields such as philosophy, science, mathematics, art and literature, thus providing scientific remedy for the division between the arts and sciences articulated by physicist and novelist Charles Percy (C.P.) Snow in 1959.³¹⁸ Precisely its purpose, systems theory was "originally intended to overcome overspecialization" among the disciplines and set a new cultural tone, preparing the way for a unified field theory in physics-- a theory capable of explaining the functioning of all natural forces.³¹⁹ When I recently asked Rosler whether she had been influenced by the social and political implications of systems theory in the late 1960s, she replied succinctly, "How could I avoid it?"³²⁰

Associated with life, growth, and change, open systems in particular took on political and social resonance for these artists.³²¹ In the exhibition catalogue for her 2005 show, *Open*

³¹⁸ C. P. Snow, *The Two Cultures and the Scientific Revolution*, Rede Lecture (Cambridge, England: University Press, 1959).

³¹⁹ von Bertalanffy, 5. The scientist explained that the theory "is a broad view which transcends technological problems and demands a reorientation that has become necessary in science in general and in the gamut of disciplines from physics and biology to the behavioral sciences and to philosophy. It is operative, with varying degrees of success and exactitude, in various realms, and heralds a new world view of considerable impact." von Bertalanffy, vii.

³²⁰ Telephone conversation with the Artist, Wednesday, April 30, 2005.

³²¹ In her introductory essay for her provocative 2005 exhibition, *Open Systems: Rethinking Art c. 1970*, curator Donna DeSalvo wrote that Rosler's work *Semiotics of the Kitchen* "weaves together two systems—that of food production and language—to critique female stereotypes. Donna DeSalvo, "Where we Begin Opening Up the System," Donna M. De Salvo, Johanna Burton, Mark Godfrey, Boris Groys, and Tate Modern (Gallery), *Open Systems: Rethinking Art c. 1970* (London: Tate Modern, 2005), 20-21. Art historian Mark Godfrey discussed Rosler's work in terms of open systems, arguing that her works, such as *Vital Statistics*, scrutinize systems of knowledge and power, particularly, how women's bodies are policed by society. "From the Box to Street and Back Again: an Inadequate Descriptive System for the Seventies," DeSalvo, *Open*

Systems, which included Rosler, curator Donna De Salvo characterized artists' attraction to open systems around 1970 as a means of institutional critique, a strategy common to conceptual art, and in terms of a desire to engage viewers and the world around them.³²² Aycock, Rosler and Denes, along with many artists and critics, were very familiar with the distinction between closed and open systems, having read the authoritative works on the subject by Austrian-American biologist Ludwig von Bertalanffy and mathematician Norbert Wiener.³²³ By definition, open systems, such as biological and social systems,

Systems, 24-49. Johanna Burton mentioned Rosler's series *Bringing the War Home* and *House Beautiful* (seemingly as one series with one date, written "*Bringing the War Home: House Beautiful* in 1969-72") as "a defence [sic] against the apathetic numbness born of late capitalism." Burton concludes by explaining that Rosler has revised the series "to insist that systems merely go underground for a time." Johanna Burton, "Mystics Rather than Rationalists," DeSalvo, *Open Systems*, 76. Aycock discussed her work in terms of open systems in her thesis. Alice [Aycock] Segal, "An Incomplete Examination of the Highway Network/User/Perceiver Systems," M.A. Thesis, Hunter College of the City Uiversity of New York, May 13, 1971. For a helpful discussion of her thesis and engagement with systems theory see Stuart Morgan, "Alice Aycock: Structures, Stories and the History of Man-Powered Flight," *Artscribe* (no. 15, 1978): 12-17; and Robert Carleton Hobbs and Alice Aycock, *Alice Aycock : Sculpture and Projects* (Cambridge, Mass.: MIT Press, 2005), 15-16. Art historian Donald Kuspit briefly discusses Denes's work in terms of systems. He argues that her work both pushes against and acquiesces to the fatedness of the "system," implying the social system. Donald Kuspit, "Agnes Denes: The Ironies of Comprehension." *Arts Magazine* (1981): 153.

³²² Donna DeSalvo, *Open Systems : Rethinking Art C.1970* (London: Tate Modern, 2005). Of the three artists considered here, only Rosler's work appeared in the exhibition. Godfrey argued that Rosler's works, such as Vital Statistics, scrutinize systems of knowledge and power, particularly, how women's bodies are policed by society. He concludes, however, that she is not hopeful of an escape from that surveillance. Mark Godfrey, "From the Box to Street and Back Again: an Inadequate Descriptive System for the Seventies," DeSalvo, *Open Systems*, 40-43. Benjamin Buchloh theorized that the essential accomplishment of Conceptual art was its engagement in institutional critique. Benjamin H. D. Buchloh, "Conceptual Art 1962-1969: From the Aesthetic of Administration to the Critique of Institutions." *October* 55 (Winter 1990). I suggest that Denes, Aycock and Rosler, took institutional critique one step further by assaulting the false neutrality of technology, science and scientific method.

³²³ Aycock read von Bertalanffy and parts of Wiener's book *Cybernetics: (Or Control and Communication in the Animal and the Machine)* (1948) in preparation for her Master's thesis "An Incomplete Examination of the Highway Network/User/Perceiver System" completed in 1971, which dealt with systems theory. Unpublished interview with the Artist, New York, NY, July 16, 2007. Rosler also read von Bertalanffy and she discussed her engagement with open systems in terms of a critique of the "closed-ended propositions of Conceptual Art [of the late 1960s]" Unpublished interview with the Artist, Brooklyn, NY, August 23, 2007. See also Rosler's essay, "The System of the Postmodern in the Decade of the Seventies" in which she referred directly to

exchange matter, energy and information with the environment and in so doing become more complex. Codified by von Bertalanffy in 1968, open systems were associated most closely with organisms, which require air and food for growth. In contrast, closed systems, such as spring-loaded clocks and many machines are set in motion by an outside force and function for a limited time, but ultimately wind down and stop.

As seen in the epigraphs above, von Bertalanffy and Wiener provided motive for the association of systems theory with social, political and cultural forces in the United States, noting the dangers of an increasingly mechanized society, symptomatic of closed systems. The artists equated closed systems with Modernism, the military-industrial-complex and technological society. Many influential cultural critics including philosophers Martin Heidegger, Herbert Marcuse and Jacques Ellul warned that individuals shaped by a closed, technological society ruled by scientific rationalism, would become incapable of imagining alternatives to that society, or incapable of imagination altogether.³²⁴ Embracing open systems became a political choice to reject inherited closed systems, seen as absolute and gendered male.

von Bertalanffy. Lawrence Alloway and Henry Art Gallery, *The Idea of the Post-Modern : Who Is Teaching It?* (Seattle, Wash.: Henry Art Gallery, University of Washington, 1981), 31. Denes's writing and work reflect a keen understanding of systems theory. She was also in curator Jack Burnham's show *Software: Information Technology, Its New Meaning for Art*, which examined the application of Wiener's cybernetics, a subset of systems theory, to art. In his catalogue essay, Burnham hailed Wiener's development of cybernetics in 1947 as "one of the landmarks in the history of science." Jack Burnham, "Notes on Art Information Technology, *Its New Meaning for Art*, when *Art* (New York: The Jewish Museum, September 16 - November 8, 1970), 11.

³²⁴ Martin Heidegger, *The Question Concerning Technology, and Other Essays* (New York: Garland Pub., 1977); Herbert Marcuse, *One Dimensional Man; Studies in the Ideology of Advanced Industrial Society* (Boston: Beacon Press, 1964); Jacques Ellul, *The Technological Society*, (1st American ed. New York,: Knopf, 1964).

Consistent with many aspects of feminist theory, open systems, undermined mechanistic production, rational corporate culture, and the Newtonian world-view associated with clock-work, causal relationships. Instead, the concept suggested complex, interdependent, organic assemblages, which transform energy imported from the environment into fuel for organized growth.³²⁵ This chapter considers the ways in which the concept of open systems became a tool for social critique for these artists, offering a transformative, open-ended conceptual model for society and substantiation for social subversion in the midst of the feminist movement and social revolution of the late 1960s and 1970s.

By the early 1970s, Denes, Aycock and Rosler had each begun to create work using systems theory as a point of entry. While much of Schneemann's work resonates with systems ideas, she has made no direct reference to systems as an influence in more than forty years of writing.³²⁶ Denes created one of the first ecologically-conscious earthworks in 1968, entitled *Rice, Tree, Burial*, which examined systems of growth, decay and, as art historian Robert Hobbs has pointed out, the effects of technology on this

³²⁵ von Bertalanffy, 17. von Bertalanffy further stated his misgivings regarding the scope of conventional physics, "Conventional physics deals only with closed systems, i.e., systems which are considered to be isolated from their environment..." (39)

³²⁶ Unpublished interview with the Artist, Springtown, New York, Monday January 15, 2007. Schneemann's ongoing interest in gestalt, based in part on scientist D. W. Thompson's theory, put forth in his book *On Growth and Form* (1917), that essential patterns underlie all physical forms bears resemblance to von Bertalanffy's marriage of Piaget's visual gestalt to systems theory. The notion of process, inherent in open systems, is also central to gestalt therapy, which itself relied heavily on the work of Austrian-American psychoanalyst Wilhelm Reich—whose career and life Schneemann followed closely. But when I asked the artist whether systems theory was an influence for her, she said that she did not know what it was. For an introduction to gestalt therapy, see Paul Goodman, Frederick S. Perls, Ralph Hefferline, *Gestalt Therapy: Excitement and Growth in the Human Personality* (New York: Julian Press, 1951). For Schneemann's interest in Reich see Carolee Schneemann, *Imaging Her Erotics : Carolee Schneemann : Essays, Interviews, Projects* (Cambridge, Mass.: MIT Press, 2002), 133.

process.³²⁷ Aycock's works have been discussed largely in the context of phenomenology, a philosophy promoted in the 1960's by Maurice Merleau-Ponty that favored direct, real-time experience of phenomena.³²⁸ But the tremendous impact of systems theory on the artist's production has only recently been examined in depth by Hobbs.³²⁹ Aycock embraced systems theory as a metaphor for artmaking because it permitted her to forge connections between seemingly disparate ideas. Aycock explained that she became interested in systems theory as a means to "knit together, a kind of

³²⁷Peter Selz claimed this was "the first site-specific work anywhere with ecological concerns." Peter Selz, "Agnes Denes: The Artist as Universalist" in Agnes Denes, Jill Hartz, ed., Intro. Thomas W. Leavitt., Donald Kuspit Essays by: Robert Carleton Hobbs, Peter Selz, Lowry Stokes Sims, Herbert F. Johnson Museum of Art, Agnes Denes (Ithaca, N.Y.: Hebert F. Johnson Museum of Art, Cornell University, 1992), 147. Hobbs argued that for Denes, nature provides a vantage point from which to expose the contradictions of the post-industrial, technological world. Robert Hobbs, "Agnes Denes's Environmental Projects," in Agnes Denes, Jill Hartz, Agnes Denes, 118. Denes commented in 1992 that this work consisted of three parts: the planting of "life-giving" rice, the chaining of trees to symbolize human interference with life, and the burial of her own verses of haiku poetry to symbolize the transference of life-giving thought for recovery by future generations. The artist described this work as a symbolic "event that announced my commitment to environmental issues and human concerns." Agnes Denes, Jill Hartz, Agnes Denes, 106. Art historian Eleanor Heartney wrote that Denes saw Rice/Tree/Burial, 1968 as a pledge of rebirth and quoted Denes who asserted that the work represented her commitment to the "the future well being of the ecological, social and cultural life of the planet." Eleanor Heartney, "Cultivating Hope: The Visionary Art of Agnes Denes" in Agnes Denes: Projects for Public Spaces, a Retrospective, Dan Mills, ed. (Lewisburg, PA: Samek Art Gallery/Bucknell University, 2003). Denes informed me that there are no photos of this work currently available. They were accidentally damaged, and at the time of this writing, she told me she was seeking ways to repair them. Unpublished interview with the Artist, New York, NY, July 21, 2006.

³²⁸ Maurice Merleau-Ponty, *Phenomenology of Perception*, International Library of Philosophy and Scientific Method (New York: Humanities Press, 1962). Maurice Merleau-Ponty's Phenomenology of Perception owes much to the philosophy of physicist Ernst Mach, Professor of Theoretical Physics at German University, Prague from 1865–95. Mach published on the primacy of sensory perception in his essay, "The Analysis of Sensations and the Relation of the Physical to the Psychical" in 1886.

³²⁹ Hobbs, *Alice Aycock: Sculpture and Projects* (Cambridge, Mass.: MIT Press, 2005), 15-16. Hobbs discussed the relevance of systems theory to the artist's work in considerable detail, but he did not analyze individual works through its lens. Stuart Morgan also discussed the influence of systems theory on her work as early as 1978, but largely in relation to her Master's thesis. Stuart Morgan, "Alice Aycock: Structures, Stories and the History of Man-Powered Flight." *Artscribe*, no. 15 (1978): 12-17.
world-view...³³⁰ In 2007, looking back on this period, she spoke about the prevalence of systems theory in the artworld of the 1960s,

As artists and as a society we were still addressing all kind of things from a philosophical and a theoretical position. And psychology, biology, physics, economics, you name it, we were still really mired in philosophy... And systems theory was out there, that was what people were talking about, whether they were talking about it as a business model, as a model for science, the environment, as a model for highway systems, for construction, as a model for the human body as a model in terms of computers.³³¹

Aycock spoke further about the opportunity systems theory offered art and artists at that time, "One doesn't think so much [anymore] about art at the apex of all these different systems. And I think in that sense it was very utopian, and very visionary and very hopeful."³³² Perhaps due to her interest in the phenomenological relationship of the body to external spaces, von Bertalanffy's notion of open systems was more appealing to her. She said, "And even today, I suppose, that whole notion about how systems within the body self-regulate is just naturally more interesting to me."³³³

While Aycock and Denes embraced systems theory in order to integrate systems of knowledge under the rubric of art, for Rosler, it substantiated consideration of the social environment, or as Rosler refers to it-- the "life world," in which works of art are made, as has been noted by curators Donna DeSalvo, Mark Godfrey and Johanna Burton in

³³⁰ Unpublished interview with the Artist, New York, NY, April 5, 2004.

³³¹ Unpublished interview with the Artist, New York, NY, July 16, 2007.

³³² Unpublished interview with the Artist, New York, NY, July 16, 2007.

³³³ Unpublished interview with the Artist, New York, NY, July 16, 2007.

essays for the *Open Systems* exhibition.³³⁴ Rosler rejected the modernist notion, forwarded by theorist and critic Clement Greenberg and his pupil Michael Fried, that the formal purity and autonomy of the art object is paramount, and that it thereby transcends the social and political concerns of everyday life.³³⁵ She has said that her own work at the time was meant to function, in part, as a criticism of conceptual art, specifically work produced by artists such as Sol Lewitt and Joseph Kosuth.³³⁶ She believed works by these artists represented "closed-ended propositions that produced ideal systems" or "created closed-ended games out of real world situations."³³⁷ She found Lewitt's and Kosuth's creation of "microcosms of perfection" to be "troubling."³³⁸ For Rosler, works that functioned as open systems engaged the social world, exposing closed institutional structures, and in so doing, proposed the existence of alternative, open, messier processes.

Systems Theory and Society

von Bertalanffy claimed to have developed systems theory for application to the biological sciences in response to what he saw as the prevailing cause-and-effect nature

³³⁴ Martha Rosler, M. Catherine de Zegher, and Ikon Gallery, *Martha Rosler: Positions in the Life World* (Birmingham, England, Vienna, Austria, Cambridge, Mass.: Ikon Gallery; Generali Foundation; MIT Press, 1998). DeSlavo, *Open Systems*, 20, 24, 76.

³³⁵ Clement Greenberg, "Modernist Painting" in Charles Harrison and Paul Wood, eds. Art in Theory, 1900-2000: An Anthology of Changing Ideas (Malden, MA: Oxford: Blackwell Publishers Ltd., 2003), 777. First published in Forum Lectures (Voices of America), Washingon, DC, 1960. Michael Fried, "Art and Objecthod" in Harrison and Wood, eds. Art in Theory, 1900-2000, 835-846. First published in Artforum, Summer, 1967.

³³⁶ Art historians Alexander Alberro and Buchloh have referred to Rosler as a post-conceptual artist. Buchloh also referred to her as an anti-conceptualist, in that her work was meant, in part, as a critique of conceptual art practices. Alexander Alberro, *Conceptual Art and the Politics of Publicity* (Cambridge, Mass.: MIT Press, 2003). Rosler named Kosuth, specifically, in her interview with Benjamin Buchloh. Benjamin Buchloh, "A Conversation with Martha Rosler" in Rosler, *Martha Rosler : Positions in the Life World*, 33 and 42

³³⁷ Unpublished interview with the Artist, Brooklyn, NY, Thursday August 23, 2007.

³³⁸ Unpublished interview with the Artist, Brooklyn, NY, Thursday August 23, 2007.

of all the sciences based on Newtonian theories, which focused on the behavior of elementary units and thereby overlooked the reality that organisms interact with their environment.³³⁹ Ironically though, the theory found greatest resonance in the fields of computer technology, cybernetics, automation and systems engineering after Wiener and electronic engineer and mathematician Claude Shannon successfully applied it to automatic weapon's systems during World War II.³⁴⁰ After the war, Shannon published "A Mathematical Theory of Communication," which dealt with the processing, storage and use of information.³⁴¹ That same year, Wiener published his influential book

³³⁹ von Bertalanffy claims to have introduced the "theory of the organism as open system" in the 1920s, and to have first published it in 1948, as he claimed, "prior to cybernetics, systems engineering and the emergence of related fields." von Bertalanffy, 12, 14. According to the International Society for the Systems Sciences, von Bertalanffy did not begin to focus on the methodology of science until the 1950s, and he did not develop his holistic epistemology until 1966, with the publication of his book Robots, Men, and Minds: Psychology in the Modern World, which criticized the machine metaphor of neobehaviorism. International Society for the Systems Sciences, http://www.isss.org/lumLVB.htm (accessed August 14, 2007). von Bertalanffy indicated the reliance of his theory on the "organismic conception in biology" for which he credits, among others, Whitehead, and psychological gestalt theory, von Bertalanffy, General Systems Theory, 208. Process-oriented, holistic approaches were integral to Whitehead's process philosophy and to Gestalt therapy. Alfred North Whitehead, Process and Reality, an Essay in Cosmology; Gifford Lectures Delivered in the University of Edinburgh During the Session 1927-28, (New York: Cambridge, Eng.: The Macmillan Company; University Press, 1929); Paul Goodman, Frederick S. Perls, Ralph Hefferline, Gestalt Therapy: Excitement and Growth in the Human Personality (New York: Julian Press, 1951).

³⁴⁰ Wiener worked on ballistic computations during World War I and on the automatic aiming and firing of anti-aircraft weapons during World War II. See Arturo Rosenbluth, Norbert Wiener and Julian Bigelow, "Behavior, Purpose and Teleology," Philosophy of Science, 10 (1943): 18-24. Found in Biography of Norbert Wiener, International Society for the Systems Sciences, http://www.isss.org/lumwiener.htm (Accessed December 18, 2008). See also Dylan Tweney, "Nov. 26, 1894: Cybernetics Pioneer Norbert Wiener Born," *Wired*, Nov. 26, 2008, http://www.wired.com/science/discoveries/news/2008/11/dayintech_1126 (Accessed December 18, 2008). Shannon worked on fire-control systems at Bell Labs during the war, and first published his article in the *Bell Systems Technical Journal*. He had worked for scientist and engineer Vanevar Bush while completing his Ph.D. at MIT in the 1930s. Bush played an important political role during World War II-- he was the presidential science advisor and was instrumental in the development of the atomic bomb.

³⁴¹ Shannon's theory was published in two parts, the first in July 1948, the second in October 1948 in the *Bell System Technical Journal*. Claude Shannon, "A Mathematical Theory of Communication," *Bell System Technical Journal* 27 (1948): 379-423 and 623-56, <u>http://cm.bell-</u>

Cybernetics: (Or Control and Communication in the Animal and the Machine) (1948), which he followed with *Human Use of Human Beings: Cybernetics and Society* (1950), intended to make his ideas available to a broad, American audience.³⁴² The purpose of cybernetics was to enable tighter control over communication systems, (particularly those involving human and machine interaction), so that information would not be changed or lost in the process of dissemination.³⁴³ Rand Corporation applied Wiener's and Shannon's ideas to U.S. military organizational systems such as air defense, command and control, as well as data analysis and satellite surveillance beginning in the late 1940s.³⁴⁴ By the 1960s, systems theory and cybernetics had been employed predominantly for the development of weapons by the military in Vietnam, and by major American corporations including IBM, Western Electric and Bell Labs, all of whom had

<u>labs.com/cm/ms/what/shannonday/paper.html</u> (accessed Jan. 13, 2009) Shannon relied on Wiener's work on the application of probability theory to communication.

³⁴² Wiener specifically targeted an American audience. He said, "I am writing this book primarily for Americans in whose environment questions of information will be evaluated according to a standard American criterion: a thing is valuable as a commodity for what it will bring in the open market. This is the official doctrine of an orthodoxy which it is becoming more and more perilous for a resident of the United States to question. Wiener, 154. Cybernetics, derived from the Greek word for steersman (kybernetes), and was first introduced by Weiner as the science of communication and control in the animal and the machine. The emphasis on engineering control systems based on closed, mechanistic, cause-and-effect relationships, changed gradually over time.

³⁴³ Cybernetics is a Greek word meaning the art of steering. It was applied by Plato to the act of governance.

³⁴⁴ Martin J. Collins, *Cold War Laboratory: Rand, the Air Force, and the American State, 1945-1950.* (Smithsonian History of Aviation and Spaceflight Series, Washington D.C.: Smithsonian Institution Press, 2002); and Paul Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: The MIT Press, 1996), 116. Systems Analysis, the application of systems theory, was developed at Rand beginning in 1948 by Edward Paxson. The following memorandii represent RAND's efforts to make Systems Analysis relevant to Air Force personnel: Malcolm W. Hoag, "An Introduction to Systems Analysis," Research memorandum, Santa Monica, CA: The Rand Corporation, April 13, 1956.

http://www.rand.org/pubs/research_memoranda/2006/RM1678.pdf. (accessed August 7, 2007). See also H. Kahn and I. Mann, "Techniques of Systems Analysis" memorandum. (Santa Monica, CA: The Rand Corporation, June 1957) Found at

http://www.rand.org/pubs/research_memoranda/2006/RM1829-1.pdf (accessed August 7, 2007).

built large, interconnected, real-time data processing systems-- computers designed to convert data into usable information.³⁴⁵

Wiener's theory of cybernetics was based on his belief that the successful communication of information is a measure of order, which enables societies to thrive.³⁴⁶ He contrasted that order to entropy (a measure of disorder in which systems break down), which became an important concept in the art world in the late 1960s. To preserve the integrity of a message from its origin to its destination, Wiener demonstrated that the machine conveying the message must be capable of monitoring its progress through feedback, a function of open systems. Just as an animal monitors its needs and available resources through its senses, which bring information from the environment back to the brain, a mechanical system may also adjust to changes in its environment or within itself, if equipped with sensory or servomechanisms. This process of self-regulation tends to increase the organization of the system, albeit temporarily. The regulation is temporary because all open systems exist within the universe, itself a closed system. Closed systems, once set in motion, eventually slow to a halt, reaching a state of disorder, also known as entropy. Entropy is an explicit condition of the second law of thermodynamics, which states that all mechanical energy within an isolated or closed system ultimately

³⁴⁵ Stan Augarten, *Bit by Bit: An Illustrated History of Computers* (New York: Ticknor and Fields, 1984), 208. Quoted in Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America*, 102. All of these companies had received substantial military contracts during the Cold War.

³⁴⁶ Wiener, 158-159. It is likely that Wiener's warnings of the entropically-inclined society, and its ramifications for art in the mercantile economy, affected artist Robert Smithson's notion of entropy. Wiener's comments derive from his discussion of information as a commodity in American society. He observed that the American mercantile economy is not conducive to the conservation of information, to art, and to the notion of property. He argued that in order for a creative work to add information, it must be independent of ownership and remain in the public domain. (160)

dissipates, moving toward a state of maximum disorder or equilibrium. Contemporary cosmological theories held that the universe would ultimately die a heat death. A bit of a misnomer, heat death refers to the expansion of the universe until all the energy contained within disperses, resulting in a uniform temperature close to absolute zero--maximal entropy.³⁴⁷ Wiener warned of the ultimate fate of humanity, "Sooner or later we shall die… the heat death, in which the world shall be reduced to one vast temperature equilibrium in which nothing new ever really happens."³⁴⁸

Despite the eventual destruction of the universe, von Bertalanffy optimistically discussed the potential for the earth, an open system, to thrive in the interim. He said, "Thus, living systems, maintaining themselves in a steady state, can avoid the increase of entropy, and may even develop towards states of increased order and organization."³⁴⁹ Because the state of increasing order negates entropy, von Bertalanffy called it *negentropy*.

³⁴⁷ Maximal entropy (the heat death) was actually one of two possible ends to the universe according to cosmological theory, but it was the most pervasive. The notion of heat death was first suggested in the 19th century by William Thompson (Lord Kelvin), who theorized an ultimate heat death for the universe in "On a Universal Tendency in Nature to the Dissipation of Mechanical Energy" published in 1852, in which he extrapolated from the second law of thermodynamics for application to the cosmos. Accordingly, all matter and energy will eventually dissipate in the universe, because it is a closed system. Thus all matter will cool to temperatures near absolute zero, resulting in the *death of heat*. However, Kelvin only theorized the *possibility* of heat death. He continued to maintain that the heat death would *not* occur, that the universe would continue to progress. He wrote, "The result would inevitably be a state of universal rest and death, if the universe were finite and left to obey existing laws. But it is impossible to conceive a limit to the extent of matter in the universe; and therefore science points rather to an endless progress, through an endless space, of action involving the transformation of potential energy into palpable motion and hence into heat, than to a single finite mechanism, running down like a clock, and stopping for ever." William Thompson, "On the Age of the Sun's Heat," Macmillan's Mag., 5 (1862): 288-93.

³⁴⁸ Wiener, 44.

³⁴⁹ von Bertalanffy, 39-41. In life systems, which von Bertalanffy notes, as well as in contemporary cosmology, steady-state refers to self-regulation, in which an open system continues to function with and within other systems. Equilibrium, the result of maximal entropy,

von Bertalanffy continually pitted his open, organic systems against the then prevalent mechanistic approach to science, which "appeared to neglect or actively deny just what is essential in the phenomena of life."³⁵⁰ He then extended the theory to social systems and to events in history, asserting that social life is comprised of an interconnected web of ideological systems. He believed that civilizations were dynamic and self-evolving entities which also went through cyclical processes of birth, growth and decay. He wrote,

Events seem to involve more than just individual decisions and actions and to be determined more by socio-cultural "systems," be these prejudices, ideologies, pressure groups, social trends, growth and decay of civilizations, or what not.³⁵¹

He believed in a cyclical view of history whereby "great entities or great systems called high cultures or civilizations" exist within an overall evolving universe, and localized events can be predicted based on probabalistic models.³⁵² He suggested that contemporary society was in a period of degeneration. He wrote, "in spite or perhaps because of our magnificent technological achievements, we live in a time of cultural decay and impending catastrophe."³⁵³

Largely responsible for the decay of civilization, von Bertalanffy argued, were systems scientists, a relatively new crop of professionals employed by government, industry and

occurs when all matter and energy have reached the simplest possible state, maximal disorder, and the system ceases to function.

³⁵⁰ von Bertalanffy, 12.

³⁵¹ von Bertalanffy, 8.

³⁵² von Bertalanffy, 200.

³⁵³ von Bertalanffy, 203. von Bertalanffy was relating the view of Oswald Spengler, argued in his book *The Decline of the West*, 1926.

the military in the fields of engineering and computer technology. Systems scientists, he asserted, had co-opted systems theory and put it to mechanistic ends, at the expense of human beings. He expressed concern that in "the new cybernetic world" "man becomes replaceable and expendable." He wrote,

To the new utopians of systems engineering... it is the "human element" which is precisely the unreliable component of their creations. It either has to be eliminated altogether and replaced by the hardware of computers, self-regulating machinery and the like, or it has to be made as reliable as possible, that is, mechanized, conformist, controlled and standardized.³⁵⁴

von Bertalanffy's repudiation of the failure of systems "utopians" to consider the human element was redolent with utopianism aimed at undermining the destructiveness of closed, conformist and mechanistic science and reintroducing the agency of the individual. He continued,

In somewhat harsher terms, man in the Big System is to be-and to a large extent has become-a moron, button-pusher or learned idiot, that is, highly trained in some narrow specialization but otherwise a mere part of the machine. This conforms to a well-known systems principle, that of progressive mechanization-the individual becoming ever more a cogwheel dominated by a few privileged leaders, mediocrities and mystifiers who pursue their private interests under a smokescreen of ideologies.³⁵⁵

von Bertalanffy accused systems scientists of enabling the creation of a mechanistic society where human beings are retro-fitted to specialized, repetitive tasks in order to serve the ends of a "few privileged leaders." To lend validity to his view, he cited cultural critic Lewis Mumford who shared his concerns,

³⁵⁴ von Bertalanffy, 10.

³⁵⁵ von Bertalanffy, 10. von Bertalanffy cited Sorokin (1966), pp. 558ff.

[Systems Science] appears to make the systems idea another – and indeed the ultimate – technique to shape man and society ever more into the "mega-machine" which Mumford (1967) has so impressively described in its advance through history.³⁵⁶

Mumford's mega-machine, defined in *The Myth of the Machine* (1967), is the exquisite organization of vast pools of human labor for the achievement of a task that serves the few in power. In the mega-machine, the individual worker becomes one predictably functioning component of an enormous and complex system—a clock, with all its various working parts, set in motion by the authoritarian ruler who winds it. Mumford similarly likened contemporary American society to a closed, top-down system, which had programmed its own military machine to brutalize the agrarian inhabitants of Vietnam.³⁵⁷ Both Mumford and von Bertalanffy argued that the mega-machine had been honed to a fever pitch in contemporary society. The biologist supported open systems as a counter-discourse to the notion of a tightly-controlled mechanized society in which the 1950s "organization man" turned perpetually like an obedient cog.³⁵⁸ He explained,

[The] professions and jobs [that] have appeared in recent years... such as systems design, systems analysis, systems engineering and others... are the very nucleus of a new technology and technocracy.³⁵⁹

³⁵⁶ von Bertalanffy, viii.

³⁵⁷Mumford explained that this military machine was designed not to accept feedback from its "machine parts." He cited Wiener, referring to his work on automation, "In the one-way system of communication characteristic of all megamachines, such 'speaking up' constituted an unthinkable affront to the ruling officers, and indeed it still remains so under military discipline." Mumford, *The Myth of the Machine*. vol. 1 and 2. 1st ed. (New York,: Harcourt, 1967), 214. ³⁵⁸ William Whyte, *The Organization Man* (New York: Simon and Schuster, 1956). Largely focused on middle management, Whyte also presents a cogent critique of the corporate system in which employees sacrifice their individual and family needs to those of the corporation in an effort to conform.

³⁵⁹ von Bertalanffy, viii.

Thus, he conflated closed systems with mechanism as the ruling principal of a technological society.

Ellul had also equated closed systems with mechanism or technique in *The Technological* Society (1964). Published the same year as Marcuse's One-Dimensional Man, Ellul asserted that technique had become the ruling principal of the Western world-view, and that American society was the technological society, a closed system that carries associations of confinement, even imprisonment.³⁶⁰ He defined technique as simply the most efficient series of actions, intended to produce a specific, predetermined result. The technological society was one in which technique itself had become determinative and self-sufficient, the reality superseding all others.³⁶¹ The philosopher remarked, "Technique has become autonomous; it has fashioned an omnivorous world which obeys While many have accused Ellul of pessimism in The Technological its own laws."³⁶² Society, he was careful to assert in his forward to the American edition that he meant to inspire the reader to take action, to confront the invisible force of technique that controls one's life. He said, "[My] purpose is to arouse the reader to an awareness of technological necessity and what it means. It is to call the sleeper to awake."³⁶³

³⁶⁰ Ellul was not alone in viewing American society as a closed system. He was accompanied in his thinking by Herbert Marcuse, Mumford and Martin Hiedegger. For Heidegger's views, see William Lovitt, intro. Martin Heidegger, *The Question Concerning Technology*, 1977. xvi. See also Herbert Marcuse, *One Dimensional Man*, 1964 and Mumford, *The Myth of the Machine*, 1967.

 ³⁶¹ Jacques Ellul, *The Technological Society*, 1st American ed (New York: Knopf, 1964), 134
 ³⁶² Ellul, 14

³⁶³ Ellul, xxxiii

Many heard Ellul's warning of the incessant, grinding march of closed American society, comprised of ordered, lifeless institutions all answerable to the military-industrial-complex. The science fiction novels *Dune* (1965) and *Dune Messiah* (1969), widely read technological dystopias penned by Frank Herbert, were premised on the economic and religious relationships between outer world planetary fiefdoms that had survived a massive takeover by machines. Enslaved by the machines for millennia and nearly decimated after waging a brutal, century-long jihad against them, humans finally defeated the computer overlord, Omnius, and forever banned all technology.³⁶⁴ Herbert later commented on the basis of the conflict in his novels,

It is the systems themselves that I see as dangerous. Systematic is a deadly word. Systems originate with human creators, with people who employ them. Systems take over and grind on and on. They are like a flood tide that picks up everything in its path.³⁶⁵

Herbert here evoked the popular conflation of systems theory with mechanistic systems that oppose and ultimately enslave the biological. Like Wiener's *machine a gouverner*, these systems originated with human creators, but ultimately overcame and destroyed them.

³⁶⁴ The jihad, referred to by Frank Herbert and described in detail in the Dune prequels written by his son Brian (posthumously, but with ample inherited notes for storylines) was called the Butlerian Jihad, which was, in my view, a reference to the British writer Samuel Butler's nineteenth century utopian novel, *Erewhon* (meaning "nowhere" spelled backward), which contained its own technological dystopia. Wiener referred to Butler's *Erewhon* in *Human Use of Human Beings*, 250.

³⁶⁵ <u>http://www.dunenovels.com/news/genesis.html</u> (accessed April 3, 2005).

Ellul asserted that technique had also overcome the arts, a concern that political philosopher Stephen Bronner has indicated was similar to Marcuse's, particularly Ellul's claim that "mechanization had penetrated into the subconsciousness of the artist"³⁶⁶ thus serving to override and control even the artistic imagination.³⁶⁷ Critic and curator Jack Burnham's book, *Beyond Modern Sculpture* (1968), was written in direct response to Ellul's assertion that art had become the servant of technique.

Art Historiography and the Systems Aesthetic

In his book, Burnham proposed that the solution to art's subservience was to reject art as a formal object controlled by mechanistic society in favor of its reconsideration as a system that interacts with the environment.³⁶⁸ He wrote, "This book makes a case for at least the temporary survival of sculpture through transition from the object to the system."³⁶⁹ Burnham's ideas had roots in Grav (Groupe de Recherche d'Art Visuel), whose statement 'Transforming the Current Situation of Plastic Art' he had reproduced in his book.³⁷⁰ He also worked under Gyorgy Kepes, a proponent of Kinetic Art, as a fellow at the Center for Advanced Visual Studies at MIT.³⁷¹ Kepes, in turn, had

³⁶⁶ Ellul, 129

³⁶⁷ Stephen Eric Bronner, "The Aesthetic Dimension" in Andrew Feenberg, Charles Webel, and Robert B. Pippin, *Marcuse : Critical Theory and the Promise of Utopia* (London: Macmillan Education, 1988), 114.

³⁶⁸ Art historian Edward Shanken pointed out that Burnham thought about the world as based on interactive feedback of information amongst systems and their components in global fields, in which there is "no logical separation between the mind of the perceiver and the environment." Edward A. Shanken, "The House That Jack Built: Jack Burnham's Concept of "Software" as a Metaphor for Art." Leonardo Electronic Almanac 6, no. 10 (1998), n.p.

³⁶⁹ Jack Burnham, Beyond Modern Sculpture; the Effects of Science and Technology on the Sculpture of This Century (New York,: G. Braziller, 1968), 13.

³⁷⁰ Art in Theory, 1900-2000: An Anthology of Changing Ideas, Charles Harrison and Paul Wood, eds. (Malden, MA: Oxford: Blackwell Publishers Ltd., 2003), 725.

³⁷¹ Edward A. Shanken, "The House That Jack Built: Jack Burnham's Concept of "Software" as a Metaphor for Art," *Leonardo Electronic Almanac* 6, no. 10 (1998). http://www.artexetra.com/House.html.

developed contacts with Buckminster Fuller and Norbert Wiener, who had been at MIT since the 1940s. Drawing from these prior notions of a non-plastic art based on motion, Burnham juxtaposed his own esthetic against the formalism of Fried, calling it post-formalist, an approach that adhered to no material rules or limits.³⁷² Burnham also published two widely read essays in *Artforum*, "Systems Esthetic" and "Real Time Systems," which argued that much conceptual art was consistent with a "systems esthetic" because it rejected the commodifiable art object and, ostensibly, the art system that perpetuated it, in favor of forging a direct relationship with the viewer's social context.³⁷³ By linking the work of art to its environment and to the viewer, Burnham effectively promoted the concept of open systems. Burnham quoted von Bertalanffy in defining a system as "a complex of components in interaction," which the critic saw as interdependent and non-deterministic.³⁷⁴

³⁷² Burnham also predicted the post-human integration of technology and humanity, via systems and cybernetics, as early as 1968. Burnham, Beyond Modern Sculpture. 373. The integration of technology and humanity, embodied by the cyborg, was a common theme in science fiction in the 1970s, including Philip K. Dick's novel Do Androids Dream of Electric Sheep (1968) and mainstream television including The Six Million Dollar Man (1974-1978) and The Bionic Woman (1976-1978).³⁷² The Six Million Dollar Man was based on the novel Cyborg (1972) by Martin Caidin. The Bionic Woman was a spin-off of the first television series. The term cyborg, a contraction of cybernetic and organism, was coined in 1960 by Manfred Clynes and Nathan Kline. Clynes and Kline viewed cyborgs as "self-regulating man-machine systems." Donald A. Mackenzie and Judy Wajcman, The Social Shaping of Technology : How the Refrigerator Got Its Hum (Philadelphia: Open University Press, 1985), 43. In the late 1980s, scholar Donna Haraway published her famously utopian (in the classic sense) theory of the post-human cyborg, which is free to roam the Internet and other digital systems remaining gender ambiguous and therefore exempt from prescribed racial, gender and class limitations. Though Haraway's notion was rooted in later issues of identity construction, her general speculations on the post-human were preceded by those of Burnham. Donna Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist Feminism in the Late Twentieth Century," in Simians, Cyborgs and Women: The Reinvention of Nature (New York: Routledge, 1991).

³⁷³ But the artist did not see Burnham's 1970 exhibition *Software* at the Jewish Museum. Unpublished interview with the Artist, New York, NY, July 16, 2007.

³⁷⁴ Margot Bivjoet noted this in Art as Inquiry, <u>http://www.stichting-</u>

mai.de/hwg/amb/aai/art_as_inquiry_04.htm#burnham (accessed October 5, 2006).

Borrowing from Thomas Kuhn's notion of paradigms put forth in *The Structure of Scientific Revolutions* (1962) (and from von Bertalanffy himself), Burnham claimed that society and art were in a state of transition to a new systems paradigm.³⁷⁵ He promoted a systems esthetic that offered a freedom from boundaries.³⁷⁶ He wrote,

In systems perspective there are no contrived confines such as the theater proscenium or picture frame. Conceptual focus rather than material limits define the system. Thus any situation, either in or outside the context of art, may be designed and judged as a system...³⁷⁷

In the catalog essay "Notes on Art and Information Processing," written for his 1970 exhibition, *Software: Information Technology Its New Meaning for Art*, in which Denes was included, Burnham explained that he selected work that "dealt with underlying structures of communication or energy exchange."³⁷⁸ In the exhibition, Burnham sought to underscore the importance of information in society and the critical role art could play in addressing its potential overflow – in other words, in containing its information entropy. Following von Bertalanffy, Burnham promoted a connection between viewer and environment in real time processes that fostered increasing organization or *negentropy*.

A close associate of Burnham's, artist Hans Haacke, began creating systems-based works in the early 1960s, and over the course of the decade a decided shift took place in his

³⁷⁵ Jack Burnham, "Systems Esthetics" first published in *Artforum*, 1968, in Jack Burnham, *Great Western Salt Works; Essays on the Meaning of Post-Formalist Art* (New York,: G. Braziller, 1974), 15. Bertalaffy also validated his discovery via Kuhn asserting that his systems viewpoint "represents a novel 'paradigm' in scientific thinking (to use Thomas Kuhn's expression)." von Bertalanffy, xvii.

³⁷⁶ Jack Burnham, "Systems Esthetics" in Great Western Salt Works, 11.

³⁷⁷ Jack Burnham, "Systems Esthetics" in Great Western Salt Works, 17.

³⁷⁸ Jack Burnham, "Notes on Art and Information Processing," *Software*, 11.

work toward engagement with open social systems.³⁷⁹ In 2007, Rosler criticized Haacke's early systems works, such as *Condensation Cube* (1963/1965) (**fig**. 26), as closed systems.³⁸⁰ This work consisted of a small amount of water contained in the bottom of a sealed Perspex box. Heated by an outside light source, the water condensed along the walls. When cooled, the water dropped to the bottom of the box until heated once more. Technically, this work functioned as an open system because water within the box responded to the vagaries of ambient light, but Rosler criticized it as closed, based on its minimalist, box-like form, revealing her own formal prejudices. By 1970, Hans Haacke had also begun to use systems thinking as a means to encompass social context.

