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Dissertation

TECHNOLOGY AND ARTISTIC PRACTICE IN 1960s AND 1970s
SOUTHERN CALIFORNIA

by

GINGER ELLIOTT SMITH

B.S., University of Tennessee, Knoxville, 2000
M.S., University of Tennessee, Knoxville, 2001
M.A., Boston University, 2007

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For Adam and Beckett.

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**TECHNOLOGY AND ARTISTIC PRACTICE IN
1960S AND 1970S SOUTHERN CALIFORNIA**

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GINGER ELLIOTT SMITH

Boston University Graduate School of Arts & Sciences, 2015

Major Professor: Gregory Williams, Associate Professor of History of Art & Architecture

ABSTRACT

This dissertation traces the ways in which the emergent countercultures on the West Coast, in parallel with the high-technology industrial complex of Southern California, fostered ad-hoc experimentation with technology in studio and post-studio practices. In the studio, individual artists researched, experimented with, and became self-taught experts on discrete technologies. In comparison, post-studio methods functioned less as a top-down mastery and innovation within a singular craft (as in the initial studio methods), and, instead, involved the creation of immersive, perceptual environments.

The Introduction situates the development of the art/technology phenomenon alongside the emergence of the art scene in Los Angeles, expanding the literature in relation to other more established histories. Each of the first three chapters focuses on one case study—Larry Bell, Mary Corse, and Fred Eversley—to reveal the scope of appropriated technologies and the permutations within various mediums (glass sculpture, industrial lighting schematics, acrylic painting, and polyester sculpture). Chapter 4 analyzes this plurality, focusing on the appropriation of cognitive psychology. As

technological appropriation became more commonplace, and particularly as some artists came to require larger spaces, curators and institutions helped orchestrate experimentation with immersive environments. I explore the range of post-studio practices in the works of Lloyd Hamrol, Tom Eatherton, Michael Asher, Robert Irwin, James Turrell, Maria Nordman, and Eric Orr, among others, and include Hal Glicksman as a key example of curatorial influence. The concluding chapter considers the art/technology legacy alongside themes of dilapidation and obsolescence.

This dissertation demonstrates how art with reflective and/or transparent materials of high-tech industry prescribed movements for viewer engagement—an embodied experience of mobile spectatorship in Los Angeles of the 1960s and 1970s. I correlate these movement patterns, in parallel with light, space, and sourced technology, to the experience of each work.

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INTRODUCTION

Just as there was no New York School, however, there was no LA Look. The latter term refers generically to cool, semitechnological, industrially pretty art made in and around Los Angeles in the sixties [. . .]. It has, in short, the aroma of Los Angeles in the sixties—newness, postcard sunset color, and intimates of aerospace profundity. —Peter Plagens (1974)¹

That was the difference between the artists on the East Coast and those on the West. We saw it and they didn't. They relied on *conception* while we worked in the domain of *perception*. —Robert Irwin (ca. 1976)²

Peter Plagens's appraisal of a quintessential 1960s Los Angeles art style—its “LA-ness”—betrays the environmental stereotypes long associated with the city's art tendencies during that decade. Beyond this regionalist commentary, the heart of Plagens's quote speaks to a significant motif in Southern California art of the 1960s and 1970s: the interface of art and technology. Influenced by the unstructured aspects of jazz music and the counterculture, the LA art scene's emergence during the late 1950s fostered a concentration of technological experimentation in Southern California art in the successive decades. The free-form sensibility of jazz and the Beats alongside the rational sphere of science worked in tandem to inspire artistic experimentation with technology. This dissertation argues that this preoccupation with experimentation modeled, in part, on the rising collaboration of scientists, spurred artistic development. It explores how the burgeoning countercultures (i.e., the Beat and hippie movements) on the West Coast, in parallel with the high-technology industrial complex of Southern

¹ Peter Plagens, *Sunshine Muse: Contemporary Art on the West Coast* (New York: Praeger, 1974), 120.

² Robert Irwin, quoted in Lawrence Weschler, *Seeing Is Forgetting the Name of the Thing One Sees: A Life of Contemporary Artist Robert Irwin* (Berkeley: University of California Press, 1982), 78.