Burnham explained that Haacke did not begin to use open systems to challenge social institutions until after 1968, which was the year von Bertalanffy published his book. Rosler recently commented on Haacke's expansion of systems art to the political realm,

The Haacke we first knew was a man who did a cube of condensation and threw bread on the water so the birds could eat it and you know, it had to do with these sort of atmospheric systems and then, a little bell went off in his head, and he said, Wait a minute. Why stick with natural systems, what about social systems? And he began investigating even things like the system of art, and capital in relationship to the production of work and so on.

³⁷⁹ According to Burnham, the artist associated his work with General Systems Theory beginning in 1965, seeking to combine biological and technological systems. However, Burnham explains, Haacke didn't become familiar with von Bertalanffy's notion of open biological systems until the publication of von Bertalanffy's book in 1968. Hans Haacke, *Framing and Being Framed* : 7 *Works, 1970-75.* (Halifax, New York: Press of the Nova Scotia College of Art and Design; New York University Press, 1975), 131-132.

³⁸⁰ Interview with the Artist, Brooklyn, NY, August 23, 2007.

Rosler's bias for work with a political concern is evident in the quote above, but a change indeed took place in Haacke's work. Burnham attributes the shift in the artist's work to world events such as; the May Revolution instigated by bourgeois students in colleges around Paris, the boycott by artists of the 10th Sao Paulo Bienal in Brazil due to the country's repressive military dictatorship, the Vietnam War, and the assassination of Martin Luther King Jr.³⁸¹ Haacke was deeply affected by the assassination as he indicated in a letter to Burnham,

The event pressed something into focus that I have known for long but never realized so bitterly and helplessly, namely, that what we are doing, the production and the talk about sculpture, has no relation to the urgent problems of our society. Whoever believes that art can make life more humane is utterly naïve...³⁸²

Haacke's political consciousness, provoked by the confluence of world events at this pivotal juncture, was shared by many artists. ³⁸³ The events of the day provided motivation, while von Bertalanffy's concept of open systems offered scientific justification for relating art to the social world.

In her 1970 essay for the exhibition *557,087*, critic Lucy Lippard also argued for the engagement of art with the social world, directly quoting Burnham and Marcuse to contextualize her position.³⁸⁴ In Marcuse, she found validation for the political critique

³⁸¹ Haacke, 131

³⁸² Haacke, 130

³⁸³ This includes members of Art & Language such as Ian Burn, Schneemann and Rosler. For Ian Burn, see Michael Corris, ed. *Conceptual Art: Theory, Myth, Practice, Conceptual Art : Theory, Myth, and Practice* (New York: Cambridge University Press, 2004), 2.

³⁸⁴Critic Lucy Lippard first repositioned art with respect to political exchange and critique of commodity value in her essay "The Dematerialization of Art." Kristine Stiles, "Language and Concepts" in Kristine Stiles and Peter Selz, *Theories and Documents of Contemporary Art : A Sourcebook of Artists' Writings* (California Studies in the History of Art; 35. Berkeley: University of California Press, 1996). This fact was called to my attention in Edward Shanken's

inherent in conceptual art, and called for a more open social system. She quoted Marcuse as follows, "Capitalist progress...not only reduces the environment of freedom, the 'open space' of the human existence, but also the 'longing,' the need for such an environment."³⁸⁵ She also claimed that art is information and that artists seek to expose circumstances and information already in the environment.³⁸⁶ Linking social engagement with the aesthetics of open systems, she referred specifically to Burnham's "systems aesthetic" in order to describe Robert Morris's search for a new "underlying order in the world," which could not be found "in material entities, but in relations between people and the components of their environment."³⁸⁷ In this approach, Lippard discussed the placement of conceptual restrictions on artmaking. She said, "it's the imposition of a closed instead of an open system."³⁸⁹ Thus, engagement with the environment was a departure from modernism and from "capitalist progress," which,

dissertation. Edward A. Shanken and Duke University. Dept. of Art History, "Art in the Information Age : Cybernetics, Software, Telematics, and the Conceptual Contributions of Art and Technology to Art History and Theory," 2001. Fn. p. 126.

³⁸⁵ Quotations hers. Lippard, 179. In 1977, Lippard evoked Marcuse in a discussion of earthworks, including Aycock's project for Williams College, 1974 (a work which was similar in form to the artist's *Low Building with Dirt Roof* (for Mary), 1973. Lippard wrote, "And Marcuse has warned that a necessary change in the human relationship to nature 'would require a new climate wherein new experiments and projects would be suggested to the intellect by new social needs…Instead of the further conquest of nature, the restoration of nature; instead of the moon, the earth; instead of the occupation of outer space, the creation of inner space…" [Elipses and quotations hers] Lucy Lippard, "Complexes: Architectural Sculpture in Nature," *Art in America* 67, no. 1 (1979): 88.

³⁸⁶ Lucy Lippard, "Introduction to 557,087" taken from Alexander Alberro and Blake Stimson. *Conceptual Art : A Critical Anthology* (Cambridge, Mass. ; London: MIT Press, 1999),182.

³⁸⁷ Lucy Lippard, "Introduction to 557,087" taken from Alexander Alberro and Blake Stimson. *Conceptual Art : A Critical Anthology*,183.

³⁸⁸ Lippard, 183.

³⁸⁹ Urusla Meyer, "Interview with Lucy Lippard," (1969) reprinted in Lucy Lippard, Six Years: The Dematerialization of the Art Object from 1966 to 1972; a Cross-Reference Book of Information on Some Esthetic Boundaries (New York: Praeger, 1973), 7.

Lippard insinuates, created a hermetic environment in which the art object was confined to institutions limiting its function to that of commodity.

Modernism was explicitly called a closed system by art historian Robert Pincus-Witten who, in his 1977 book *Postminimalism*, characterized the formalist criticism of Fried as a closed system that was outmoded and inconsistent with the new work being made in the late 1960s and early 1970s.³⁹⁰ Pincus-Witten described Fried's thesis as follows, "[Fried's] tone – often inflated to the pompous – corresponded to *a closed formalist machine of judgment* from which personal reference and biography were omitted."³⁹¹ [italics mine] He explained that the rejection of formalism resulted from despair over the conduct of American politics (Vietnam, Watergate etc.), and was "energized by the insurgency and success of the Women's Movement."³⁹² Thus according to Pincus-Witten, the closed formalist system had been opened by the counter-culture and the women's movement in order to consider the social and cultural landscape against which new work was being made.

Similarly, in a 1980 essay, art historian Donald Kuspit equated open systems with the intent of Postmodern work.³⁹³ He said, "The Postmodernist attitude…means to overcome the entropy that inevitably accompanies the hermetically sealed, purely formal

³⁹⁰ I am indebted to Burton for noting Pincu-Witten's comment in her essay, "Mystics Rather than Rationalists," 65.

 ³⁹¹ Robert Pincus-Witten, *Postminimalism* (New York: Out of London Press, 1977), 14
 ³⁹² Pincus-Witten, 14.

³⁹³ Kuspit, "Postmodernism, Plurality and the Urgency of the Given" in Lawrence Alloway, and Henry Art Gallery, *The Idea of the Post-Modern : Who Is Teaching It?* (Seattle, Wash.: Henry Art Gallery, University of Washington, 1981).

work of art by making it into an open performance."³⁹⁴ In the essay, he indicated that he used the terms "open" and "closed" as von Bertalanffy had. In so doing, he equated open systems with the biological idea of growth.³⁹⁵ Kuspit seems to have internalized von Bertalanffy's association of open systems with social systems, because he explained that by a closed system he meant a mechanical one, in which no growth is possible.³⁹⁶ In his essay, modernism is closed and hermetic, while postmodernism is active. He correctly positioned open systems in opposition to entropy or the idea of decay. Kuspit, like Pincus-Witten, associated formalist art, as promoted by Fried, with closed systems and postmodern (postformalist) work as engaged with its social context.

Recently, art historian Alexander Alberro echoed Pincus-Witten in his explanation of conceptual art. Alberro characterized conceptual art's shift away from modernism partly as a break from Fried's reification of the autonomy of the art object. Alberro suggested that formalism represented a limited, stifling approach to art and the hallmark of an institution that had become closed. Alberro wrote that in "Art & Objecthood," Fried feared that a completely new way of experiencing art would emerge, "subverting the autonomy of art and turning the viewer's kinesthetic reactions and bodily responses into a central issue."³⁹⁷ This shift focused on "the contingency of work in relation to real space," which "prompted the promotion of an unrestricted, open, external space without

³⁹⁴ Kuspit. "Postmodernism, Plurality and the Urgency of the Given," 19.

³⁹⁵ Kuspit misinterpreted von Bertalanffy to some degree in this essay. The notion that open systems are strictly biological was not espoused by the scientist, who posited that inorganic systems also may be open.

³⁹⁶ Kuspit, "Postmodernism, Plurality and the Urgency of the Given," 19

³⁹⁷ Alexander Alberro, "Content, Context and Conceptual Art: Dan Graham's Schema" in Corris, *Conceptual Art, Theory, Myth and Practice*, 56.

institutional limits."³⁹⁸ Thus, according to Alberro, art became open to the social context of its own making and was free to engage in direct criticism of those institutions, the art market, art museums, etc. with which it was entwined.

Art historian Suzaan Boettger characterized modernism and 1960s society as, effectively, closed systems in an astute discussion of Robert Smithson's engagement with entropy, an inextricable part of closed systems.³⁹⁹ Boetgger commented that entropy was "an apt metaphor for the societal mood of the late 1960s." She wrote further,

It describes the public's apprehension over the deterioration of nature from pervasive pollution, of the country's slackening economic pace under the burden of the Vietnam War, and on the social level, a late-sixties society that was itself undergoing disruption. The experience of increasing disorder in a system could serve as a macrocosmic explanation for the sense that, under the stress of civil rights protests, antiwar divisiveness, and the broad rejection of tradition in all forms of art and social mores that was destabilizing familiar conventionality, the country itself was experiencing 'breakdowns and fractures.'⁴⁰⁰

In the late 1960s and early 1970s Smithson described entropy as the steady degradation or disorganization of a system, a process he extended to contemporary American society.⁴⁰¹ He believed Western thought had contributed to the decay of both nature and society.⁴⁰² Smithson dealt with the concept of entropy in works like *Spiral Jetty* (1970)

³⁹⁸ Alexander Alberro, "Content, Context and Conceptual Art: Dan Graham's Schema" in Corris, *Conceptual Art, Theory, Myth and Practice*, 56-57.

³⁹⁹ von Bertalanffy, 39. "Thermodynamics expressly declares that its laws only apply to closed systems."

⁴⁰⁰ Suzaan Boettger, *Earthworks : Art and the Landscape of the Sixties* (Berkeley: University of California Press, 2002), 51.

⁴⁰¹ Robert Smithson, "Entropy and the New Monuments" in Robert Smithson and Jack D. Flam, *Robert Smithson : The Collected Writings* (Berkeley: University of California Press, 1996).

⁴⁰² Suzaan Boettger remarked on Smithson's dystopian mood evident in this article. She also pointed to a particular incident in his life, the death of his older brother that "makes

(**fig**. 27), an earthwork created in the Great Salt Lake of Utah, which the artist saw as an image of creation and evolution, meant to degrade over time.⁴⁰³ In speaking about entropy in his work, he said he did not see the evolution of the earth in terms of idealism, pointing out, "There is still the heat death of the sun."⁴⁰⁴ Thus evoking the cosmological end, Smithson utilized the concept of entropy to express a sense of social nihilism.⁴⁰⁵

Evidenced in Smithson's work and writing, the social conception of entropy in the late 1960s and early 1970s connoted a hopeless acceptance of social and environmental decay at the hands of American art, corporate and governmental institutions seen as favoring self-interest over the interests of artists, the environment or society writ large.⁴⁰⁶ This despair, characterized by imperturbable stoicism or boredom, is evident in Smithson's essays of this period including "Entropy and the New Monuments," written in response to

understandable the particular appeal for Smithson of entropy." Suzaan Boettger, *Earthworks : Art and the Landscape of the Sixties*, 63 and 51.

⁴⁰³ Smithson announced in his interview with Alison Sky, "I propose a dialectics of entropic change." "Entropy Made Visible: Interview with Alison Sky" in Nancy Holt, ed. *The Writings of Robert Smithson* (New York: New York University Press, 1979), 191. Further, Art historian Marga Bijvoet claimed that Smithson used entropy in his work as a metaphor for movement and dynamism, in opposition to the static work of art. Marga Bijvoet, *Art as Inquiry : Toward New Collaborations between Art, Science, and Technology*, American University Studies. Series Xx, Fine Arts ; V. 32. (New York: Peter Lang, 1997), 99. It is important to remember, however, that movement in a closed, entropic system moves inexorably toward a dead state.

⁴⁰⁴ "Entropy Made Visible: Interview with Alison Sky" in Nancy Holt, ed. *The Writings of Robert Smithson*, 191.

⁴⁰⁵ Hobbs wrote that Smithson's art, including Spiral Jetty, "seizes upon entropy as a uniting faculty for generating an air of unsentimental, objective, and inexorable hopelessness... His art is not about the future, it is about the present and concerns the hopelessness of understanding life through systems, the absurdity of orthodox forms of rationality and the meaninglessness of life and art when viewed from a universal vantage point." Robert Hobbs, *Robert Smithson: Sculpture* (Ithaca and London: Cornell University Press, 1981), 25. Jonathan Fineberg asserted that Smithson used entropy as a means to "negate the concept of progress" and to express his "existential hopelessness" and "profoundly pessimisitc emphasis on the irreversible destruction of the universe." Jonathan David Fineberg, *Art since 1940 : Strategies of Being* (New York: H.N. Abrams, 1995), 326-330. See also Boetgger, 50-51.

⁴⁰⁶ Suzaan Boettger characterized the late sixties as marked by cultural anxiety, and the year 1968 as an apocalyptic rupture. Boettger, *Earthworks : Art and the Landscape of the Sixties*, 157.

monolithic, minimalist works by artists Donald Judd, Dan Flavin, Morris and Sol LeWitt.⁴⁰⁷ Smithson commented in his essay,

In a rather round-about way, many of the artists have provided a visible analog [for entropy] by telling us that energy is more easily lost than obtained, and that in the ultimate future the whole universe will burn out and be transformed into an all-encompassing sameness...⁴⁰⁸

Smithson's words bear a striking resemblance to those of Wiener, whose work he knew well, who described the ultimate heat death of the universe thus, "There will be nothing left but a drab uniformity..."⁴⁰⁹ An avid reader of science fiction, Smithson had incorporated technological and scientific tropes into his work and writing since the 1950s. Art historian Caroline Jones has linked the artist's engagement with the concept of entropy to his growing disillusionment with technology.⁴¹⁰ She claimed that, from 1968-1972, Smithson became temporarily mistrustful of technology, a shift she attributed to his feelings about war research and "the shiny public relations projects (the moon

⁴⁰⁷ Robert Smithson, "Entropy and the New Monuments" 1966 from *Unpublished Writings in Robert Smithson: The Collected Writings*. Quoted in *Robert Smithson*.

http://www.robertsmithson.com/essays/entropy.htm (accessed August 17, 2007). Smithson continued, "The awareness of the ultimate collapse of both mechanical and electrical technology has motivated these artists to build their monuments to or against entropy...The much denigrated architecture of Park Avenue known as "cold glass boxes," along with the Manneristic modernity of Philip Johnson, have helped to foster the entropic mood... As the cloying effect of such "values" wears off, one perceives the "facts" of the outer edge, the flat surface, the banal, the empty, the cool, bland after blank; in other words, that infinitesimal condition known as entropy." For Smithson, crystals represented an evolution toward clarity, setting the futility of technological and modernist progress in stark relief.

 ⁴⁰⁸ Robert Smithson, "Entropy and the New Monuments" Quoted from *Robert Smithson*.
 http://www.robertsmithson.com/essays/entropy_and.htm. (accessed August 17, 2007).
 ⁴⁰⁹ Wiener, 45. Smithson referred to Wiener and to Wiener's ideas extensively in his 1973

interview. Alison Skye, "Entropy Made Visible: Interview with Alison Skye" in Holt, ed. *The Writings of Robert Smithson*, 190.

⁴¹⁰ Caroline Jones, *Machine in the Studio: Constructing the Postwar American Artist.* (Chicago: University of Chicago Press, 1996), 311. Jones noted that although Smithson's writing of the 1960s seems rife with the standard technophilia of the 1960s industrial aesthetic, his technologies "are primed for imminent collapse into entropy."

mission most prominent among them) that decorated the military-industrial complex."⁴¹¹ Smithson said in 1970 that he saw scientific theories as fiction. He said, "Science works, yes, but to what purpose? Disturbing the grit on the moon with the help of billions of dollars."⁴¹² Jones's assertions about Smithson's work during this period, along with the artist's own writings, reveal that he saw technology as integral to cultural decay, and thus a closed system.

Attitudes toward technology in this period were intertwined with concern for the state of the environment. The environmental movement, which took root in the 1960s after the publication of Rachel Carson's *Silent Spring* (1962), had gained significant momentum by 1970, the year of the first Earth Day celebration, and the year Smithson completed *Spiral Jetty*.⁴¹³ Referring to this and other works, Smithson commented on the

⁴¹¹ Jones, 330. Jones remarked on the complexity of Smithson's attitudes toward technology over these four years. She went on to say that Smithson had resolved his anti-technological feelings by 1972 when he offered his work to industrial corporations in an effort to ameliorate the negative feelings that were developing around industry as a result of the environmental movement." (331). ⁴¹² "Discussion with Heizer, Oppenheim, Smithson," first published in *Avalanche*, (Fall, 1970). Quoted in Nancy Holt, ed. *The Writings of Robert Smithson*, 176.

⁴¹³ Art historian Suzzan Boettger and others have pointed out this connection. Suzaan Boettger. *Earthworks : Art and the Landscape of the Sixties.* Relationships between technology, the environment and systems theory in cultural discourse had been examined by scientist Gregory Bateson, though his book, *Notes on an Ecology of Mind* was not published until 1972, he had discussed the topic much earlier. At the Dialectics of Liberation conference held in London in 1967, Bateson said, "But what worries me is the addition of modern technology to the old system. Today the purposes of consciousness are implemented by more and more effective machinery, transportation systems, airplanes, weaponry, medicine, pesticides, and so forth. Conscious purpose is now empowered to upset the balances of the body, of society, and of the biological world around us. A pathology—a loss of balance—is threatened." Gregory Bateson, "Conscious Purpose versus Nature," in *Steps to an Ecology of Mind; Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology* (San Francisco: Chandler Publications for Health Sciences Co., 1972), 440.

pointlessness of efforts to save the environment through recycling. He said, "The earth, being a closed system, there's only a certain amount of resources."⁴¹⁴

Aycock, who had spoken with Smithson at length about his work during this period, was intrigued by the concept of entropy. In conversation with me, she was careful to distinguish her interest in open systems from entropic, closed systems. She recollected, "I was much more interested in these opens systems that could keep changing and you never quite knew how it was going to transform itself into something else."⁴¹⁵ Similarly, Rosler commented that Smithson's engagement with entropy seemed to her a kind of "theological metaphor for human fallibility and decay." She believed that he operated from the premise that "material life is doomed toward entropic decay," and emphasized that her work functions very differently. ⁴¹⁶ Both artists distanced themselves from Smithson, in part perhaps, because he is such a major figure. Further, the complexity and scope of the artist's work, belies the sense of fatalism attributed to him. Smithson's statements on this issue, however, were remarkably consistent.

Unlike Aycock and Rosler, Denes's ideas bear some relation to Smithson's, but were ultimately more optimistic. In *The Book of Dust*, which the artist wrote from 1972 to 1988, Denes intended to chart the evolutionary course of dust from the beginnings of the universe to the end of life. She stated the intent of the book in her introduction, "I want to emphasize that this is not a book of despair or acquiescence, but of questioning and

⁴¹⁴ Alison Sky, "Entropy Made Visible: Interview with Alison Sky" in Holt, ed. *The Writings of Robert Smithson*, 190.

⁴¹⁵ Unpublished interview with the Artist. New York, NY, April 4, 2004.

⁴¹⁶ Unpublished interview with the Artist, Brooklyn, NY, August 23, 2007.

fighting back, which is in line with human nature as it strives to better itself."⁴¹⁷ She described entropy as "forever increasing in the universe, and with it the chaotic phase of dust, destined to triumph over order."418 Here, she expressed an awareness of the inevitability of entropy in the universe, but did not succumb to Smithson's hopelessness. The artist's very next sentences states, "Nonetheless, we see order arising out of chaos everywhere as the random dust of earth are assembled into complex living things."419 Thus resonating with von Bertalanffy's and Burnham's negentropy, the notion of transformation in Denes's oeuvre may be better characterized as agitation toward positive change. Hopeful notions of natural growth and ultimate social improvement, evident in her earthworks Rice, Tree, Burial, 1968 and Wheatfield, 1982 (figs. 28), are more germane to her politics, articulated fully in *The Book of Dust*, than is an acceptance of human decadence. For her reiteration of *Rice*, *Tree*, *Burial* at Artpark in the Niagra Gorge, Lewiston, NY from 1977-79, (fig. 29) the artist buried a time capsule filled with existential questions. (fig. 30) She scheduled the time capsule to be opened in the year 2979 so that earth's future inhabitants could learn about her own time. She wrote, "the questionnaire functioned as an open system of communication, allowing our future

⁴¹⁷ Agnes Denes, *The Book of Dust: The Beginning and Ending of Time and Thereafter* (Rochester, New York: Visual Studies Workshop Press, 1992), 8.

⁴¹⁸ Agnes Denes, *The Book of Dust*, 13. Marga Bijvoet interperets Smithson's engagement with entropy similarly to my interpretation of Denes's. Bijvoet suggests that Smithson's works in this vein, Like *Spiral Jetty*, should be perceived as dynamic instead of motionless. I agree that this is true in the short term. I also agree with Bijvoet's assessment that Smithson's focus on the *chance* transformations of matter and energy in the entropic process symbolized a rejection of *mechanism*. In the end though, Smithson's many statements on entropy overwhelmingly point to a disbelief in the possibility that maximal entropy could be averted. Witness, for example, the following comment by Smithson, cited by Bijvoet, "That's where my things don't offer any kind of freedom in terms of endless vistas or infinite possibilities. There's no exit, no road to utopia, no great beyond in terms of exhibition space. I see it as an inevitability; of going toward the fringes, toward the broken, the entropic." Marga Bijvoet, Art as Inquiry: Toward New Collaborations between Art, Science, and Technology, American University Studies. Series Xx, Fine Arts ; V. 32 (New York: Peter Lang, 1997), 95-98.

⁴¹⁹ Denes, *The Book of Dust*, 13.

descendents to evaluate us not so much by the objects we created...but by the questions we asked and how we responded to them."⁴²⁰

Open Systems and Labyrinths in the Work of Alice Aycock

Aycock was raised near Harrisburg Pennsylvania, the daughter of supportive parents. Her father was a successful engineer who worked on the PA Turnpike and later established his own construction company, accepting contracts from the power industry. Aycock's younger brother Billy, her friend and artistic muse, had cystic fibrosis and thus she spent much of her youth and young adulthood braced against the trauma of his illness and tentative survival. Her ongoing fear of the unexpected manifested itself in much of her early work. The artist credits the use of imaginative stories that inform her work, to her paternal grandmother. A well-read, well-educated teacher filled with ideas and imagination, she was esteemed by the entire family as the most intelligent among them.⁴²¹ Aycock attended Douglass College from 1964-1968, where she intended to major in English, because she believed that cerebral pursuits were more worthy than art 422 After taking an art history class that synthesized intellectual ideas with art, including readings by Irwin Panofsky and John Cage, she decided to major in art. She received her MA from Hunter College in 1971 where she was exposed to the work of luminaries like Linda Nochlin, Tony Smith and Morris, on faculty there. She developed her interest in systems theory while attending Hunter College.

⁴²⁰ Agnes Denes, Jill Hartz, Agnes Denes, 106.

⁴²¹ Hobbs, Alice Aycock: Sculpture and Projects, 31.

⁴²² Unpublished interview with the Artist, New York, NY, April 5, 2004.

Aycock's application of systems theory to her work is perhaps the most widely known of the four artists considered here. Her 1971 MFA thesis titled *An Incomplete Examination of the Highway/ Network/ User/ Perceiver System*, ⁴²³ examined the implications of systems theory as applied to the interstate, then nearing completion.⁴²⁴ Influenced by her sculpture teacher Tony Smith's essay on driving the New Jersey turnpike, and by her father's work on the turnpike as an engineer, her thesis investigated the way the highway is experienced by the user over time.⁴²⁵ The process of driving on the highway results in

⁴²³ Alice Avcock, "An Incomplete Examination of the Highway Network/User/Perceiver System(s)." (M.A. Thesis, Hunter College, 1971). Aycock wrote, "Systems Theory states that processes can no longer be treated as the result of simple and linear cause and effect or one-toone relationships. Based on the premise that the whole is more than the sum of its parts, systems theory directs itself to complex wholes, wherein a number of "active elements" or parts and subparts "couple" to and integrate with each other to form a system. On a primary level these elements or parts are defined as energy processes which undergo various "transformations" and assume various positions within a system. Systems theory views these processes as taking place in space and time. Moreover, if the system is an open system, it reacts to and upon or is limited by and limits its environment..." Found in Hobbs, Alice Aycock : Sculpture and Projects, 15. Hobbs commented on Aycock's application of Systems Theory, "Differing from first-generation cyberneticists, who viewed systems as static and closed, Aycock takes into consideration the role of the viewer, who is a kinesthetic participant in the systems she creates. In accord with the tenets of quantum mechanics, which Aycock also studied, the situation that she sets up in her work demonstrates the extent to which viewers are inextricably connected with their views, which depend to a certain extent on their orientation." Hobbs, Alice Aycock : Sculpture and Projects, 16. ⁴²⁴ Stuart Morgan. "Structures, Stories and the History of Man-Powered Flight," Stuart Morgan was the first to note the connection between *Maze* and systems theory. Hobbs discussed it in greater depth in his 2005 monograph, examining the importance of Jack Burnham's concept of negentropy. Hobbs asserted that Aycock's work as a whole functions as an open system that continually engages the viewer, but, he did not analyze her individual works through the lens of Systems Theory. Hobbs, Alice Avcock: Sculpture and Projects, 16 ⁴²⁵ Hobbs noted that Aycock's interest in the experience of driving on the NJ Turnpike was influenced by her sculpture teacher at Hunter College, Tony Smith. Hobbs, *Alice Aycock:* Sculpture and Projects, 59-60. In 1966, Artforum published an interview in which Smith described his experience driving at night on an unfinished section of the New Jersey Turnpike. For him, the experience opened new aesthetic possibilities. He described an 'artificial landscape without cultural precedent.' Smith recounted 'this drive...couldn't be called a work of art. On the other hand, it did something for me that art had never done...It seemed that there had been a reality there that had not had any expression in art...Most painting looks pretty pictorial after that. There is no way you can frame it, you just have to experience it," reprinted in Fineberg Art Since 1940: Strategies of Being, 326-27. Originally an architect, Tony Smith had attended the New Bauhaus where his teachers included László Moholy-Nagy, György Kepes and Alexander Archipenko. There, he was undoubtedly exposed to the conceptual use of science and technology

a gradual awareness of one's place within the vast network of roads. The relationship between the driver and the highway constitutes an open system because each, in a sense, accommodates the other. The arc and incline of an on-ramp, for example, is carefully calculated to support the size, weight and anticipated speed of a car, while the driver must conform to the twists and turns of the road. Aycock read Wiener's work in preparation for her thesis, but von Bertalanffy's open systems held special appeal.⁴²⁶ She also relied on Claude Levi-Strauss in conceiving of a system that contained both a necessary structure-- the highway, and a contingent event-- the user's experience of navigating the highway.⁴²⁷ Aycock described her project as follows,

a vast, anonymous, all-pervasive network-monument and open system which exist as an 'in-field' situation, takes place in actual experiential time and exhibits a predominantly public and democratic character, since it is relatively free and available to anyone.⁴²⁸

Art historian Stuart Morgan has pointed out that the title of her thesis could be regarded as a rejection of the prevailing 1960s concept of entropy, a closed system. In its place, Aycock used the terms "dynamic homeostasis" or "steady state."⁴²⁹ She explained the concept in her thesis,

in art. Smith's essay also influenced Robert Smithson's 1966 essay, "Entropy and the New Monuments," in which Smithson examined the Second Law of Thermodynamics. According to Hobbs, Aycock was involved in discussions with Robert Smithson in the early 1970s and was influenced by his ideas. Hobbs, *Alice Aycock: Sculpture and Projects*, 56. Aycock also had a personal motivation for selecting the turnpike as a subject for her thesis. Her father, an engineer and contractor, was involved in the building of the turnpike.

⁴²⁶ Unpublished interview with the Artist, New York, NY, July 16, 2007.

⁴²⁷ Stuart Morgan. "Structures, Stories and the History of Man-Powered Flight," 12

⁴²⁸ Alice Aycock, An Incomplete Examination of the Highway Network/ User/ Perceiver
System," Quote found in Morgan, "Structures, Stories and the History of Man-Powered Flight,"
2.

⁴²⁹ Morgan, "Structures, Stories and the History of Man-Powered Flight," 15.

unlike closed systems, open systems are neither immune to nor simply acted upon by their environment. They interact with it in an input-output energy exchange which enables them to store energy—acquire negative entropy—grow, and become increasingly differentiated or complex. Growth is dependent upon the 'insufficiency' of a system; that is, the environment contains certain elements which the system needs.⁴³⁰

Aycock's first major work after completing her thesis was Maze (1972) (fig. 31), which she described in 1975, "as a system."⁴³¹ Set within the landscape, *Maze* was a wooden structure, twelve-sided, approximately 32 feet in diameter and composed of five concentric dodecagonal rings, broken by 19 points of entry. The viewer, or participant in this case, was invited to move within the sculpture, winding, twisting and turning through walls approximately six feet tall. A maze is defined as a confusing network of intercommunicating paths or passages, or alternatively, any complex system or arrangement that causes bewilderment, confusion or perplexity. The work has also been called Labyrinth, which is similarly defined. The artist recently explained to me that she chose to create a maze because it bore an appropriate formal relationship to the highway. She said, "Maze was kind of a metaphor and I mean, a meta, like a small scale version of what you might experience on the highway."⁴³² The movement of the viewer within the walls, like the car on the highway, is an open system in which each conforms to the other. Inspired in part by an Egyptian labyrinth built as a prison, the walls are too high to determine one's place within the work,⁴³³ but, like the labyrinth of King Minos at

 ⁴³⁰ Aycock, "An Incomplete Examination of the Highway Network/ User/ Perceiver System,"
 Quote found in Stuart Morgan, "Structures, Stories and the History of Man-Powered Flight." 11.
 ⁴³¹ Janet Kardon, "Janet Kardon Interviews Some Maze Makers," *Art International* (April/May, 1976): 64-68.

⁴³² Unpublished interview with the Artist, New York, NY, July 16, 2007.

⁴³³ Hyewon Lee, "Space as a Physical Reality: Experiencing Architectural Sculptures by Nancy Holt, Mary Miss, and Alice Aycock," (Thesis. University of Oklahoma, 1997), 68.

Knossos, which Aycock had visited, it also represents a test or an initiation rite of selfdiscovery.

The confounding enclosure is meant to evoke an emotive response, leading to a process of introspection. The goal is not to find a way out, but to immerse oneself within. Moving through Aycock's *Maze*, the walls generate a series of directions for which a clear, rational response is impossible. In this and other early works, Aycock attempted to evoke a response of fear, surprise or anxiety. She created what she calls psycho-physical spaces where the participant is forced to face herself and her own emotions. Removed from her comfort zone, the viewer confronts a unique, singular experience rather than mediated or socially constructed experience, thus eliciting a subjective, physiological response, leading to a heightened level of self-awareness.

Hobbs suggested that the artist thought about systems theory in relation to her phenomenological public sculpture, intended to engage the viewer in a multi-sensory experience.⁴³⁴ *Maze* and other early works by Aycock emphasized the primacy of sensory perception. As such, they relied on philosopher Maurice Merleau-Ponty's concept of phenomenology, articulated in *Phenomenology of Perception* (French 1945, English trans. 1962), which promotes an experiential process with no structured

⁴³⁴ Hobbs, *Alice Aycock: Sculpture and Projects*, 16. Shanken pointed out that in Burnham's Software exhibition, the curator synthesized cybernetics, aesthetics, phenomenology, and semiotics and "emphasized the process of audience interaction with "control and communication techniques," encouraging the "public" to "personally respond" and ascribe meaning to experience." Edward A. Shanken. "The House That Jack Built: Jack Burnham's Concept of "Software" as a Metaphor for Art," Leonardo Electronic Almanac 6:10 (November, 1998). Reprinted in Roy Ascott, ed., *Reframing Consciousness: Art and Consciousness in the Post-Biological Era* (Exeter: Intellect, 1999), 159.

beginning or end. The philosopher rejected the Cartesian (top-down/subject-object) view that the world is an extension of our minds, in favor of the idea that human beings actively coexist and relate to the world in an open system of relationships.⁴³⁵ Aycock quoted him in her thesis,

Perceived things, unlike geometrical objects, are not bounded entities whose laws of construction we possess a priori, but... they are open, inexhaustible systems which we recognize through a certain style of development, although we are never able, in principle, to explore them entirely...⁴³⁶

Thus Aycock synthesized the aims of Merleau-Ponty's phenomenology with the concept of open systems by requiring the viewer to interact with the work, thereby cultivating viewer feedback and response.⁴³⁷ Fully incorporated into the work, each viewer constructs his own meaning, drawing from personal experiences and emotional associations of fear, loss and despair. Thus phenomenology operates on much the same premise as cybernetics and open systems in its concern with the engagement of the participant in a systemic process. Phenomenological works seek to elicit a sensory response, which functions as a servo-mechanism, making the viewer an active participant in the process of discovery and self-discovery, in a flexible, open-ended search. Aycock confronts the viewer with a distressing situation, seeking to startle her into an awareness of her surroundings.

 ⁴³⁵ Maurice Merleau Ponty, *Phenomenology of Perception*, Colin Smith, trans. (London: Routledge & Kegan Paul, 1962). First published Maurice Merleau Ponty, *Phénoménologie de la perception* (Paris: Gallimard, 1945).
 ⁴³⁶ Maurice Merleau Ponty, *Phenomenology of Perception*. Quoted in Morgan "Structures, Stories

⁴³⁰ Maurice Merleau Ponty, *Phenomenology of Perception*. Quoted in Morgan "Structures, Stories and the History of Man-Powered Flight," 15

⁴³⁷ Hobbs has suggested the connection between systems theory and Merleau-Pont's phenomenology in a discussion of Aycock's thesis. Hobbs, *Alice Aycock: Sculpture and Projects*, 61-62.

Aycock's conception of the maze as a metaphor for networks of information in contemporary society may derive from Argentine writer Jorge Luis Borges, an important source for the artist.⁴³⁸ Borges's short stories dealt poetically and intellectually with the nature of time, space, fear and information – all critical themes for Aycock. Fascinated by libraries since his youth, Borges was appointed director of the National Library in Buenos Aires in 1955. Over the course of his prodigious career, he published several stories centered on the ever-increasing glut of information in society, famously asserting that no new word or concept could possibly be conceived that had not already existed. Borges's short story *Library of Babel* (1941, English 1962) told the tale of an infinite network of hexagonal galleries filled with incomprehensible books that comprised the universe.⁴³⁹ Within dwelled "imperfect librarians" forever doomed to futilely search for the meaning of their existence within the infinite tomes whose spines bore no relationship

⁴³⁸Aycock has discussed the importance of Borges to her work many times. See for example, Alice Aycock, "Progetti Per Il Mio Corpo-Labirinto, Palizzata E Costruzioni (Projects for My Body-Maze, Wooden Posts and Constructions)" Lotus International 17, no. 104 (1977). She also evoked Borges in a discussion about her work Maze. She said, "And what about Borges's reference to that 'one Greek labyrinth which is a single straight line...invisible and unceasing'? Hobbs, Alice Aycock: Sculpture and Projects, 82. Quoted from "Work 1972-1974," in Alan Sondheim, ed., Individuals: Post-Movement Art in America (New York: E.P. Dutton, 1977), 104-121. Aycock also made the following comment in connection to Maze, "In the essay 'Pascal's Sphere' Borges traces the history of the concept of sphere whose center is everywhere and circumference nowhere from the Greek philosophers to Pascal. The current form of this idea is the theory of a uniformly expanding universe: from any point in the universe, one appears to be standing in the center." Alice Aycock, "Work: Maze," in Kristine Stiles and Peter Selz. Theories and Documents of Contemporary Art (California: University of California Press, 1996), 558-560. The essay by Borges proposes that the history of man is comprised of his ever-changing attitudes toward nature and god, expressed in a handful of metaphors. Hobbs has discussed the importance of Borges's story "The Aleph," in which the protagonist finds a tear or window into the universe. Hobbs, Alice Aycock: Sculpture and Projects, 151-154. To my knowledge, no one has discussed the conceptual parallel of Borges's maze with Aycock's engagement of systems theory.

⁴³⁹ Written in 1941, this story was elaborated from a similarly-themed story by Borges written in 1939. Merleau-Ponty's "Phenomenology of Perception" was written in French in 1942. Borges's story was published in English in 1962.

to the indecipherable pages within. In the "vast library" Borges explained, "there are no two identical books." Many search the library endlessly for the one book that might provide the key to deciphering the rest, an achievement that would anoint him or her an omnipotent god. Thus researchers are doomed to trudge through a maze of useless information, only to misinterpret the meaning of the universe over and over again. The endless web of hexagonal galleries that comprises Borges's *Library of Babel* references the labyrinth, another of the writer's most enduring themes. Borges said, "Often the labyrinth is a symbol for happiness... because we feel we are lost in the world, and the obvious symbol is that of losing yourself in the labyrinth..." ⁴⁴⁰ For Borges, as for Aycock, the presence of myriad choices for information rather than one clear, direct route (the epitomy of Ellul's Technological Society) connotes freedom. Although one may interpret a profusion of incomprehensible information as symbolic of entropy, I would argue that, for Aycock, the opportunity for growth and increased awareness inherent in the search process is in fact characteristic of negentropy.

Aycock continued to investigate systems and information theory within labyrinthine forms in *Study for a Hexoganal Building*, 1975 (**fig**. 32). Like Borges's *Library of Babel* and her own *Maze*, Aycock's building is intended to confuse. Consisting of two levels enclosing a sunken courtyard, the upper level contains three points of entry along the ground level with only one leading inside. The other two lead to a secret passageway between the inner and outer walls, like servant's hallways in an old house. The courtyard inside is visible through eye slots in the passageway, but is not accessible. From the

⁴⁴⁰ Maurice Berger, *Labyrinths, Robert Morris, Minimalism and the 1960's* (New York: Harper & Row Publishers, 1989), 132.

inside, there are four openings, doorways with only one leading out. The lower level is a passageway or cul-de-sac featuring an eye slot at the end, peering into the courtyard. The lower level may be accessed from the interior courtyard, which also provides access to an underground pit. Aycock's hexagonal building is a structure of frustration, but also of surveillance, because key locations within the work provide information without revealing the surveyor's identity.⁴⁴¹ Some portals lead to useful knowledge, others bring new and unexpected information, still others merely disappoint.

Borges's Babel is explicit in Aycock's 1984 project proposal, *The Hundred Small Rooms* (Another Tower of Babel) *on the Eve of the Industrial Revolution* (A Pictorial Recreation of the Raising of an Egyptian Obelisk in the Piazza di San Pietro, Rome, 1586) *with Turning, Cranking* (1984) (**fig.** 33). Hobbs referred to this work as a vertical labyrinth. Containing sixty-three rooms on seven floors the passageway, as with *Maze* and *Study for a Hexoganal Building*, leads to a dead-end. Movement is further stymied by the hobbit-like proportions of each story, only four and a half feet high. Access to all sites within the work is available if one is prepared to submit to the process of discovery. Aycock's tower of Babel is a symbol of confounded information, offering no clear path, but rather many portals to self-awareness and to a more profound understanding of the world.

The maze had also been an important motif in the development of systems and information theory, a point acknowledged by Burnham. The first machine capable of

⁴⁴¹ Hobbs noted that Aycock read Foucault's *Discipline and Punish: The Birth of the Prison*, which was published in France in 1975 and in English in 1977. Hobbs, *Alice Aycock: Sculpture and Projects*, 150.

learning was developed in 1950 by Shannon, who created a magnetic, mouse-sized machine called Theseus. Named after the Greek hero who found his way out of King Minos's labyrinth at Knossos, Theseus was controlled by a relay circuit that enabled him to move through a maze that could be modified at will.⁴⁴² The mouse was designed to search through corridors until it found its target. If placed in an unfamiliar location, it was programmed to search until it reached a known coordinate, thus adding new knowledge to its memory and, in effect, learning, in an experiential process over time.

Burnham, whose work Aycock read with great interest, discussed Shannon's "mazerunning mice" in *Beyond Modern Sculpture*, as an attempt by a scientist to construct paradigms of organic behavior, claiming that this invention and others like it "are tenuously linked to life itself."⁴⁴³ Two mazes appeared in his 1970 exhibition, *Software: Information Technology Its New Meaning for Art* held at the Jewish Museum in New York, which sought to underscore the importance of information in society and the critical role art could play in addressing its potential overflow – in containing its entropy and bringing it to a steady state.⁴⁴⁴ For the exhibition, the Architecture Machine Group from M.I.T. created the work *Seek* (**fig**. 34), a computerized machine that constructed a maze-like superstructure for gerbils comprised of stacks of blocks about 5' x 8' in diameter. Equipped with sensory mechanisms, the machine continually adjusted the structure after inevitable jostling and disruption by the animals. Like Shannon's machine

⁴⁴² Theseus was aided in this feat by King Minos's daughter Ariadne, who gave him a piece of string to unfurl behind him and thus track his movements through the maze.

⁴⁴³ Jack Burnham, *Beyond Modern Sculpture*, 204. For Aycock's interest in Burnham see Hobbs, 16. Also, Unpublished interview with the Artist, New York, NY, July 16, 2007.

⁴⁴⁴ Aycock stated that she did not see Burnham's *Software* show, but she did see Kynaston McShine's *Information* show, dealing with many of the same issues, which she found to be "extraordinarily exciting." Unpublished interview with the Artist, New York, NY, July 16, 2007.

mouse, *Seek* was capable of learning and adapting its maze-like, built space to the unpredictable nature of the animals.⁴⁴⁵ In addition to *Seek*, the technical advisor for the *Software* show, Theodor H. Nelson, along with Art & Technology, Inc. member Ned Woodman, created the piece *Labyrinth* to demonstrate the capability of computers to do more than compute—to actually organize information and facilitate its access. Woodman described *Labyrinth* as an interactive text retrieval system, "the first public demonstration of a hypertext system..." (a common function of today's Internet) "wherein the visitor may browse through a maze of writings on the screen."⁴⁴⁶ In his essay, Burnham announced that the purpose of the *Software* exhibition was to encourage viewers to "sense your responses when you perceive in a new way or interact with something or someone in an unusual situation...Introspection rather than inspection is the point of the show."⁴⁴⁷

The notion of the labyrinth as a countercultural symbol for the metaphysical search for the self was put forth by art historian Maurice Berger in an examination of the work of Morris, Aycock's teacher and thesis director at Hunter College. In a 1975 article, Morris wrote, "…Here the labyrinth form is perhaps a metonym of the search for the self, for it demands a continuous wandering, a relinquishing of the knowledge of where one is."⁴⁴⁸ Berger stated that the labyrinth was a phenomenological "accumulation of information in time."⁴⁴⁹ For Aycock, the labyrinth was also a metaphor for open systems capable of

⁴⁴⁵ Burnham, *Software*, 23.

⁴⁴⁶ Burnham, Software, 18

⁴⁴⁷ Burnham, *Software*, 12

⁴⁴⁸ Robert Morris, "Aligned with Nazca." Art Forum 14, no. 2 (October 1975): 36.

⁴⁴⁹ For Morris, Berger argued that the labyrinth was a metaphor for "the possibility of liberation from repression, [which] was a utopian goal for intellectuals such as Marcuse." Maurice Berger,
expanding information about the self, with Borges's labyrinth serving as an important precursor.⁴⁵⁰ The labyrinth as an open phenomenological system offered many possible avenues for discovery as well as a decided emphasis on the body.

Aycock continued to employ systems theory in her work of the late 1970s, but these works tended to be more explicitly critical of technology. *Large Scale Dis/Integration of Microelectronic Memories* (A Newly Revised Shantytown) (1980-81) (**fig.** 35) drew inspiration from diagrams for a microelectronic circuit chip, thus it drew on the very recent development of PC computers, which in turn rely on cybernetics and systems theory to process information efficiently.⁴⁵¹ Hobbs has claimed that Aycock understood the PC's ability to generate and communicate information such that "knowledge is reconstrued in terms of systems, networks."⁴⁵² Built on Manhattan's Battery Park City landfill by the West Side Highway, Aycock conceived the installation in three parts.⁴⁵³ One part consisted of a balloon construction framework supported by scaffolding. (**fig.**

Labyrinths : Robert Morris, Minimalism, and the 1960s. 1st ed, Icon Editions (New York: Harper & Row, 1989), 132. Janet Kardon also discussed these types of structures as metaphysical connections or passageways. Janet Kardon, *Connections: Bridges, Ladders, Ramps, Staircases, Tunnels*, March 11-April 24, 1983 (Philadelphia: Institute of Contemporary Art, 1983).

⁴⁵⁰ Morris's ideas regarding labyrinths, along with Tony Smith's examination of the highway were surely influential to Aycock's notion of the labyrinth as an open system for the accumulation of information about the self. Hobbs has noted, however, that Morris did not create an architectural version of the labyrinth until 1974. Hobbs, *Alice Aycock: Sculpture and Projects*, 83. Nelson and Woodman's *Labyrinth* and the *Maze*, by the Architecture and Machine Group can not conclusively be considered influential because Aycock did not see the show.

⁴⁵¹ Jonathan Fineberg, *Impossibilism*, (Raleigh, NC: City Gallery of Cotenmporary Art, 1989), 40. See also Hobbs *Alice Aycock : Sculpture and Projects*, 284. Fineberg claimed the work drew inspiration from an electronic circuit chip. Hobbs clarified that it depended on diagrams for microelectronic circuitry.

⁴⁵² Hobbs, Alice Aycock : Sculpture and Projects, 250-251.

⁴⁵³ Eugenie Tsai explained that this work unites three of Aycock's favorite themes, the city, memory and the labyrinth. Eugenie Tsai, "A Tale of (at Least) Two Cities: Alice Aycock's "Large Scale Dis/Integration of Microelectronic Memories (a Newly Revised Shantytown)"," *Arts Magazine* 56: 10 (1982).

36) The next was a series of old, recycled doors forming a jumble of colorfully painted walls. The last was a semi-spherical wheel, referring either to an amusement park carousel or, perhaps, a roulette wheel. (**fig**. 37) The piece, which was never finished, was sited on an expanse of sand. To the north were wooden piers and dilapidated warehouses. The east overlooked lower Manhattan (**fig**. 38), and the west afforded a view of the Hudson River (**fig**. 39).⁴⁵⁴ Aycock described this work as a "maze-like wooden structure that keeps changing all the time."⁴⁵⁵

The artist began to incorporate both fictional and autobiographical stories into her work in the mid-1970s, which often served as metaphors for the storage and retrieval of information. For this work, she interwove three stories ostensibly related to the tripartite structure.

A child, who had crayons—big boxes of crayons and drawing paper—was in my mind. And there's a streetwalker. She wants to remember all the rooms she's been in; she wants to lay out the pattern of her rooms, so that she can remember her life. And there's an old woman who assigns doors to different parts of her life, to different weeks of her life, and when she can't remember, there's a black door.⁴⁵⁶

Hobbs noted that the artist's stories represent the three stages of life; birth, middle and old age.⁴⁵⁷ The infant learns with his drawing utensils, the street walker and old woman seek strategies to help them remember their experiences, and the old woman's memory begins to fail. Hobbs linked Aycock's use of systems to the concept of memory,

⁴⁵⁴ Tsai, 135.

⁴⁵⁵ Carol Felder, "Alice Aycock Competes with the World," *New Jersey Monthly* (October 1980), 134.

⁴⁵⁶ Felder, 134.

⁴⁵⁷ Hobbs, Alice Aycock: Sculpture and Projects, 284.

specifically to the failing memory of her beloved grandmother. He asserted that the doors recall her grandmother's house, explaining that they function as metonyms for mental spaces created to organize and store memories, and thus are similar to the practice of mnemonics or memory aids. At the time, she was reading about Matteo Ricci, a Jesuit priest to the Chinese governor of Jiangxi in the late 16th century, who devised and taught memory techniques to the governor.⁴⁵⁸ Ricci required that his student devise a system for storing accumulated data by imagining an expansive house with many doors, behind which related bits of information could be logically stored for ready access, a method that has since been applied to the development of artificial intelligence.

Hobbs wrote that Aycock chose mnemonics as a model for this work because it afforded her a *pre-digital* means for assessing the relationship between memory and forgetfulness.⁴⁵⁹ With his assumption of her premise established, Hobbs then discussed her process in terms of schizophrenic metaphors for the fracture and discontinuity inherent in modern life manifesting itself in divided and transitory identity, his primary interpretative framework for her work. I would argue, though, that her choice of mnemonics may be better understood as a criticism of an increasingly technologized society. By employing an ancient means of organizing and recalling data, a form of cybernetics not reliant on technology, the artist questions the novel achievement of digital technologies and perhaps their potential uses.

⁴⁵⁸ Hobbs reported that Aycock had been reading Jonathan D. Spence's *The Memory Palace of Matteo Ricci* while creating this work. A Worldcat search revealed, however, that the first publication of this book was in 1984, several years after the completion of the project. Perhaps Aycock had instead read Henri Bernard's *Matteo Ricci's Scientific Contribution to China*, (1935), which was reprinted in 1973. Henri Bernard, *Matteo Ricci's Scientific Contribution to China*, trans. Edward Chalmers Werner (Westport, CT: Hyperion Press, 1973).

⁴⁵⁹ Hobbs, Alice Aycock: Sculpture and Projects. 284.

Aycock's employment of pre-digital information storage had notable corollaries in science fiction in this period. For example in Herbert's *Dune* novels, humanity of the future rejected technology, *en masse*, as inherently evil because man had become enslaved by it. In order to accomplish goals similar to the reviled "thinking machines," select individuals, called Mentats, were trained to logically store, access and process information in order to produce a prime projection for a given situation-- to determine the best solution to a problem or preferable course of action. In the novel, micro-electronic tasks are humanized in a pointed criticism of human-kind's over-reliance on thinking-machines. Similarly, Aycock's sculpture cast backward in time, as Hobbs contended, commenting on the disintegration of human-mastered techniques that preceded micro-electronic data storage.

In the late 1970s, Aycock shifted from temporary wooden constructions in the landscape to machineworks that continued to function as open systems offering a profusion of interpretations suggested in part by the plurality of jury-rigged forms in the works, but more directly by her meandering titles, statements and accompanying stories. Her machineworks were often indoor sculptures built with metals, wood, Plexiglas, neon and sometimes motors, components that indicated a more pointed critique of technology in that they mimicked machines in form, but were not intended to function. *Hoodoo (Laura): Vertical and Horizontal Cross Section of the Ether Wind*, (from the series How to Catch and Manufacture Ghosts) (**fig**. 40) was commissioned by the Hirshhorn Museum

for its Metaphors exhibition held in 1981.⁴⁶⁰ The title of Aycock's work itself is labyrinthine, referring at once to the outmoded scientific theory of ether winds once believed to be a medium for light waves, and to the 'ghost in the machine,' represented by the word "Hoodoo." The complex bricolage of hanging metal bars, looped wire and twisted steel draws the viewer into a vast maze of irreconcilable metaphoric associations. According to the artist, the large, whirling orb, in the center, emits the energy that animates the universe, while the ribbon-like arc of galvanized metal, to the right, is the ghost catcher that harnesses that vital force. It is not necessarily the forms themselves that demonstrate her interest in systems theory, but rather the metaphoric functions of the forms, which she designates in verbal and written statements. Aycock always applied layers of meanings to her work through formal disjuncture, iconographic references, circumlocutory titles and attendant written stories. Presented with a profusion of often conflicting meanings, the viewer is thus forced to form her own, drawn from experience and personal perspective. As Hobbs has pointed out, each viewer's reading process and resulting interpretation forms a continuum with the work, constantly feeding it with new information and increasing its complexity.⁴⁶¹

The notion of the ghost or vital force in Aycock's series *How to Catch and Manufacture Ghosts* may be likened to Maxwell's Demon, which Wiener clarified, is uniquely capable

⁴⁶⁰ I am grateful to curator Howard Fox for providing access to his files on *Hoodoo (Laura)* at the LA County Museum of Art, which currently owns the work. (The work is no longer installed.) I am also grateful to the Hirshhorn Museum for affording access to their archives, including a taped interview with Fox and the other exhibiting artists in the *Metaphors* show, which included Dennis Oppenheim and Robert Morris.

⁴⁶¹ Hobbs, Alice Aycock: Sculpture and Projects, 26.

of resisting entropy.⁴⁶² Named after physicist James Clerk Maxwell, the demon regulates a given system by admitting energy from the outside in varying amounts, thus violating the second law of thermodynamics, which states that energy spontaneously dissipates. Stationed at a portal between two adjacent systems, say two containers of gas, the demon admits useful energy into one, while relieving the other of non-useful energy. Maxwell's Demons are, in effect, equipped with feedback mechanisms, eyes of a sort, enabling them to sense energy levels inside and outside each container. Like Aycock's whirling, curved metal ghost catcher, the demon deftly controls the doorway between, keeping energy within the systems more organized. In this way, Wiener explained, "The Maxwell Demons are responsible for temporarily overcoming the tendency of entropy to increase."⁴⁶³ Wiener continued,

we are not yet spectators at the last stages of the world's death... in the world with which we are immediately concerned there are stages which, though they occupy an insignificant fraction of eternity, are of great significance for our purposes, for in them entropy does not increase and organization and its correlative, information, are being built up.⁴⁶⁴

Here Wiener, like von Bertalanffy, gives hope and implies that we are in a unique and a somewhat isolated place and time in which we are functioning as an open system, admitting energy and information from the outside and thus defying entropy, for the time being. Smithson referred to Maxell's Demon in a 1973 interview, though with characteristic pessimism. He believed that the proliferation of human-made waste on

⁴⁶² Wiener, 42.

⁴⁶³ Wiener, 42. An apt analogy for the function of Aycock's work as Maxwell's Demon or, a mediator of energy in a system, is that of the trickster, described by anthropologist Claude-Levi-Strauss whose work was very important to the artist's thinking. Levi-Strauss described the trickster, whom he found to be central to many Native American mythologies, to be a cultural mediator, an ambiguous character who mediates between two opposing ideas. ⁴⁶⁴ Wiener, 45.

earth was so profound that efforts to reverse the process of entropy would take too long to "keep alive the numberless generations of Maxwell's Demons needed to complete the project."⁴⁶⁵ Aycock, on the other hand, entertained hope for the demons' success in maintaining open systems.

I assert that Aycock saw her work as a cultural equivalent to Maxwell's Demon, giving momentary hope through a negentropic building up of information in an open system in which the viewer continually added meaning to her work through myriad interpretations, while reciprocally, her work opened new perspectives for viewers. Under the mantle of Maxwell's Demon, *she* became the ghost in the machine. Maxwell's thought experiment reads thus,

if we conceive of a being whose faculties are so sharpened that he can follow every molecule in its course, such a being, whose attributes are as essentially finite as our own, would be able to do what is impossible to us.⁴⁶⁶

The artist takes on the role of Maxwell's Demon whose sharpened faculties mitigate against the onslaught of entropy, creating an open system of hope and change in place of a closed one.

Aycock reveled in the openness of meaning *Hoodoo Laura* evoked and its associated freedoms. She remarked, "before making...[this] piece I imagined myself like an

⁴⁶⁵ Alison Sky, "Entropy Made Visible: Interview with Alison Sky," 190.

⁴⁶⁶ Maxwell (1871) reprinted in Harvey S. Leff and Andrew F. Rex, *Maxwell's Demon : Entropy, Information, Computing, Princeton Series in Physics* (Princeton, N.J.: Princeton University Press, 1990), 4.

inanimate free-floating particle being spun around."⁴⁶⁷ Howard Fox, the curator of the *Metaphors* exhibition, suggested to Aycock in a contemporaneous interview that her titles, which "connote practically everything in the world…" localize her work in the viewer's mind, rather than in the gallery. She replied, "Right." "And one just dreams of how things could be somehow. And it just keeps expanding it…"⁴⁶⁸

The expansion of information in the form of possible meanings and interpretations persisted in Aycock's work from the early 1970s into the 1980s. Her initial interest in systems theory derived from a desire to integrate otherwise specialized branches of knowledge. Through the labyrinth, an ongoing conceptual metaphor in her work, she examined the relationship between biological and structural systems, resulting in a contingent, open-ended, metaphysical investigation of the self, in which the artist functions as one of Maxwell's privileged demons, maintaining growth and complexity within the system. Emphasis on self-exploration, on the individual body and mind, offered freedom from the confines of technological society and its enduring mechanistic symbols of an outmoded utopia.

Negentropy and Synthesis in the Work of Agnes Denes

Born in Budapest Hungary, Denes lived underground during the siege of Budapest (1944-45) which was bombed daily, cutting off its food supply. She left the city with her parents

⁴⁶⁷ Maurice Poirer, "The Ghost in the Machine" Art News 85, no. 8 (1986): 86.

⁴⁶⁸ Howard Fox "Interview with Alice Aycock and Dennis Oppenheim," August 1981, in conjunction with the *Metaphors* exhibition at the Hirshhorn Museum, DVD 43:18, Courtesy the Library of the Hirshhorn Museum and Sculpture Garden, Smithsonian Institution.

at the age of ten and went on to study at the Stockholms Universitat in Sweden.⁴⁶⁹ She came to the U.S. in 1953, where she attended Columbia University and also studied painting at the New School for Social Research. She had written poetry for many years, especially haiku, but found it difficult to continue writing poetry in a different language. In 1968 she created an outdoor, ecologically-conscious work called *Rice/Tree/Burial*, in which she ceremoniously abandoned her haiku poetry by burying it in the ground.⁴⁷⁰ In 1969, the year of the moon landing, she created an assemblage light box sculpture called *Moon Landing*, featuring cowboy-inspired toy astronauts (armed with lassos, guns and axes) trapped in a spherically-shaped, resin mold. This work is ambiguous at best regarding the fate of mankind in the space age.

In the late 1960s, Denes rejected overspecialization and turned to a systems approach in order to integrate information from various branches of knowledge, particularly art, science and philosophy, an objective that she, along with Burnham, believed that artists, uniquely, possessed the ability to achieve this.⁴⁷¹ She wrote,

My concern is with the creation of a language of perception that allows the flow of information among alien systems and disciplines, eliminating the boundaries of art in order to make new associations and valid analogies possible...⁴⁷²

⁴⁶⁹ Unpublished interview with Martina Norelli, Curator, Smithsonian American Art Museum, January 31, 1985, New York, NY, file Agnes Denes, Curatorial Archives, Smithsonian American Art Museum, Washington, DC.

⁴⁷⁰ Peter Selz claimed this was "the first site-specific work anywhere with ecological concerns." Peter Selz, "Agnes Denes: The Artist as Universalist" in Agnes Denes, Jill Hartz, *Agnes Denes*, 147.

 ⁴⁷¹ Jack Burnham, "Art in the Marcusean Analysis," In *Penn State Papers in Art Education*,
 edited by Paul Edmonston, 1-21 (University Park: The Pennsylvania State University, 1969), 9.
 ⁴⁷² Denes. "Notes on Eco-Logic: Environmental Artwork, Visual Philosophy and Global

Perspective," Leonardo, 26, no. 5, Art and Social Consciousness: Special Issue (1993): 387.

Despite her considerable body of work and writing that attest to her concern with systems theory, and the inclusion of her works in Burnham's *Software* show, which dealt specifically with the intersection of art with systems and information theory, Denes's work has only been interpreted through this lens by Kuspit. He argued that the irony and satire in her work betrayed "a bitter, cutting edge—an edge of despair." He believed that through her work, she pushed back against the "fatedness of the system" to make it "less confining, less constricting." But he believed that in the end, her work succumbed. "For all its look of detachment—of innocent calculation and abstracted order—it deals with the frustrations attendant upon the recognition of the inevitable."⁴⁷³ Rather than an imminent end, I argue that Denes presents an untenable reality that, through her work, she seeks to alter.

The forms in Denes's drawing *Study of Distortions: Global Perspective* (1970) (**fig.** 41), included in Burnham's show, reflect her concerns regarding the distortion of information, or system entropy. The triangular forms seem stretched and compressed. The attenuated, scalene triangle pointing toward the upper right hand corner contains a series of smaller circles and squares. This triangle is an elongation of the inverted isosceles triangle on the bottom of the page, which perhaps represents a mirror image or a shadow of the other, indicated by the partial cross hatching, emerging like the moon's penumbra in the center of the lower triangle. By depicting possible distortions, the artist asked the viewer to consider the ramifications of such disorder on a global scale. Denes explained the work,

⁴⁷³ Donald Kuspit, "Agnes Denes: The Ironies of Comprehension." Arts Magazine (1981): 153.

Study of Distortions encompasses all aspects of distortion such as lack of objectivity due to inadequate knowledge, emotions and errors. This includes erroneous information given and accepted, error as the distortion that results from a partial view (understanding) of things, and loss of communication, [for example] between viewer and artist, between specific meaning and symbol.⁴⁷⁴

Her description recalls Wiener's theory of cybernetics, which sought to control the integrity of communication through feedback mechanisms so that information would not be changed or lost in the process of dissemination. Denes's ruminations on "erroneous information" or "distortion" arising from a "loss of communication" or a "partial" understanding characterize information entropy. Consistent with Burnham's early utopian hopes for a systems esthetic, Denes saw her role as artist to correct partial, entropic misunderstanding by unifying the disparate disciplines under the aegis of art. Critic and curator Lawrence Alloway commented that "she has defined creativity as the opposite of entropy," implying that the creative act itself begets an open system.⁴⁷⁵

The artist's first public declaration of her commitment to visual art, and departure from poetry, was her series of dialectic triangulations around 1969.⁴⁷⁶ By the term dialectic triangulation, Denes meant a questioning of two distinct and dichotomous modes of thought. Kuspit noted that her process of triangulation was an effort to activate the static states of the system, presumably the social system, "It is a way in which 'the trinities are argued and regrouped'—so as to prevent that stasis, that sense of closure and foreclosure,

⁴⁷⁴ Agnes Denes, "Studies of Distortions: Global Perspective," 1974, in Corcoran Gallery of Art, *Agnes Denes : Perspectives* : December 6-January 26, 1974-75. (Washington, D.C.: Corcoran Gallery of Art, 1975), n.p.

⁴⁷⁵ He wrote that she made this comment "in lectures." Lawrence Alloway, "A Note on Macro-Esthetics," Corcoran Gallery of Art, *Agnes Denes : Perspectives* : December 6-January 26, 1974-75 (Washington, D.C.: Corcoran Gallery of Art, 1975).

⁴⁷⁶ "Agnes Denes 1968-1980," Hayden Gallery, (Cambridge, Mass. Massachusetts Institute of Technology, 1980).

that is associated with the feeling of being in the grip of fate."⁴⁷⁷ The artist has described the dialectic in her work as an effort to create "thesis, antithesis and synthesis," which, as art historian Thomas McEvilley noted, derives from the philosophy of Georg Wilhelm Friedrich Hegel,⁴⁷⁸ who also provided a philosophical basis for von Bertalanffy's open systems.⁴⁷⁹ Hegel explained that modern society was filled with dynamic contradictions and tensions, which he endeavored to interpret as part of a rational unity. Works like Dialectic Triangulation: A Visual Philosophy (including the Human Argument) (1969-70) (fig. 42) often take the form of triangles. In this, her work bears comparison to the writings of designer and architect Buckminster Fuller who attempted to apply general systems theory to problems of ecological exploitation and energy use. In his book Synergetics (1975) Fuller claimed, "Triangles are inherently open," and he further maintained that "Only [the] triangularly structured patterns are regenerative patterns."⁴⁸⁰ Denes's works visually represent the philosophical method of dialectical triangulation, a process she referred to as "a reevaluation of accepted knowledge."⁴⁸¹ The juxtaposition of these modes yields "rising knowledge" and "deepening awareness."⁴⁸² Triangulation, she clarified, is the force that activates the otherwise static states through a combination

⁴⁷⁸ *Time and Space Concepts in Art*, Marilyn Belford and Jerry Herman, eds. (New York: Pleiades Gallery, 1980). McEvilley has thoughtfully applied her process of dialectical triangulation to her work *Rice, Tree, Burial* and he developed an intriguing interpretation of the work as a dialectic of Demeter and Artemis, synthesized by Athena. See Thomas McEvilley, "Philosophy in the Land," *Art in America* (2004). I am grateful to Suzanna Knight, a.k.a. grrljedi, for pointing out the connection between Hegel and dialectical triangulation for me.

⁴⁷⁷ Kuspit, "Agnes Denes: The Ironies of Comprehension," 153.

⁴⁷⁹ von Bertalanffy, 11, 110, 198, 199. Dynamism is also at the root of von Bertalanffy's view of history as cyclical, a notion he supported by reference to Hegel. von Bertalanffy claimed that Hegel asserted that the construction of a theoretical view of history was possible.

⁴⁸⁰ R. Buckminster Fuller, Arthur L. Loeb, and E. J. Applewhite, *Synergetics ; Explorations in the Geometry of Thinking*, (New York,: Macmillan Pub. Co., 1975), 326 and 319.

⁴⁸¹ Agnes Denes, "Dialetic Triangulation: A Visual Philosohpy," 1969, in Corcoran Gallery of Art, *Agnes Denes : Perspectives*, n.p.

⁴⁸² Corcoran Gallery of Art, Agnes Denes : Perspectives, n.p.

of "intellect, instinct and intuition."⁴⁸³ Once probed in this way, thought systems increase in complexity. So, through dialectic triangulation, distinct thought systems may be synthesized and altered, indicative of an open system.

Because the artist herself initiates the triangulation, *she* becomes the activating force, the progenitor of change. Her statement on this work in the *Software* catalogue includes the following explanation of the process, "But each time it is the triangulation which institutes the interaction of a particular static state, being the activating force."⁴⁸⁴ McEvilley has noted that for Denes, change was a central concept that was linked with evolution, in that it is a process to which all of nature is subjected. ⁴⁸⁵ Denes's concept of evolution derived from the cosmological principle of the big bang, which, while predicting the ultimate entropic heat death of the universe, also indicated that the universe is constantly changing.⁴⁸⁶ She seemed to accept the entropic or closed model of the

⁴⁸³ Agnes Denes. Dialectic Triangulation: A Visual Philosophy, 1969--(Artist statement. from AD, Perspectives, 1974)

⁴⁸⁴ Burnham, Software, 27

⁴⁸⁵Thomas McEvilley, "Philosophy in the Land," *Art in America* (2004): 160. Denes wrote, "We believe in change and evolution and have tampered with our destiny." According to the artist, our advances in science and technology have led to a trichotomous, inherently evolutionary world view. For her, trichotomy implies a belief in evolution and change, while dichotomy (as embraced by the Egyptians) implies a static world view. Agnes Denes, Jill Hartz, *Agnes Denes*, 32. Interestingly, the inevitability of change is the central theme (and mode of salvation) in science fiction writer Octavia Butler's novel *Parable of the Sower* (1993), a dystopian novel depicting a future U.S. descended into chaos.

⁴⁸⁶ Since the mid-1960s, the Big Bang Theory has been regarded as the best available theory of the origin and evolution of the Cosmos. Prior, in the early 1950s, the two prevailing cosmological models were the Steady State Theory and the Big Bang. Fred Hoyle developed the Steady State model in 1948 and continued to lobby for it even as evidence mounted that supported the Big Bang Theory. Scientists Arno Allan Penzias's and Robert Wilson's (Penzias-Wilson) discovery of background radiation (CMBR) in 1964 provided substantial confirmation for the Big Bang model, because they determined that the energy was thermal. The origins of Big Bang Theory date back to the mid-1020s. George LaMaitre first suggested in 1927 that the universe began with an explosion of a primeval atom. Edwin Hubble found evidence to justify LaMaitre's prediction, asserting that distant galaxies were receding in every direction with relationship to

universe, but, in accordance with von Bertalanffy's and Wiener's view, she adhered to the notion that life on earth may represent a pocket of increasing order. Through the process of dialectic triangulation, she sought a temporary state of increasing complexity – an open system within a closed system, and therefore hope for humanity within the universe. She wrote in *The Book of Dust*,

Nonetheless, we see order arising out of chaos everywhere as the random dust of the earth are assembled into complex living things. This apparent negative entropy allows us to question if life has a quality that supersedes the laws of physics.⁴⁸⁷

Her reference to "negative entropy," or, "order arising out of chaos everywhere," recalls von Bertalanffy's negentropy. The scientist explicitly stated that, based on the theory of open systems, "the apparent contradiction between entropy and evolution disappears." Both can coexist. Living systems can avoid the increase of entropy and develop "toward states of increased order and organization."⁴⁸⁸ Evolution is thus coextensive with the notion of transformation toward increased complexity, which carries with it the inevitability of change over time.⁴⁸⁹ Her belief in the inevitability of change, coupled with her statement above that "apparent negative entropy allows us to question if life has a quality that supersedes the laws of physics" suggest an undeniable utopianism.

earth. Gamow then suggested that this phenomenon confirmed the fact that the universe had begun at a finite time and had been expanding ever since. Discussion with David Devorkin, Curator, Department of Space History, National Air and Space Museum, Smithsonian Institution. Washington, D.C. August 2007.

⁴⁸⁷ Denes, *The Book of Dust*, 13

⁴⁸⁸ von Bertalanffy, 41. von Bertalanffy further stipulated that his theory of open systems could be applied to ecology.

⁴⁸⁹ Despite the ultimate end of the universe, Denes (along with many physicists) believed in the possibility of a cyclical universe. In other words, the inevitable heat death may be followed by another Big Bang and a new universe. This will be discussed in greater depth in the next chapter.

Thus for Denes, the essential nature of all systems was change, a concept inherent in probability theory, which she applied to her *Pyramid Series* begun in 1970, an outgrowth of her Dialectic Triangulations. For early works from this series, like Pascal's Triangle: Study of Unpredictability (1973) (fig. 43), she created number systems derived from seventeenth century philosopher Blaise Pascal's abstract mathematical theory of probability, systems which she then transferred into visual form. Probability theory asserts that a random event or sequence of events, if repeated many times, will exhibit certain statistical patterns that may be predicted. Important for Wiener's cybernetics (the mathematician cited Pascal as critical to the formation of his theory), probability allows one to predict the likelihood of a given event and thereby assess the stability of a system. Denes's pyramid is depicted from a worm's eye view, looking upward toward the apex. It is somewhat warped into a semicircular form with the cornerstones stretching toward one another in a near embrace. Because the mathematical theory is probabilistic, the numbers are subject to change, and so is the form. She described the series in the early 1990s as follows.

As the anatomy of the form changes, layers of appearances and assumptions are peeled away to allow elusive processes to emerge... Thus a process develops that probes the essential nature of systems... A reality of changing illusions emerges in flawless, pure forms that remain "perfect" (their own essence) for a moment, instantly metamorphosing into new systems and processes...⁴⁹⁰

As she indicated, the ability of her probabilistic pyramids to transform their shape is actually a metaphor for the mutability of seemingly rigid and systemic ideological assumptions. Her application of Pascals' probability theory should be seen as a challenge

⁴⁹⁰ Agnes Denes, Jill Hartz, Agnes Denes, 32.

to mechanism in general and to mechanistic science, such as Newtonian physics, in particular which formed the basis of the mechanistic world-view.⁴⁹¹ Denes's interrogation of existing systems was intended to increase human understanding of its own predicament with the hope that through awareness of its situation, humanity could reverse its entropic decline.

Denes intensified her examination of mechanism in the late 1970s as she continued her pyramid series with works such as *Pascal's Perfect Probability Pyramid and the People Paradox—The Predicament* (1980) (**fig.** 44), which depicts some 16,000 hand-drawn human beings who, together, comprise a massive, delicately attenuated pyramidal form. No two figures are posed the same – no two are alike, yet from a distance, they are indistinguishable (**fig.** 45). The paradox, the artist explained, is that each individual believes he or she is unique and free, yet each is but a small component of a larger social system from which none can escape, because they comprise the very structure that sustains them. The individuals remain blissfully unaware of their complicity with the system.⁴⁹² She described them as follows,

The endless contradictions they seem to accept into their lives, their ability to know so much and understand so little, makes them very endearing. They are emotionally unstable yet manage complicated technological miracles and do not seem to realize that their great advances have interfered with their own evolution.⁴⁹³

⁴⁹¹ Otto Mayr, *Authority, Liberty, & Automatic Machinery in Early Modern Europe* (Baltimore: Johns Hopkins University Press, 1986), 67. Mayr noted that "Pascal rejected Descarte's mechanistic interpretation of nature."

⁴⁹² Agnes Denes, Jill Hartz, Agnes Denes, 32.

⁴⁹³ Agnes Denes, Jill Hartz, Agnes Denes, 32-34.

Denes's work closely resembles Mumford's *megamachine*, the prototypical example for which was the construction of the pyramids in Egypt. Mumford explained that the Pharaoh, sanctioned by divine right, commanded a conscripted labor force via a complex hierarchy of underlings or "gang bosses."⁴⁹⁴ Mumford's archetype for the American megamachine likely provided a model for Denes's pyramid series, her metaphor for contemporary society begun in 1969, just two years after the publication of Mumford's book. *Pascal's Perfect Probability Pyramid and the People Paradox—The Predicament*, similarly exemplifies a society trapped like cogs in a wheel of power. Denes described the work,

The magnificence of their collective accomplishments and the insignificance of the individual component are unmistakable. Not a single tiny figure can walk away from the structure—they ARE the structure.⁴⁹⁵

Just as Mumford implicated the priests in the hierarchal abuses of Egyptian power, Denes pointed out "the priests" in her work, which occupy the upper section of the pyramid, just under the apex. ⁴⁹⁶

Denes's figures, trapped as unwitting participants in a closed system also resemble the *monads* of philosopher Wilhelm Liebnitz, whom Wiener credited as an intellectual forebear of his own ideas. In the early eighteenth century, Liebnitz forwarded that monads are mindless automata that function in a pre-established pattern, or closed system, according to the clockmaker's design.⁴⁹⁷ They are programmed at the time of

⁴⁹⁴ Mumford, 17

⁴⁹⁵ Agnes Denes, Jill Hartz, Agnes Denes, 32.

⁴⁹⁶ Unpublished interview with the Artist, New York, NY, July 21, 2006.

⁴⁹⁷ In the *New System* published in 1695, Liebnitz insisted that both body and soul operate as two interdependent systems that keep one another perfectly aligned.

their creation by God, and like Denes's figures, their lives are predetermined. In *Monadology* (1714), Liebnitz proposed that the universe was comprised of monads or infinitesimal force centers ordered in a pyramid-like hierarchy, with God at the apex. The monads do not interact with one another, they are self-sufficient and their activity preprogrammed.⁴⁹⁸ Thus Liebnitz's monads bear striking resemblance to the deluded, predestined humanity depicted by Denes. von Bertalanffy also evoked them,

Human society is not a community of ants or termites, governed by inherited instinct and controlled by the laws of the superordinate whole; it is based upon the achievements of the individual and is doomed if the individual is made a cog in the social machine... the Leviathan of organization must not swallow the individual.⁴⁹⁹

Like the biologist who warns against the swallowing of the individual by the social machine, I suggest that Denes's pyramid is also a warning. By presenting the viewer with a closed social system, the artist, the activating force that probes the paradox, confronts the viewer with what is, to inspire her to imagine the possibility of change. Denes then depicted the process of transformation in subsequent images.

Her work, *When the Pyramid Awakens-- Study for Environmental Sculpture*, 1983 (**fig**. 46) is representative of her restless pyramids that she described as distorted pyramidal shapes that are mutating into new forms. These pyramids are in the process of breaking away from the "tyranny of being built" and proceed to mutate into new structures "of their own choosing." In these pyramids, Denes probed beneath layers of appearances, stripping away ideological assumptions to reveal underlying structures that were organic and constantly transforming. So, while the artist called attention to our predicament, she

⁴⁹⁸ Mayr, 72-73.

⁴⁹⁹ von Bertalanffy, 52-53.

also offered models for new approaches to the world's problems that individuals may choose for themselves.

In *The Book of Dust*, Denes's social perspective (often lacking in her other writings) is made apparent. Her preoccupation with humanity's plight is linked to a concern about the effects of technology and science on our society, which she unveiled in her introduction,

Book of Dust is a result of thoughts that stem from a deep concern not only with human survival but with its methods and standards. Can our principles remain intact, or will they perish in the struggle? Will we become mechanized superbeings with minds of steel and hearts of time? Who and what will lead, compel and stir us? What will we believe in?⁵⁰⁰

In *The Book of Dust*, her social critique of American society, indeed Western society, is made apparent. She stated her concern that overspecialization had impeded the ability of individuals to recognize the harmful processes they had put in motion, which have been exacerbated by science and technology. Here, she clearly stated that she saw humanity's actions as myopic and harmful. It is incapable of seeing beyond itself and recognizing the damage it has wrought. Its inability to grasp its effect on the world is its essential predicament. While she revealed humanity's predicament, she persisted in her utopian probing of the problem, maintaining belief in the ability of the artist to make new discoveries. She wrote,

the closer one ventures to the edge, at the fringes of knowledge, the more intense the excitement... In this strange land of possibilities and ambiguities, one is alone with one's faith, curiosity and the hope of a new connection or some insight. One must break through membranes and eliminate boundaries to enter this land. It is new,

⁵⁰⁰ Denes. The Book of Dust, 5-6.

transparent, pure, and unspoiled, where nothing can hide—a realm where one can place one's dream and vision, as though it were an incubator, and watch it take root and develop.⁵⁰¹

The "elimination of boundaries" to allow the free flow of knowledge and information, was for Denes the special province of the artist. Applying her own intellect through the process of triangulation, she activated rigid membranous dichotomies, creating systems of increasing complexity. Countermanding entropy, Denes contributed to what Burnham and von Bertalanffy called, negentropy, an open system on earth.

Open Systems and Social Critique in the Work of Martha Rosler

Rosler responded to von Bertalanffy's assertion that social life is comprised of an interconnected web of ideological systems, which enabled her to permeate the boundaries between the reified art object and the socio-economic systems that supported it. She commented recently, "[Systems theory] enabled me to write about the art world as a system... That it's not just about a bunch of people making art. This is a social system." In her essay for the exhibition *Open Systems*, curator DeSalvo wrote that Rosler investigates "whole systems," institutions and argues that her work *Semiotics of the Kitchen* "weaves together two systems—that of food production and language—to critique female stereotypes."⁵⁰² In his essay for the same exhibition, "From the Box to Street and Back Again: an Inadequate Descriptive System for the Seventies," art historian Mark Godfrey noted that such questions as "state power, political iconography,

⁵⁰¹ Denes, *The Book of Dust*, 7.

⁵⁰² DeSalvo, "Where We Begin: Opening the System, c. 1970," 20-21.

advertising and artistic celebrity" occupied Rosler.⁵⁰³ As was true for Denes and Aycock, open systems enabled Rosler to cross disciplinary boundaries, exposing the inequities in dominant systems of thought and representation including Greenbergian modernism and the scientific establishment. She announced in a lecture in 1981, "It is art's *connectedness* to the rest of social life that I would like to reaffirm and stress."⁵⁰⁴ Rosler used systems theory to reveal the connections between U.S. economic systems and the lived experience of individuals.

Rosler explained that her photo/text installation *The Bowery in Two Inadequate Descriptive Systems* (1974-75) (**fig**. 47) exposed the inadequacy of authoritative systems of representation (photography and text) to explicate the complexity of social realities that create and maintain poverty in the wealthiest nation in the world.⁵⁰⁵ The artist paired photographs of the Bowery, a small neighborhood in south Manhattan noted for poverty and homelessness, with words and phrases indicative of drunkenness. Her photographs captured vacant sidewalks littered with empty or half empty liquor bottles beside storefronts adorned with torn signs, abraded paint and graffiti. Her images are stark, frontal and set in shallow space, offering no hint of depth or movement. (**figs**. 48 and 49)

⁵⁰³ Godfrey, "From the Box to Street and Back Again: an Inadequate Descriptive System for the Seventies," 40.

⁵⁰⁴ Italics hers. Martha Rosler, "The System of the Postmodern in the Decade of the Seventies" in Lawrence Alloway, and Henry Art Gallery. *The Idea of the Post-Modern : Who Is Teaching It?* ⁵⁰⁵ Numerous critics, including Buchloh, Alberro, Annette Michelson, DeSalvo, Godfrey and Burton have interpreted Rosler's work as a critique of social systems. To my knowledge, only DeSalvo, Godfrey and Burton have suggested a differentiation between open and closed systems. For essays by DeSalvo, Godfrey and Burton, see DeSalvo, *Open Systems*. For essays by Alberro and Michelson and an interview with Bucholoh see Rosler, *Martha Rosler : Positions in the Life World*. See also Anne Ellegood, *Martha Rosler: Positions in the Life World* for the New Museum, <u>http://www.newmuseum.org/more_exh_m_rosler.php</u> (accessed May, 20, 2007). In an interview with the author Rosler explained, "There's no system in the world that can adequately represent experience." Unpublished interview with the Artist, Brooklyn, NY, Thursday August 23, 2007.

Each photograph, coupled with a page of sparse text on white background, is mounted in a black frame. (**fig.** 50) Rosler's *Bowery* images confront the viewer with important systems of representation: photography and language or text. Roland Barthes demonstrated that when these two forms are juxtaposed, as in newspapers, they connote truth or fact. ⁵⁰⁶ Thus, while no figures are present in the photographs, the run-down buildings and accompanying words suggest the presence of inebriated bums, who, according to conventional wisdom, are responsible for their own abjection. The individuals, to whom words and phrases like "comatose" "pickled" and "fried to the hat" seem to refer are absent from these photos, their presence only implied. Rosler's inclusion of the word "Inadequate" in the title not only bears witness to the ways these absent individuals are viewed by society, it also implicates the representational systems themselves, which fail to reveal the subtleties of a capitalist system that begets and sustains poverty.

Rosler's works recalled the lauded American social documents of urban life made by photographers like Walker Evans in the 1930s and 40s, which invariably included the poor and homeless themselves. While she admired this work for its intent to provoke awareness of the plight of the poor and inspire social change, she questioned the ability of documentary photography and journalism to illuminate actual, lived experience. She also questioned the underlying humanist belief that if such problems are exposed they will be addressed-- an attitude she criticized as "an optimistic view of progress."⁵⁰⁷ *The Bowery*

⁵⁰⁶ Roland Barthes, "The Photographic Message" In *Image, Music Text*, Trans. Stephen Heath (Fontana/ Collins, 1977): 27.

⁵⁰⁷ Buchloh, "Interview with Martha Rosler," 44. In an attempt to clarify her intent, Buchloh asked Rosler directly whether this piece was utopian or a double negation. She explained that it

images also respond to serial projects by photographers like Robert Frank, and to the straight, ordered snapshots of conceptual artists such as Lee Friedlander. In this way, Rosler imposed order on the otherwise untidy realities of urban life by sequencing uniform compositions and displaying them grid-like. Thus she also challenged a central notion of conceptual photography, forwarded by tastemakers like MoMA photo curator John Szarkowski, that order and meaning could be imposed on the disorder of everyday life.⁵⁰⁸ In the *Bowery*, Rosler called attention to the ways people without power are captured on film, especially when the photographs come to be seen in galleries and museums. In this new context, as the images become aestheticized, their power is drained. When robbed of their context and distributed ubiquitously, as the works of Walker Evans had been, the images may also serve to reinforce the myths they were intended to question. Thus by disrupting the notion that traditional systems of representation communicate binding social truths, Rosler opened spaces for new and inventive languages as well as new social relations.