California, fostered artistic experimentation with technology in, and eventually beyond, the studio.

In emulation of previous Art and Technology movements (e.g., the Bauhaus or Constructivism), numerous American artists enthusiastically adapted novel technologies to their practices during the 1960s and 1970s. The intensive high-tech growth of Los Angeles during the postwar years encouraged many artists to experiment within this autodidactic paradigm. In the studio, this experimentation manifested unilaterally, wherein a selection of artists independently researched, appropriated, and became self-taught experts on discrete technologies. The methods employed by artists working in the post-studio mode functioned less as a top-down mastery and innovation within a singular craft (as in the initial studio methods) and, instead, operated more divergently. As the links between art and technology became more pervasive, and particularly as these artists came to require larger, experimental, and technologically equipped spaces, curators and institutions helped orchestrate technological experimentation within immersive environments.

This dissertation acknowledges that the interface of art and technology—a paradigm dubbed “the machine in the studio” by Caroline Jones—increasingly infiltrated American art practices during the postwar period (roughly 1945 through the 1970s).³ Whereas Jones analyzes this phenomenon using predominantly East Coast examples

³ This dissertation echoes the arguments about “post-studio” put forth by Caroline Jones, where she closely analyzes the role of technology and new modes of art production in postwar American art practices (especially the construction of identity in relationship to these emergent studio dynamics). Jones traces how these new models and sites of production affected the works in visual and conceptual terms. She also focuses heavily on the relationships between these models and industrial modes of production in parallel with the construction of gender identity. See Jones, *Machine in the Studio: Constructing the Postwar American Artist* (Chicago: University of Chicago Press, 1996).

(including Jackson Pollock, Frank Stella, Andy Warhol, and Robert Smithson), I examine the ways in which the machine became a part of LA studio and post-studio practices. I chronicle how the “machine” paradigm operated in LA art practices involving such diverse materials as glass, florescent lighting, acrylic paint, and plastics. While the growing scholarship has begun to tie the postwar industrial complex of Southern California to experiments in art/technology, scholars rarely delve into extensive technical—and interdisciplinary—discussion.⁴ To address this need, I describe the operational processes of three artists whose practices integrated technology (and the materials cited above) into their studios: Larry Bell, Mary Corse, and Fred Eversley. While Bell, Corse, and Eversley all adopt distinctive procedures that are somewhat idiosyncratic and especially innovative within their craft, their artworks all share a wholesale concern with perception and technological experimentalism. Each artist’s oeuvre represents interventions in the methods of glass coating, florescent lighting schematics, acrylic on canvas, and polyester resin casting. The first three chapters reveal the important reverberations between the LA avant-garde and the commitment of each artist to her/his appropriated technology in the studio. These case studies share their impetus with other postwar American artists who appropriate technology in the studio; part of this Introduction situates these artists within this trend in 1960s American art generally.

⁴ A noteworthy exception to this situation is the Getty Conservation Institute’s close examination of De Wain Valentine’s appropriation of and innovation in polyester resin plastic, which culminated in a publication and exhibition at the J. Paul Getty Museum. See Tom Learner, Rachel Rivenc, and Emma Richardson, *From Start to Finish: De Wain Valentine's Gray Column* (Los Angeles: The Getty Conservation Institute, 2011).

While the first three case studies correlate distinct technological appropriations and the modes of perceptual experience that spectators undergo, I apply a more pluralistic framework to Chapter 4. Here I transition to discuss a spectrum of artists using technologies within immersive environments. Whereas the first three chapters probe specific interventions in materials—mineral-coated glass, fluorescent light bulbs, acrylic paint, and polyester resin—Chapter 4 examines works whose medium is the ether itself. Also in agreement with Jones, Chapter 4 documents how a shift in mid-1960s art practices compelled American artists to abandon the studio model in order to execute art that was often object-less, ephemeral, and/or site-specific—the “post-studio” or “nonstudio” paradigm.⁵ Specifically, Chapter 4 reveals how this paradigm shift in American art practices resulted specifically in West Coast artists becoming less concerned with making perception-based objects and more concerned with enveloping the participant in perceptual environments. Such immersive environments constitute an evolution in the technological appropriation model, whereby artists began experimenting with technologies within spaces oriented toward activating viewer perception.