In her performance and video *Vital Statistics of a Citizen Simply Attained* (performance 1973; video 1977) (**fig**. 51), Rosler questioned the adequacy of scientific systems of measurement—the notion of scientific rationalism, challenging the cultural belief that data extrapolated from precise measurement, can be productively applied to individual experience. Godfrey argued that the central theme of this work is that there is no such

was a double negation, but continued "But that doesn't mean that I wasn't in some strong sense a utopian."

⁵⁰⁸ Robert Hirsch, *Seizing the Light: A History of Photography* (Boston: McGraw-Hill, 2000), 380.

thing as the private sphere—that it is entirely policed.⁵⁰⁹ Rosler explained in the introduction to the video that, "It's about the meaning of truth... The definition of fact."⁵¹⁰ For the artist, the scientific establishment was a dominant member of the social technocracy that determines what constitutes knowledge. She stated in an introductory voiceover to the video, "Bureaucratic crime can be brutal or merely devastating."⁵¹¹ In the beginning of the video, Rosler appears as a scientific subject, stripped of clothing, individuality and identity. Each body part is rigorously measured by two men in white lab coats (code for the male-dominated medical profession). After each measurement, one states whether the result is standard or substandard, and the other records the result. After every announcement, three women, presumably lab technicians also in lab coats, stand by like stoic, affirming muses, ringing bells or tooting horns, attesting that the result is normal or deviant. Critic and historian Annette Michelson noted that the woman's body is a site of domination and the measurement of its parts are in fact an act of dismemberment. She suggested that measurement connotes an informative truth of the self, and its imposition causes the subject to internalize the standards, viewing herself as being comprised of "parts."⁵¹² The deadpan facticity of the action and narrative in the video emphasized the inadequacy of scientific systems of measurement precisely because they were applied by members of an established scientific regime that sought to create hegemonic standards that serve to reify itself. In other words, social goals were set by

⁵⁰⁹ Godfrey, "From Box to Street and Back Again: An Inadequate Descriptive System for the Seventies," 40-41.

⁵¹⁰ Martha Rosler, Excerpt from transcript for *Vital Statistics of a Citizen, Simply Obtained* in Rosler, *Martha Rosler : Positions in the Life World*, 210.

⁵¹¹ Excerpt from transcript for *Vital Statistics of a Citizen, Simply Obtained* in Rosler, *Martha Rosler : Positions in the Life World*, 210.

⁵¹² Annette Michelson, "Solving the Puzzle" in Rosler, *Martha Rosler : Positions in the Life World.* This analysis also rings true for Rosler's *Body Beautiful, Beauty Knows No Pain*, 1966-72 photomontage series as well, where the woman, as object, is reduced to her sexualized parts.

those in power in order to maintain it, but their personal or group goals were masked by the rationalism of science.

The artist also challenged the adequacy of scientific rationalism when used to reaffirm accepted social beliefs. During the doctors' examination, a male voice overlay reads the 'documented' story of a young boy who had suffered physically because his parents exchanged accepted social roles; his mother worked and his father cared for him. As a result, the boy suffered from decreased intelligence and physical deterioration, until his parents reversed roles to those prescribed by society at which time he 'recovered' fully. The story of the young boy is relayed as a scientific test. No matter how ridiculous the conclusion drawn, the treatment process was rational and so the result must be correct. Alberro noted that Rosler sought to implicate not science or technology per se, but the social forces that design and implement them, in their various guises.⁵¹³

In the final segment of the video, the artist discusses the prominence of science, its effect on society and on women, as women strive to live up to the expectations it produces. After Rosler undergoes the measurement process, she proceeds to dress with the help of the lab technicians. She puts on layer after layer of clothing in two intermittent dressing sequences: in one she dons a wedding dress, in the other a black evening gown, after which she applies make-up and fixes her hair. During this scene, Rosler's own voice overlay asks whether measurement provides meaning, suggesting that the scientists who

⁵¹³ Alexander Alberro, "The Dialectics of Everyday Life" in Rosler, *Martha Rosler : Positions in the Life World*, 99.

propagated 'measurement theory' sought to categorize those being measured according to societal expectations, always those of white males.

The underlying message of the video is that subjects of scientific examination, particularly women, become objects of surveillance and social control.⁵¹⁴ She comments in her voiceover, "Statistics. For an institution to be evil it need not be run by Hitler... it need only be run by heartless people, sometimes called intellectuals or scientists."⁵¹⁵ Thus, in this video, Rosler implicated patriarchy and science as important parts of a social system that victimizes its weaker members. Godfrey concluded correctly, after Alberro, that through the absurdity and disjuncture inherent in the video, Rosler enabled the viewer to question the tightly controlled scientific system. But Godfrey ultimately argued that the artist "seems to be less hopeful about such an escape."⁵¹⁶ Instead, I suggest that she uses von Bertalanffy's notions of open systems not only to validate the open, dialectical relationship she creates between her work and the social systems it interrogates, but, that her criticism itself, as in the work of John Heartfield, Bertolt Brecht and others before her, is evidence of her belief in the possibility for change. It represents a process whereby she urges the viewer to a new level of awareness of her surroundings and, hopefully, activism.

⁵¹⁴ Alexander Alberro, "The Dialectics of Everyday Life" in Rosler, *Martha Rosler : Positions in the Life World*. Alberro points out that Rosler made this connection for her video *Born to be Sold*. He also saw application to *Vital Statistics*.

⁵¹⁵ Excerpt from transcript for Vital Statistics of a Citizen, Simply Obtained in Rosler, Martha Rosler : Positions in the Life World.

⁵¹⁶ Godfrey, 43.

Wiener's and von Bertalanffy's theories of cybernetics and systems, disseminated by Burnham in the late 1960s and early 1970s, pervaded artistic imaginations during the Cold War. In the context of the counterculture and the women's movement, the closed formalist art system was opened to encompass the social and cultural landscape. Aycock, Denes and Rosler embraced von Bertalanffy's open systems, which emphasized the interrelationship of social and biological systems in opposition to mechanism, which, he argued, had dominated the physical sciences and penetrated the culture through the work of systems scientists. The notion of open systems resonated with artists who sought to subvert closed, institutional structures within American "Technological Society," including the military-industrial-complex and the art world, and imagine the possibility of social growth and transformation. Entwined ecological, social, political and economic systems suggested paradigmatically different world-views emphasizing a synthesis of knowledge and a permeation of boundaries rather than a restrictive segmentation of disciplines.

Aycock and Rosler placed the body in opposition to mechanism in works that called for an open-ended processes of self-discovery and social change. Central to feminist utopianism, the notion of change as an ongoing process may be seen in contrast to the blueprint utopia, historically determined by and for a universalizing male subject, who, Sargisson writes, "conquers passion by the exercise of reason and his mind conquers his body."⁵¹⁷ Aycock's labyrinthine works, designed as open systems intended to foster a

⁵¹⁷ Lucy Sargisson, *Contemporary Feminist Utopianism*, *Women and Politics* (London ; New York: Routledge, 1996), 51. Sargisson wrote that the open-ended feminist utopia is "related to an unease within feminist theory with any ascription of a fixed nature to men and women." I would

multi-sensory process of self-discovery over time, should be seen in contrast to technique, which allows for only the most efficient, rational course.⁵¹⁸ Her works also elicit open-ended interpretations that escaped the "closed, formalist machine of judgment" articulated by Pincus-Witten, that characterized the modernist criticism of Greenberg and Fried.⁵¹⁹ Aycock undertook a critique of computer technology in works that situated the storage and processing of information squarely in the body and in memory. Her lengthy stories and titles served to accrete meaning or information, thus transforming the work of art and the viewing experience into an open exchange. Rosler pitted the body against the scientific establishment arguing that personal experience is in fact shaped by systems of classification and judgment.

Ongoing transformation, a process to which all organic and inorganic matter was subject through evolution was also central for Denes. The change of matter and energy within and between open systems, was integral to the cyclical processes of decay and growth in the artist's earthworks, including *Rice, Tree, Burial*, but was also important for her early dialectic triangulations. Otherwise static systems, these triangular forms were activated by the artist's own interrogation or "synthesis" of opposing concepts (thesis and antithesis), carried out through a combination of "intellect, instinct and intuition," a

argue that this is indeed the case for Rosler, Denes and Aycock, whom Hobbs correctly argued was a liberal feminist. Hobbs, *Alice Aycock: Sculpture and Projects*, 96. ⁵¹⁸ Ellul, 134.

⁵¹⁹ Pincus-Witten, 14. Clement Greenberg, "Modernist Painting" in Charles Harrison and Paul Wood, eds. *Art in Theory, 1900-2000*, 777. First published in Forum Lectures (Voices of America), Washingon, DC, 1960. Michael Fried, "Art and Objecthod" in Harrison and Wood, eds. *Art in Theory, 1900-2000*, 835-846. First published in *Artforum*, Summer, 1967.

process which increased their complexity.⁵²⁰ As the progenitor of the triangulation, the artist, through her work, became the activating force. Denes believed that art was capable of providing a much-needed bridge between overspecialized disciplines and that her interrogations of received knowledge would generate awareness of current problems and perhaps give rise to more equitable and affirming approaches to life.

Sargisson claimed that "Most (contemporary) feminist utopian works lack [a] sense of stagnancy, being instead fluid and dynamic constructions."⁵²¹ She states that it is precisely a resistance to closure and a commitment to an ongoing process of change that characterize feminist utopianism.

Progress, movement and the perpetuation of struggle take the place of finality in many (contemporary and historical) utopian texts. A flexible and open-ended approach may go some way towards enabling conceptualization of a multiple and open-ended utopianism.⁵²²

Like the authors of fiction whose work provided the evidentiary basis for Sargisson's theory, these artists adopted a felixible and open-ended approach to knowledge systems and criticism of dominant ideologies including modernism, the primacy of scientific knowledge and mechanistic social structure) that satirized the concept of perfection⁵²³ The artists did not prescribe a specific alternative, an act that would reproduce the intransigence of the one they inherited. But by dismantling the structures that exist, the

⁵²⁰ Agnes Denes, "Dialectic Triangulation: A Visual Philosophy," 1969, in Corcoran Gallery of Art, *Agnes Denes : Perspectives*, n.p.

⁵²¹ Sargisson, 20.

⁵²² Sargisson, 20. Sargisson commented later that openended feminist utopianism is related to an unease within feminist theory which ascribes a fixed nature to men and women (essentialism). (50) The importance of openendedness and transformation in the works of these liberal feminist artists becomes more pronounced (more often and explicitly stated) in the mid-70s, when women artists became regularly categorized according to essentialist feminist modes of work.
⁵²³ Lucy, 3.

artists ask the viewer to contribute her own substitutes. Rosler, for example, sees her works as propositions for alternative ways of being. She said that everything she has done she has thought of "as if," meaning "a sketch, a line of thinking, a possibility."⁵²⁴ In other words, an open-ended utopian motivation fueled her critique of closed systems of representation. But as the science of open systems suggested, science might be used justly, in an alternative social system.

An alternative social system is precisely what the ambitious von Bertalanffy hoped his theory would beget, declaring that it heralded "a new scientific paradigm"-- a notion forwarded by scientist Thomas Kuhn-- which will be discussed in the following chapter. von Bertalanffy continued,

[Systems philosophy is] the reorientation of thought and world view ensuing from the introduction of "system" as a new scientific paradigm (in contrast to the analytic, mechanistic, one-way, causal paradigm of classical science). The concept of "system" constitutes a new "paradigm," in Thomas Kuhn's phrase, or as the present writer (1967) put it, a new "philosophy of nature," contrasting the "blind laws of nature" of the mechanistic world view and the world process as a Shakespearean tale told by an idiot, with an organismic outlook of the "world as a great organization.⁵²⁵

⁵²⁴ Buchloh, "Interview with Martha Rosler,"

⁵²⁵ von Bertalanffy, xxi. Parenthesis () and quotations von Bertalanffy's.

Chapter 4

Unmasking the Myth of the Machine: Physics and Cosmology in the Works of Alice Aycock and Agnes Denes

"Why should the enterprise sketched above [science] move steadily ahead in ways that, say, art, political theory, or philosophy does not? Why is progress a prerequisite reserved almost exclusively for the activities we call science?"⁵²⁶ --Thomas S. Kuhn, 1962

"Once we abandon Newtonian static physics and accept Einstein's four-dimensional principles of relativity, we question reality and know that even the laws of nature may undergo evolutionary changes. We even invented the uncertainty principle, although we use it for different reasons." ⁵²⁷

--Agnes Denes, 1976

"I'd like a time-machine: the next thing. To travel between generations. Returns and extensions. Tune in on Mme de Stael the day Constant came back. Where are you originally from? The drop off of memory-generation. Remembering that three hundred years ago this mix of nationalities, races in flux was uncommon. One came from where one was. (How far could a woman dream to travel?) And because we are capable of simultaneous ideas, curiosities and desires with the time-mind we will grant each other the right and help in discovering utilizing simultaneities."⁵²⁸

--Carolee Schneemann, 1967

Alice Aycock's and Agnes Denes's works of the late 1960s and early 1970s functioned as open systems embracing organized growth and change, in stark contrast to the closed technological society that many counterculture critics believed Cold War America had become, but as the Cold War drew on, the artists engaged in more direct and biting

⁵²⁶ Thomas S. Kuhn, *The Structure of Scientific Revolutions*, (Chicago: University of Chicago Press, 1962), 160.

⁵²⁷ Excerpted from Agnes Denes, "Evolution and the Creative Mind," a lecture first delivered at the Smithsonian Institution, Washington, D.C., 1976.

⁵²⁸ Carolee Schneemann and Bruce R. McPherson, *More Than Meat Joy: Performance Works and Selected Writings*, 2nd ed. (Kingston, NY: McPherson & Co., 1997), 127.

appraisals of the cultural primacy of science and technological progress.⁵²⁹ The artists followed developments in the fields of cosmology and high energy physics. By the early 1970s cosmological evolution, which derived from groundbreaking discoveries centering on the origin of the universe, offered hope for a full understanding of the fate of the cosmos, while the standard model of particle physics, which effectively unified relativity theory and quantum theory, provided a functional (though somewhat deficient and inelegant) unified field theory of matter.⁵³⁰ The artists sought to apply their knowledge to the social functions of science in a post-industrial American society that had built the bomb, put men on the moon and waged war in Vietnam. They held conflicting attitudes toward science that were common in a Cold War culture that associated quantum physics with devastating mechanistic weaponry and destructive government policy, but also celebrated the wonders of nuclear power.⁵³¹ Aycock's father, for example, was a construction engineer who thrived on contracts from energy plants, including nuclear power plants. She recalled, "In the 1950s there was this myth of the good bomb. I

⁵²⁹ These theorists included but were by no means limited to Jacques Ellul, *The Technological Society* 1st American ed. (New York,: Knopf, 1964); Lewis Mumford, *The Myth of the Machine*. 1st ed. (New York,: Harcourt, 1967), 3; Herbert Marcuse, *One Dimensional Man; Studies in the Ideology of Advanced Industrial Society* (Boston,: Beacon Press, 1964), 228-229; Theodore Roszak, *Where the Wasteland Ends; Politics and Transcendence in Postindustrial Society*, 1st ed. (Garden City, N.Y.,: Doubleday, 1972), 21.*Reflections on the Technocratic Society and Its Youthful Opposition* (Garden City, N.Y.: Doubleday, 1969).

⁵³⁰ Since the mid-1960s, the Big Bang Theory has been regarded as the best available theory of the origin and evolution of the Cosmos. The standard model of physics was first formulated in 1963 and achieved its current form by 1974.

⁵³¹Hobbs has noted this paradoxical aspect of Aycock's consideration of nuclear power. Robert Carleton Hobbs, and Alice Aycock. *Alice Aycock : Sculpture and Projects* (Cambridge, Mass.: MIT Press, 2005), 228; Jonathan Fineberg, *Alice Aycock's Impossibilism* (Raleigh, NC: City Gallery of Contemporary Art, 1989), 41; Maurice Poirier, "The Ghost in the Machine." *Art News* 85, no. 8 (1986): 83-84. I suggest that philosophical applications of quantum physics played a greater role than has previously been noted in the work of the Fluxus artists, as well as Robert Smithson, Nancy Holt and possibly Robert Morris.

remember a family vacation visiting a muddy construction site called Peachbottom."⁵³² But, as Robert Hobbs has noted, the nuclear accident at Three Mile Island, which occurred in 1979 near Aycock's family home in Harrisburg, also suggested the possibility of cataclysmic consequences.⁵³³ In the artists' work, quantum physics and cosmological evolution were treated as harbingers of positive change, while nuclear and industrial technologies were regarded as root causes of the ills of the Atomic Age.⁵³⁴ The works of these artists reflect a thoughtful grasp of the philosophical applications of complex scientific theories centered on chance and uncertainty, which, in accord with historian Jackson Lears's assertion that chance was part of an artistic "protest against an overorganized society," were employed to criticize a mechanistic social structure arising from the modern scientific paradigm and thereby suggested that social repression was subject to change.⁵³⁵

Drawing on the notion of scientific paradigms or world-views forwarded by scientist Thomas Kuhn, both artists adopted a strategy of criticism of society in which they evoked the scientific theories (and their technological applications) of past cultures, including ancient Egypt, Medieval Europe, and nineteenth-century U.S., setting them in contrast to present-day American society.⁵³⁶ In his popular book *The Structure of Scientific*

⁵³² Hobbs, Alice Aycock : Sculpture and Projects, 30.

⁵³³ Hobbs claimed that this incident had a powerful effect on the artist and her work. Hobbs, 228. ⁵³⁴ Hobbs argued that Aycock saw nuclear power as both creative and destructive. Hobbs, 228.

 ⁵³⁵ Jackson Lears, "Out of Control: Art and Accident in a Mangerial Age" in Joan M. Marter, Simon Anderson, and Newark Museum, *Off Limits : Rutgers University and the Avant-Garde, 1957-1963* (Newark, N.J.; New Brunswick, N.J.; London: Newark Museum; Rutgers University Press, 1999), 49.

⁵³⁶ Hobbs has noted Kuhn's importance to Aycock's work. He wrote, "With her reading of Kuhn's book, Aycock ceased to see science as the absolute model for Truth and instead thought of it as a series of historical and sociological constructs that she could weave into her complexes."

The artists' investigation of scientific theories must be considered in tandem with the conceptual and material use of technology in their works. Like many influential cultural

Hobbs, 11. Hobbs also asserted "Moreover her art undertakes the important task of ideological reformation by puncturing established views—setting up a rift in them—in order to create new spaces where new insights might become possible." Hobbs, 153. Aycock has discussed her interest in investigating history in her work for many years, see for example, Alice Aycock, "Projects for my Body," Lotus International (December, 1977). In addition, numerous scholars have discussed the fact that the artist seeks to investigate past world views, including Edward Fry, Jonathan Fineberg, Janet Kardon, Stuart Morgan, Eugenie Tsai, Patricia Phillips and Hobbs. Edward Fry, Alice Aycock Projects, Introduction by Edward Fry (Tallahassee: University of South Florida, 1981); Jonathan Fineberg, Alice Aycock's Impossibilism (Raleigh, NC: City Gallery of Contemporary Art, 1989), 40; See also Howard Fox, Metaphor: New Projects by Contemporary Sculptors (Washington D.C.: Hirshorn Museum and Sculpture Garden, Smithsonian Institute, 1982), 50; Machineworks: Vito Acconci, Alice Aycock, Dennis Oppenheim, Essays by Janet Kardon and Kay Larson (Philadelphia: Institute of Contemporary Art, University of Pennsylvania, 1981); Stuart Morgan, "The State of Ideas, New York Chronicle," Artscribe (December, 1978): 4; Patricia Philips, "Alice Aycock: Storm King Art Center" Artforum International (October, 1990): 173-74; Eugenie Tsai, "A Tale of at Least Two Cities: Alice Aycock's "Large Scale Dis/Integration of Microelectric Memories (A Newly Revised Shantytown)" Art Magazine, June (1982): 134-135. To my knowledge, no one has noted the relationship of Kuhn to Denes's work, but, his criticism of scientific progress is evident in her work from the mid-1970s forward, as will be discussed.

⁵³⁷ Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962).

⁵³⁸ Kuhn, 98.

critics during the Cold War era, including Lewis Mumford, Theodore Roszak and Herbert Marcuse, the artists generally viewed science and technology as interrelated.⁵³⁹ Mumford, for example, characterized the twentieth century in terms of the relationship between new technologies, like nuclear power, and the scientific theory, quantum physics, from which it arose. Mumford, whose work Aycock had read, noted that the twentieth century,⁵⁴⁰

has witnessed a radical transformation in the entire human environment, largely as a result of the impact of the mathematical and physical sciences upon technology. The shift from an empirical technics to an experimental mode has opened up such new realms as those of nuclear energy, supersonic transportation, cybernetic intelligence and instantaneous distant communication. Never since the Pyramid Age have such vast physical changes been consummated in so short a time.⁵⁴¹

In the quote above, Mumford noted society's "physical changes" wrought by science, drawing a comparison to the pyramid age. He further argued that the regularity of the "megamachine' of ancient Egypt, sprang directly from scientific calculations. "As for the Egyptian pyramids, what are they but the precise static equivalents of our own space rockets?" he asked.⁵⁴² Similarly, the artists incorporated the technologies of other eras

⁵³⁹ Mumford did distinguish modern science and technology from technics as used in Paleolithic societies, however, modern science and technology went arm in arm. Lewis Mumford, *The Myth of the Machine*. 1st ed. (New York,: Harcourt, 1967), 3. Marcuse decried prevailing scientific and technological rationality. Marcuse, *One Dimensional Man*, 228-229. Stephen Bronner asserts that "Marcuse conflated the critique of "science" and "technology" with a critique of the uses to which they were put." Andrew Feenberg, Charles Webel, and Robert B. Pippin. *Marcuse: Critical Theory and the Promise of Utopia* (London: Macmillan Education, 1988), 135. Similarly, Roszak assaults technology "and the science on which it is based" as "the sign of [American] cultural superiority." Theodore Roszak, *Where the Wasteland Ends*, 21. ⁵⁴⁰ Aycock reported that she had read Mumford's work. Unpublished Interview with the Artist,

July 16, 2007, New York, NY. The concerns inherent in Denes's *Pyramid Series*, particularly her work *Pascal's Perfect Probability Pyramid and the People Paradox—The Predicament* (1980) indicate that she was aware of his work.

⁵⁴¹ Mumford, *The Myth of the Machine*, 3.

⁵⁴² Mumford, *The Myth of the Machine*, 12.

(materially, pictorially and conceptually) in order to connote the paradigm from which For example, Aycock criticized the notion that technological they sprang. accomplishment was the sole domain of the modern, scientific world-view, by evoking the machines of the Middle Ages, created by individuals subject to, what had been commonly accepted as, a drastically different magical or religious world-view.⁵⁴³ Her choice of materials in these works, such as wood, and forms like water wheels and wind mills indicated, after Kuhn, that scientific revolutions, in the plural, together with their technological offspring, occurred at many different times throughout history in response to a given historical need or context, and that scientific accomplishment was not solely the domain of the twentieth century.⁵⁴⁴ She described her thinking, "I was always interested in why it was that if people lived in this sort of dark zone of magic up until the scientific revolution, how did they survive?"⁵⁴⁵ Denes also incorporated industrial materials in her works as a means to evoke past scientific paradigms, which she used as a metaphor for the present. For her project Noah's Ark—A Spaceship, 1982 (fig. 52), the artist juxtaposed technologies such as timber and animal skin, which might have been used in the biblical patriarch's vessel, with new technologies such as fiberglass and Lucite, that might be found in a spaceship.⁵⁴⁶ Upon boarding the ship, the engines

⁵⁴³Historian Richard Kirby has noted, "The centuries which followed the decline of imperial Rome have so often been called the Dark Ages in the West that many assume there was no one except the clergy concerned with improving the condition of daily life." Richard Shelton Kirby, *Engineering in History* (New York: Dover Publications, 1990), 95.

⁵⁴⁴ Hobbs mentioned Kuhn in connection to Aycock's investigation of Medieval subjects writing the following, "In light of her interest in Kuhn's *Structure of Scientific Revolutions*, I should point out that this reference to electricity –one of many in her writings—is noteworthy because Kuhn used the prehistory of the paradigm of electricity throughout his book to explain the dynamics of scientific investigation and the competing claims of and often strange ideas that have been put forth in the name of science." Hobbs, 213.

⁵⁴⁵ Unpublished interview with the Artist, April 5, 2004, New York, NY

⁵⁴⁶ Denes, Hartz, Agnes Denes, 113.
respond and lights flash in readiness, but the rockets throw sparks rather than ignite and the oars, it is revealed, are actually made out of lead.⁵⁴⁷ The work indicated the futility of science, and its products, as a means of progress in itself, and at the same time it suggested stages in an earth-centered cosmological evolution, which is continuously disrupted by human-made technologies. Thus, the artists' works functioned as mediators between past and present, revealing subtle, often disturbing similarities between the scientific paradigm and those that did not survive.

Both Aycock and Denes engaged in feminist utopian subversion of science as a patriarchal domain of knowledge and power. Building upon the work of Dada and Fluxus artists, their investigations of notions of chance and uncertainty allowed the artists room to question the rigidity of accepted norms within American society, and the prominence of the scientific-world-view.⁵⁴⁸ Metaphoric movement through time offered them speculative spaces from which to criticize their own world and suggest alternatives. Aycock's construction of fantastical worlds in her machine works and Denes's investigation of future worlds, including space stations comprised of the "pure technology" of "natural systems" were representative of feminist utopian hopes for a different future.⁵⁴⁹

⁵⁴⁷ Denes, Hartz, Agnes Denes, 113.

⁵⁴⁸ Yet these phenomena had also been validated by science, suggesting that at some level, the artists may have considered science a subject worthy of serious consideration within the male-dominated art world.

⁵⁴⁹ Denes, Hartz, Agnes Denes, 35.

Aycock questioned the prominence of rationalism that characterized the scientific method, which many viewed as the basis of Cold War society.⁵⁵⁰ The scientific method required the collection of data through observation and experimentation after which hypotheses were formed and tested. The cause-and-effect rationalism associated with the scientific method has been questioned by many scholars of gender and science who view it as ideologically patriarchal.⁵⁵¹ Former nuclear physicist and historian of science Brian Easlea explained that "the objectivity of the scientific method," has historically excluded women who were viewed as essentially lacking the logical rigor necessary for the "hard, ruthless application of logic and experimental evidence [required] to understand and master the natural world"⁵⁵²

In response to rationalism, Aycock placed contemporary ideologies in doubt and suggested that others may also be viable. Her work, in effect, insisted that magic was a necessary component of social life that had been repressed. In many of her machine works, Aycock metaphorically investigated forms of light and energy, foregrounding

⁵⁵⁰ The critique of mechanism or technological rationalism in Western, and especially American society is essentially the primary topic of each of the following books: Mumford, *The Myth of the Machine*,1967; Marcuse, *One Dimensional Man*, 1964); Theodore Roszak, *The Making of a Counter Culture*, 1969.

⁵⁵¹ See for example, Sandra G. Harding, *Whose Science? Whose Knowledge? : Thinking from Women's Lives, Science Question in Feminism* (Ithaca, N.Y.: Cornell University Press, 1991); Judy Wajcman, *Technofeminism* (Cambridge, UK ; Malden, MA: Polity, 2004); Hilary Rose, "Dreaming the Future." *Hypatia* 3, no. 1 (1988).

⁵⁵² Brian Easlea, "Patriarchy, Scientists, and Nuclear Warriors," in Janet A. Kourany, *The Gender* of Science (Upper Saddle River, NJ: Prentice Hall, 2002), 102-103. In his essay, Easlea cites many comments made by physicists over the years defining scientific skills as gendered masculine. One notable example from the mid-1980s was made by Noble laureate physicist, Isidore Rabi who said that "women were temperamentally unsuited to science" and that the female nervous system is "simply different...It makes it impossible for them to stay with the thing. I'm afraid there's no use quarrelling with it, that's the way it is."

formidable sources of power, including nuclear power, as a central theme. She saw in quantum physics, with its inherent uncertainty, a form of the magic and playfulness that she sought to reintroduce into contemporary society. By foregrounding the uncertain nature of particles, she, like Mumford, rejected the idea that science was inherently rational and objective, in contrast to magic and religion.⁵⁵³ For Aycock, modern physics, to which chance and probability were integral, represented a fundamental shift from a positivist world-view that Newtonian physics had engendered.

[Quantum mechanics] seemed to be an act of faith to me on some level. To believe in it. Because in order to believe in it you had to throw out pure experience, cause and effect, all of that and you had to posit something that seemed to be true, but you couldn't really verify it. I loved that leap of faith.⁵⁵⁴

Quantum theory suggested that nature is not absolute, as Newtonian physics states, but is contingent, and does not exist independently of the observer. Further, uncertainty is inherent in quantum physics: Heisenberg's Uncertainty Principle stipulates that both the precise location and momentum of a particle can never be observed simultaneously and therefore, measured simultaneously. Probabilistic equations must therefore be used in order to approximately determine the particle's location and momentum at the same time.

Influenced by her reading of Kuhn, her works are based on the premise that the dominance of science and scientific truths became ideological beliefs and, rather than

⁵⁵³ Mumford wrote, "There is no clean dividing line between the irrational and the super-rational; and the handling of these ambivalent gifts has always been a major human problem. One of the reasons that the current utilitarian interpretations of technics and science have been so shallow is that they ignore the fact that this aspect of human culture has been as open to both transcendental aspirations and demonic compulsions as any other part of man's existence—and has never been so open and so vulnerable as today." Mumford, *The Myth of the Machine*, 11.

⁵⁵⁴ Unpublished interview with the Artist, April 5, 2004, New York, NY.

remaining fixed and eternal, were subject to change in different contexts. The notion of paradigmatic shift in scientific world-views offered validation for Aycock's criticism of contemporary society as contingent. Many critics of the period, including Mumford, argued that modern society's priorities directly derived from its prevailing world-view, and linked its technologies to that world-view.⁵⁵⁵

Aycock's materials functioned as a pictorial device meant to conjure outmoded scientific theories in her work. Hobbs pointed out that the artist chose wood as her primary material in her works of the 1970s because it was affordable, readily available and easy to use, but he maintained that her choice was also a conscious evocation of proto- or early industrial building material, which evoked a "pre-scientific" world-view.⁵⁵⁶ In her works, the artist traveled back through history, evoking the central scientific and technological achievements of bygone eras, particularly medieval European and nineteenth century European and American society.

Aycock's interest in depicting numerous worlds may also derive from Jorges Luis Borges, whose work she read attentively.⁵⁵⁷ The artist's 1970 earthwork *Maze* (**fig**. 31),

⁵⁵⁶ Hobbs, 112. "Pre-scientific" here refers to the view, rejected by Mumford and Kuhn, as mentioned above, that the ruling principle of the Middle Ages was magic and/or religion.

⁵⁵⁵ Mumford noted a "radical transformation in the entire human environment" in the past century "largely as a result of the mathematical and physical sciences upon technology." Mumford, *The Myth of the Machine*, 3.

⁵⁵⁷ In interviews, Aycock frequently mentions the influence of Borges, who was well known for his metaphorical use of the labyrinth. See for example, Alice Aycock, "Progetti Per Il Mio Corpo-Labirinto, Palizzata E Costruzioni (Projects for My Body-Maze, Wooden Posts and Constructions)" *Lotus International* 17, no. 104 (1977), l. She also evoked Borges in a discussion about her work *Maze*. She said, "And what about Borges's reference to that 'one Greek labyrinth which is a single straight line...invisible and unceasing'? Hobbs, 82. Quoted from "Work 1972-1974," in Alan Sondheim, ed., *Individuals: Post-Movement Art in America*, (New York: E.P. Dutton, 1977), 104-121. I would argue that Borges's stories, particularly, "Garden of Forking

based in part on Borges's short story "Library of Babel," also bears comparison to another of Borges's fictional stories, "The Garden of Forking Paths," a connection noted by Hobbs.⁵⁵⁸ Borges's story illustrated the many-worlds interpretation of quantum physics, which suggested that different dimensions of space-time (alternate worlds) exist.⁵⁵⁹ The many-worlds theory assumed wave-particle duality. This means that sometimes a particle acts like a particle, and sometimes it acts like a wave. It depends upon how it is measured. Attempts to measure the position of a particle may be successful, but only at the expense of knowledge of its precise momentum. The more exactly a particle's position is measured, the less can be known about its momentum and vice versa. The wave function accounts for all possible positions of a particle in space and all possible momenta. But what happens to the *many possible* positions of a particle, once its exact momentum is determined? There are two known answers: the Copenhagen interpretation of quantum mechanics and the many-worlds interpretation. The manyworlds theory claims that once the exact momentum of a particle is measured, it has

Paths" published in 1964 had a strong influence on a number of artists in the late 1960s and early 1970s.

⁵⁵⁸ Hobbs asserted that Aycock's "understanding of mazes as elaborate and ingenious intellectual frameworks, whose beauty lies more in their complexity than in their clarity, was no doubt catalyzed by her reading of Jorge Luis Borges's stories," particularly, "The Garden of Forking Paths." Hobbs, 83-84. Hobbs claims that the maze motif was possibly adopted by artists (and by Aycock) to register the new social, political and artistic complexities of the period. I argue instead that, at least for Aycock, it represented a phenomenological search for the self. Hobbs has also discussed Borges's story "The Aleph," in which the protagonist finds a tear or window into the universe, which he maintains is an important interpretative framework for the artist. Hobbs, 151-154. See also Christine Filippone, "Alice Aycock" *Artists on the Edge: Douglass College and the Rutgers MFA* Edited by Ferris Olin. Intro. by Joan Marter, Mary H. Dana Women Artists Series. New Brunswick, NJ: Mabel Smith Douglass Library, Rutgers, The State University of New Jersey, March 9 - June 6, 2005), 7-8.

⁵⁵⁹ Borges wrote his story before the many-worlds theory was formulated in 1957, but he was very familiar with modern physics. See Donald A. Yates and James E. Irby, eds. *Jorge Luis Borges: Labyrinths & Other Writings*. Preface by Andre Maurois (New York: New Directions Publishing Corporation, 1964), x. See also Floyd Merrell, *Unthinking Thinking : Jorge Luis Borges, Mathematics, and the New Physics* (West Lafayette, Ind.: Purdue University Press, 1991).

many possible positions in space and *it occupies all of those positions*. In other words, all possible outcomes are obtained, *each in a different world*. Like "Library of Babel," "The Garden of Forking Paths" is a visual and conceptual metaphor for the search for meaning via an endless array of possible routes, however, the paths here are represented by countless timelines, consistent with the many-worlds theory. Hobbs quoted a portion of the story in which Borges wrote,

The Garden of Forking Paths" is a picture, incomplete yet not false, of the universe such as Ts'ui Pen conceived it to be. Differing from Newton and Schopenhauer your ancestor did not think of time as absolute and uniform. He believed in an infinite series of times, in a dizzily growing, ever spreading network of diverging, converging and parallel times. This web of time—the strands of which approach one another, bifurcate, intersect or ignore each other through the centuries—embraces every possibility.⁵⁶⁰

In the story, a learned and respected Chinese nobleman renounced his position as governor to construct a great labyrinth in which all men would become lost. He also purported to write an intricate novel. Presumed to have died before completing the labyrinth, the only tangible works to survive him were a series of chaotic manuscripts of inconsistent and circumlocutory narrative. In the preface to the first manuscript he had written, "I leave to the various futures (not to all) my garden of forking paths." ⁵⁶¹ The protagonist (his descendent) finally deduced that the nobleman's labyrinth was never intended to be a structure, rather, his manuscript *was* the labyrinth. The forking paths occurred in time, not in space. For example in the third chapter the hero dies, but in the

⁵⁶⁰ Hobbs, 84. Quoted from Jorge Luis Borges, *Ficciones*, ed. Anthony Kerrigan, trans. Emece Editores (New York: Grove Press, 1962), 100.

⁵⁶¹ Yates, Jorge Luis Borges: Labyrinths & Other Writings, 26.

fourth he is alive. The nobleman suggested that when confronted with many choices, we choose one, but do not necessarily eliminate the others.

Philosophically applied on the macrocosmic level, the story implies that every time we are faced with one or more courses of action, we in fact choose all, and the results of each choice unfold in a separate, parallel branch of space-time. Borges's story suggested we choose all futures simultaneously and move forward in each timeline, creating many diverse futures, which themselves fork and proliferate.⁵⁶² Similarly, Aycock permitted her viewer to select any path through her *Maze*. None is privileged over any other and each offered the participant a phenomenological path toward self-awareness and self-discovery. As Borges's Chinese nobleman moved along infinitely splitting paths, so Aycock led her viewer through many worlds of possibility in this and in subsequent works. The artist's practice of moving back in time, metaphorically reconstructing past worlds through her work, creates a conceptual shift in time and space, forcing the viewer to consider the difference between the past world and her own.

In her series of temporary works created for the Cranbrook Academy in Bloomfield Hills, Michigan, collectively titled *Project Entitled "On the Eve of the Industrial Revolution, a City Engaged in the Production of False Miracles,"* 1978, (**figs**. 53 and 54) Aycock compared the technologies of Medieval Europe to those of present day. For the project,

⁵⁶² Aycock did not admit to a conscious evocation of Many Worlds theory, but her admiration and reliance on Borges, who was well-versed in modern physics, is indisputable. See for example, Alice Aycock, "Progetti Per Il Mio Corpo-Labirinto, Palizzata E Costruzioni (Projects for My Body-Maze, Wooden Posts and Constructions)" *Lotus International* 17, no. 104 (1977) l.p.; Hobbs, 82-84. Unpublished interview with the Artist, April 5, 2004, New York, NY.

the artist sited five, wooden assemblage sculptures in a forested area along meandering trails that had been worn by frequent use. She justified the placement of the works, "These structures were located in terms of the existing system of "labyrinthian" paths..."⁵⁶³ Her sculptures were meant to interrupt passersby amid their travels around campus. Each work incorporated an aspect of shelter, a protective wall, plywood roof, or framework of planks.

Aycock's choice of material in these works was a purposeful means of evoking a past, "pre-scientific" world-view. Hobbs explained that she had relied on science historian A.C. Crombie's description of construction tools in that era. In the works *A Structure Called "An Explanation for the Rainbow,"* 1978 (**fig**. 53) and *"The Treadmill*, 1978 (**fig**. 54), Aycock evoked the forms of the spinning wheel and watermill illustrated by Crombie, using wood, the material appropriate to the period. She said, "I was searching for a kind of primitive image that would have all the power of what technology means, but also refer back in time."⁵⁶⁴ In his book *Medieval and Early Modern Science* (1963), Crombie described the technology of the early industrial period.

Until the end of the 18th century the most important material for machinery and construction generally was wood. Most of the parts of watermills and windmills, spinning wheels, looms, presses, ships and vehicles were of wood, and wood was used for geared wheels in much machinery as late as the 19th century... Wood, as Lewis Mumford has vividly pointed out, "provided the finger exercises for the new industrialism."⁵⁶⁵

⁵⁶³ Hobbs, 220.

⁵⁶⁴ Poirier, "The Ghost in the Machine," 83-84.

⁵⁶⁵ A.C. Crombie, *Medieval and Early Modern Science*. 2nd ed. (Cambridge, Mass.,: Harvard University Press, 1963), 209-213. Quoted in Hobbs, 112-113.

As Crombie's citation of Mumford, above, makes clear, wood provided the means of experimentation, or "finger exercises," with mechanical process that informed the great increases in energy production of the industrial revolution.⁵⁶⁶ Each of Aycock's works resembled temporary, ad hoc shelters or staging areas featuring obtrusive wooden, mechanical wheels. In the artist's written description of the two works, she indicated that they represented sites of theatrical medieval fairs where "the production of miracles drew large crowds" and where "jesters, clothiers, tumblers, walkers on stilts" functioned as cover for brutal executions.⁵⁶⁷

Four of the Cranbrook sculptures contained one or more circular forms resembling mechanical wheels. Aycock's forms and materials were consistent with Crombie's descriptions and reproductions of technology of the period. The wheel form in *The Treadmill* (**fig.** 54) appears capable of motion, of performing work. Crombie explained that the "initial stages of the industrial revolution were brought about by the power of... water and wind." He wrote further,

The great expansion of the use of watermills and windmills that took place during the later Middle Ages, in association with the growth of manufacturing, brought in an essentially new stage in mechanical technique. From this period must be dated that increasing mechanization of life and industry, based on the ever-increasing exploitation of new forms of mechanical power, which characterizes modern civilization.⁵⁶⁸

⁵⁶⁶ The increases in energy production was provided, for example, by the steam engine, whose capacity replaced that of water wheels and wind mills. Mumford had claimed that the roots of the industrial revolution could be found in the Middle Ages. See Lewis Mumford, *Technics and Civilization* (New York: Harcourt, Brace & World, 1963), 9.

⁵⁶⁷ Hobbs, 220, 221

⁵⁶⁸ Crombie, 196

Crombie reproduced drawings of watermills and windmills from 14th century sources (**fig. 55**) that bear striking resemblance to Aycock's. *The Treadmill* juxtaposed a watermill with an A-frame shelter, likely intended to protect its users from inclement weather while they worked, similar to the drawing of the watermill from the Luttrell Psalter (**fig.** 56) in Crombie's book. A similar A-frame shelter appears in the lower right-hand corner of the drawing of the water-driven silk mill (**fig.** 57), reproduced two pages later. The right half of the drawing reveals a water mill enclosed by a trough connected to a turning crank, which is sheltered by a sloped roof much like Aycock's.

The artist's seemingly fantastical work *A Structure Called "An Explanation for the Rainbow*," likely relies upon Crombie's historical discussion of the scientific "explanation of the rainbow," put forth by the Medieval German writer Theodoric of Freiberg (d. 1311) (**fig.** 58).⁵⁶⁹ Crombie asserted that Theodoric's theory on the refraction and reflection of light rays by individual raindrops is still accepted today and that his efforts to prove his theory were "an outstanding example of the use of the experimental method in the Middle Ages."⁵⁷⁰ Theodoric's drawings (**fig.** 59), reproduced by Crombie, bear comparison to the circular form in the artist's sculpture. The orthogonals inside the round enclosure in Aycock's work point northwest and southwest, just like those in Theodoric's drawing.

Aycock clarified in the text that accompanied the project that the organizing principle for the works was St. Bartholomew's Fair, an annual event established in the early 12th

⁵⁶⁹ Crombie, 110-112.

⁵⁷⁰ Crombie, 110

century to celebrate the saint's Feast day, where feats of skill and danger were performed as well as religious wonders. She wrote,

The site of the Fair was associated with the city playground, the city gallows, the Friday market, the burial ground of the "plague smitten." The Fair was also the site of tournaments and jousts...⁵⁷¹

In these works, the artist created machines used simultaneously for destruction, production and spectacle. Thus she associated her recreations of early technologies with amusements, war-games and burial grounds.⁵⁷² The earliest treadmills, for example, were powered by prisoners.⁵⁷³ In a talk in 1980, Aycock shared her intent for this project, "I tried to construct what I call a kind of false amusement park... I was trying to make a relationship between machines of torture and machines of pleasure and industrial machines."⁵⁷⁴ Drawing a parallel between the uses of technology in Medieval times to those of present-day, Aycock indicated that the products of the scientific world-view functioned similarly.

⁵⁷¹ Monroe A. Denton, Jr. *Alice Aycock: Projects and Proposal, 1971-1978* (Allentown, PA: The Center for the Arts, Muhlenberg College, 1978), 35.

⁵⁷² Hobbs explained that the artist connected *The Treadmill* with "machines, torture devices, sewing machines, and a wheel rocket ship." Hobbs, 226.

⁵⁷³ "The prison treadmill was invented in England in 1817 by Sir William Cubit, who observed prisoners lying around in idleness and put himself to the task of "reforming offenders by teaching them habits of industry." Oliver P. Hubbard, The Treadmill in America, 1887, pamphlet. Quoted in "Histories and Precedents," <u>http://www.uic.edu/aa/college/gallery400/notions/histories.htm</u>, (accessed February 9, 2008). The "Cosmic Treadmill," conceived in 1961, used atomic energy to enable comic book heroes Flash and Kid Flash to travel to the past and future. The Flash Archives, Vol. 4 (DC Archive Editions). Found in

http://www.amazon.com/review/product/1401207715?showViewpoints=1, (accessed February 9, 2008)

⁵⁷⁴ Alice Aycock, "Transcript from a Presentation," October 30, 1980, File 6, the Mary H. Dana Women Artist Series Files, Douglass Library, Rutgers University, New Brunswick, NJ.

Science and technology in the Middle Ages had been erroneously viewed by many as primitive compared to the classical past and the modern scientific age.⁵⁷⁵ The reason for the difference, many believed, was that the Medieval world-view was rooted in magic or religion rather than science.⁵⁷⁶ Thus, the stereotype suggested that the people of that era were incapable of advancing, of making technological progress, an assumption that Aycock's works belie.

Through these works, the artist subverted the widely-held notion that a culture that interprets the world through a framework of magic is incapable of technological progress.⁵⁷⁷ Medieval culture, she implied, produced its own scientific and technological "miracles," as indicated in her title for the series. More importantly, the conflicting purposes to which those technologies were put—destruction and spectacle--were not so different from current ones. Nuclear fission was employed to generate cheap electricity and to power atom bombs, both scientific and technological wonders in their way. Thus, Aycock's frequent use of the word "miracles" with respect to her work suggested that what constitutes a miracle versus a menace is contingent upon point-of-view. Like Kuhn, Aycock implied that science and technology were not neutral or value free, but instead

⁵⁷⁵ Mumford, among many others, objected to this view. Lewis Mumford, *The City in History: Its Origins, Its Transformations, and Its Prospects*, 1st ed. (New York,: Harcourt, 1961), 591. See also Kirby. *Engineering in History*, 95. Aycock uses the terms "Middle Ages" and "Medieval" times interchangeably to mark the period. See for example Alice Aycock, "Transcript from a Presentation," October 30, 1980.

⁵⁷⁶ Crombie, a science historian, anthropologist Claude Levi-Strauss and others had pointed to the errors in this conception by the 1960s. Claude Levi-Strauss, *The Savage Mind* (Chicago: University of Chicago Press, 1966). See also Mumford, *The Myth of the Machine*.

⁵⁷⁷ Interestingly, British science fiction writer Arthur C. Clarke famously commented in 1961, "Any sufficiently advanced technology is indistinguishable from magic." Arthur C. Clarke, *Profiles of the Future*, 1961.

imbued with the values of both the maker and the user. Aycock further discussed her works of this period,

...also, there's a correlation between the wheels of the universe and the wheels that resulted in the Machine Age, the Industrial Revolution... Right now I'm involved in false speculations, concocting various world-views—serving them up...⁵⁷⁸

The notion of "wheels of the universe," mentioned by Aycock, also bears comparison to Wilhelm Leibnitz's view that monads were essentially at the mercy of a God that winds the closed, clockwork cosmos. These works served to question the prominence of the scientific world view and to show that other systems of belief, such as those based in magic, were equally valid.⁵⁷⁹

Shortly after the Cranbrook sculptures, Aycock's focus shifted from Medieval times to the industrial revolution and the nineteenth century and, fittingly, her materials changed from wood to metal and other industrial materials. She also began to refer to outmoded nineteenth-century scientific theories in her work, and her prose, intended to accompany her visual works, became more lengthy and allusive. In a 1977 catalogue documenting her piece *Project Entitled "The Beginnings of a Complex*," the artist described a moment in time that for her represented a paradigm shift that occurred in the nineteenth century, a split from the Newtonian world-view, to the modern, indeterminate scientific-world-view

⁵⁷⁸ D.A.A. Journal. College of Design, Architecture, and Art, University of Cincinnati, OH, January, 1980.

⁵⁷⁹ Hobbs mentioned Kuhn in connection to Aycock's investigation of Medieval subjects writing the following, "In light of her interest in Kuhn's *Structure of Scientific Revolutions*, I should point out that this reference to electricity –one of many in her writings—is noteworthy because Kuhn used the prehistory of the paradigm of electricity throughout his book to explain the dynamics of scientific investigation and the competing claims of and often strange ideas that have been put forth in the name of science." Hobbs, 213.

based on quantum theory.⁵⁸⁰ In her essay, Aycock marked the point in history, the eve of World War I, when the ability of Newtonian physics to adequately explain the behavior of all natural forces lost credibility. She listed the discoveries that had gradually eroded the theory's preeminence.

...Michelson-Morley and the constancy of the speed of light; Einstein and his clock paradox; Max Planck and his quanta; Picasso and his Les Demoiselles d'Avignon, and poof! The stability of the Newtonian world is gone. A pity, it was all so hard won.⁵⁸¹

Notable in her comment is the word "stability" related to Newtonian mechanics, which was associated with absolutes, such as absolute time and absolute space. Absolute time suggests that time runs at the same rate for all observers in the universe. Similarly, absolute space can not be affected by any forces acting within it. Einstein's theories of special and general relativity, in which space and time are relative to one another, upended Newton's laws, which were later eroded by the contingency and indeterminacy connoted by quantum mechanics. While Newton's physics was still very much in use and the primacy of science during the Cold War was not in question, Aycock noted that the indeterminacy inherent in quantum physics held magical implications for her in that the path and position of a given particle could never be wholly verified.⁵⁸² Art historian

⁵⁸¹ Reprinted in Hobbs, 13. The artist's comments were a part of her sculptural installation *Beginnings of a Complex*, 1976-77. They were also printed in Alice Aycock, "For Granny (1881-) Whose Lamps Are Going Out: A Short Lecture on the Effects of Afterimages," *Tracks: A Journal of Artists' Writings* 3, no. 1 and 2 (1977): 141-45.

⁵⁸⁰ Hobbs was the first to note her interest in the concept of "paradigm shifts." He also explained that her interest in paradigm shifts was influenced by Kuhn. Hobbs, 13.

⁵⁸² Fineberg, *Alice Aycock's Impossibilism*, 41. Aycock commented in a recent interview, "I was brought up a Catholic and there was always this strong [dichotomy] between this magic thinking and science and I sort of aligned myself with science, but I was still interested in magic thinking and all religion to me is really magic. So I followed through on it. And quantum mechanics did have [this quality that] If I say so then such and such is so, and if that's so then such and such is

Jonathan Fineberg noted the mystical element for her was that subatomic events can not be seen, their presence only inferred by the traces left behind,⁵⁸³ a fact that led physicist Niels Bohr to famously comment, "Anyone who is not shocked by quantum theory has not understood it."⁵⁸⁴

Aycock's work *Hoodoo (Laura): Vertical and Horizontal Cross Section of the Ether Wind*, (from the series How to Catch and Manufacture Ghosts), 1981 (**fig**. 60, facing north), which connected quantum theory with the defunct theory of ether winds and with the ghost in the machine, represented the artist's answer to Marcel Duchamp's fantastical and meaning-laden machines.⁵⁸⁵ She has referred to the influence of Duchamp for her interest in both science and history.

I think the obvious mentor for something like this would be Duchamp who really had one foot in the Middle Ages and the other in quantum mechanics, and played very poetically with those ideas. I just attempt to deal with what is around me. I've always been very interested in history and I play with history. It's also necessary to play with science. ⁵⁸⁶

Aycock has described the metaphorical meaning of this sprawling network of industrial materials including copper, galvanized sheet metal, glass heating coils, incandescent light bulbs, iron, lead, neon and steel: for the artist, the word "Hoodoo" in *Hoodoo (Laura)* referred to the ether wind, a supernatural force, or ghostlike entity, which is processed by

⁵⁸⁴ John R. Gribbin, *In Search of Schroedinger's Cat : Quantum Physics and Reality* (Toronto ; New York: Bantam Books, 1984), 5. Quote found in "What is Quantum Physics?" <u>http://library.thinkquest.org/3487/qp.html</u> (accessed May 4, 2004).

so....well that's what they did during the Middle Ages... Quantum mechanics is a little like that." Unpublished Interview with the Artist, April 5, 2004, New York, NY.

⁵⁸³ Fineberg, Alice Aycock's Impossibilism, 41.

⁵⁸⁵ Hobbs claimed that *Hoodoo (Laura)* is Aycock's response to Duchamp's *The Large Glass*, which he analyzes at length. See Hobbs, 282.

⁵⁸⁶ *Complex Visions: Sculpture and Drawings by Alice Aycock*, Essay by Jonathan Fineberg (New York: Storm King Art Center, 1990), 17.

the motorized, hypnotically whirling turbine comprised of curved, metal strips in the center of the installation (fig. 60 and 61).⁵⁸⁷ The eight foot-high turbine rests on a base of four metal rods, from which extend two fifteen-foot long sheets of Plexiglas edged in steel that seem to intersect one another, forming an X, with the turbine at the center. The turbine is situated between a steel "electromagnetic" scaffold draped in black and pierced with five metal rings, on the left, (fig. 60) and the "ghost catcher," a ten foot-tall "ribbonlike arc of twisting, galvanized metal" on the right (fig. 60 and 62--facing east).⁵⁸⁸ Directly in front of the "ghost catcher," (facing northwest) is a scaffold of piping, draped with clear Plexiglas, extending from floor to ceiling. (fig. 63) Situated at the base of the piping are two arcs of neon, like the filament in a light bulb. The piping scaffold is connected to the turbine by a horizontal scaffold running along the floor. The horizontal scaffolding serves to visually connect the "ghost catcher" with a hammock-like net hanging close to the floor at the far, east side of the room. Against the wall behind the net are two sweeping arcs of metal connected at their ends to a long metal pipe resting about two-thirds of the way up the wall. In front of all these forms (fig. 60), and toward the southeast (right hand-side) of the room, are two black sheets of metal—one rising diagonally from the floor, the other hanging at a diagonal from the ceiling—both nearly converging at a right angle. They are connected to one another by eight intersecting vertical pipes, like teeth in a gaping mouth. Adjacent to these is a curved metal arc, about two feet wide, bifurcated by a pole that extends from floor to ceiling.

⁵⁸⁷ "Draft Text for a Didactic Panel." In *Curatorial Files, Los Angeles County Museum of Art.* Los Angeles, c. 1991, courtesy of Howard Fox, Chief Curator, Contemporary Art.

⁵⁸⁸ Alice Aycock, Hoodoo (Laura), accession #86233, In *Curatorial Files, Los Angeles County Museum of Art.* Los Angeles, c. 1991, courtesy of Howard Fox, Chief Curator, Contemporary Art.

Aycock explained how the work was meant to metaphorically function. The lumineferous ether is initially captured by the electromagnetic scaffold, draped in black and ringed with coils, standing to the left of the central spherical turbine (**fig**. 60). The scaffold then diverts the light, enveloped in its ether medium, to the gyrating turbine. The turbine then converts the ether to ghost-like energy and redirects it to the curved arms of the "ghost catcher," (**fig**. 62), which harnesses the vital plasma.⁵⁸⁹ The steel arc that represents the ghost catcher is strikingly similar to the undulating metal strips in her work of the same year, *The Miraculating Machine: The Charmed Circle*, 1981 (**fig**. 64), which, as Fineberg noted, was modeled on a circular particle accelerator, ⁵⁹⁰ like the one pictured here at Fermilab in Chicago built in the 1960s (**figs**. 65 & 66).⁵⁹¹ In 1976, physicists from the U.S., the Soviet Union and Europe announced a collaboration to build a "world machine," a particle accelerator thirty miles in circumference "that would dwarf any now in existence,"⁵⁹² which, I would argue, prompted Aycock to create her sculpture, *The Machine that Makes the World* (1979) (**fig**. 67) a structure that contained a wheel

⁵⁹⁰ Fineberg, *Alice Aycock's Impossibilism*, 41. Fineberg asserted that the *Charmed Circle* was modeled on a particle accelerator. He also implies, however, that it was modeled on a *linear* accelerator, which is unlikely because linear accelerators are straight, not curved. Fox has likened these forms to a cyclotron. *Metaphor: New Projects by Contemporary Sculptors*, essay by Howard Fox (Washington D.C.: Hirshhorn Museum and Sculpture Garden, Smithsonian Institute, 1982). Cyclotrons had been in use since the 1930s, but were not nearly as powerful as the circular accelerators invented in the 1950s, synchrotrons, which propel particles in rings using electromagnetic radiation and variable field magnets (rather than the fixed field magnets used in cyclotrons) to achieve greater momentum and speed and thus a more forceful collision. According to Hobbs, Aycock's work *Neutrino Ramps*, 1982 is an extrapolation of a diagram of the result of a neutrino being smashed by a proton. Hobbs, 304

⁵⁸⁹ Hobbs helpfully described how the work was meant to function. See Hobbs, 282. The LACMA files were also helpful in understanding the sculpture. "Draft Text for a Didactic Panel." In *Curatorial Files, Los Angeles County Museum of Art.* Los Angeles, c. 1991, courtesy of Howard Fox, Chief Curator, Contemporary Art.

⁵⁹¹A synchrotron was the first type of circular accelerator built at FermiLab (then named the National Accelerator Laboratory) in 1968-69. In 1983, The FermiLab accelerator was upgraded to a Tevatron, but continued to use the same circular pathway.

⁵⁹² Walter Sullivan, "Physicists Hoping to Build 30-Mile Atom Device to Explore Matter," *New York Times*, October 10 1976.

composed of three concentric rotating rings, echoing the storage rings, in which particle beams collide. The artist's choice of the word "Charmed" for the title of Miraculating Machine: The Charmed Circle (fig. 64) was not simply an off-hand reference to a beguiling technology.⁵⁹³ New York Times science writer Walter Sullivan explained that the purpose of the "world machine" was to search for the F meson, a particle formed of a "charmed" and a "strange" quark. He wrote, "Strangeness and Charm are special properties of some particles which appear to be conserved in particle interactions."⁵⁹⁴ The metaphorical meanings of specific forms in Aycock's installations, like the labyrinth for example, generally carry through to other works. It is likely then that the motif of the ghost catcher in *Hoodoo (Laura)* also refers to a particle accelerator. Hobbs pointed out that the artist's innovation in this work is that "she underscores the contemporary need to trap ghosts."⁵⁹⁵ "Ghosts" is a term commonly used in quantum physics to identify the many possible routes an electron could take. If Hobbs's assertion is true, then by referring to a particle accelerator as a technology meant to trap otherwise unhampered energy, nuclear technology became a means of capturing and controlling natural forces. While quantum theory connoted freedom and indeterminacy for the artist, 20th century technology still meant restriction and confinement. Hobbs claimed that the whirling orb represented Laura, a murdered character from a 1940s film whose absence haunts those

⁵⁹³ Fineberg, *Alice Aycock's Impossibilism*, 41. In 1980, New York *Times* science writer Walter Sullivan described planned accelerator experiments intended to determine whether neutrino particles indeed have mass. The article anticipated the result, "If this proves to be the case, it would mean that those *ghostlike particles* [italics mine] largely ignored in previous cosmologies, embody most of the matter and energy of the universe." Walter Sullivan, "Tests Expected to Throw Light On the Role of Neutrino Particles," *New York Times*, May 4, 1980. According to Hobbs, Aycock's work *Neutrino Ramps*, 1982 is an extrapolation of a diagram of the result of a neutrino being smashed by a proton. Hobbs, 304.

⁵⁹⁴ Sullivan, "Physicists Hoping to Build 30-Mile Atom Device to Explore Matter."

⁵⁹⁵ Hobbs, 282. Italics mine

she left behind.⁵⁹⁶ Thus Aycock's ghost-like machine is a female entity that allows energy to pass through it, while the ghost catcher, the particle accelerator, seeks to control it. Aycock commented in connection to this work, "Sometimes I visualize myself being not a human being, but more like a particle that can move through the wall..."⁵⁹⁷ Importantly, quantum physics allows for the tunneling of particles through walls, which would have been impossible in classical physics.⁵⁹⁸ Like a ghost who can walk through walls, uninhibited by the controls of technology, Aycock associates freedom of movement with the indeterminate, "free-floating" quantum particle and with the perpetually-blowing ether winds. Aycock's desire to move through space is, in my view, metaphorically contiguous with her desire to move through time in order to investigate other world-views.

Her interest in movement through time and space may also derive from the Copenhagen interpretation of quantum theory. Both Heisenberg's uncertainty principle and the Copenhagen interpretation put forth by Bohr, found popular expression in the U.S. by the 1960s. The Copenhagen interpretation of quantum physics assumes wave-particle duality, just as the many-worlds theory does. But unlike many-worlds, in which all possible outcomes occur in another world or timeline, the Copenhagen interpretation asserts that all other possibilities are eliminated-- once the measurement is made. Thus at the moment of calculation, the wave function "collapses," and that measurement is all that exists. At that instant something is known about the system. Definitive calculation

⁵⁹⁶ Hobbs, 277 and 282. The 1944 film *Laura* was directed by Otto Preminger and starred Gene Tierney as Laura.

⁵⁹⁷ Maurice Poirier, "The Ghost in the Machine," 83.

⁵⁹⁸ I am grateful to physicist Bradley Filippone for pointing out this important fact during his reading of this chapter.

was important to Bohr, because he believed it was meaningless to ascribe any properties or even existence to anything that had not been measured.⁵⁹⁹ Philosophically applied, the Copenhagen interpretation suggests that the past and future trajectory of a particle collapses at the moment it is quantified, the moment of realization.

This concept is illustrated in Borges's short story "The Aleph," which served as one of Hobbs's primary interpretative frameworks for Aycock's work.⁶⁰⁰ The Aleph in Borges's story was a tiny square inch of space that contained all pasts and all futures. The protagonist of the story, Borges himself, was given the unprecedented opportunity to observe the one and only Aleph, which existed in the basement of his acquaintance, Carlos Argentino Daneri, a man he did not trust. Lying vulnerable on the floor by the bottom step of Daneri's dark cellar, nearing a state of panic, Borges witnessed the phenomenon and achieved a moment of enlightenment. In the Aleph, he observed his own past and future along with those of everyone who has ever lived. Peering through this small hole in space, Borges saw all spaces and times converge.

⁵⁹⁹ Alastair I.M. Rae, Alastair, *Quantum Physics, Illusion or Reality?* (Cambridgeshire ; New York: Cambridge University Press, 1986), 50. Quote found in "What is Quantum Physics?" <u>http://library.thinkquest.org/3487/qp.html</u> (accessed May 4, 2004).

⁶⁰⁰ Aycock mentioned the importance of the Aleph to her work. See Grace Glueck, "A Sculptor of Encylopedic Imagery," *The New York Times*, August 15 1990. Hobbs argued that Borges's Aleph represented a tear in the universe, which he applied metaphorically to all of Aycock's work, suggesting that the tear represented a hole the artist punctured in dominant ideologies. Hobbs, 153. See also Christine Filippone, "Alice Aycock," in Joan Marter and Ferris Olin, eds., *Artists on the Edge: Douglass College and the Rutgers MFA*, Mary H. Dana Women Artists Series, (New Brunswick: Mabel Smith Douglass Library, Rutgers, The State University of New Jersey, March 9 - June 6, 2005), 9. While Borges did not claim to base his story of the Aleph on philosophical concepts arising from quantum physics, the writer was conversant with both relativity theory and quantum physics as pointed out by literary scholar, Andre Maurois, in his preface to the collection of Borges's work. See Jorge Luis Borges, *Labyrinths; Selected Stories & Other Writings*, Augmented ed, *New Directions Paperbook ; 186*. (New York,: New Directions Pub. Corp., 1964), x. In addition, scholar Floyd Merrell draws clear connections between physics and Borges's stories in Merrell, *Unthinking Thinking : Jorge Luis Borges, Mathematics, and the New Physics*.

The collapsing of time and space is present in many literary works of the period, for example, Frank Herbert's *Dune* examined the implications of this theory. Herbert's protagonist, the Kwisatz Haderach was a human possessed of special ability. He had the power to be all places at once, to envision all possible futures for humanity and simultaneously direct all human action. He was a human version of the Aleph, the fulcrum where past and present collapsed.

Like Herbert's Kwisatz Haderach and Borges's Aleph, Aycock's works like those comprising her series *Project Entitled "On the Eve of the Industrial Revolution, a City Engaged in the Production of False Miracles,"* 1978 and *Hoodoo (Laura)* moved effortlessly in time, metaphorically surveying the beliefs of other cultures. The artist commented in 1990,

I keep remembering the Borges story, "The Aleph," in which the narrator finds a tear in the universe that allowed him to see everything there was and is and will be. He is thus able to pull himself away from the 'now' by understanding what came before him, living in the world that is, and envisioning another one. I'd be happy if I could just find a tiny rip.⁶⁰¹

Works like *Hoodoo (Laura)* became the fulcrum for the past and present, functioning as a conduit of time travel, revealing mythic truths about the connections between past scientific and pseudo-scientific discoveries, the relationship between cultural understandings of what is rational and what is irrational, and how these understandings change over time. Aycock's machine works, collapsed present and past, evoking

⁶⁰¹ Grace Glueck, "A Sculptor of Encylopedic Imagery."

historical, scientific ideas and their resonance in the present. Aycock explained the thoughts that informed her works.

I was thinking about how these different world views are sufficient for the period in which they are, in the context in which they find themselves. And that no one is ever going to be the final. That ours was just as sufficient and as insufficient as any of the others. 602

Ayock's impulse before making *Hoodoo (Laura)*, to identify with a free-floating particle and with the subversive ghost in the machine, was as liberating as her preoccupation with movement through time. She described the appeal that such freedom held for her in a reference to the character N.N. who appeared frequently in her works.

The way he wanders through space and time and through history and through ideas in a naïve way is to me very attractive... He is a naïve seer who doesn't have boundaries. He is free the way most people aren't free.⁶⁰³

Through her work, Aycock occupied the role of naïve seer, peering intently through the Aleph at all pasts and futures, without boundaries. Aycock used concepts in quantum physics to undermine linear time and move fluidly back through history in order to reexamine, and reconceive, past assumptions as well as current ones. Powerful ideas that once held sway, like the ether winds, are always in danger of being replaced.⁶⁰⁴

Aycock's The Miraculating Machine in the Garden (Tower of the Winds), 1981 (fig. 68)

at Douglass Library, Rutgers University addressed the powerful, uncontrollable forces at

⁶⁰² Unpublished interview with the Artist, New York, 4 April 2004.

⁶⁰³ N.N. was a patient of Freudo-Marxist psychoanalyst and anthropologist, Gheza Roheim, who was diagnosed with schizophrenia. Poirier, "The Ghost in the Machine," 82.

⁶⁰⁴ The theory of ether winds was effectively disproved by the Michelson and Morley experiment in 1887, an event hailed as toppling a central tenet of Newtonian physics and instigating the second scientific revolution.

play in the creation of nuclear power, as well as the once formidable potency of the ether wind—noted in the work's title, *Tower of the Winds*.⁶⁰⁵ Made of steel, plexiglass, neon and piping, the work is a monument to the inadequacy of Newtonian physics and the now defunct nineteenth-century theory of the ether wind, then believed to be a medium for light waves. Once omnipresent truths in Western society, both had been struck a serious blow by the failure of Albert Michelson's and Isaac Morley's experiment of 1887 in which the scientists had set out to detect the movement of the ether wind and simultaneously prove the existence of absolute motion, an ill-fated law long upheld by Isaac Newton.⁶⁰⁶ The Tower of the Winds, which is metaphorically and futilely fueled by the once potent and pervasive ether wind, also bears comparison to the present-day creative and destructive purposes of nuclear power. Like Hoodoo (Laura), it is another fantastical machine (originally motorized) that has no practical function. The steel back of the sculpture, bulging with a gentle curve near the ground (fig. 69), adjoins two angled, slatted conveyor belts to form the basic structure (fig. 70), leaving one side of the sculpture open to view (fig. 71). The open end features a fuscia neon light in the form of an undulating wave near the top. A small glass box containing a spool of wire sits close to the ground (fig. 71). Near the box stands a long pole topped with another glass box, similar to an old fashioned street lamp. Two other, taller lamps with round globes slant

⁶⁰⁵ Poirier, 82. Hobbs also discussed the importance of nuclear power plants to her machine works, particularly *The Central Machine, The Machine that Makes the World,* and *How to Catch and Manufacture Ghosts*. Hobbs, 228.

⁶⁰⁶ Michelson and Morely's experiment famously failed to detect the ether it set out to measure, thus setting the stage for Einstein's Special Relativity eighteen years later, which finally disproved the existence of ether. Further, the most common interpretation of the Michelson and Morley experiment by the 1960s was that it had undermined Newtonian mechanics, which postulated the existence of absolute motion. While absolute motion was not predicted by Newton per se, it was predicted by Galilean mechanics, which Newton had adopted. I am grateful to Dr. Bradley Filippone, Professor of Physics, California Institute of Technology for his input on all aspects of physics and cosmology addressed in this chapter.

to the left and right of the machine. (fig. 72). Towering over all of these to the left is a type of electric pole supporting five U-shaped conductors (fig. 71). Avcock acknowledged that her machine works, with their eclectic array of industrial parts, are "almost a homage to industrial architecture."⁶⁰⁷ Art critic Maurice Poirier likened another of her works made at this time to a nuclear power plant or an oil refinery.⁶⁰⁸ Aycock mentioned a refinery like the one seen here (fig. 73), that fascinated her. "On the New Jersey Turnpike there is a Standard Oil refinery that I've looked at for years and always loved—especially at night with all the lights and smoke."⁶⁰⁹ However, the artist had a much more intimate knowledge of nuclear power plants, due to her father's occupation.⁶¹⁰ Aycock discussed his work, "He installed power plants, you know hydroelectric and all those kinds of things, generators and turbines and so, it was part of my visual environment and I was interested in addressing that."⁶¹¹ Further, the association to nuclear power plants would have had particular relevance to viewers less than two years after the partial melt-down at Three Mile Island, located near Harrisburg where she grew up. Hobbs asserted that the artist began making her machine works in response to the accident at Three Mile Island, which, he claimed, had a powerful effect on her personally as well as on her work.⁶¹² The artist recently commented on the influence that the accident had on her work of this period, perhaps downplaying its impact.

⁶⁰⁷ Poirier, 82

⁶⁰⁸ Poirier, 82. He referred to her sculpture *Collected Ghost Stories from the Workhouse*, 1980.

⁶⁰⁹ Poirier, 82

⁶¹⁰ Hobbs, 27.

⁶¹¹ Unpublished interview with the Artist, July 16, 2007, New York, NY

⁶¹² He said, "The potential dangers of Three Mile Island stimulated her to focus in yet a new way on the discredited prehistory of scientific beliefs and to find new means to manifest the mythos of the 'ghost in the machine' to symbolize the mysteries of subatomic particles, quantum mechanics, and electricity." Hobbs, 228.

All that Three Mile Island did for me was, all that early work was about a sense of fear, and adventure and danger, and that you had to go on this journey... because the world could be a fearsome place, and you had to overcome these things and all that Three Mile Island did is reinforce that, I think, in me. And it reinforced the notion that *at any moment a system can come and these forces of power and these forces that are mindless, that it's neither good nor bad, you just unleash these forces.*⁶¹³ [italics mine]

The artist's inadvertent connection between powerful forces of nuclear energy and the notion of a mindless system had particular relevance during the Cold War period, characterized as a closed, technological system "grinding on and on." Further, the preface of this work's title, Miraculating Machine is the same as that for The Miraculating Machine: The Charmed Circle (based on a particle accelerator), indicating that they are part of the same series. Favorable comparisons could be made to diagrams of nuclear plants (Note the formal qualities of the boiling water nuclear plant in figure 74, particularly the globe form at the top, and the wave symbols in this simple explanation of the function of a plant in figure 75), but her first-hand experience of these plants, through her father's work, inspired her paradoxical investigation of the particles within the machines as the root of destructive, technological force as well as the fanciful forces capable of escaping the rigid confinement of cause-and-effect logic.⁶¹⁴ The Miraculating Machine: The Charmed Circle and the Miraculating Machine in the Garden (Tower of the Winds) dealt with different aspects of nuclear power-- the defining energy source of the Cold War, which the artist deftly undermined in her fantastical, illfunctioning machines.

⁶¹³ Unpublished interview with the Artist, July 16, 2007, New York, NY.

⁶¹⁴ Fox noted that her machine works are "metaphors for cosmic forces." Fox, *Metaphor: New Projects by Contemporary Sculptors*. Hobbs also pointed to the positive and destructive aspect nuclear power held for the artist. Hobbs, 228.

Another important component of the *Miraculating Machine in the Garden* (**fig. 68**), as noted in the title, is the fact that it is situated in a low-walled sculpture garden. Sculpture gardens gained popularity in the nineteenth century as a means of escape from the tensions of industrialization. Aycock alluded to this period in her primary medium, steel, a material which revolutionized the development of technology and industrial production in the nineteenth century.⁶¹⁵ Historian Leo Marx noted that by the end of the nineteenth century, the garden came to be viewed with nostalgia as the machine dominated the landscape.⁶¹⁶ The unlikely juxtaposition of a non-functioning machine within a bucolic environment posed questions about the hopes engendered by technological discovery and common belief in progress arising in the nineteenth century. By situating a machine-like form within a space of repose and contemplation, Aycock disrupted the notion of the garden as haven.

For Aycock, the garden represented a space of freedom. In a recent interview, she discussed the importance of the garden as a separate space of liberatory exploration and contemplation, "My grandmother had a garden. It was a world. You could move on the paths and tell stories. It became a universe." ⁶¹⁷ According to utopian scholars Frank

⁶¹⁵ I refer to the Bessemer process patented in 1855, which allowed steel to be mass-produced relatively inexpensively.

⁶¹⁶Leo Marx, *The Machine in the Garden; Technology and the Pastoral Ideal in America* (New York,: Oxford University Press, 1964), 29. Marx's insightful study examined the historical economic relationship between the garden and the machine in American culture. He wrote, "But the striking fact is that again and again our writers have introduced the same overtones, depicting the machine as invading the peace of an enclosed space, a world set apart, or an area somehow made to evoke a feeling of encircled felicity. The setting may be an island, or a secluded valley in the mountains... Most important is the sense of the machine as a sudden shocking intruder upon a fantasy of idyllic satisfaction. It invariably is associated with crude, masculine aggressiveness in contrast with the tender, feminine, and submissive attitudes traditionally attached to the landscape."

⁶¹⁷ Brooke Kamin Rapaport, "Alice Aycock, Public Artist," *Sculpture* 22.10 (2003): 37.

and Fritzie Manuel, the garden has long been a potent symbol of utopia, a paradise on earth.⁶¹⁸ The Manuels explained that a mystical version of paradise developed from the Talmud and the Midrash and found greatest expression in the Kabbalah, a series of mystical interpretations of the Hebrew Bible. An important source for Borges as well as for Aycock, Hobbs noted Aycock's use of ancient kabbalistic emblems in a later drawing she titled, *The Dance Garden Containing Magic Diagrams*, 1988 (**fig**. 76).⁶¹⁹ The Zohar (The Book of Splendor), among the most important books of the Kabbalah, discussed the nature of God and the universe.⁶²⁰ In its first pages, "It identifies Adam and Eve as the father and mother and the Garden as Divine Radiance and Female Principle on earth."⁶²¹ Another kabbalic work, the Sefr-ha-Temunah, suggested that God created not one world, but many in succession, called Schemittas, which are cosmic cycles, each with its own beginning, middle and end. The Manuels asserted that the Sefer-ha-Temunah presented a paradise in the past and the future on a cosmic scale. Our world is the second Schemitta, of greatest suffering, but the final Schemitta is open to new possibilities and to constant transformation.⁶²² I suggest that Aycock was well aware of these utopian associations of the Garden of Eden from the Kabbalah when she created the *Miraculating Machine in the* Garden.

⁶¹⁸ Frank and Fritzie Manuel, *Utopian Thought in the Western World* (Belknap Press, 1979), 38-43. The Manuals explained that the first known paradisiacal garden, from Persian mythology, was surrounded by a wall made of a soft, sticky, morphous-like substance, evocative of a womb. Scholars generally agree that this is the likely source for the Judeo-Christian concept of the Garden of Paradise. The Hebrew word *pardes* (garden) is of Persian origin, and the Greek word for Garden of Eden is *paradeisos*. As early as the first century, the Gnostics suggested that the Garden of Eden was an allegory for the womb.

⁶¹⁹ Hobbs, 346. See also Fineberg, Alice Aycock's Impossibilism, 40.

⁶²⁰ Alice Aycock, *Retrospektive Der Projekte Und Ideen 1972-1983: Installation Und Zeichnungen.* (Stuttgart: Wurttembergischer Kunstverein, 1983).

 ⁶²¹ Manuel, 54. A section of the Zohar, called the "Rav Mithivtha," describes "a visionary journey through future paradise and a discourse... on the destinies of the soul in the other world."
⁶²² Manuel, 56.

In his discussion of *The Dance Garden Containing Magic Diagrams*, Hobbs explained that these emblems have been interpreted as magic signs capable of inducing invincibility.⁶²³ The inspiration for this drawing was a dream about dancing that Aycock related to a curator who wrote,

One night, the artist went out dancing, which since childhood she had always found exhilarating and liberating. When she got home she fell into a deep sleep, jet-lagged and exhausted. Aycock dreamt she was dancing across history and as the music changed as she moved through space in a time machine, changing centuries and world views from the Middle Ages to the 1930s of Fred Astaire.⁶²⁴

The notion of the garden as another world, a liberatory space threatened by modern technologies should be seen in comparison to the freedom that particles represented for the artist, as well as the freedom connoted by her metaphoric travel through time, evoking past worlds as if she, as she commented above, had "moved through space in a time machine."

Aycock's works placed the towering miracles of science and technology on shifting sand. She drew from contemporary sources of energy and power, including nuclear plants and nuclear accelerators, juxtaposing these scientific and technological wonders with ghostlike energy in the form of the ether wind. Her impotent machines highlight the transience of scientific beliefs, and the dangers of uncritically accepting the scientific world-view. But at the same time, the chance and uncertainty inherent in quantum theory

⁶²³ Hobbs, 346.

⁶²⁴ Hobbs, 346.

gave the artist permission to question absolutes, such as the dominance of the mechanistic, Newtonian world-view.

Cosmological Evolution in the Work of Agnes Denes

Denes applied a cosmological framework in addition to an integrative systems approach to her drawings, prints and ecological projects in the landscape in an effort to realize organized growth and positive transformation for a society she often described as flawed due to the destructive technologies it had created. She wrote:

Within the last 10,000 years, man has become the dominant life-form on the planet... But the power man gained through his proliferation and the technology he created has drastically altered the ecosystem of the earth.⁶²⁵

The theory of cosmological evolution gained credence in the mid-1960s with the acceptance among physicists of a theory for the origin of the universe—the big bang, according to which the universe originated in an explosion of matter and antimatter particles and has continued to expand ever since.⁶²⁶ The notion of ongoing process inherent in the theory informed Denes's practice of working in series, each work building upon the last, coupled with her accompanying narration. For example, the works and narration that comprise her *Pyramid Series* told the story of the evolution of civilization, from ill-fated ancient Egypt to present-day, and ended with a forecast for different futures. For the artist, cosmological evolution also encompassed biological evolution,

⁶²⁵ Agnes Denes, *The Book of Dust: The Beginning and Ending of Time and Thereafter* (Visual Studies Workshop Press, 1992), 6.

⁶²⁶ Cosmological evolution lent credence to Darwin's theory of biological evolution because it justified belief in a much older earth than that suggested in the Bible. Many scientists, therefore, broadened cosmological evolution to incorporate the origin and evolution of biological life. James E. McClellan and Harold Dorn, *Science and Technology in World History: An Introduction.* 2nd ed. (Baltimore: Johns Hopkins University Press, 2006), 6 and 376.

evident in her text *The Book of Dust: The Beginning and End of Time and Thereafter*, which traced the primordial beginnings of cosmic dust after the big bang through its galactic, chemical and biological iterations and its potential new beginnings after the "inevitable" heat death of the universe. Importantly, she left her reader room to hope for a "thereafter."⁶²⁷

Denes's forays in time examined other worlds past and future in order to thrust the failings of contemporary society into sharp relief. According to Denes, present-day society exhibited many of the same problems inherent in Egyptian society. Problems such as capitulation to systems of power, illustrated by Mumford's megamachine, were engendered by the use and abuse of technology and technological systems over centuries. By recalling the past civilization of ancient Egypt, Denes warned against the blind acceptance of absolute laws, and implicated contemporary society in a similar enslavement to the closed, technological imperatives that leave humanity oblivious to its effects on the environment. Importantly though, Denes's pyramids grew and evolved, developing the capability to awaken and free themselves from the technological "miracles" imposed by their human inhabitants. Some of these pyramids, called space stations, were thoroughly equipped with eco-technologies, which allowed them to live in perfect balance with their occupants. Similarly, the burial of the time capsule in *Rice*, Tree, Burial, 1977 (fig. 29) represented an expression of hope that future societies would overcome the problems of the present.

⁶²⁷ Denes, *Book of Dust*, 8.

Central to Denes's work is the concept of change. In a statement included in a 1974 exhibition catalogue she wrote, "Change is the fourth dimension, time is but a measuring device."⁶²⁸ The importance of change to the artist's work is derived in part from the notion of cosmological evolution, rooted in the big bang theory. First postulated in 1927 by the Belgian astrophysicist and Catholic priest George Lamaitre, the big bang theory asserted that the universe originated in an incredibly hot and dense explosion of matter and antimatter particles and has continued to expand ever since. Prior to the big bang, it was assumed that the universe existed in a static state, which precludes ongoing change. It was not until 1964 that the big bang theory was finally regarded as the best available theory for the origin and evolution of the cosmos.

The artist's interest in cosmological evolution was evident as early as 1970. She exhibited the work *The Big Bang—A Short Story of Man*, 1970 in Burnham's Software show. ⁶²⁹ In the catalogue for her 1992 retrospective at the Herbert F. Johnson Museum of Art at Cornell, the artist expanded upon the work,

This early computer animated cartoon depicts the birth of the universe, human evolution, the space age, future cities, the end of the Earth and the sun, the end of the universe, and a new Big Bang. Time is measured in astronomical constants, parsecs, megaparsecs, and light years.⁶³⁰

⁶²⁸ Corcoran Gallery of Art, *Agnes Denes : Perspectives : December 6-January 26, 1974-75* (Washington, D.C.: Corcoran Gallery of Art, 1975), n.p.

⁶²⁹ The Big Bang—A Short Story of Man was not included in the Software catalogue. Only Study of Distortions and Matrix of Knowledge & Trigonal Ballet, 1970 are listed and described. But the artist confirmed that The Big Bang—A Short Story of Man was in the Software show. Email conversation with the artist, January 20, 2008.

⁶³⁰ Denes, Hartz, *Agnes Denes*, 142. It is actually distance that is measured in parsecs and light-years, not time, as stated by the artist.

Her text above confirms her understanding of cosmological theory, along with the possibility of a future universe. Denes's interest in cosmology was also made evident in her text *The Book of Dust*, which she described as "a glance at the history and the future of the universe."⁶³¹ She discussed its concepts of change and process in her introduction,

Dust is the beginning and the end...All things in the universe—the galaxies, the planets and all matter—were made of dust and will one day become dust again before they begin another cycle of transformation...[This] book presents information and events that are in a constant state of flux while they reflect underlying processes whose transformation is eternal and predetermined.⁶³²

The artist's view of the theory was not limited to the cosmos, but also included atmospheric, geological, chemical and biological evolution, extrapolations that were not expressly made by physicists like Edwin Hubble, George Gamow and Robert Wilson whose discoveries were central to the establishment of the big bang theory. Further, she noted that the transformation of the universe was eternal, and the ongoing cycles of change were predetermined, which is reminiscent of Aycock's belief in the "wheels of the universe," and Leibnitz's clockmaker deity. The notions of a cyclical and predetermined universe had no verifiable basis in science. The scope of Denes's concerns, however, were mirrored by American astronomer Harlow Shapley.⁶³³ With decades of scientific credentials to support him (he served as director of the Harvard

⁶³¹ Denes, *The Book of Dust*, 6.