Specific examples of this phenomenon operating in Southern California include the installations of Michael Asher, Robert Irwin, Tom Eatheron, Lloyd Hamrol, Maria Nordman, Eric Orr, and James Turrell. These artists employed technologies that include both physical applications (i.e., mechanized, computerized, and chemical technologies) as well as theoretical functions (i.e., phenomenological and cognitive theories as scientific applications). Chapter 4 also attests to the ways in which this post-studio model became

⁵ Jones demonstrates how the onset of post-studio practices manifested in the industrial aesthetic of Robert Smithson, a key initiator of this paradigm shift.

increasingly diverse, performative, concept-driven, and collaborative. I highlight the symbiotic role that curators played in negotiating this new terrain by using the example of preparator and curator Hal Glicksman—one of the leading coordinators of these post-studio initiatives—as a case in point. Consequently, Chapter 4 surveys a broad range of experimentation with technologies in the perceptual spaces of Southern California artists (and foregoes the strict monographic framework of the initial three chapters).

Of utmost importance for this dissertation, however, is to lay bare the technologies appropriated as precisely as possible. Significant—and largely untold—are the modes of experimentation that these artists used: the research undertaken in order to comprehend the chosen technology, the resources tapped to locate necessary equipment and materials, and, especially interesting, the anecdotal evidence that explains the instances of trial and error. This dissertation thus takes a revisionist approach, focusing on the socio-political and technical contexts of autodidactic experimentation that manifested in Southern California art during the 1960s and 1970s. Using an interdisciplinary framework I chronicle how Larry Bell, Mary Corse, and Fred Eversley each set up his or her studio similar to a makeshift laboratory. And in the case of post-studio practices, I examine how artists applied psychological research and technical apparatuses to construct experimental spaces, likening such experiences to cutting-edge psychological and cognitive experimentation. I argue that, akin to the scientific method, such investigative processes should be valued as a critical component in the reception of these art forms. The works discussed necessitated temporospatial negotiations of the body in perceptible patterns—an embodied experience of mobile spectatorship. In

contradistinction to single-position viewing, mobile spectatorship manifests as the psychological awareness of one's movements while gazing: vis-à-vis circumambulation, transambulation, optical adjustments, and/or corporeal rotation, hunching, etc. My analysis attends to the necessary movements enacted by viewers and, particularly, the ways in which the experience of industrial materials or psychological environments demanded predictable types of motion.

An Art Scene Is Hatched in 1957

Three noteworthy events—a book's publication, a satellite's launch, and a gallery's founding—took place in 1957. More than mere coincidences, the alignment of these events represents a sort of presaging of artists experimenting with new technologies in Southern California during the 1960s and 1970s. In September 1957, Viking Press published Jack Kerouac's enduring anthem for the Beat movement, *On the Road*. This now canonical complement to the larger countercultural project helped establish, in popular print, what Allen Ginsberg's 1955 performance of *Howl* at Six Gallery in San Francisco had already championed. *On the Road*, in the wake of *Howl*'s notoriety, helped crystallize the counterculture's agitation against the American postwar culture of "normalcy."⁶ By the early 1960s, Americans were becoming aware of countercultural leanings that were bubbling in certain regions of the country, with San Francisco existing as the "pulsing heart of the counterculture," to borrow Lucy Lippard's descriptive

⁶ Elissa Auther and Adam Lerner, "Introduction: The Counterculture Experiment: Consciousness and Encounters at the Edge of Art," in *West of Center: Art and the Counterculture Experiment in America, 1965-1977* (Minneapolis: University of Minnesota Press, 2012), xxi.

phrase.⁷ The proximity of Los Angeles to the countercultural hub would have a direct impact on the LA avant-garde.

Following the release of *On the Road*, Americans were stunned to learn that the Soviet Union had successfully placed Earth's first artificial satellite, Sputnik, into orbit in October 1957. This event ushered the United States into what was quickly dubbed the "Space Race," an inexorable component of the broader, more anxiety-causing Cold War. Sputnik's launch implored Americans to acknowledge the importance of keeping pace with the Soviets; it also directly influenced American policymakers to establish the National Aeronautics and Space Administration (NASA) the following year (July 1958).⁸ Aerospace engineering quickly became one of the leading high-tech industries—not to mention an iconic field of activity second only to Hollywood—in Southern California.

The counterculture and the technological landscape comprise the two essential matrices against which the art/technology practices described below evolved.⁹ The West Coast counterculture and the visibility of Southern California's intense technological growth produced favorable conditions for artistic experimentation with new materials and technologies.¹⁰ The high concentration of consumer technology businesses and engineers in the region made technical outsourcing and art/technology collaborations easily attainable. Just prior to the publication of *On the Road* and to Sputnik's launch, Walter

⁷ Lucy R. Lippard, "Foreword: Memory as Model," in Auther and Lerner, eds., *West of Center*, x.

⁸ NASA, "A Brief History of NASA: Launching NASA," at URL: <http://history.nasa.gov/factsheet.htm> (accessed 4 February 2015).

⁹ In this dissertation, I deliberately employ "art/technology" to illustrate the full hybridity of art and technology. I use "Art and Technology" to denote the cultural phenomenon itself, such as the theme's application to exhibitions or publications.

¹⁰ Lippard delineates the avant-garde from the counterculture in her Forward for *West of Center*, asserting: "If New York had a handle (and a triumphant grip) on the avant-garde, having only recently wrested the title from Paris, the counterculture swirled out of control all around us." *Ibid.*, ix.

Hopps and Edward Keinholz opened the Ferus Gallery on La Cienega Boulevard in the spring of 1957. The gallery's inaugural exhibition in March—*Objects on the New Landscape Demanding of the Eye*—grouped abstract paintings by Bay Area and LA artists, including Jay DeFeo, Richard Diebenkorn, and Clyfford Still.¹¹ Hal Glicksman recalls, “The early Ferus crowd were Beats in blue jeans and it was a diverse, big group of artists, almost all of whom were abstract expressionists. There would be jazz playing and white wine, and it was a funky party scene.”¹² In June of 1957, the gallery gave artist and Beat poet Wallace Berman his first solo show, which resulted in his arrest on obscenity charges by the Hollywood Vice Squad (not to mention the gallery's temporary closing).¹³ Glicksman's description of the Ferus scene as beatnik as well as the gallery's ties to Berman was no coincidence. In 1953, Berman and his new bride, Shirley Morand, purchased a home in Beverly Glen, which quickly became a locus for Beat poets and jazz musicians to socialize.¹⁴ Ferus co-founder Walter Hopps, along with artist Craig Kauffman (1932 - 2010) and other close friends, were all heavily involved in the West Coast jazz scene. Growing up in Eagle Rock, California, Hopps and his high school pals repeatedly drove up to San Francisco to catch jazz-hall performances. Hopps had also attended Stanford briefly, where his passion for jazz music initially compelled him to

¹¹ Christine McKenna, *The Ferus Gallery: A Place to Begin* (Göttingen, Germany: Steidl, 2009), 143.

¹² Hal Glicksman (2004), quoted from a conversation with Kristine McKenna at his home in Santa Monica, CA in *ibid*.

¹³ Berman exhibited wooden sculptures and small drawings/text on parchment, imbued with Kabbalistic and philosophical ideas. Within one of the four sculptures, Berman included a small photograph of a couple having intercourse. The Ferus Gallery was closed for two weeks. Following his arrest, Berman moved to San Francisco where he became heavily involved in producing his hand-made magazine, *Semina*. See McKenna, *The Ferus Gallery*, 31 and 157.