⁶³² Denes, *The Book of Dust*, 5. Here Denes takes a cyclic view of cosmological evolution, which was a possible result of one of two scenarios for the universe following the Big Bang. In the cyclic view, the universe would expand to an end point and then recede in a final implosion, a big crunch. Following the crunch, some suggested that the conditions that preceded the Big Bang could recur, resulting in another big bang and another universe. At other times in *The Book of Dust*, though, Denes mentions the "heat death" of the universe, which is the other possible scenario, the one discussed by Weiner, Bertalanffy and Robert Smithson. The heat death is the result of expansion until all matter and energy dissipates, at which point the universe would reach a temperature near absolute zero-- the *death* of *heat*.

⁶³³ Shapley was the first to prove with some accuracy, in 1918, that our galaxy is not heliocentric, that our sun is actually positioned on the fringe of the Milky Way.

College Observatory from 1921-1952), Shapley attempted to integrate cosmology and evolution, with a kind of pantheistic God pulling the strings.⁶³⁴ Shapley contended in a 1966 article in *Zygon*, a journal of religion and science, that there are four basic entities of the universe: space, time, energy and matter, to which, he argued, a fifth should be added: cosmic evolution.⁶³⁵ Metaphysical in comparison to the theory of cosmological evolution, and not scientifically verified, Shapley's cosmic evolution, inspired by proof of the expansion of the universe, encompassed biological, geological, atmospheric, stellar, and galactic evolution.⁶³⁶ In his article, entitled "Life, Hope and Cosmic Evolution," Shapley wrote,

We have in cosmic evolution a fundamental principle of growth that affects the chemical atoms as well as plants and animals, the stars and nebulae, space-time, mass energy. In brief, everything that we can name, everything material and non-material, is involved. It is around Cosmic Evolution that we might build philosophies and religions.⁶³⁷

Here, Shapley noted the "fundamental principle of growth" that encompasses animals, plants and stars as well as "space-time, mass and energy." He predicated his argument on the belief that the historical heliocentric view of the galaxy was the result of sheer human vanity, as was any anthropocentric religion or philosophy. Explaining that humankind occupies a small place in a vast universe, he proposed an expansion of the

⁶³⁴ Shapley helped organize the continuing Conference on Science, Philosophy and Religion, first held in 1940. James Burkhart Gilbert, *Redeeming Culture : American Religion in an Age of Science* (Chicago, IL: University of Chicago Press, 1997).

⁶³⁵ Harlow Shapley, "Life, Hope, and Cosmic Evolution" Zygon 1, no. 3 (1966).

⁶³⁶ Shapley, 277. Interestingly, the principles of cosmic evolution are consistent with the notions of growth and increased complexity inherent in open systems.

⁶³⁷ Shapley, 281.

notion of God from an entity that responds only to man to the notion that "All Nature is God and all God is Nature," essentially, "Nature is All."⁶³⁸

Denes's first ecological work, *Rice, Tree, Burial*, 1968 completed two years after Shapley published his article, also favors a broader, evolutionary view focused on nature, emphasizing the importance of growth and increased complexity, central to Shapley's cosmic evolution. The act of sowing the rice, the artist explained in 1979, "implied the source of growth" and "initiated the process, the setting of something into motion." This symbolic "event," a word the artist noted in quotes, was comprised of three acts: the sowing of rice, the chaining of trees and the burial of her haiku poetry.⁶³⁹ She defined "event" in terms strikingly similar to Shapely's,

According to evolutionary theories, Event is the only reality, while the reality we perceive is forever changing and transforming in an expanding evolutionary universe in which time, space, mass, and energy are all interconnected and interdependent.⁶⁴⁰

Here Denes noted the transformation of the evolutionary universe as well as the interdependence of time, space, mass and energy just as Shapely had. The artist used the first part of this quote, "According to evolutionary theories, Event is the only reality, while the reality we perceive is forever changing and transforming" in a statement written in 1973, to elucidate her drawing *Syzygy*—"*The Moment of*…", 1972-73 (**fig**. 77), which, according to the artist, represented "an abstract map of reality and a hypothetical center

⁶³⁸ Shapley, 279.

⁶³⁹ Denes, Hartz, *Agnes Denes*, 106. The catalogue in which the artist's statement was printed was published in 1992, but the artist indicated, with a copyright symbol, that the statement was written in 1979. The statement was likely written on the occasion of the reiteration of this work in 1979 at Artpark, Niagra Falls.

⁶⁴⁰ Denes, Hartz, Agnes Denes, 106.

of the universe. It forms a visual metaphor for the space/time continuum."⁶⁴¹ The word Syzygy, derived from Latin and Greek, signifies conjunction or unity. In the work, the artist typed the word Syzygy in capital letters in the center of a piece of graph paper and underlined it. Directly beneath, running down the center of the page in column-form, she typed in capital letters a list of thirty-one words beginning with "conjunction," "fusion," combination," "segregation" and "rejection..." About an inch and a half to the left of the string of words, and half-way down the column, she typed the phrase, "The Moment of:." Overtop all of the words she drew a series of sixty-five intersecting straight lines extending to all edges of the page. At nearly every point where the lines intersect, the artist placed a small dot or point, marking the convergence. The fact that the phrase "The Moment of:," followed by a colon, precedes the column of words suggests that the artist intended the viewer to conceive "The Moment of" "conjunction" or of "segregation." In addition, the definition of the artist's words listed in the column often oppose one another, implying that she sought to unite opposites in her drawing, encouraging the viewer to consider the moment of fusion as well as the moment of segregation. The artist explained that each point, designating the intersection of two or more lines, was intended to mark "a moment in which something important occurs called the Event." Here she defined "event" exactly as above, an every-changing reality" and later, as a "creative act." Her drawn dots, like her lines come into being as the result of her creative acts. Thus the conscious, creative act or moment is an "event."⁶⁴²

⁶⁴¹ Denes, Hartz, Agnes Denes, 28.

⁶⁴² Denes, Hartz, Agnes Denes, 28.

The word Syzygy is also a common term in astronomy referring to the alignment of three or more celestial bodies along a straight line. The artist explained that her points are metaphors for celestial bodies and her lines, which connect the points, extend to the ends of the universe with varying results. The destination of the lines depends upon the actual trajectory of the universe. The artist described the work.

In a real universe in which matter is not distributed evenly, there are variations in the curvature of space, and the lines would be deflected as they passed galaxies and stars. Instead of intersecting and returning, they could miss by millions of light years and continue their endless wandering, eventually filling all of space. If we assume that real space is open-ended, the extended lines would continue outward forever, making calculation impossible.⁶⁴³

On another sheet of graph paper to the right of the first (**fig**. 78), Denes duplicated the points exactly, but eliminated the lines and words. She represented only the framework of celestial bodies as if these, by themselves, encompassed the lines, words and all of their meanings. The artist described this framework, "What remains is a starry night, a star map, afterimages blinking like fireflies, events of eons ago and yet to be known."⁶⁴⁴ The points are the fragments left when the lines extend or dissipate in the entropic end of cosmological evolution, representing an intact, momentary framework of an everchanging universe.

In *The Book of Dust*, the artist devoted a chapter to "Cosmic Evolution" in which she created a diagram containing a series of chemical equation for the transformation of inorganic carbon compounds to proteins and then to life, intended, according to the artist, to indicate the possible chemical process by which inanimate, inorganic carbon

⁶⁴³ Denes, Hartz, Agnes Denes, 28.

⁶⁴⁴ Denes, Hartz, Agnes Denes, 28.
compounds, existing in the "early prebiotic days of earth," may have spontaneously produced the "organic materials" of life.⁶⁴⁵ The diagram depicts a series of chemical equations Similarly, Shapley encompassed the logical progression from the inanimate to the animate. He wrote,

Through chemical ties, we are kin of the glacial boulders and the thunderclouds, and close cousins of the fossil plants and beasts that in times past took a try, as also do we, at biological existence and persistence....Cosmic Evolution naturally takes care of such matters as the origin of life. The progression is clear and rational throughout the whole course-atoms to stars to cells to man.⁶⁴⁶

As he noted, Shapley's cosmic evolution encompassed the "origin of life" from atoms to fossils to humankind. The scientist's concept of evolutionary change was so pervasive that he did not even believe that the laws of nature, or evolution itself would remain static, proclaiming, "Even evolution itself evolves."⁶⁴⁷

Denes's seventeen-foot-wide monoprint *Introspection I—Evolution*, 1968-71 (**fig**. 79), diagrammatically depicting the transformation of early man from ape to present day, also traced the origins of life. Beginning with comparisons between human and ape skeletons, brains and hands, she tracked changes in the human skull, fetus and musculature. Her diagrams were based on etchings used to illustrate old medical and engineering books, which she either traced or drew herself in the same style.⁶⁴⁸ These are interspersed with her writing and with small geometric symbols representing her philosophical triangulations. She revealed that the work represented her desire to explore a subject on

⁶⁴⁵ Denes, *The Book of Dust*, 32.

⁶⁴⁶ Shapley, 281.

⁶⁴⁷ Shapley, 277

⁶⁴⁸ Ronny H. Cohen, "Agnes Denes: Triumph of the Will," *Print Collector's Newsletter*, 13, no. 5 (1982): 159.

an encyclopedic scale, and thus she chose to present the full sequential evolution of humankind, as discussed by Shapley, from fossil to human being ⁶⁴⁹

Shapley cautioned against a view that favored humans in the evolutionary scheme explaining that more advanced forms of life may exist elsewhere in the universe, but he did favor intellect as an advanced evolutionary trait. He wrote,

We cannot draw a sharp boundary that separates man from fellow animal. Certainly we humans developed from simpler, less thoughtful organic forms...Perhaps we are on the way to the establishment of a Psychozoic Kingdom, where brain overshadows brawn.⁶⁵⁰

Shapley argued that intelligence, regardless of who or what possessed it, may represent an advanced evolutionary trait. Similarly, Denes believed that intelligence was the ultimate achievement in evolution. Her own efforts to apply her intellect to heretofore unsolved problems that spanned the disciplines of science, philosophy and art grew from her belief that creativity, intellect and artistic instinct could engender powerful new ideas and ultimately, inspire change.⁶⁵¹ She claimed, "Finally, the greatest product of order, intelligence, could become a factor in our universe that may one day challenge its most fundamental laws."⁶⁵² The artist believed that by applying her own intellect and intuition, she could play a role in the creation of a new society by putting science to the service of creative artistic vision.

Despite the notable similarities between Denes's and Spaley's notions of cosmological (or cosmic) evolution, Denes's concerns with the "Event" and with "process" spring

⁶⁴⁹ Cohen, 159.

⁶⁵⁰ Shapley, 284.

⁶⁵¹ Agnes Denes, "Dialectic Triangulation: A Visual Philosophy," (Artist's Statement) 1969, Corcoran Gallery of Art, *Agnes Denes, Perspectives*, n.p.

⁶⁵² Denes, *The Book of Dust*, 14.

more clearly from the metaphysical cosmology of British mathematician, logician and philosopher Alfred North Whitehead, whom Shapley knew personally, and whom Belgrad has noted, had a significant impact on the art world in the mid-twentieth century.⁶⁵³ In his book *Process and Reality: An Essay in Cosmology* (1929), Whitehead postulated that process rather than matter should be considered the fundamental ingredient of the universe and that reality consisted only of process.⁶⁵⁴ For him, the cosmos was nothing more than energy drifting through space and time.⁶⁵⁵ He defined event as an "actual occasion" or an "actual entity" in the process of becoming. He was concerned with "the becoming, the being, and the relatedness of 'actual entities," and put forth that all matter should be understood as a series of events and processes in relation to one another.⁶⁵⁶ He wrote, in seeming anticipation of Bertalanffy's open systems, "actual entities are drops of experience, complex and interdependent."⁶⁵⁷ Time and change were central categories of metaphysical understanding, and evolution was the paradigmatic concept on which his philosophy was based.⁶⁵⁸ Whitehead's Adventures and Ideas, which contained a chapter called Cosmologies, was reissued in 1954. Historian Daniel Belgrad asserted that in this book, Whitehead proposed a "topological definition of space," in

⁶⁵³ Daniel Belgrad, *The Culture of Spontaneity: Improvisation and the Arts in Postwar America* (Chicago; London: University of Chicago Press, 1998), 113-114. Belgrad argued that Whitehead's cosmology was an important influence for the development of gesture-field painting and collage by the post-war American avant-garde including Lee Krasner and Robert Motherwell. ⁶⁵⁴ Whitehead and Shapley were at Harvard together from 1924-1937, which was the extent of Whitehead's tenure there. Shapley introduced Whitehead to the American Academy in 1941. See Papers of Harlow Shapley, 1906-1966: An Inventory, Harvard University Archives, <u>http://oasis.lib.harvard.edu/oasis/deliver/~hua03998</u> (accessed February 13, 2008)

⁶⁵⁵ Belgrad, *The Culture of Spontaneity*, 126.

⁶⁵⁶ Alfred North Whitehead, *Process and Reality, an Essay in Cosmology*; Gifford Lectures Delivered in the University of Edinburgh During the Session 1927-28 (New York; Cambridge, England: The Macmillan Company; University Press, 1929), viii.

⁶⁵⁷ Whitehead, Process and Reality, an Essay in Cosmology, 24.

⁶⁵⁸ Joachim Klose, "Process Ontology from Whitehead to Quantum Physics," Unpublished article, 1-21. Dresden, 2007, <u>www.solid.ethz.ch/pauli-conference/material/Whithead QM Klose.pdf</u> (accessed February 1, 2008).

which "points and lines are loci...with duration in time."⁶⁵⁹ The philosopher's topological space recalls the lines and points in Denes's work *Syzrgy*, which represent creative moments in time.

Professor of philosophy of science at the University College London in the early 1920s, Whitehead was well aware of modern physics and relied on Einstein's theory of relativity to develop his metaphysical system, which came to be known as process philosophy. He used relativity theory to argue against the concept of universals of any kind, explaining that relativity, was "the basis of [my] metaphysical system..."⁶⁶⁰ Belgrad has called Whitehead's metaphysics the "energy field" model of human society, in which the individual is simply an organized event passing through the flux of energy in spacetime.⁶⁶¹

In 1980, Denes was commissioned by the Container Corporation of America to create a series of works for its *Great Ideas* series, for which she incorporated the writing of Whitehead.⁶⁶² Begun in 1950, the intention of the series was to combine modern art with ideas, in the form of quotes by famous writers, scientists and other thinkers. Typically, the company's curator would present an artist with a quote intended to inspire a new work of art. Denes rejected more than thirty quotes offered by curator John Massey

⁶⁵⁹ Belgrad, 125

⁶⁶⁰ Whitehead, Process and Reality, an Essay in Cosmology, 66.

⁶⁶¹ Belgrad, 11.

⁶⁶² Container Corporation, news release, n.d. Agnes Denes curatorial file, Smithsonian American Art Museum, Washington, DC.

including statements by John Locke, Theodore Roosevelt and Alden Whitman.⁶⁶³ She informed the curator that she, herself, wrote and would prefer to submit her own words. She said, "I couldn't understand why I had to relate myself to somebody else's thoughts, you know? I found that a constriction."⁶⁶⁴ Finally, the curator allowed her to create her own statement (**fig**. 80) which read,

Evolution provides answers to where we are going; a future prediction based on previous phenomena. The universe contains systems, systems contain patterns. The purpose of the mind is to locate these patterns and to seek the inherent potential for new systems of thought and behavior.⁶⁶⁵

Perhaps Massey deduced that Whitehead was a source for Denes's commitment to evolution, because he then kindly asked the artist to approve a famous quote in order to remain consistent with the company's program. He presented her with one by Alfred North Whitehead that read "The vitality of thought is in adventure. Ideas won't keep. Something must be done with them." The artist accepted without hesitation. After rejecting numerous quotes, she finally settled on one by Alfred North Whitehead, whose metaphysical system bore such a close relationship to her work and writing. She described her work in a 1978 lecture, "My art exists in a dynamic, evolutionary world where objects are processes and forms are dynamic patterns, where measures and concepts are relative and reality itself is forever changing."⁶⁶⁶ Like Whitehead, Denes also resisted the notion of universals and fixed particulars represented by Newtonian

⁶⁶³ Unpublished Interview with Martina R. Norelli Regarding Denes's Commission for Container Corporation, New York, NY, January 31, 1985, Agnes Denes curatorial file, Smithsonian American Art Museum, Washington, DC.

⁶⁶⁴ Unpublished Interview with Martina R. Norelli, New York, NY, January 31, 1985.

⁶⁶⁵ Unpublished Interview with Martina R. Norelli, New York, NY, January 31, 1985.

⁶⁶⁶ Excerpted from Agnes Denes, "Evolution and the Creative Mind," a lecture first delivered at the Smithsonian Institution, Washington, D.C., 1976, Copyright Agnes Denes, 1978, Agnes Denes curatorial files, Smithsonian American Art Museum, Washington, DC.

physics in favor of Einstein's relativity. And like both Whitehead and Shapley, she believed that even the laws of nature were not static. She wrote,

Once we abandon Newtonian static physics and accept Einstein's four-dimensional principles of relativity, we question reality and know that even the laws of nature may undergo evolutionary changes.⁶⁶⁷

Implicit in the notion of evolutionary change for Denes, Shapley and Whitehead, was a belief in progress or improvement over time. The concept of positive evolutionary progress was certainly not integral to cosmological evolution, for which evolution meant only continual change, nor was progress a stated component of Darwin's evolutionary theory. The notion of evolutionary progress arose in the 19th century in the social Darwinism of Herbert Spencer, which relied on Darwin's concept of natural selection to postulate that only those that proved fittest over time survived and thrived.⁶⁶⁸ The artist's belief in the inevitability of change was consistent with contemporary theories in physics, but her belief in progressive change over time, marked a distinct departure from cosmological evolution. Shapley's cosmic evolution, Whitehead's metaphysical cosmology and Bertalanffy's notion of open systems, however, all suggest increased growth and complexity over time, and all likely served to inspire the overarching framework for the artist's work. The concept of change inherent in cosmological evolution coupled with a yearning for the improvement of social life inspired her to criticize societies past and present while maintaining hope for an improved future.

⁶⁶⁷ Excerpted from Agnes Denes, "Evolution and the Creative Mind," a lecture first delivered at the Smithsonian Institution, Washington, D.C., 1976.

⁶⁶⁸ Interestingly, Spencer believed in a form of cosmic evolution, arguing that evolutionary processes applied to stars and galaxies as well as biological life and that these became more complex and differentiated over time.

Denes's *Pyramid Series* is a collection of works created from the early 1970s to the late 1980s that individually represent worlds or civilizations in various stages of cosmological evolution. In her 1992 catalogue, the artist wove together her descriptions of the works, written over the course of the prior two decades, into a meta-narrative that told the tale of the evolution of the pyramid, a metaphor for our own world, from the absolutist Egyptian age to an indeterminate but hopeful future.⁶⁶⁹ The artist also called this series *Stations of the Pyramids*, evoking the Christian devotional practice, Stations of the Cross, which usually begins with Christ's trial, includes his death on the cross, and ends with his resurrection into heaven. Dene's pyramids undergo a similar journey, which follows.

Denes's early pyramids like *Pascal's Triangle II: A Study of Unpredictability*, 1973 (**fig**. 43) were visual manifestations of mathematician Blaise Pascal's probability theory and were comprised of series of numbers or binomial coefficients, which the artist then replaced, in later works in the series, with small, perfectly shaped blocks resembling ashlar masonry. Denes characterized this transition as an effort to peel away appearances and assumptions and to allow "elusive processes to emerge."⁶⁷⁰ In her drawing on graph paper *4,000 B.C.*, 1973 (**fig**. 81), one of the first to include representations of masonry, the artist depicted the three great pyramids of Gizeh, Egypt, closely resembling the actual pyramids of Menkuare, Khafre and Khufu in both dimension and proximity to one another, and a smaller queen's pyramid in the left foreground. (**fig**.82) To the right of the pyramids and in the far right of the drawing is a column of algebraic equations. Above and below the pyramids are tiny geometric diagrams, mostly equilateral triangles,

⁶⁶⁹ The artist began her *Pyramid Series* in the early 1970s, probably as a conceptual and formal outgrowth of her philosophical dialectic triangulations.

⁶⁷⁰ Denes, Hartz, Agnes Denes, 32.

representing scientific and philosophical relationships. In the upper left corner of the drawing, is a triangle. The artist assigned to the three points of this triangle the names of the three atomic particles, "proton, neutron and electron." In the upper right corner of the drawing there are nine triangles, five of which are on the left side of a short diagonal line, which points to the tip of Khufu's pyramid on one end, and toward the upper right-hand corner of the page on the other end. On the left side of this line, the artist wrote the words "changelessness-static." On the right side of the line she wrote "evolution-fluxvariation." Of the five triangles on the left side of the line, the side designated "changelessness - static," only two of the three points of each triangle have a textual designation. These include: "life, death," "river, sun," "moral virtue, immortality." The third point of each triangle was designated with a question mark. The four triangles on the right side of the line, marked "evolution-flux-variation," have textual designations including, "law, theory and hypothesis," "conflict, survival, harmony," "will, effort, mind." Denes described the drawing as a juxtaposition of ancient Egypt and present-day civilization, with the pyramids representing the unwavering permanence and dualistic simplicity of the ancient society, while the diagrams of triangulating logic refer to the increased complexities of contemporary society. The artist interpreted the drawing as follows.

4,000 B.C.... confronts two civilizations, contrasting and drawing analogies between us and the ancient Egyptians whose structures were heavy and ever-lasting, their thinking "dichotomous." They tended to think in two absolutes, choices limited to two, and a static world view. In contrast, with more advances in science and technology, we seem to have tendencies toward a more "trichotomous" approach to life, culminating in an evolutionary world view and complex theories.⁶⁷¹

⁶⁷¹ Denes, Hartz, Agnes Denes, 32.

The artist's claim that humankind has evolved progressively into a more dynamic and complex society due to its "advances in science and technology" indicated a distinctively positive improvement over the binary thinking of ages past—a notion consistent with her view of cosmic evolution. Importantly though, the artist believed that evolutionary progress could be inhibited by technology. The artist continued.

Trichotomy, the division into threes, here refers to the building of more complex systems or the breaking down into more intricate divisions, which does not necessarily mean that we are smarter, only more complex. We believe in change and evolution and have tampered with our destiny. Did they as well? Do civilizations that transcend themselves die out? The Egyptians did.⁶⁷²

The artist suggests that despite the fact that we believe in "change" and "evolution," we have "tampered with our destiny," through our abuse of science and technology. Thus the artist indicates we are more complex, but not smarter—a characteristic she associates with evolutionary advancement. Denes implied that the Egyptians transcended themselves by successfully fulfilling the technological "miracle" of building the pyramids, but in spite of that accomplishment, they "died out." Or perhaps, *because of* that accomplishment they met their demise. Was the building of the pyramids an outright cause or merely a symbol of their impending doom? I suggest that for the artist, it was both. The fact of transcendence, through technological feats implemented for power, glory or short-sighted self-interest, was self-destructive. This work and its attendant narrative suggest that the artist sought to warn her viewers that they were hastening our their end.

⁶⁷² Denes, Hartz, Agnes Denes, 32.

Denes's *Pascal's Perfect Probability Pyramid and the People Paradox—The Predicament,* 1980 (**fig.** 44) brought the viewer to present day. Like the workers in Mumford's Egyptian megamachine, these figures are slaves to a system they can not comprehend. The 16,000 individuals that comprise the pyramid are unwittingly trapped by it. Unlike the severe, solid pyramidal forms in the drawing *4,000 B.C.*, this pyramid is slender and precarious, with fine, slightly curved lines exemplifying the uncertainty of survival. The technological advances of this civilization, the artist pointed out, have "interfered with [its] own evolution."⁶⁷³ The power structure of this megamachine is kept firm by systems of control so insidiously entrenched in the minds of the citizens that they can not, at first, conceive of breaking away.

Eventually though, the delicate balance maintained in *Pascal's Perfect Probability Pyramid and the People Paradox—The Predicament*, 1980 is disrupted, "tampered with," in subsequent works like *Magic Mountain II*, 1985 (**fig**. 83) by the "complicated technological miracles" the individuals employ.⁶⁷⁴ In this work, the topography of the two, overlapping cone-shaped mountains rising to slender peaks is determined by a series of undulating lines comprised of solitary figures, as in *The Predicament*. The lines here, though, are more fragile and the figures comprising the right flank of the right-hand pyramid begin to separate from the constrictive form and congregate on the lower right-hand side. These individuals dissemble and break away, forming small, interactive groups. They are free from the imposing structure (**fig. 84**). But their freedom, as we shall see, is illusory, the artist claimed, for each individual is forever limited, "bound by a

⁶⁷³ Denes, Hartz, Agnes Denes, 34

⁶⁷⁴ Denes, Hartz, Agnes Denes, 34.

skin container separating it from the others and from the rest of the world, creating a subjective self-state with a trapped consciousness and a fixed perspective from within." Denes explained that the figures seem "unaware that by breaking away the landscape will disintegrate." ⁶⁷⁵ Like cells they are separate, but inextricably linked to the society and the ecology that bind them.

The result of their new found independence is, at first, chaos, the artist explains. The figures are swept away in a whirling vortex of their own creation. As a solution, they build the *Tower of Babel*, 1983 (**fig. 85** a) in which the fractured society is redesigned "with state-of-the-art technology." This curving, pyramidal form is once again comprised of material, rather than individuals, but the blocks are sleek, not rough, and they are stacked in a dynamic, upwardly spiraling pattern that bulges outward toward the top, before turning inward to a fine, tenuous point at the apex. Denes's *Tower of Babel*, an ancient symbol of confusion, is thus the product of new technologies that the inhabitants employ out of fear for their survival. Predictably then, the tower is weakened and becomes a symbolic remnant of itself manifested in *Tower of Babel—The Shadow*, 1983 (**fig.** 85 b). Possessing the same peripheral shape as its predecessor, the structural lines that form the individual blocks in this work have disintegrated, leaving only skeletal remains. Without substance or integrity, this tower can no longer support its inhabitants, and becomes "the poetry of its architecture."⁶⁷⁶

⁶⁷⁵ Denes, Hartz, Agnes Denes, 34.

⁶⁷⁶ Denes, Hartz, Agnes Denes, 34.

As a result of the dissolution of their society, the individuals are in danger and worse, the entire species is at risk, but they press on. Despite their haplessness, they become *Master Builders* seeking self-perpetuation through perfection, creating "the best ruins yet." They build "perfect pyramids" to populate an increasingly perfected *City of Fools: Model for a Flawless Ruin, 1986* (image unavailable) "for future generations to ponder and be filled with awe."⁶⁷⁷ As the city becomes more complex, it grows more fragile and subject to disruptions in its equilibrium, teetering toward entropy. The builders remain unaware of their dependence on the metropolis that sustains them, which now boasts myriad new monuments. The artist described the Citadel of Pride, near the *City of Fools*, highlighting its most noteworthy sites and cherished holdings,

The Archives of Human Values, which is deteriorating, faces the *Pillars of Assumptions*, inscribed by the elders, and the *Temple of Narcissism*, a cave of reflecting crystals. The *Boulevard of Skills* crosses *Terror Park*, and just below it lies the *Avenue of Intentions* leading to *Power Drive* and *Error Lane*. The major square in the center of town is called *Common Ground*, which is used for interrogations, punishments, dedications, and celebrations—often simultaneously.⁶⁷⁸

Reminiscent of Aycock's theatrical Medieval machines, Denes indicated the paradox of humanity's earnest efforts to create a harmonious community using skills and good intentions to build a common ground for all citizens, and simultaneously, the dangerous, self-defeating results of narcissism, self-interest and ineptitude.

The Pillars of Assumptions are inscribed by the city's elders. They are comprised of strong beliefs and "wisdom" meant to be passed along to future generations. The practice

⁶⁷⁷ Denes, Hartz, Agnes Denes, 34.

⁶⁷⁸ Denes, Hartz, Agnes Denes, 34.

of passing on ideologies accepted uncritically, Denes warned, serves to perpetuate them. She further described the city,

Plaques are everywhere, honoring physical excellence and training, accuracy and speed... [The Master Builders] take great pride in their accomplishments and in their *Perfect Pyramids*. The inhabitants tend to their young with great affection but cannot help contaminating them, so that each new generation grows up with more or less the same propensities and parameters. Thus misconceptions are nurtured and propagated until they are totally ingrained in their culture. Everything repeats itself endlessly. They are trying to find some use for the elderly because they are embarrassed by them, reminded of their own frailty.⁶⁷⁹

The City of Fools is a damning commentary on contemporary American society, which the artist depicted as incessantly building newer and better monuments with "state-of-theart technology," but with little regard for the future of its occupants or for the environment imperiled in the process. Denes presented her viewer with a visual and literary other-world that subversively criticized her own in a feminist utopian strategy of estrangement. *The City of Fools* is American Cold War society, and as the penultimate stage in Denes's *Stations of the Pyramids*, it is offered as a metaphor for Christ's death and entombment.

The *Stations of the Pyramids*, though, are not complete. Just as Christ emerged from his tomb and rose to heaven, so the artist depicts the resurrection of the pyramids, which finally shed their chains in search of a better existence. In the artist's series *Restless Pyramids*, the environment itself awakens. Denes wrote,

All the *Restless Pyramids* are related and they are born *When the Pyramids Awaken*. Realizing they are organic forms, the pyramids lose their rigidity and stillness, begin to stretch and sway, as they break loose from the tyranny of being built...⁶⁸⁰

⁶⁷⁹ Denes, Hartz, Agnes Denes, 34.

⁶⁸⁰ Denes, Hartz, Agnes Denes, 35.

Not only are Denes's *Restless Pyramids* freed from their bonds, but like Christ's ascension into heaven, these other, future worlds *propel themselves*. Newly empowered they "unglue their units" ridding themselves of the programs "that bind their cell structure." The evolutionary change is deep and complete as the pyramids, which had been bound to roles determined by others, finally liberate themselves. *When the Pyramid Awakens—Study for Environmental Sculpture*, 1983 (**fig**. 46), epitomizes dynamic self-propulsion as its base twists in a muscular curve and its finely attenuated tip spirals upward from the momentum, like a tree uprooting itself. The artist revealed that "the *Restless Pyramids* become flexible to take on dynamic forms of their own choosing. At this point they decide to fend for themselves and create their own destiny."⁶⁸¹

Despite their new-found freedom, *The Restless Pyramids* choose to continue to support their inhabitants, but now in new, more self-sustaining ways. Denes's *Restless Pyramids* are also obvious metaphors for environmental change, an important concern for the artist. Ecofeminist theory links the domination and degradation of nature to the historical oppression of women. Utopian studies scholar Marisa Pereyra has found deeply rooted commonalities between ecofeminism and feminist utopianism in this period in the fiction of women writers. She commented, "[both] share the same goals: respect for everyone and everything, celebration of diversity and recuperation of a desire for land lost in the past, but attainable in a hopeful future." ⁶⁸²

⁶⁸¹ Denes, Hartz, Agnes Denes, 35.

⁶⁸² Marisa Pereyra, "Lost Paradise: A Reading of *Waslala* from Feminist utopianism and Ecofeminism," unpublished manuscript, delivered at the Annual Conference for the Society for Utopian Studies, Toronto, Canada, October 5, 2007. Ecofeminism is an important component of Denes's work, but is too expansive to be considered here.

The new forms adopted by the Restless Pyramids include *Half Bird: A Flexible Space Station*, 1984 (**fig**. 86) and *Teardrop Pyramid*, 1984 (**fig**. 87). These organic and fluid bodies are more like living organisms than built structures. More richly detailed than its immediate predecessors, *Half Bird: A Flexible Space Station* is a curvaceous, triangular form seemingly comprised of reflective scales rather than blocks of stone. The rounded lower left base gives way to form the stomach and breast of the body, which appears symmetrically divided by a crevice that, as it rises toward the neck, becomes the angular edge of the pyramid once more. The artist explained that these are the first "space environments/stations with flexible, self-regenerating, and easy to repair units or modules resembling natural systems." It is unclear why the new pyramids must occupy outer space, but based on the carelessness of their former human stewards, it seems likely that the earth suffered an apocalyptic end. These new pyramids are perfectly adapted to their purpose because they are comprised of the "pure technology" of "natural systems." The artist described them further,

They are created for a different world in which the inhabitants will live in space, hovering above Earth...These structures will have little of "science fiction" about them; rather, they are pure technology with yet another kind of "perfection," that of the flexibility of natural systems.⁶⁸³

Markedly opposed to the stolid, imposing pyramids of *4,000 B.C.* built by the ancient Egyptians as well as the *Perfect Pyramids* occupying the *City of Fools* constructed by the Master Builders of our time, the resurrected pyramids are fluid and easily adaptable. They are comprised of natural systems, which are perfect because they are flexible and unrestrained, capable of evolving in response to new conditions. Unlike the immobile,

⁶⁸³ Denes, Hartz, Agnes Denes, 35.

man-made structures that were manifestations of fixed and flawed patriarchal ideologies and technological society, these are empowered to override self-destructive domination. These dynamic, independent structures constitute themselves and determine their own destiny, but benevolently continue to support their former oppressors, on their own terms.

Denes's *Pyramid Series* was a study of her own and other worlds: past, present and future. *4,000 B.C.* was a mirror of Cold War American society revealing the destructive practices of a failed civilization, reiterated in the current one. The artist warned that contemporary society will likely suffer the same fate if it continues to perfect its own technologies. Consistent with her interest in cosmological evolution, her pyramids changed over time. Some progress is evident in the increased complexity of these worlds, but the increased specialization and new technologies in particular serve to weaken these societies, making them more vulnerable to disruptions in equilibrium, both social and environmental. Finally, the future sleeper worlds awaken and rebel, finding a liberated existence in outer space. Sudden awareness of their subjugation to closed, technological society enables them to transform at will into new perfect, natural forms. More complex, but lacking the self-destructive tendencies of the *Master Builders* (ourselves) *The Restless Pyramids* have evolved into better, future worlds.

Denes's works reveal a metaphysical understanding of cosmological evolution, in which humanity could potentially overcome endemic problems, such as over-specialization and exploitation of the environment by technologies, and perhaps, with intelligence, overcome universal entropy. She wrote, Today our science and technology have made us so powerful that we are rapidly usurping our environmental resources, while our population is overrunning the planet... Such rampant growth is out of balance and cannot continue in a finite world in which the environment is unable to replenish itself fast enough to keep up with the frantic exploitation.... We are young and, like children, we are recklessly abusing and squandering our resources. We have created a runaway, computerized, high-tech society without the ability to manage its toys.⁶⁸⁴

She developed a philosophical and scientific understanding of the universe in order to address the proliferation of technology, believing that her creativity and intelligence, the result of the cosmic evolutionary process, offered her special insight into problems that specialists in various fields were too myopic to recognize. She commented,

We haven't begun to understand the implications of this new, relativistic existence, where everything we had known and had believed now seems to be wrong. In this new dynamic world, objects become processes and forms are patterns in motion. Matter is a form of energy and our own human substance is but spinning velocity. There is no solid matter and no empty space; time becomes an earthbound reality but remains an enigma in the fourth dimension.⁶⁸⁵

Denes assured her readers that she would not capitulate to the forces of a technological society. She insisted in *The Book of Dust*, "I want to emphasize that this is not a book of despair or acquiescence, but of questioning and fighting back, which is in line with human nature as it strives to better itself."⁶⁸⁶

⁶⁸⁴ Agnes Denes, *Book of Dust*, 111-113

⁶⁸⁵ Excerpted from Agnes Denes, "Evolution and the Creative Mind," a lecture first delivered at the Smithsonian Institution, Washington, D.C., 1976. Copyright Agnes Denes, 1978. (found in SAAM curatorial files)

⁶⁸⁶ Denes, *Book of Dust*, 8.

Drawing upon the notion of scientific paradigm's forwarded by Kuhn, Aycock and Denes criticized the scientific-world-view, and the notion that science had progressed cumulatively over time, in works evoking the scientific and technological accomplishments of other worlds such as ancient Egypt, Medieval Europe and the nineteenth-century U.S., requiring viewers to speculate on the failings of their own. The artists' works suggested concern with over-reliance and misuse of industrial technologies like nuclear power and encroachment upon nature in a rigid social structure whose populace was blind to its own participation. Paradoxically, both artists found validation in contemporary scientific theories, including quantum physics and cosmological evolution, which connoted chance, change and uncertainty, concepts that suggested alternatives to the rationalism of the Newtonian world-view.

The artists' interest in investigating alternate worlds as a critical and imaginative strategy in their work was common among feminist utopian literary works in this period, which, as Sargisson observed, often introduced several worlds, "often contrasting, none perfect." Sargisson suggests that temporal or spatial displacement, the creation of other worlds in time or space, is an important strategy of estrangement, which permits one to investigate different temporal and spatial realms in order to criticize what exists.⁶⁸⁷ These worlds, Sargisson explained, "play speculative, meditative or critical roles rather than instructing as to the creation of a perfect world."⁶⁸⁸ Far from a flawless society, Denes's *Pascal's Perfect Probability Pyramid and the People Paradox—The Predicament*, 1980 is essentially a dystopian one, whose occupants remain witlessly ensconced in their own

⁶⁸⁷ Lucy Sargisson, *Contemporary Feminist Utopianism*, *Women and Politics* (London ; New York: Routledge, 1996, 46.

⁶⁸⁸ Sargisson, 20.

social construct. In this series, the artist evoked ancient Egypt, a society she described as subjected to absolute Pharoanic rule, suggesting that her own was similarly governed by a technological imperative.⁶⁸⁹ As her pyramid series progressed, however, the artist speculated upon the possibility that one or more of the self-entrapped individuals would walk free, and that finally, the pyramids themselves would awaken, "take on dynamic forms of their own choosing" and "create their own destiny" as in her Restless Pyramids including When the Pyramid Awakens-Study for Environmental Sculpture, 1983 and Half Bird: A Flexible Space Station, 1984.⁶⁹⁰ In the Restless Pyramids, the viewer is meant to identify with the anthropomorphic pyramid or bird forms, which alter shape of their own volition and escape a predetermined future, but, the viewer is also a fortunate inhabitant of the benevolent *Flexible Space Station*, a mutable, living world comprised only of the "pure technologies" of "natural systems"—a world that conforms to the requirements of human beings, who in turn respect its needs. The notion of a cosmological evolution, like Shapley's, that encompassed biological and social evolution as well as galactic matter and energy, gave the artist hope for a fundamental principle (and future) of progressive growth, in stark contrast to that of entropic decay.

Aycock's evocation of defunct nineteenth-century theories of physics, like that of the ether winds in works like *Hoodoo (Laura): Vertical and Horiztontal Cross section of the Ether Wind, (from the series How to Catch and Manufacture Ghosts)*, 1981 and the *Miraculating Machine in the Garden (Tower of the Winds)*, 1981, point to the folly of

⁶⁸⁹ Denes described the ancient Egyptians as "[tending] to think in two absolutes, choices limited to two, and a static world view." Denes, Hartz, *Agnes Denes*, 32. As discussed above, these include but are by no means limited to Ellul, Mumford, Marcuse and Roszak.

⁶⁹⁰ Denes, Hartz, Agnes Denes, 34-35.

uncritical faith in science as a predominant form of knowledge, but at the same time, the mysteries of physics afforded the artist a sense of liberation as she: identified with the "free-floating" quantum particle moving through walls; immersed herself in the intricate pathways (many-worlds) of the labyrinthine garden; gained privileged access to all pasts and futures like Borges's Aleph; and finally as she moved "through space in a time machine." Theories of quantum physics and relativity suggested the existence of other worlds and timelines. In metaphoric travel through time and space, both artists created other worlds that provided them with the perspective to speculate on the restrictions of their own. Literary scholar Carol Pearson proposed that conceptions of non-linear time, such as relative time was a common strategy in feminist utopian works at this time, particularly works of science fiction. She wrote,

To the degree that we live only in linear time, we are locked into a world governed by the laws of causality, dualism, linearity, and struggle... In this dimension [of relative time], time and space are not separate, and time/space is curved. It then becomes possible to understand that we can change not only the future but the past.⁶⁹¹

Through free metaphoric movement through time and space the artists created disjunctive worlds from which they criticized the laws of causality governing present-day technological society, but simultaneously, the notion of non-linear time suggested an alternative world-view in which time and space is curved and both present and the past could be reimagined.

⁶⁹¹ Carol Pearson, "Of Time and Space: Theories of Social Change in Contemporary Science Fiction," Ruby Rohrlich and Elaine Hoffman Baruch, eds., *Women in Search of Utopia: Mavericks and Mythmakers* (New York: Schocken Books, 1984), 260-261. Quoted in Sargisson, 212.

Conclusion

This study examined the work of four American women artists made from the late 1960s to the mid-1980s that incorporated science and technology in their work paradoxically; on the one hand these forms of knowledge and practice were exposed as integral to a closed Cold War society that the artists viewed as restrictive, mechanistic and patriarchal; on the other hand they were presented as a means to undermine that society and imagine alternative concepts of human community. Alice Aycock and Agnes Denes incorporated scientific theories such as quantum physics and cosmological evolution as flexible and indeterminate antidotes to the rigidity of a technological society arising from the Newtonian world-view. Martha Rosler and Carolee Schneemann criticized military, domestic and communication technologies that were themselves outgrowths of war and of a society viewed by the counterculture as focused on the domination of the marginalized, both at home and abroad. The works of these artists functioned as critiques of the relationships between science, technology and American social life, but at the same time, revealed the artists' hopes for other ways of life.

Activism characterized the work of Rosler and Schneemann in the 1960s and 70s, both of whom embraced New Left and counterculture ideas as a means of social subversion. Schneemann described the possibilities for change in the 1960s, especially the potential role of the artist.

I was full of naiveté and conviction that we were going to change things. And everybody you met, as a young artist who just turned up in New York from Illinois or anywhere--everybody I met was definitely going to change everything--either in art, music, painting, sculpture, politics, economics, or farming. It was cumbersome as anticipation, as experiment.... Being able to hang out with Abby Hoffman [a student of Herbert Marcuse's], Janis Joplin, and Rauschenberg in the same night. Our world was completely charged up, charging...⁶⁹²

As demonstrated in chapter two, Rosler and Schneemann criticized the war and capitalist society in their works, which were viewed as integrated systems by the counterculture. Influenced by New Left and countercultural critics such as Herbert Marcuse and Wilhelm Reich, the artists described technological rationality as producing systems of social control and domination.⁶⁹³ Marcuse believed that humankind's happiness was stifled by mechanistic industrial civilization. Consistent with Lucy Sargisson and Tom Moylan's view that utopian thought is rooted in the discontent of specific classes and groups who endeavor to provoke social transformation through a process in which "differences and imperfections are retained," these artists engaged in feminist utopian opposition to the Vietnam War and to the status quo, criticizing the notion of perfect-world utopias in the form of the perfect suburban house wife or home.⁶⁹⁴ Moylan argued that the "critical utopia is part of the political practice and vision shared by a variety of autonomous oppositional movements that reject the domination of the emerging system of

⁶⁹³ Herbert Marcuse's One Dimensional Man; Studies in the Ideology of Advanced Industrial Society (Boston,: Beacon Press, 1964), xii; and Herbert Marcuse, An Essay on Liberation (Boston,: Beacon Press, 1969); Wilhelm Reich, Character-Analysis, 3d, enl. ed. (New York,: Noonday Press, 1949); Wilhelm Reich, Ether, God, and Devil: Cosmic Superimposition. (New York,: Farrar, 1973); Paul A. Robinson, The Freudian Left : Wilhelm Reich, Geza Roheim, Herbert Marcuse. 1st ed. (New York: Harper & Row, 1969), 12. Robinson explained, "Indeed the most striking feature of Reich's childhood was its bucolic setting. Perhaps this closeness to nature explains his later antipathy to "mechanistic" industrial civilization, as well as the prominent role which the eighteenth-century rhetoric of "naturalism" assumed in his social criticism."
⁶⁹⁴ Lucy Sargisson, Contemporary Feminist Utopianism, Women and Politics (London: New York: Routledge, 1996), 53; and Tom Moylan, Demand the Impossible: Science Fiction and the Utopian Imagination (New York: Methuen, 1986).

⁶⁹² Kate Haug, "An Interview with Carolee Schneemann," Wide Angle 20.1 (1998): 27.

transnational corporations and post-industrial production and ideological structures."695 Rosler and Schneemann linked their critiques of military and domestic technologies with the social oppression of women, connections made by the New Left, because they believed technological domination was integral to the maintenance of unequal power structures in capitalist society. By the early 1970s, new feminist groups created in the wake of the American women's movement, such as those centered on feminist film and video, offered new tactics of subversion. Rosler employed video specifically to call attention to the social control inherent in television—a pervasive communication technology whose content and advertising were controlled by a privileged few with an economic interest in maintaining women's status as both helpmates to man and purchasers of domestic technologies. Both artists used video as part of a feminist critique, but also out of genuine hope that the medium could disseminate feminist messages to a broader audience, while undermining existing power structures within the artworld. By the early 1970s, film and video suggested a critique of commodification and of the masculine authority of Abstract Expressionism.

As discussed in chapter three, the science of open systems, as codified by scientist Ludwig von Bertalanffy, and popularized by critic Jack Burnham, offered a means of social subversion because it insisted on the integration of social, biological and environmental systems. Emphasizing growth and an exchange of energy and information, open systems offered a flexible approach to change as an ongoing process that was also consistent with feminist utopian criticism of fixed, perfect-world utopias. Aycock, Denes and Rosler utilized the concept of open systems in different ways and to

⁶⁹⁵ Moylan, 11.

different ends. Aycock and Denes viewed open systems as a means to synthesize the various disciplines. Aycock also considered open systems as analogous to her phenomenological works that privileged the body in an open-ended search for the self. For Denes, the concept also suggested new ways of viewing the relationships between humanity and the environment, potentially undermining the otherwise inevitable destruction of ecological systems by technology. For Rosler, open systems afforded the means to criticize unchanging social systems such as poverty and gender repression. She scrutinized these systems in her video works, revealing the relationships between, for example, medical science and the consideration of women as dissected parts rather than whole human beings. For all three artists, open systems directly challenged the notion of closed technological society.

As Cold War tensions rose from the late 1970s to the mid-1980s, and defense spending sky-rocketed with the proposal of new space-age military weaponry, Aycock and Denes engaged in sobering critiques of technology and science, particularly Newtonian physics, as ideological systems enjoying unquestioned power. As demonstrated in chapter four, the artists engaged in the feminist utopian strategy of evoking other, past worlds in order to highlight the systemic social weakness of the current scientific-world-view and the resulting American over-reliance on technology. Perhaps in light of the renewed cultural focus on science as necessary for U.S. survival against Soviet aggression, the artists upheld theories of physics and cosmology, which allowed for change, chance and uncertainty as concepts counter to the rigid social system. Constant change was linked to contemporary theories of cosmological evolution, which, for Denes, included the

inevitability of social transformation. Denes's metaphysical understanding of cosmological evolution suggested, however improbably, that the heat death of the universe could be averted, that the very nature of matter and energy evolves, and that intelligence itself may be the ultimate product of evolution. Her imagined future worlds were ecologically perfect and in constant transformation, states they achieved through active resistance to humanity's environmentally destructive impulse. For Aycock, quantum physics ushered in the atomic bomb, but it also legitimized uncertainty and the consideration of individual perspectives. Her celebration of the irrational properties of quantum particles suggested a sense of freedom from controlled, repressive social systems.

While engaging in scathing critiques of science and technology as bound up with political and patriarchal dominance, these artists gravitated to these disciplines for various reasons, including, to garner respect for the mastery of tools and bodies of knowledge traditionally gendered male. When the optimism of the 1960s social revolution began to fade in the early 1970s, the women's movement-- a pivotal force in buoying the life and careers of Aycock, Denes, Rosler and Schneemann-- served as a countervailing force against the increasing pessimism associated with government exploitation, both at home and abroad, for the remainder of the Cold War.

This dissertation refocused attention on the conceptual and material engagement of science and technology by women artists, by examining their work in terms of Cold War attitudes and countercultural discourse leveled by contemporary critics known to the

artists including Marcuse and Lewis Mumford. It has also considered their work broadly, as feminist criticism of patriarchal domains of knowledge, and particularly, as employing feminist utopian strategies. Feminist utopian theory, relying on New Left and feminist philosophy, allows us to revalue the contradictions in works meant to undermine perfect-world utopias associated with science and technology, while simultaneously utilizing these domains of power to speculate on other ways of living and being. Indicative of Ernst Bloch's notion of utopia, the works considered here express a yearning for an ongoing process of change and belief that it may be achieved. For example, Rosler explained to me that the body of her work may be seen as a "gesture of becoming." She said, "I always want to say to the viewer, *and now it's your turn*, because work is made by the viewers. So everything is just an outline, it's not a masterwork or a final statement." "The purpose of the critique is to tell you that you have to develop an alternative... It's part of a dialogue. It's hard to say that a work has a dialogue, but it's part of a human dialogue."

⁶⁹⁶ Interview with the Artist, Brooklyn, NY, Thursday August 23, 2007. This line of thinking, Rosler continued, comes from Bertolt Brecht.

ILLUSTRATIONS



Figure 1 Carolee Schneemann, Viet-Flakes, 1966. 16mm film still



Figure 2 Carolee Schneemann, *Snows*, 1967. Kinetic theater Photo: Herbert Migdall



Figure 3 Martha Rosler, *Cleaning the Drapes*. Photomontage. From the series *Bringing the War Home*, 1967-1972



Figure 4 Carolee Schneemann, *Americana I Ching Apple Pie*, 1974. Performance, Greene Street Gallery, Women's Festival



Figure 5 Martha Rosler, Photomontages from the series *Body Beautiful or Beauty Knows No Pain*, 1966-1972









Figure 6 Martha Rosler, Semiotics of the Kitchen, 1975. Video Stills



Figure 7 Book cover, David Cooper, ed. The Dialectics of Liberation (Baltimore: Penguin, 1968)



Figure 8 Martha Rosler, *Hot Meat*. Photomontage. From the series *Body Beautiful or Beauty Knows No Pain*, 1966-1972



Figure 9 Martha Rosler, *Damp Meat*. Photomontage. From the series *Body Beautiful or Beauty Knows No Pain*, 1966-1972



Figure 10 Martha Rosler, *Beauty Rest.* Photomontage. From the series *Bringing the War Home*, 1967-1972



Figure 11 Martha Rosler, *Balloons*. Photomontage. From the series *Bringing the War Home*, 1967-1972



Figure 12 Martha Rosler, *Tron* (amputee). Photomontage. From the series *Bringing the War Home*, 1967-1972



Fig. 13 Martha Rosler, *Red Stripe Kitchen*. Photomontage. From the series Body Beautiful or Beauty Knows no Pain, 1967-1972



Figure 14 Carolee Schneemann, Meat Joy, 1964. Performance, Judson Church, NYC



Figure 15 Carolee Schneemann, *Fuses*, 1964-67. 1965. Film still, Self-shot. 16mm film. 18 min



Figure 16 Carolee Schneemann, *Gift Science, 1964.* Construction in wooden box: slides, mirrors, moving lights, paint, bird. 41.25" x 15/5" x 5"



Figure 17 Carolee Schneemann, *Viet-Flakes*, 1966. 16mm film still



Fig. 18 Carolee Schneemann, *Viet-Flakes*, 1966. 16mm film still

Martha Rosler, *Balloons*. Photomontage. From the series Body Beautiful or Beauty Knows no Pain, 1967-1972



Figure 19 Carolee Schneemann, *Viet-Flakes*, 1966. 16mm film still



Figure 20 Carolee Schneemann, *Snows*, 1967. Kinetic theater (The figure is overlaid with footage from Schneemann's film Viet-Flakes (1965). Photo: Herbert Migdall.


Figure 21 Carolee Schneemann, *Snows*, 1967. Kinetic theater



Figure 22 Carolee Schneemann, Snows, 1967. Kinetic theater



Figure 23 Carolee Schneemann, *Snows*, 1967. Kinetic theater Photo: Herbert Migdall



Fig. 24 Carolee Schneemann, *War Mop*, 1983. Sculpture with Video. Photo: Scott Bowron



Figure 25 Martha Rosler, The East is Red, the West is Bending, 1977. Video still



Figure 26 Hans Haacke, Condensation Cube, 1963-65



Figure 27 Robert Smithson, *Spiral Jetty*, 1970. Black rock, salt crystals, earth, red water (algae) at Great Salt Lake, Utah. 1,500' x 15'



Figure 28 Agnes Denes, *Wheatfield—A Confrontation*, 1982. Battery Park Landfill, Manhattan



Figure 29 Agnes Denes, Rice/Tree/Burial, 1979. Artpark, Lewiston, NY.



Figure 30 Agnes Denes, *Rice/Tree/Burial—The Time Capsule*, 1979. Artpark, Lewiston, NY.



Figure 31 Alice Aycock, *Maze*. 1972. 32' diameter x 6' high (destroyed) Gibney Farm, New Kingston, PA



Figure 32 Alice Aycock, *Study for a Hexagonal Building*. isometric section, 1975. Pencil on vellum, 21" x 38"



Figure 33 Alice Aycock, *The Hundred Small Rooms (Another Tower of Babel)* on the Eve of the Industrial Revolution (A Pictorial Re-creation of the Raising of the an Egyptian Obelisk in the Piazza di San Pietro, Rome, 1586) with Turning, Cranking, 1984



Figure 34 The Architecture Machine Group, M.I.T., *Seek*, 1969-70. Pictured on the catalog cover for the exhibition *Software: Information Technology Its New Meaning for Art*



Figure 35 Alice Aycock with *The Large Scale Dis/ Integration of Micro-Electronic Memories* (A Newly Revised Shantytown), Manhattan, Battery Park, 1980-81 (never finished)



Figure 36 Alice Aycock with *The Large Scale Dis/ Integration of Micro-Electronic Memories* (A Newly Revised Shantytown), Manhattan, Battery Park, 1980-81



Figure 37 Alice Aycock with *The Large Scale Dis/ Integration of Micro-Electronic Memories* (A Newly Revised Shantytown), Manhattan, Battery Park, 1980-81



Figure 38 Alice Aycock with *The Large Scale Dis/ Integration of Micro-Electronic Memories* (A Newly Revised Shantytown), Manhattan, Battery Park, 1980-81



Figure 39 Alice Aycock with *The Large Scale Dis/ Integration of Micro-Electronic Memories* (A Newly Revised Shantytown), Manhattan, Battery Park, 1980-81



Figure 40 Alice Aycock, *Hoodoo (Laura): Vertical and Horizontal Cross Section of the Ether Wind* From the series How to Catch and Manufacture Ghosts, 1981. Plexiglas, glass, steel (also galvanized), motors, and neon



Figure 41 Agnes Denes, Study of Distortions: Global Perspective, 1970



Figure 42 Agnes Denes, *Dialectic Triangulation, A Visual Philosophy*, (including The Human Argument), 1969-1970.



Figure 43 Agnes Denes, Pascal's Triangle: Study of Unpredictability, 1973



Figure 44 Agnes Denes, *Pascal's Perfect Probability Pyramid* and the People Paradox -- The Predicament, 1981. lithograph. 32" x 43"



Figure 45 Agnes Denes, *Pascal's Perfect Probability Pyramid – The Predicament*, 1981. lithograph. 32" x 43" (detail)



Figure 46 Agnes Denes, *When the Pyramid Awakens—Study for Environmental Sculpture*, 1983. Pencil on Vellum. 36 x 45".



Figure 47 Martha Rosler, *The Bowery in Two Inadequate Descriptive Systems* 1974 – 1975.



Figure 48 Martha Rosler, *The Bowery in Two Inadequate Descriptive Systems* 1974 – 1975.



Figure 49 Martha Rosler, *The Bowery in Two Inadequate Descriptive Systems* 1974 – 1975.

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Figure 50 Martha Rosler, *The Bowery in Two Inadequate Descriptive Systems* 1974 – 1975.



Figure 51 Martha Rosler, *Vital Statistics of a Citizen Simply Attained*, 1977. Video still.



Figure 52 Agnes Denes, *Noah's Ark—A Spaceship*, 1982. Pencil and Gouache on vellum, 48 ¹/₂" x 34 ¹/₄" Proposed for Miami International Airport and North Waterfront Park, a converted dump site.



Figure 53 Alice Aycock, A Structure Called "An Explanation for the Rainbow," from *Project Entitled "On the Eve of the Industrial Revolution, a City Engaged In the Production of False Miracles,"* Wood. Exhibited at Cranbrook Academy of Art, Bloomfield Hills, Michigan.



Figure 54 Alice Aycock, *The Treadmill*, from *Project Entitled "On the Eve of the iundustrial Revolution, a City Engaged In the Production of False Miracles,*" 1978. Wood. Exhibited at the Cranbrook Academy of Art, Bloomfield Hills, Michigan.



xxv. Watermill. From the Luttrell Psalter.



xxv1. Spinning wheel. From British Museum MS Royal 10. E. iv (x1v cent.).

Figure 55 Watermill and Spinning wheel. Reproduced in A.C. Crombie, *Medieval and Early Modern Science*, vol. 1, 1963



Figure 56 Watermill. From the Luttrell Psalter, 14th C. Reproduced in A.C. Crombie, *Medieval and Early Modern Science*, vol. 1, 1963



Alice Aycock, *The Treadmill*, from Project Entitled "On the Eve of the iundustrial Revolution, a City Engaged In the Production of False Miracles," 1978.





Figure 57 Water driven silk mill, 16th C. From V. Zonca, *Novo Teatro di Machine et Edificii*,
Padua. Reproduced in A.C. Crombie, *Medieval and Early Modern Science*, vol. 1, 1963

Alice Aycock, *The Treadmill*, from *Project Entitled "On the Eve of the iundustrial Revolution, a City Engaged In the Production of False Miracles,"* 1978.



Figure 58 Diagram published in Jodocus Trutfetter, *Totius Philosophiae Naturalis Summa* (Erfurt, 1514), to illustrate Theodoric of Freiberg's explanation for the rainbow. Reproduced in A.C. Crombie, *Medieval and Early Modern Science*, vol. 1, 1963 Alice Aycock, A Structure Called "An Explanation for the Rainbow," from Project Entitled "On the Eve of the Industrial Revolution, a City Engaged In the Production of False Miracles," Wood. Exhibited at Cranbrook Academy of Art, Bloomfield Hills, Michigan.

Figure 59 Drawing from Theodoric of Freiberg, *De Irde*, Basel Univresity Library MS F. iv 30 (XIV cent.), showing the paths of the rays inside a transparent sphere, e.g. a spherical glass vessel of water or a raindrop, to illustrate his explanation of the formation of the primary rainbow. Reproduced in A.C. Crombie, *Medieval and Early Modern Science*, vol. 1, 1963.

Alice Aycock, A Structure Called "An Explanation for the Rainbow," from Project Entitled "On the Eve of the Industrial Revolution, a City Engaged In the Production of False Miracles,"
Wood. Exhibited at Cranbrook Academy of Art, Bloomfield Hills, Michigan.



Figure 60 Alice Aycock, *Hoodoo (Laura): Vertical and Horizontal Cross Section of the Ether Wind* From the series How to Catch and Manufacture Ghosts, 1981. Plexiglas, glass, steel (also galvanized), motors, and neon. Image courtesy of the LA County Museum of Art



Figure 61 Alice Aycock, *Hoodoo (Laura): Vertical and Horizontal Cross Section of the Ether Wind* (detail) From the series How to Catch and Manufacture Ghosts, 1981. Plexiglas, glass, steel (also galvanized), motors, and neon. Image courtesy of the LA County Museum of Art



Figure 62 Alice Aycock, *Hoodoo (Laura): Vertical and Horizontal Cross Section of the Ether Wind* From the series How to Catch and Manufacture Ghosts, 1981. Plexiglas, glass, steel (also galvanized), motors, and neon Image courtesy of the LA County Museum of Art



Figure 63 Alice Aycock, *Hoodoo (Laura): Vertical and Horizontal Cross Section of the Ether Wind* (detail) From the series How to Catch and Manufacture Ghosts, 1981. Plexiglas, glass, steel (also galvanized), motors, and neon. Image courtesy of the LA County Museum of Art





Figure 64 Alice Aycock, *Hoodoo (Laura): Vertical and Horizontal Cross Section of the Ether Wind* From the series How to Catch and Manufacture Ghosts, 1981. Plexiglas, glass, steel (also galvanized), motors, and neon

Alice Aycock, *The Miraculating Machine: The Charmed Circle*, June 1981. Steel, glass, wood, theatrical lights, motorized spinning galvanized steel pan which throws sparks, turning gyroscope and spinning straw blades. 25' w x 60' 1 x 12' h



Figure 65 Aerial view of the Tevatron particle accelerator at Fermi National Accelerator Laboratory, Batavia, Illinois



Figure 66 Tevatron Ring, Fermi National Accelerator Laboratory, Batavia, Illinois



Figure 67 Alice Aycock, *Machine that Makes the World*, 1979. Steel, wood, steel doors, pulleys, and revolving drum; 8' high x 12' 1 ¹/₂" wide x 38' deep



Figure 68 Alice Aycock, *The Miraculating Machine in the Garden (Tower of the Winds)*, 1980-1982. Douglass College, Rutgers University, New Brunswick, New Jersey



Figure 69 Alice Aycock, *The Miraculating Machine in the Garden (Tower of the Winds)*, 1980-1982. Douglass College, Rutgers University, New Brunswick, New Jersey.



Figure 70 Alice Aycock, *The Miraculating Machine in the Garden (Tower of the Winds)*, 1980-1982. Douglass College, Rutgers University, New Brunswick, New Jersey



Figure 71 Alice Aycock, *The Miraculating Machine in the Garden (Tower of the Winds)*, 1980-1982. Douglass College, Rutgers University, New Brunswick, New Jersey



Figure 72 Alice Aycock, *The Miraculating Machine in the Garden (Tower of the Winds)*, 1980-1982. Douglass College, Rutgers University, New Brunswick, New Jersey



Figure 73 Standard Oil Refinery



Figure 74 Alice Aycock, The Miraculating Machine in the Garden (Tower of the Winds), 1980-1982. Douglass College, Rutgers University, New Brunswick, New Jersey

Diagram: Boiling water nuclear power plant



Figure 75 Alice Aycock, The Miraculating Machine in the Garden (Tower of the Winds), 1980-1982. Douglass College, Rutgers University, New Brunswick, New Jersey



Diagram: "How a nuclear reactor works"



Figure 76 Alice Aycock, The Dance Garden Containing Magic Diagrams, 1988, detail. Sepia and gold ink on cream paper with watercolor; top section: 36" x 118", bottom section 48" 118".



Figure 77 Agnes Denes, Syzygy-- "The Moment of...", 1972-73. Detail. Ink on lavender film grid, $10 \frac{1}{4} \times 8$ "



Figure 78 Agnes Denes, Syzygy-- "*The Moment of*...", 1972-73. Ink on lavender film grid, 2 drawings, 10 ¹/₄ x 8" each.



Figure 79 Agnes Denes, Introspection I-Evolution, 1968-71. Monoprint, 41 1/2" x 17"

Evolution provides answers as to where we are going; a fitture prediction based on previous phenomena. The universe contains systems, systems contain preterns. The purpose of the mind is to locate these patterns and to locate these patterns and to seek the inherent potential for new systems of thought and behavior. Aques Deves Figure 80 Agnes Denes, Statement, 1978. "The vitality of thought is in adventure. Ideas won't keep. Something must be done with them."—Alfred North Whitehead, 1861-1947. From the series Great Ideas. Image courtesy of the Smithsonian American Art Museum.



Figure 81 Agnes Denes, 4,000 B.C., 1973. India ink on orange graph paper, 18 x 22"



Figure 82 Great Pyramids, Gizeh, Egypt, Dynasty IV. From left: Pyramids of Menkaure, c. 2490-2472 BCE; Khafre, c. 2520-2494 BCE; and Khufu, c. 2551-2528 BCE.

Agnes Denes, *4,000 B.C.*, 1973. India ink on orange graph paper, 18 x 22"



Figure 83 Agnes Denes, *Magic Mountain II* (detail), 1985. Ink on vellum, 28 x 50" (detail)



Figure 84 Agnes Denes, Magic Mountain II, 1985. Ink on vellum, 28 x 50"



Figure 85 a Agnes Denes, *Tower of Babel*, 1983. Silver ink on rag paper, 39 $\frac{1}{2} \ge 29 \frac{1}{2}$ Figure 85 b Agnes Denes, *Tower of Babel—The Shadow*, 1983. Pencil on colored paper,



Figure 86 Agnes Denes, *Half Bird—A Flexible Space Station*, 1984. Pencil on vellum, 34 ½ x 53"



Figure 87 Agnes Denes, Teardrop Pyramid, 1984. Pencil on vellum, 48 x 36"

BIBLIOGRAPHY

- After Years of Rumination on the Events That Led up to This Misfortune...Alice Aycock: Projects and Proposals 1971-1978. Edited by Monroe Denton. Allentown, PA: Muhlenberg College Center fot the Arts, 1978.
- Agnes Denes: Projects for Public Spaces, a Retrospective. Edited by Dan Mills. Essay by Eleanor Heartney. Lewisburg, PA: Samek Art Gallery/Bucknell University, 2003.
- "Alice Aycock." The Daily Targum, Wednesday, October 20 1982, 4.
- "An Interview with Alice Aycock." D.A.A. Journal. Design, Architecture and Art University of Cinncinnati, Ohio (January 1980).
- Androgyny in Art. Edited by Catalogue Text by Gail Gelburd. Hempstead, New York: Emily Lowe Gallery, November 6-December 19, 1982.
- *Complex Visions: Sculpture and Drawings by Alice Aycock.* Translated by Jonathan Fineberg. New York: Storm King Art Center, 1990.
- "Draft Text for a Didactic Panel." In Curatorial Files, Los Angeles County Museum of Art. Los Angeles, c. 1991. Courtesy Howard Fox, Chief Curator, Contemporary Art.
- Herbert Marcuse: The New Left and the 1960s. Edited by Douglas Kellner. Six vols. Vol. Three, Collected Papers of Herbert Marcuse. London; New York: Routledge, 2005.
- Machineworks, Vito Acconci, Alice Aycock, Dennis Oppenheim. Edited by Janet Kardon. Philadelphia: Institute of Contemporary Art, 1981.
- Making Their Mark: Women Artists Move into the Mainstream. Edited by Ellen Landau Essays by Randy Rosen, Calvin Tomkins, Judith Stein, Ann Sargent-Wooster, Thomas McEvilley, Marcia Tucker, Ferris Olin, Catharine Brawer. New York: Abbeville Press, 1989.
- *The New Left Revisited*. Edited by Paul Buhle John McMillian. Philadelphia: Temple University Press, 2003.
- "Taste of Doomsday in Pennsylvania Nuclear Accident." *New York Times*, April 1 1979, E1.
- *Time and Space Concepts in Art*. Edited by Marilyn Belford and Jerry Herman. New York: Pleiades Gallery, 1980.

- Achbar, Mark and Peter Wintonick, directors. Manufacturing Consent: Noam Chomsky and the Media: Production: Humanist Broadcasting Foundation, National Film Board of Canada (NFB), Necessary Illusions Productions Inc., Norsk Rikskringkasting (NRK), Special Broadcasting Service (SBS), Téléfilm Canada, Vision TV, Yleisradio (YLE), 2002. DVD.
- Ades, Dawn. *Photomontage*. rev. and enl. ed. London ; New York: Thames and Hudson, 1986.
- Ainsa, Fernando. *Necesidad De La Utopia*. Buenos Aires: Coedicion de Tupac Ediciones y Editorial Nordan-Comunidad, 1990.
- Alberro, Alexander. *Conceptual Art and the Politics of Publicity*. Cambridge, Mass.: MIT Press, 2003.
- Alberro, Alexander, and Blake Stimson. *Conceptual Art : A Critical Anthology*. Cambridge, Mass. ; London: MIT Press, 1999.

Alloway, Lawrence. "Robert Smithson's Development." Artforum (1972): 52-61.

------. "Network: The Art World Described as a System." *Artforum* 11, no. 1 (1972): 28-33.

———, and Henry Art Gallery. *The Idea of the Post-Modern : Who Is Teaching It?* Seattle, Wash.: Henry Art Gallery, University of Washington, 1981.

Amelunxen, Hubertus V. Photography after Photography: Memory and Representation in the Digital Age. G+B Arts, 1997.

Anderson, Randall. "Carolee Schneemann." Border Crossings 23, no. 1 (2004): 85-86.

- Armstrong, Elizabeth, Joan Rothfuss, Simon Anderson, and Walker Art Center. *In the Spirit of Fluxus* : Published on the Occasion of the Exhibition. 1st ed. Minneapolis: Walker Art Center, 1993.
- Artaud, Antonin. December 1925. Manifesto in a Clear Language. In, http://www.391.org/manifestos/192512antoninartaud_clearlanguage.htm. (accessed March 1, 2007.
- Ascott, Roy. Art, Technology, Consciousness : Mind@Large. Bristol, UK ; Portland, OR: Intellect, 2000.
- Ascott, Roy, and Edward A. Shanken. *Telematic Embrace : Visionary Theories of Art, Technology, and Consciousness.* Berkeley: University of California Press, 2003.

Aycock, Alice. "Alice Aycock, Recent Projects." ARTI, Art Today 23 (1995): 80-87.
- ———. "Fourth World and the Anasazi." *Tracks: A Journal of Artists' Writings* 2, no. 2 (1976): 23-26.

———. "Introduction to a Short Work of Untitled Fiction in Five Chapters (Work in Progress)." ARTI, Art Today 23 (1995): 40-57.

——, Jonathan David Fineberg, and Storm King Art Center. *Complex Visions : Sculpture and Drawings by Alice Aycock : May 21-October 31, 1990.* Mountainville, N.Y.: Storm King Art Center, 1990.

-. Retrospektive Der Projekte Und Ideen 1972-1983: Installation Und Zeichnungen. Stuttgart: Wurttembergischer Kunstverein, 1983.

——. "Transcript from a Presentation." In Mary H. Dana Women Artist Series Files. New Brunswick, NJ: Douglass Library, Rutgers University, 1980.

——, and University of South Florida. *Alice Aycock Projects, 1979-1981*. Edited by Introduction by Edward Fry. [Tampa, Fla.]: University of South Florida, 1981.

 , and Württembergischer Kunstverein. Alice Aycock, Retrospektive Der Projekte Und Ideen, 1972-1983 : Installation Und Zeichnungen :[Ausstellung:]
W"Urttembergischer Kunstverein, Stuttgart, 4. August Bis 18. September 1983. Stuttgart: W"urttembergischer Kunstverein, 1983.

Bachelard, Gaston. The Poetics of Space. Boston: Beacon Press, 1969.

- Ballerini, Julia. "Carolee Schneemann: Recent Work." In *Carolee Schneemann*, edited by Carolee Schneemann and Max Hutchinson Gallery. New Paltz, NY: Documentext; Max Hutchinson Gallery, 1982.
- Bammer, Angelika. *Partial Visions : Feminism and Utopianism in the 1970s.* London ; New York: Routledge, 1991.

- Barnhisel, Greg. "Perspectives USA and the Cultural Cold War: Modernism in Service of the State." *Modernism/Modernity* 14, no. 4 (2007): 729-54.
- Barr, Marleen S. Future Females, the Next Generation : New Voices and Velocities in Feminist Science Fiction Criticism. Lanham, Md.: Rowman & Littlefield, 2000.
- Barthes, Roland. Mythologies. New York,: Hill and Wang, 1972.
- Bateson, Gregory. *Steps to an Ecology of Mind; Collected Essays in Anthropology, Psychiatry, Evolution, and Epistemology*, Chandler Publications for Health Sciences. San Francisco,: Chandler Pub. Co., 1972.
- Battcock, Gregory. "Marcuse and Anti-Art." Arts Magazine 43, no. 7 (1969): 17-19.

- Beardsley, John. *Earthworks and Beyond : Contemporary Art in the Landscape*. Expanded ed. New York: Abbeville Press, 1989.
- Bee, Susan and Mira Schor. *M/E/a/N/I/N/G: An Anthology of Artists' Writings, Theory and Criticism.* Durham: Duke University Press, 2000.
- Belgrad, Daniel. The Culture of Spontaneity: Improvisation and the Arts in Postwar America. Chicago; London: University of Chicago Press, 1998.
- Bell, Daniel. *The Coming of Post-Industrial Society; a Venture in Social Forecasting*. New York,: Basic Books, 1973.
- Bellamy, Edward. Looking Backward, 2000-1887. Boston: Ticknor,, 1888. microform.
- Bergdoll, Barry. *European Architecture*, 1750-1890. Oxford ; New York: Oxford University Press, 2000.
- Berger, Maurice. Labyrinths : Robert Morris, Minimalism, and the 1960s. 1st ed, Icon Editions. New York: Harper & Row, 1989.

—. Representing Vietnam 1965-1973. New York: The Bertha and Karl Leubsdorf Art Gallery Hunter College, February 9 - March 25, 1988.

- Bers, Rachel. "What Are You Reading: Artists That Make Books Reveal Their Current Reading Interests." *Art on Paper* 8, no. 6 (2004): 54.
- Bertalanffy, Ludwig von. General System Theory; Foundations, Development, Applications. New York, G.Braziller,, 1968.

Bijvoet, Marga. Art as Inquiry : Toward New Collaborations between Art, Science, and Technology, American University Studies. Series Xx, Fine Arts ; V. 32. New York: Peter Lang, 1997.

Bloch, Ernst. The Principle of Hope. 3 vols. Oxford: Blackwell, 1986.

------. The Utopian Function of Art and Literature : Selected Essays. Translated by

------. Heritage of Our Times. Berkeley: University of California Press, 1991.

- Blythe, Sarah Ganz, Edward D. Powers, Centre Georges Pompidou., National Gallery of Art (U.S.), and Museum of Modern Art (New York N.Y.). *Looking at Dada*. New York, NY: The Museum of Modern Art, 2006.
- Boettger, Suzaan. *Earthworks : Art and the Landscape of the Sixties*. Berkeley: University of California Press, 2002.

———. "Behind the Earth Movers." Art in America 92, no. 4 (2004): 54-63.

- Bohm, David. *Causality and Chance in Modern Physics*. London,: Routledge and Paul, 1957.
- Bonner, Frances, and Open University. U207 Course Team. *Imagining Women : Cultural Representations and Gender*. Cambridge: Polity Press in association with the Open University, 1992.
- Borges, Jorge Luis. *Labyrinths; Selected Stories & Other Writings*. [Augmented ed, New Directions Paperbook ; 186. New York,: New Directions Pub. Corp., 1964.
- Briggs, Kenneth A. "Churches Turning to Arms Race as Top Social Issue for the 1980s." *New York Times*, March 25 1979, 1.
- Broad, William J. "Star Wars: Pentagon Lunacy." New York Times, May 13 1982, A27.
- Broude, Norma, Mary D. Garrard, and Judith K. Brodsky. *The Power of Feminist Art : The American Movement of the 1970s, History and Impact*. New York: H.N. Abrams, 1994.
- Buchloh, Benjamin H. D. "Conceptual Art 1962-1969: From the Aesthetic of Administration to the Critique of Institutions." *October* 55, no. Winter (1990): 105-43.

Buckberrough, Sherry. "Carolee Schneemann." Arts Magazine (1981): 5.

- Buck-Morse, Susan. Dreamworld and Catastrophe: The Passing of Mass Utopia in East and West, 2000.
- Burnham, Jack. Beyond Modern Sculpture; the Effects of Science and Technology on the Sculpture of This Century. New York,: G. Braziller, 1968.
- ———. "Corporate Art." *Artforum* (1971): 66-71.
- ———. Great Western Salt Works; Essays on the Meaning of Post-Formalist Art. New York,: G. Braziller, 1974.
- ———. "Corporate Art." *Artforum* (1971): 66-71.
- ———. Great Western Salt Works; Essays on the Meaning of Post-Formalist Art. New York,: G. Braziller, 1974.
- ———, James A. Mahoney, Theodor H. Nelson. Software: Information Technology, Its New Meaning for Art. New York: The Jewish Museum. September 16 -November 8, 1970.
- Butler, Samuel, and H. M. Tomlinson. *Erewhon or over the Range*. New York,: Chesire House, 1931.
- Bzdak, Meredith. *Public Sculpture in New Jersey: Monuments to Collective Identity*. New Brunswick, NJ: Rutgers University Press, 1999.
- Cameron, Daniel. "In the Flesh." In *Carolee Schneemann: Up to and Including Her Limits*, edited by Carolee Schneemann. New York: New Museum of Contemporary Art, 1997.
- Chipp, Herschel Browning, Peter Howard Selz, and Joshua Charles Taylor. *Theories of Modern Art; a Source Book by Artists and Critics*, California Studies in the History of Art ; 11. Berkeley,: University of California Press, 1968.
- Cirlot, Juan Eduardo, and Jack Sage. A Dictionary of Symbols. London,: Routledge & Paul, 1962.
- Cohen, Ronny H. "Agnes Denes: Triumph of the Will." *Print Collector's Newsletter* 13, no. 5 (1982): 159-61.

- Collins, Martin J. Cold War Laboratory : Rand, the Air Force, and the American State, 1945-1950, Smithsonian History of Aviation and Spaceflight Series. Washington [D.C.]: Smithsonian Institution Press, 2002.
- Cooper, David, ed. The Dialectics of Liberation. Blatimore: Penguin, 1968.
- Corcoran Gallery of Art. *Agnes Denes : Perspectives* : December 6-January 26, 1974-75. Washington, D.C.: Corcoran Gallery of Art, 1975.
- Corris, Michael. *Conceptual Art : Theory, Myth, and Practice*. New York: Cambridge University Press, 2004.
- Cott, Nancy F. *The Grounding of Modern Feminism*. New Haven: Yale University Press, 1987.
- Counsell, Colin. *Signs of Performance: An Introduction to Twentieth Century Theatre.* New York: Routledge, 1996.
- Cowan, Ruth Schwartz. More Work for Mother : The Ironies of Household Technology from the Open Hearth to the Microwave. New York: Basic Books, 1983.
- Crary, Jonathan. "Projects in Nature." Arts Magazine (1975): 52.
- Creager, Angela N. H., Elizabeth Lunbeck, and Londa L. Schiebinger. *Feminism in Twentieth-Century Science, Technology, and Medicine*. Chicago: University of Chicago Press, 2001.
- Crombie, A. C. *Medieval and Early Modern Science*. 2nd ed. Cambridge, Mass.,: Harvard University Press, 1963.
- Crombie, James. "Mumford on How Mining and War Corrupted out Values: On the Social Origins of Some Unsustainable Technologies and Accounting Practices." *The Electronic Journal for the Society for Philosophy and Technology* 2, no. 3-4 (1997).
- Daily, Meghan. "Gloria: Another Look at Feminist Art in the 1970s." *Artforum* 41, no. 4 (2002): 141.
- Danius, Sara. *The Senses of Modernism : Technology, Perception, and Aesthetics*. Ithaca: Cornell University Press, 2002.
- Davies, Hugh Marlais, Ronald J. Onorato, and La Jolla Museum of Contemporary Art. Sitings : Alice Aycock, Richard Fleischner, Mary Miss, George Trakas. La Jolla, Calif.: La Jolla Museum of Contemporary Art, 1986.

- Davis, Douglas M. "Art & Technology-- the New Combine." Art in America 56, no. 1 (1968): 38-47.
- Davisson, Sven. "An Aetheticism of Being: Foucault & the Epistomology of Self, Post Modernity." *Ashe! Journal of Experimental Spirituality* 1, no. 1-2 (2002): 14-23.
- De Salvo, Donna M., Johanna Burton, Mark Godfrey, Boris Groys, and Tate Modern (Gallery). *Open Systems : Rethinking Art C.1970*. London: Tate, 2005.
- Denes, Agnes. Agnes Denes: Sculpture of the Mind. Akron, OH: The Emily H. Davis Art Gallery of the University of Akron, 1976.
 - —. "Evolution and the Creative Mind." In Agnes Denes Curatorial Files, Smithsonian American Art Museum. Washington, DC, 1976.
- *———. The Book of Dust: The Beginning and Ending of Time and Thereafter.* Visual Studies Workshop Press, 1992.
- -------. "Evolution and the Creative Mind." Paper presented at the Smithsonian Institution, Washington, D.C. 1976.

——, Jill Hartz, ed., Intro. Thomas W. Leavitt., Donald Kuspit Essays by: Robert Carleton Hobbs, Peter Selz, Lowry Stokes Sims., and Herbert F. Johnson Museum of Art. *Agnes Denes*. Ithaca, N.Y.: Hebert F. Johnson Museum of Art, Cornell University, 1992.

-, and Klaus Ottmann. *The Human Argument : The Writings of Agnes Denes.* 1st ed. Putnam, Conn.: Spring Publications, 2008.

Denton, Monroe. "Lexicon of the Work of Alice Aycock." *ARTI, Art Today* 23 (1995): 58-80.

Diamond, Jamie. "Heavy Metal: Sculptor Alice Aycock's Outsize Vision." *Lears* (1991): 85-87.

- Donawerth, Jane, and Carol A. Kolmerten. *Utopian and Science Fiction by Women : Worlds of Difference*. 1st ed, Utopianism and Communitarianism. Syracuse, N.Y.: Syracuse University Press, 1994.
- Durbin, Paul T., and Jerome R. Ravetz. *A Guide to the Culture of Science, Technology, and Medicine*. 1st Free Press pbk. ed. New York; London: Free Press; Collier Macmillan, 1984.

- Edwards, Paul N. The Closed World : Computers and the Politics of Discourse in Cold War America, Inside Technology. Cambridge, Mass.: MIT Press, 1996.
- Ellegood, Anne. 2000. Martha Rosler: Positions in the Life World. In, New Museum, http://www.newmuseum.org/more_exh_m_rosler.php. (accessed September 16, 2005).
- Ellul, Jacques. The Technological Society. 1st American ed. New York,: Knopf, 1964.
- Essed, Philomena, David Theo Goldberg, and Audrey Lynn Kobayashi. *A Companion to Gender Studies*, Blackwell Companions in Cultural Studies ; 8. Malden, MA: Blackwell Pub., 2005.
- Evans, Sara M., and Sallie Bingham Center for Women's History and Culture. *Personal Politics : The Roots of Women's Liberation in the Civil Rights Movement and the New Left.* 1st ed. New York: Knopf ; distributed by Random House, 1979.
- Ezrahi, Yaron, Everett Mendelsohn, and H. M. Segal. *Technology, Pessimism, and Postmodernism.* Amherst: University of Massachusetts Press, 1995.
- Feenberg, Andrew. "Marcuse or Habermas: Two Critiques of Technology." *Inquiry* 39 (1996): 45-70.

———, Charles Webel, and Robert B. Pippin. *Marcuse : Critical Theory and the Promise of Utopia*. London: Macmillan Education, 1988.

- Felder, Carol. "Alice Aycock Competes with the World." *New Jersey Monthly* (October 1980).
- Filippone, Christine. "Alice Aycock" Artists on the Edge: Douglass College and the Rutgers MFA. Edited by Ferris Olin. Intro. by Joan Marter, Mary H. Dana Women Artists Series. New Brunswick, NJ: Mabel Smith Douglass Library, Rutgers, The State University of New Jersey, March 9 - June 6, 2005.
- Fineberg, Jonathan. *Alice Aycock's Impossibilism*. Raleigh, NC: City Gallery of Contemporary Art, 1989.

. Art since 1940 : Strategies of Being. New York: H.N. Abrams, 1995.

- Fitting, Peter. "Fredric Jameson and Anti-Anti-Utopianism." *Arena Journal* (Annual 2006): 37.
- Flanagan, Mary, and Austin Booth. *Reload : Rethinking Women + Cyberculture*. Cambridge, Mass.: MIT Press, 2002.

- Focillon, Henri. *The Life of Forms in Art*. Translated by George Kubler. Cambridge, MA: MIT Press, 1992.
- Forman, Paul. "How Lewis Mumford Saw Science, Art, and Himself." *Historical Studies in the Physical and Biological Sciences* 37, no. 2 (2007): 271-336.
- Fox, Howard N., and Hirshhorn Museum and Sculpture Garden. Metaphor, New Projects by Contemporary Sculptors : Vito Acconci, Siah Armajani, Alice Aycock, Lauren Ewing, Robert Morris, Dennis Oppenheim. Washington, D.C.: Smithsonian Institution Press, 1982.
- Friedan, Betty, and Sallie Bingham Center for Women's History and Culture. *The Feminine Mystique*. New York: Norton, 1963.
- Fuller, R. Buckminster. Earth, Inc. Garden City, N.Y: Anchor Press, 1973.

———. Utopia or Oblivion: The Prospects for Humanity. New York: Overlook Press, 1969.

- ———, Arthur L. Loeb, and E. J. Applewhite. *Synergetics ; Explorations in the Geometry of Thinking*. New York,: Macmillan Pub. Co., 1975.
- Garrels, Gary. Agnes Denes 1968-1980. Boston: Hayden Gallery MIT, 1980.
- Gunther, Hans. The Culture of the Stalin Period. New York: St. Martin's Press, 1990.
- Galison, Peter. "The Ontology of the Enemy: Norbert Wiener and the Cybernetic Vision." *Critical Inquiry* 21, no. 1 (1994): 228-66.
- Gallery, Ruth White. "Agnes Denes: Sculpture and Paintings 'Evolution'." Washington, DC: National Air and Space Museum, Smithsonian Institution.
- Gilbert, James Burkhart. *Redeeming Culture : American Religion in an Age of Science*. Chicago, IL: University of Chicago Press, 1997.
- Gilbert-Rolfe, Jeremy. "Robert Morris: The Complication of Exhaustion." *Artforum* 13 (1974): 44-49.
- Glahn, Philip. "The "Brecht Effect": Politics and American Postwar Art." *Afterimage* 34, no. 3 (2006): 29(4).
- Glueck, Grace. "A Sculptor of Encylopedic Imagery." *The New York Times*, August 15 1990.
- Goldberg, RoseLee. *Performance : Live Art since 1960*. New York: Harry N. Abrams, 1998.

- Goldstein, Ann, Anne Rorimer, and Museum of Contemporary Art (Los Angeles Calif.). *Reconsidering the Object of Art : 1965-1975.* Los Angeles; Cambridge, Mass.: Museum of Contemporary Art ; MIT Press distributor, 1995.
- Grau, Oliver. *Virtual Art : From Illusion to Immersion*. Rev. and expanded ed. Cambridge, Mass. ; London: MIT Press, 2003.
- Green, Alison. "Utopias & Universals." Art Monthly (U.K.), no. 265 (April 2003): 7-10.
- Green, Eileen, and Alison Adam. Virtual Gender : Technology, Consumption, and Identity. London ; New York: Routledge, 2001.
- Green, Sam, director. *The Weather Underground*: Bill Siegel, Producer, 2004. Documentary.
- Greene, Brian. "The Universe on a String." The New York Times, October 20 2006.
- Gribbin, John R. In Search of Schroedinger's Cat : Quantum Physics and Reality. Toronto ; New York: Bantam Books, 1984.
- Gumpert, Lynn. *Investigations: Probe, Structure, Analysis.* Agnes Denes, Lauren Ewing, Vernon Fisher, Stephen Prina, David Reed. New York: The New Museum, September 27-December 4, 1980.
- Haacke, Hans. *Framing and Being Framed : 7 Works, 1970-75*. Halifax New York: Press of the Nova Scotia College of Art and Design; New York University Press, 1975.

———, Walter Grasskamp, Molly Nesbit, and Jon Bird. *Hans Haacke*, [Contemporary Artists]. London ; New York: Phaidon, 2004.

- Hanhardt, John G. *Video Culture : A Critical Investigation*. Layton, Utah: G.M. Smith, Peregrine Smith Books, in association with Visual Studies Workshop Press, 1986.
- Harding, Sandra G. Whose Science? Whose Knowledge? : Thinking from Women's Lives, Science Question in Feminism. Ithaca, N.Y.: Cornell University Press, 1991.

—. *The Feminist Standpoint Theory Reader : Intellectual and Political Controversies.* New York: Routledge, 2004.

Harrison, Charles and Paul Wood, eds. Art in Theory, 1900-2000: An Anthology of Changing Ideas. Malden, MA: Oxford: Blackwell Publishers Ltd., 2003.

- Hartz, Jill, and University of Virginia. Art Museum. Siting Jefferson : *Contemporary Artists Interpret Thomas Jefferson's Legacy*. Charlottesville, VA; London: University of Virginia Press, 2003.
- Harvey, David. *The Condition of Postmodernity : An Enquiry into the Origins of Cultural Change*. Oxford, England ; Cambridge, Mass., USA: Blackwell, 1989.
- Haug, Kate. "Femme Experimentale Interviews with Carolee Schneemann, Barbara Hammer, and Chick Strand." *Wide Angle* 20, no. 1 (1998): 1-19.

. "An Interview with Carolee Schneemann." Wide Angle 20, no. 1 (1998): 20-49.

- Hayles, N. Katherine. *How We Became Posthuman : Virtual Bodies in Cybernetics, Literature, and Informatics.* Chicago, Ill.: University of Chicago Press, 1999.
- Heartney, Eleanor. "Cultivating Hope: The Visionary Art of Agnes Denes." In *Agnes Denes: Projects for Public Spaces-- a Retrospective*, edited by Dan Mills, 10-38. Lewisburg, PA: Samek Gallery, Bucknell University, 2003.
- Heidegger, Martin. *The Question Concerning Technology, and Other Essays*. New York: Garland Pub., 1977.
- Heisenberg, Werner. Physics and Philosophy : The Revolution in Modern Science. 1st
- Harper Torchbook ed, World Perspectives. New York: Harper & Row, 1962.
- Henderson, Linda Dalrymple. *The Fourth Dimension and Non-Euclidean Geometry in Modern Art*. Princeton, N.J.: Princeton University Press, 1983.

———. Duchamp in Context : Science and Technology in the Large Glass and Related Works. Princeton, N.J.: Princeton University Press, 1998.

- Hendricks, Geoffrey, Mead Art Museum (Amherst College), and Mason Gross School of the Arts (Rutgers University). Critical Mass : Happenings, Fluxus, Performance, Intermedia, and Rutgers University, 1958-1972. New Brunswick, N.J.: Rutgers University Press, 2003.
- Henry Art Gallery, and Walker Art Center. Art into Life : Russian Constructivism, 1914-1932. New York; Seattle: Rizzoli; Henry Art Gallery, 1990.
- Hirsch, Robert. Seizing the Light : A History of Photography. Boston: McGraw-Hill, 2000.
- Hobbs, Robert. "Agnes Denes's Environmental Projects and Installations: Sowing New Concepts." In *Agnes Denes*, edited by Jill Hartz, 163-70. Ithaca, NY: Herbert F. Johnson Museum of Art, Cornell University, 1992.

———, and Alice Aycock. *Alice Aycock : Sculpture and Projects*. Cambridge, Mass.: MIT Press, 2005.

- Hulten, K.G. Pontus. *The Machine as Seen at the End of the Mechanical Age*. New York: Museum of Modern Art, 1968.
- Huyssen, Andreas. *Twilight Memories : Marking Time in a Culture of Amnesia*. New York: Routledge, 1995.
- Irigaray, Luce. *Sexes and Genealogies*. Translated by Luce Irigaray ; translated by Gillian C. Gill. and 23 cm. New York: Columbia University Press, 1993.

——. Je, Tu, Nous : Toward a Culture of Difference. New York, N.Y. ;: Routledge, 1993.

Jameson, Fredric. Marxism and Form; Twentieth-Century Dialectical Theories of Literature. Princeton, N.J.,: Princeton University Press, 1972.

——. Archaeologies of the Future : The Desire Called Utopia and Other Science Fictions. London ; New York: Verso, 2005.

- Jay, Martin. "Somaesthetics and Democracy: Dewey and Contemporary Body Art." Journal of Aesthetic Education 36, no. 4 (2002): 55-57.
- Jones, Amelia. *The Feminism and Visual Culture Reader*, In Sight. London ; New York: Routledge, 2003.
- Jones, Amelia. ""Presence" in Absentia: Experiencing Performance as Documentation." *Art Journal* 56, no. 4 (1997): 11-19.

—. *Self/Image: Technology, Representation, and the Contemporary Subject.* New York: Routledge, 2006.

-. "Televisual Flesh: Activating Otherness in New Media Art." *Parachute: Contemporary Art Magazine* 113 (Jan-March, 2004): 70-92.

Jones, Caroline A. *Machine in the Studio : Constructing the Postwar American Artist.* Chicago: University of Chicago Press, 1996.

-, Peter Louis Galison, and Amy E. Slaton. *Picturing Science, Producing Art.* New York: Routledge, 1998.

- Juhasz, Alexandra. *Women of Vision : Histories in Feminist Film and Video, Visible Evidence*; V. 9. Minneapolis ; London: University of Minnesota Press, 2001.
- Kardon, Janet. "Janet Kardon Interviews Some Maze Makers." Art International April/May, 1976: 64-68.

——. Connections: Bridges, Ladders, Ramps, Staircases, Tunnels, March 11-April 24, 1983. Philadelphia: Institute of Contemporary Art, 1983.

- Karmel, Pepe. "The Year of Living Minimally." Art in America (2004): 90-101.
- Kevles, Daniel J. The Physicists / the History of a Scientific Community in Modern America. Cambridge, Mass.: Harvard University Press, 1995.
- Kinsey, April. "Agnes Denes at A.I.R. (Review)." Artforum January (1973).
- Kirby, Richard Shelton. Engineering in History. New York,: McGraw-Hill, 1956.
- Kitch, Sally. *Higher Ground : From Utopianism to Realism in American Feminist Thought and Theory, Women in Culture and Society.* Chicago: University of Chicago Press, 2000.
- Klose, Joachim. "Process Ontology from Whitehead to Quantum Physics." 1-21. Dresden, 2007.
- Kluver, Billy. "Theater and Engineering: An Experiment." *Artforum* 5, no. 6 (1967): 26-33.
- Kourany, Janet A. The Gender of Science. Upper Saddle River, NJ: Prentice Hall, 2002.
- Kozloff, Max. "The Multimillion Dollar Art Boondoggle." Artforum (1971): 71-76.
- Kramer, Hilton. "Abstraction and Utopia, I and Ii." *New Criterion* 16, no. 1 (1997): 12 (7p).
- Krauss, Rosalind E. *Passages in Modern Sculpture*. New York: Viking Press, 1977.

------. *The Originality of the Avant-Garde and Other Modernist Myths*. Cambridge, Mass.: MIT Press, 1985.

Kubler, George. *The Shape of Time; Remarks on the History of Things*. New Haven,: Yale University Press, 1962.

- Kuhn, Thomas S. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press, 1962.
- Kuspit, Donald. "Agnes Denes: The Ironies of Comprehension." Arts Magazine (1981): 152-53.
- Larson, Kay. "Alice in Duchampland." New York Times, May 25 1981.
- Levi-Strauss, Claude. The Savage Mind. Chicago: University of Chicago Press, 1966.
- Laing, R. D. The Politics of Experience. New York,: Pantheon Books, 1967.
- Lavin, Maud. *Clean New World : Culture, Politics, and Graphic Design*. Cambridge, Mass. ; London: MIT Press, 2001.

—, and Hannah Hoch. Cut with the Kitchen Knife : The Weimar Photomontages of Hannah Hoch. New Haven: Yale University Press, 1993.

- Lee, Hyewon. "Space as a Physical Reality: Experiencing Architectural Sculptures by Nancy Holt, Mary Miss, and Alice Aycock." University of Oklahoma, 1997.
- Lee, Pamela M. *Chronophobia : On Time in the Art of the 1960's*. Cambridge, Mass.: MIT Press, 2004.
- Leff, Harvey S., and Andrew F. Rex. *Maxwell's Demon : Entropy, Information, Computing*, Princeton Series in Physics. Princeton, N.J.: Princeton University Press, 1990.
- Lerman, Nina E., Ruth Oldenziel, and Arwen Mohun. *Gender & Technology : A Reader*. Baltimore: Johns Hopkins University Press, 2003.
- Leslie, Stuart W. The Cold War and American Science : The Military-Industrial-Academic Complex at MIT and Stanford. New York: Columbia University Press, 1993.

Levin, Kim. "Farewell to Modernism." Arts Magazine 54 (October 1979): 90-92.

- ———. "The State of the Art: 1980." Art Journal 40, no. 1 (1980): 366-68.
- Levitas, Ruth. The Concept of Utopia. 1st ed, *Utopianism and Communitarianism*. Syracuse, N.Y.: Syracuse University Press, 1990.

Lewitt, Sol. "Paragraphs on Conceptual Art." Artforum 5, no. 10 (1967): 79.

- Lippard, Lucy. "Caring: Five Political Artists: Mary Beth Edelson, Adrian Piper, Martha Rosler, Nancy Spero and May Stevens." *Studio International* CXCIII (1977): 197-207.
- ———. "Complexes: Architectural Sculpture in Nature." Art in America 67, no. 1 (1979): 86-97.
- ------. "The Dematerialization of Art." Art International 12, no. 2 (1967): 31-36.
- ------. From the Center : Feminist Essays on Women's Art. New York: Dutton, 1976.
 - ------. *Get the Message? : A Decade of Art for Social Change*. 1st ed. New York: E.P. Dutton, 1984.
- ———. "Introduction" 955,000. Vancouver: The Vancouver Art Gallery, January 13 -February 8, 1970.
- ------. *Twenty-Six Contemporary Women Artists, April 18-June 13, 1971*. Ridgfield, CT: The Aldrich Museum of Contemporary Art, 1971.
- Lista, Giovanni. Futurism. Paris: Terrail, 2001.
- Lobell, John. "American Women Architects." Artforum Summer (1977): 28.
- Lodder, Christina. Russian Constructivism. New Haven, Conn.: Yale University Press, 1983.
- Los Angeles County Museum of Art. Art and Technology Program., and Maurice Tuchman. A Report on the Art and Technology Program of the Los Angeles County Museum of Art, 1967-1971. Los Angeles,: Los Angeles County Museum of Art, 1971.
- Lovelace, Carey. "Weighing in on Feminism." ARTnews 96, no. 5 (1997): 140-45.
- Macdonald, Sharon, Pat Holden, and Shirley Ardener. *Images of Women in Peace and War : Cross-Cultural and Historical Perspectives*. Madison, Wis.: University of Wisconsin Press, 1988.

- MacKenzie, Donald A., and Judy Wajcman. *The Social Shaping of Technology : How the Refrigerator Got Its Hum*. Milton Keynes ; Philadelphia: Open University Press, 1985.
- Malloy, Judy. Women, Art, and Technology. Cambridge, Mass. ; London: MIT Press, 2003.
- Manuel, Frank and Fritzie. Utopian Thought in the Western World: Belknap Press, 1979.
- Marcuse, Herbert. *Eros and Civilization; a Philosophical Inquiry into Freud*. Boston,: Beacon Press, 1955.
- *——. An Essay on Liberation*. Boston,: Beacon Press, 1969.
- ------. "Marxism and Feminism." Women's Studies 2, no. 3 (1974): 279-88.

———. One Dimensional Man; Studies in the Ideology of Advanced Industrial Society. Boston,: Beacon Press, 1964.

- ———. *Reason and Revolution; Hegel and the Rise of Social Theory.* 2d ed. New York,: Humanities Press, 1954.
- ———, Kurt H. Wolff, and Barrington Moore. "Art and Revolution" in The Critical Spirit; Essays in Honor of Herbert Marcuse. Boston,: Beacon Press, 1967.
- Margolin, Victor. The Struggle for Utopia : Rodchenko, Lissitzky, Moholy-Nagy : 1917-1946. Chicago: University of Chicago Press, 1997.
- Marter, Joan M., Simon Anderson, and Newark Museum. *Off Limits : Rutgers University and the Avant-Garde, 1957-1963.* Newark, N.J. New Brunswick, N.J. ; London: Newark Museum ;Rutgers University Press, 1999.

———, Ferris Olin, ed. Artists on the Edge: Douglass College and the Rutgers MFA, Mary H. Dana Women Artists Series. New Brunswick: Mabel Smith Douglass Library, Rutgers, The State University of New Jersey, March 9 - June 6, 2005.

- Martin, Herbert Marcuse and Biddy. "The Failure of the New Left?" *New German Critique Autum*n, no. 18 (Autumn, 1979): 3-11.
- Martineau, Alain, and Herbert Marcuse. *Herbert Marcuse's Utopia*. Montreal: Harvest House, 1986.
- Marx, Karl. *Manifesto of the Communist Party*. Edited by Fredrick Engels. 28th printing of the 100th Anniversary Edition, 1989 ed. New York: International Publishers, 1948.

- Marx, Leo. *The Machine in the Garden; Technology and the Pastoral Ideal in America*. New York,: Oxford University Press, 1964.
- Mayberry, Maralee, Banu Subramaniam, and Lisa H. Weasel. *Feminist Science Studies :* A New Generation. New York ; London: Routledge, 2001.
- Mayr, Otto. *Authority, Liberty, & Automatic Machinery in Early Modern Europe.* Baltimore: Johns Hopkins University Press, 1986.
- McClellan, James E., and Harold Dorn. *Science and Technology in World History : An Introduction*. 2nd ed. Baltimore: Johns Hopkins University Press, 2006.
- McClure, Michael. Meat Science Essays. 2d ed. [San Francisco]: City Light Books, 1966.
- McDowell, Edwin. "Arms Makers Are the Top Beneficiaries." *New York Times*, January 20 1980, F1.
- McElreavy, Timothy S. "Paradise Lost/Paradise Found: Materializing a History of Conceptual Art." *Art Journal* 61, no. 4 (Winter 2002): 107, 4 pgs.
- McEvilley, Thomas. "Art in the Dark." Artforum 21, no. 10 (1983): 60-71.
- ———. "Philosophy in the Land." Art in America (2004): 158-63.
- McLuhan, Marshall. Understanding Media; the Extensions of Man. 1st ed. New York,: McGraw-Hill, 1964.
- ———, and John W. Hartman Center for Sales Advertising & Marketing History. *The Mechanical Bride; Folklore of Industrial Man*, Beacon Paperbacks. Boston,: Beacon Press, 1967.
- ——, and Quentin Fiore. *The Medium Is the Massage*. New York,: Random House, 1967.
- McShine, Kynaston, Museum of Modern Art (New York N.Y.), and International Council of the Museum of Modern Art (New York N.Y.). *Information*. New York,: Museum of Modern Art, 1970.
- McWilliam, Neil. *Dreams of Happiness : Social Art and the French Left, 1830-1850.* Princeton, N.J.: Princeton University Press, 1993.
- Menard, Andrew. "Art and the Logic of Computers." Art Criticism 8, no. 2 (1993): 58-67.
- Merleau-Ponty, Maurice. *Phenomenology of Perception, International Library of Philosophy and Scientific Method.* New York,: Humanities Press, 1962.

- Merrell, Floyd. Unthinking Thinking : Jorge Luis Borges, Mathematics, and the New Physics. West Lafayette, Ind.: Purdue University Press, 1991.
- Meyer, Richard. "Feminism Uncovered." Artforum 45, no. 10 (2007): 211-13.
- Meyer, Ruth K. "Interview with Alice Aycock: Ancient Places and Personal Spaces: Homage to Alice Aycock." D.A.A. Journal, Cincinnati: College of Design, Architecture and Art (1980): 16.
- Meyer, Ursula. "De-Objectification of the Object." *Arts Magazine* 43, no. 7 (1969): 20-21.
- Miller, Lynn F., and Douglass College. Women Artists Series at Douglass College, Tenth Anniversary Year, 1980-1981, Women Artists Series. New Brunswick: State University of New Jersey, Rutgers, 1980.
- ——, and Mabel Smith Douglass Library. *Women Artists Series*, Year Five, Women Artists Series. New Brunswick, N.J.: Mabel Smith Douglass Library, Douglass College, Rutgers, the State University of New Jersey, 1975.
- ——, Sally S. Swenson, Beryl K. Smith, and Joan Arbeiter. *Lives and Works, Talks with Women Artists.* Metuchen, N.J.: Scarecrow Press, 1981.
- Mills, C. Wright. The Power Elite. New York: Oxford University Press, 1956.
- ------. "Letter to the New Left." New Left Review, no. 5 (1960).
- Mohr, Charles. "It's a Long Way to Star Wars: Shuttle's Military Potential Is Rather Prosaic." *The New York Times*, June 27 1982, 156.
- Monroe A. Denton, Jr. *Alice Aycock: Projects and Proposal, 1971-1978.* Allentown, PA: The Center for the Arts, Muhlenberg College, 1978.
- Morgan, Robin. Sisterhood Is Forever : The Women's Anthology for a New Millennium. New York, NY: Washington Square Press ;, 2003.
- Morgan, Robert C. "Carolee Schneemann's Viet-Flakes (1965)." In *Imaging Her Erotics: Essays, Interviews, Projects*, edited by Carolee Schneemann, 86-88. Cambridge, MA: MIT Press, 2002.
- ———. Conceptual Art : An American Perspective. Jefferson, N.C.: McFarland, 1994.

—. Art into Ideas : Essays on Conceptual Art, Contemporary Artists and Their Critics. Cambridge ; New York: Cambridge University Press, 1996.

—. Between Modernism and Conceptual Art : A Critical Response. Jefferson, N.C.: McFarland & Co., 1997.

. "The Spectacle in Time: A New Look at Art and Technology." *Arts Magazine* 62, no. 2 (October 1987): 76-79.

Morgan, Stuart. "Alice Aycock: Structures, Stories and the History of Man-Powered Flight." *Artscribe*, no. 15 (1978): 12-17.

Morris, Robert. "Aligned with Nazca." Art Forum 14, no. 2 (October 1975): 26-39.

Motherwell, Robert. The Dada Painters and Poets; an Anthology. New York,: Wittenborn, 1951.

------. "The Present Tense of Time and Space." Art in America Jan./Feb. (1978): 70.

Moylan, Tom. *Demand the Impossible : Science Fiction and the Utopian Imagination*. New York: Methuen, 1986.

———, and Raffaella Baccolini. *Dark Horizons : Science Fiction and the Dystopian Imagination*. New York ; London: Routledge, 2003.

Mumford, Lewis. *The City in History: Its Origins, Its Transformations, and Its Prospects.* [1st ed. New York,: Harcourt, 1961.

——. The Myth of the Machine. vol. 1 and 2. 1st ed. New York,: Harcourt, 1967.

- ———, and Donald L. Miller. *The Lewis Mumford Reader*. Athens: University of Georgia Press, 1995.
- Munro, Eleanor. Originals: American Women Artists. New York: Simon and Schuster, 1979.
- Nancy Holt, ed. *The Writings of Robert Smithson*. New York: New York University Press, 1979.
- Naumann, Francis M., Beth Venn, Allan Antliff, and Whitney Museum of American Art. *Making Mischief : Dada Invades New York.* New York: Whitney Museum of American Art : Distributed by Harry N. Abrams, Inc., 1996.
- Neff, John. Concept into Form, Works 1970-1990, May 9-June 29, 1990. Chicago: The Arts Club, 1990.

-. "Thoughtlines: A Visual Dialogue with the Third Millennium." In *Curatorial Archives Smithsonian American Art Museum*, 10. New York: Randy Rosen, October 1, 1990.

- Neil Harris, Martina Roudabush Norelli. Art, Design, and the Modern Corporation: The Collection of Container Corporation of America, a Gift to the National Museum of American Art. Washington, DC: Smithsonian Institution Press, 1985.
- Neumaier, Diane. *Reframings : New American Feminist Photographies*. Philadelphia: Temple University Press, 1995.
- Newman, Amy. "Art/Architecture; an Innovator Who Was the Eros of Her Own Art." *New York Times*, February 3, 2002, n.p.
- Newport Harbor Art Museum., Agnes Denes, Channa Horwitz, and Joyce Cutler-Shaw. Three Directions : Agnes Denes, Channa Horwitz, Joyce Cutler Shaw, October 23-November 28, 1976 : An Exhibition. Newport Beach, Calif.: The Museum, 1976.
- Nochlin, Linda. "Picturing Modernity, Then and Now." *Art in America* (May 2005): 124-29, 80.
- Norelli, Martina. "Interview with Agnes Denes." In Curatorial Archives, Smithsonian American Art Museum. Washington, DC, January 31, 1985.
- Nyo, Paula Tin. "Carolee Schneemann: An Artweek Interview." *Artweek* 22, no. 12 (1991): 21.
- O'Neill, John. Perception, Expression, and History; the Social Phenomenology of Maurice Merleau-Ponty. Evanston,: Northwestern University Press, 1970.
- Oppenheim, Dennis, and Germano Celant. *Dennis Oppenheim : Explorations*. Milano: Charta, 2001.
- Petrolle, Jean, and Virginia Wright Wexman. *Women and Experimental Filmmaking*. Urbana: University of Illinois, 2005.
- Philips, Patricia. "Alice Aycock: Storm King Art Center." *Artforum International* October (1990): 173-74.
- Pincus-Witten, Robert. Postminimalism. New York: Out of London Press, 1977.
- Pisano, Dominick. *The Airplane in American Culture*. Ann Arbor: University of Michigan Press, 2003.

Poirier, Maurice. "The Ghost in the Machine." Art News 85, no. 8 (1986): 78-85.

Popper, Frank. Art of the Electronic Age. New York: Harry N. Abrams, 1993.

- Popper, Karl Raimund. *The Open Society and Its Enemies*. London,: G. Routledge & Sons, 1945.
- Press, The Associated. "Reagan's Panel Is Said to Back Space Weapons." *New York Times*, October 19 1983, A1.
- Price, Aimee Brown. "A Conversation with Alice Aycock." *Architectural Digest* April (1983): 54-60.
- Rae, Alastair I. M. Quantum *Physics, Illusion or Reality?* Cambridge [Cambridgeshire] ; New York: Cambridge University Press, 1986.
- Rapaport, Brooke Kamin. "Alice Aycock, Public Artist." *Sculpture* 22, no. 10 (2003): 33-37.
- Reckitt, Helena, and Peggy Phelan. Art and Feminism, Themes and Movements. London; New York, NY: Phaidon, 2001.
- Reich, Wilhelm. Character-Analysis. 3d, enl. ed. New York,: Noonday Press, 1949.

——. Ether, God, and Devil. Cosmic Superimposition. New York,: Farrar, 1973.

- Reise, Barbara. "Agnes Denes: Analytical Works." *Studio Art International Journal of Modern Art* 188, no. 970 (1974): 235 38.
- Richard, Paul. "Stage Props in Search of a Pastime: Alice Aycock's Game of Fliers at 12th & G." *The Washington Post* 1980, B1-B2.
- Rickey, George. Constructivism; Origins and Evolution. New York,: G. Braziller, 1967.
- Roberts, John. *The Art of Interruption : Realism, Photography, and the Everyday, The Critical Image.* Manchester ; New York: Manchester University Press, 1998.
- Robinson, Hilary. Visibly Female : Feminism and Art : An Anthology, Women on Art. London, England: Camden, 1987.

———. *Feminism-Art-Theory : An Anthology, 1968-2000.* Oxford ; Malden, Mass.: Blackwell Publishers, 2001.

Robinson, Paul A. *The Freudian Left : Wilhelm Reich, Geza Roheim, Herbert Marcuse.* 1st ed. New York: Harper & Row, 1969.

- Rorimer, Anne. *New Art in the 60s and 70s : Redefining Reality*. London: Thames & Hudson, 2001.
- Rose, Hilary. "Dreaming the Future." *Hypatia* 3, no. 1 (1988).
- Rosen, Ruth. The World Split Open : How the Modern Women's Movement Changed America. New York: Viking, 2000.
- Rosenberg, Jan. Women's Reflections : The Feminist Film Movement, Studies in Cinema; No. 22. Ann Arbor, Mich.: UMI Research Press, 1983.
- Rosler, Martha. "To Argue for a Video against the Mythology of Everyday Life." In *Conceptual Art: A Critical Anthology*, edited by Alexander Alberro, 366. Cambridge, MA: MIT Press, 1999.
- Decoys and Disruptions : Selected Writings, 1975-2001. Cambridge, Mass.: MIT Press in association with International Center of Photography, New York, 2004.

—. "Image Simulations/ Computer Manipulations." In *The Techno/Logical Imagination: Machines in the Garden of Art*, edited by Neil Sieling, 10-16. Minneapolis: Intermedia Arts Minnesota, 1989.

- . "Out of the Vox: Martha Rosler on Art's Activist Potential." *ArtForum* 43, no. 1 (2004): 218-19.
 - . "The Private and the Public: Feminist Art in California." *Artforum* 8 (1975): 46-53.

—. "Video: Shedding the Utopian Moment." In *Decoys and Disruptions: Selected Writings*, 1975-2001, edited by Martha Rosler, 53-85. Cambridge, MA: MIT Press in association International Center for Photography, 2004.

——, Anthony Vidler, and Alexander Alberro. *Rights of Passage : Photographs*. New York: New York Foundation for the Arts, 1997.

——, Brian Wallis, and Dia Art Foundation. *If You Lived Here : The City in Art, Theory, and Social Activism, Discussions in Contemporary Culture*. Seattle: Bay Press, 1991.

- ——, M. Catherine de Zegher, and Ikon Gallery. *Martha Rosler : Positions in the Life World*. Birmingham, England; Vienna, Austria; Cambridge, Mass.: Ikon Gallery; Generali Foundation: MIT Press, 1998.
- Roszak, Theodore. *The Making of a Counter Culture : Reflections on the Technocratic Society and Its Youthful Opposition*. Garden City, N.Y.: Doubleday, 1969.
- Rubenstein, Charlotte Stieffer. American Women Sculptors. Boston: GK Hall & Co., 1990.
- Rubin, William Stanley, Museum of Modern Art (New York N.Y.), Los Angeles County Museum., and Art Institute of Chicago. *Dada, Surrealism, and Their Heritage*. New York,: Museum of Modern Art; distributed by New York Graphic Society, Greenwich, 1968.
- Rutsky, R. L. High Technåe : Art and Technology from the Machine Aesthetic to the Posthuman, Electronic Mediations ; V. 2. Minneapolis, MN ; London: University of Minnesota Press, 1999.
- Ryan, Marie-Laure. *Cyberspace Textuality : Computer Technology and Literary Theory*. Bloomington: Indiana University Press, 1999.
- Sargisson, Lucy. Contemporary Feminist Utopianism, Women and Politics. London; New York: Routledge, 1996.
- Sayre, Henry. *The Object of Performance: The American Avant-Garde since 1970.* Chicago: University of Chicago Press, 1989.
- Schneemann, Carolee. "Americana I Ching Apple Pie." *High Performance* 14, no. 4 (1982): 74.
- ———. "The Blood Link: Fresh Blood--a Dream Morphology and Venus Vectors." Leonardo 27, no. 1 (1994): 23-28.
- ———. Imaging Her Erotics : Carolee Schneemann : Essays, Interviews, Projects. Cambridge, Mass.: MIT Press, 2002.
- ———. "The Obscene Body Politic." Art Journal 50, no. 4 (1991): 28-35.
- ——, and Bruce R. McPherson. *More Than Meat Joy : Performance Works and Selected Writings*. 2nd ed. Kingston, NY: McPherson & Co., 1997.

-, and Max Hutchinson Gallery (New York N.Y.). *Carolee Schneemann*. New Paltz, N.Y. New York, N.Y.: Documentext: Max Hutchinson Gallery, 1982.

 , and New Museum of Contemporary Art (New York N.Y.). Carolee Schneemann
: Up to and Including Her Limits. New York: New Museum of Contemporary Art, 1996.

Schneider, Rebecca. *The Explicit Body in Performance*. London ; New York: Routledge, 1997.

Schuldt. "Word Art." Arts Magazine 43, no. 7 (1969): 22-23.

Selz, Peter. "Agnes Denes: The Artist as Universalist." In Agnes Denes, edited by Jill Hartz, 147-54. Ithaca, NY: Herbert F. Johnson Museum of Art, Cornell University, 1992.

------. "Agnes Denes: The Visual Presentation of Meaning." *Art in America* (1975): 72-74.

- Selz, Peter Howard. Beyond the Mainstream : Essays on Modern and Contemporary Art, Contemporary Artists and Their Critics. Cambridge, U.K. ; New York: Cambridge University Press, 1997.
- Shanken, Edward A. "Gemini Rising, Moon in Apollo: Attitudes on the Relationship between Art and Technology in the Us, 1966-71." Anders Nereim, ed. ISEA97: *Proceedings of the Eighth International Symposium on Electronic Art.* Chicago: ISEA97 (1998).

———. "The House That Jack Built: Jack Burnham's Concept of "Software" as a Metaphor for Art." *Leonardo Electronic Almanac* 6, no. 10 (1998).

——, and Duke University. Dept. of Art History. "Art in the Information Age : Cybernetics, Software, Telematics, and the Conceptual Contributions of Art and Technology to Art History and Theory." 2001.

Shapley, Harlow. "Life, Hope, and Cosmic Evolution." Zygon 1, no. 3 (1966): 275-85.

- Sherburne, Donald W. A Key to Whitehead's Process and Reality. Bloomington,: Indiana University Press, 1966.
- Shteir, Ann B., and Bernard V. Lightman. Figuring It Out : Science, Gender, and Visual Culture. 1st ed, Interfaces, Studies in Visual Culture. Hanover, N.H.: Dartmouth College Press : Published by University Press of New England, 2006.
- Simon, Joan. "Report from San Francisco: Art for Tomorrow's Archive." Art in America November (1996): 41-47.

- Sims, Lowery Stokes. "Penetrating the Folds of Time...: The Visionary Art of Agnes Denes." In Agnes Denes, edited by Jill Hartz, 155-61. Ithaca, NY: Herbert F. Johnson Museum, Cornell University, 1992.
- Smith, Hedrick. "U.S. Priorities: Basic Reversal: Budget Placing Military above Domestic Needs." *New York Times*, March 5 1981, A1.
- Smith, Howard. "Outstanding in Her Field." The Village Voice, June 29 1982, 28.
- Smith, Philip. "Dynamic Visual Systems in Process: The Work of Agnes Denes." Arts Magazine (1975): 77-79.
- Smithson, Robert, and Jack D. Flam. *Robert Smithson : The Collected Writings*. Berkeley: University of California Press, 1996.

———, and Nancy Holt. *The Writings of Robert Smithson : Essays with Illustrations*. New York: New York University Press, 1979.

- Snow, C. P. *The Two Cultures and the Scientific Revolution*, Rede Lecture. Cambridge, England: University Press, 1959.
- Solomon R. Guggenheim Museum., Schirn Kunsthalle Frankfurt., and Amsterdam (Netherlands). Stedelijk Museum. *The Great Utopia : The Russian and Soviet Avant-Garde*, 1915-1932. New York: Guggenheim Museum : Distributed by Rizzoli International Publications, 1992.

Sontag, Susan. On Photography. New York: Farrar, Straus an Giroux, 1977.

------. "What Have We Done?" the Guardian/UK, May 24 2004.

Stiles, Kristine. Correspondence Course, an Epistolary History of Carolee Schneemann and Her Circle. Durham, NC: Duke University Press, 2010.

——. "The Painter as an Instrument of Real Time." In *Imaging Her Erotics: Carolee Schneemann: Essays, Interviews, Projects*, edited by Carolee Schneemann. Cambridge, MA: MIT Press, 2002.

———. "Performance and Its Objects." Arts Magazine 65 (1990): 35+.

———. "Sticks and Stones: The Destruction in Art Symposium." *Arts Magazine* (January 1989): 54-60.

—, and Peter Howard Selz. *Theories and Documents of Contemporary Art : A Sourcebook of Artists' Writings*, California Studies in the History of Art ; 35. Berkeley: University of California Press, 1996.

- Sullivan, Walter. "Physicists Hoping to Build 30-Mile Atom Device to Explore Matter." *New York Times*, October 10 1976, 30.
- Summers, Lawrence. "Remarks at Nber Conference on Diversifying the Science and Engineering Workforce." Cambridge, Mass.: Harvard University, 2005.
- Toepfer, Karl. "Nudity and Textuality in Postmodern Performance." *Performing Arts Journal* 18, no. 3 (1996): 76-91.
- Tomkins, Calvin. *The Bride and the Bachelors : Five Masters of the Avant-Garde*. New York: Penguin Books, 1976.
- Troy, Nancy J. The De Stijl Environment. Cambridge, Mass.: MIT Press, 1983.
- Tsai, Eugenie. "A Tale of (at Least) Two Cities: Alice Aycock's "Large Scale Dis/Integration of Microelectronic Memories (a Newly Revised Shantytown)"." *Arts Magazine* 56, no. 10 (1982).
- Turner, Fred. From Counterculture to Cyberculture : Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism. Chicago: University of Chicago Press, 2006.
- Vanmeenen, Karen. "A Hunger for Images." Afterimages 33, no. 4 (2006): 13-18.
- Varon, Jeremy. Bringing the War Home : The Weather Underground, the Red Army Faction, and Revolutionary Violence in the Sixties and Seventies. Berkeley: University of California Press, 2004.
- Wajcman, Judy. *Feminism Confronts Technology*. University Park, Pa.: Pennsylvania State University Press, 1991.
 - ——. *Technofeminism*. Cambridge, UK ; Malden, MA: Polity, 2004.
- Wallis, Brian. Blasted Allegories : An Anthology of Writings by Contemporary Artists, Documentary Sources in Contemporary Art ; V. 2. New York; Cambridge, Mass.: New Museum of Contemporary Art ; MIT Press, 1987.
- ———. "Living Room War." Art in America 80, no. 2 (1992): 104-07.
- Wark, Jane. "Conceptual Art and Feminism: Martha Rosler, Adrian Piper, Eleanor Antin, and Martha Wilson." *Woman's Art Journal* 22, no. 1 (2001): 44-50.
- Weinstock, Jane. "Interview with Martha Rosler." *October* Summer, no. 17 (1981): 77-98.

- Wheeler, Daniel. Art since Mid-Century : 1945 to the Present. New York: Vendome Press : Distributed by Rizzoli International Publications, 1991.
- Whitehead, Alfred North. *Process and Reality, an Essay in Cosmology*; Gifford Lectures Delivered in the University of Edinburgh During the Session 1927-28. New York, Cambridge, Eng.,: The Macmillan Company; University Press, 1929.
- Whyte, William Hollingsworth. *The Organization Man.* New York: Simon and Schuster, 1956.
- Wiener, Norbert. *Cybernetics; or, Control and Communication in the Animal and the Machine*. 2d ed. New York,: M.I.T. Press, 1961.

- Wilford, John Noble. "Space and the American Vision." *New York Times*, April 5 1981, SM14.
- Withers, Rachel. "A Short History of Performance: Part One." *Artforum* 41, no. 1 (2002): 214.
- Wood, Paul and Gill Perry, ed. *Themes in Contemporary Art, Art of the 20th Century:* Yale University Press, 2004.
- Woodward, Kathleen M. *Myths of Information : Technology and Postindustrial Culture, Theories of Contemporary Culture.* Madison, Wis.: Coda Press, 1980.
- Yates, Donald A. Jorge Luis Borges: Labyrinths & Other Writings. New York: New Directions Publishing Corporation, 1964.
- Zipes, Jack and Frank Mecklenburg. *Studies in Contemporary German Social Thought*. Cambridge, Mass.: MIT Press, 1988.

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INSTRUCTOR OF ART HISTORY	
History of Photography, Rutgers University, New Brunswick, NJ	Summers 2005 & 06
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INSTRUCTOR OF ART HISTORY	
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PUBLICATIONS

"Cosmology and Transformation in the Work of Michelle Stuart" *Woman's Art Journal* 30:1 (Spring/Summer 2009) (forthcoming)

Louise Downey, ed. *Don't Kiss Me: The Art of Claude Cahun and Marcel Moore* in *Woman's Art Journal* 28:2 (Fall/Winter 2007): 52-55. Book review

Tirza True Latimer, *Women Together/Women Apart: Portraits of Lesbian Paris* in *Woman's Art Journal*, 28:2 (Fall/Winter 2007): 55-57. Book review

Robert Hobbs, *Alice Aycock: Sculpture and Projects* in *Woman's Art Journal*, 27:1 (Spring/Summer 2006): 57-61. Book review

"Eve Sussman's The Rape of the Sabine Women" invited essay for the exhibition *The Rape of the Sabine Women*, The Nasher Museum of Art, Duke University, July 4 – September 6, 2006

PUBLICATIONS continued

"Artur Zmijewski" and "Sigalit Landau" invited essays for the exhibition *Memorials of Identity: New Media from the Rubell Family Collection*, The Nasher Museum of Art, Duke University, August 3 – October 1, 2006

"Alice Aycock" Artists on the Edge, Douglass College and the Rutgers MFA (New Brunswick: Rutgers University Libraries, 2005): 5-11

Introductory essay, IMPRINT: A Public Art Project (Phila.: The Print Center, 2002)

Introductory Essay, *The Print Center International Competition*, (Phila. The Print Center, 1999, 2000, 2001, 2002)