¹⁴ See Hunter Drohojowska-Philp, *Rebels In Paradise: The Los Angeles Art Scene and the 1960s* (New York: A John Macrae Book/Henry Holt, 2011), 29.

consider a career in concert promotion. From this perspective, the establishment of the Ferus Gallery was a direct patterning of the Bay Area counterculture. Yet, Ferus also filled an observable need for the young gallerists. As Christine McKenna notes, Hopps and his friends believed contemporary art needed a place to coalesce, and “they began thinking about the need for ‘an outlaw gallery’ in Los Angeles.”¹⁵

Hopps and his circle also gravitated toward the new LA transplants and collectors, who, through the fruits of LA’s postwar economic boom, came to support the emergent scene. During the late 1940s, while still in high school, Hopps befriended collectors Walter and Louise Arensberg—a relationship that deeply influenced the future LA gallerist. Hopps visited the Arensberg home on occasion, where he became familiar with their significant collection of Surrealist art.¹⁶ By the mid-1950s, Hopps had married art history student Shirley Neilsen. Neilsen would prove to be an intellectual force behind Ferus, helping Hopps to cultivate their collector base directly. As soon as the Ferus Gallery opened for business, Hopps and Neilsen began holding private contemporary art classes in the homes of prospective patrons. The participants—including Monte and Betty Factor, Stanley and Elyse Grinstein, Gifford and Joann Phillips, Fred and Marcia Weisman, and Don Factor, among others—would become the first major collectors of contemporary art in Los Angeles.¹⁷

¹⁵ McKenna, *The Ferus Gallery*, 12.

¹⁶ As the Arensbergs were the primary patrons of Marcel Duchamp, Hopps met the legendary artist in 1949. McKenna, *The Ferus Gallery*, 46. Also, Walter Hopps, et al., in *Modern Art in Los Angeles: A Tribute to Walter Hopps* [videocassettes and transcript] (Los Angeles: The Getty Research Institute, 2005).

¹⁷ McKenna, 46.

Out of these colliding events of 1957 sprang a nascent art scene in Los Angeles — a small community devoted to experimentation with materials, art forms, social interaction, and nontraditional modes of experience. In 1960, the gallery scene in Los Angeles was still in its infancy and the city lacked a museum devoted to modern art, which helped foster the local avant-garde’s independence.¹⁸ During the 1960s and 1970s, this art milieu enjoyed an especially robust period of growth that was, according to Peter Plagens, “divorced from New York art-historical dialectics.”¹⁹ In one of the earliest monographs devoted to Southern California art of this moment, Plagens claims that it was precisely this sense of open-ended possibility that freed West Coast artists from the pressures of established art figures.²⁰

My contention is that these ripples of countercultural activity on the West Coast encouraged an immense amount of artistic freedom and experimentation. I echo scholar Charlie Gere’s observation that the greater degree of an artist’s access to technological tools, “the greater is the degree for experimentation.”²¹ The visibility of high-technology niches in Southern California provided a sense of cultural immersion (as well as a desire for mutual participation) in the industries dominating the growing metropolis of Los Angeles. “High technology” refers to “advanced, specialized, or complex technology,” and, in Southern California, this phenomenon included such diverse industries as communications equipment, aeronautical systems and instruments, and electronic

¹⁸ Drohojowska-Philp, *Rebels in Paradise*, xxiii.

¹⁹ Plagens, *Sunshine Muse*, 30.

²⁰ *Ibid.*

²¹ Charlie Gere, “Research as Art,” in Hazel Gardiner and Charlie Gere, *Art Practice in a Digital Culture* (Farnham, Surrey, England: Ashgate Pub, 2010), 5.

components and accessories.²² Not only did this visibility of high-tech industries encourage artistic commentary, but its availability also facilitated artists mining these technologies directly. Arising from these art/technology experiments were art forms that became affiliated with the so-called LA Look and, its subcategories, California Light and Space as well as Finish Fetish—rubrics that claimed an identifiable visual cohesion was somehow regional and linked to the area’s typifying characteristics. Wary of strictly tying an art movement to regional stereotypes, my argument deliberately steps away from these terms and problematizes the adequacy of such categories.

Direct and indirect appropriations of technology in 1960s and 1970s Southern California art were indeed part of a broader phenomenon in America and Europe.²³ While obvious intersections occurred in specific instances of technological appropriation in Southern California art, it is important to emphasize that experimentation with new materials occurred in other art centers. Noteworthy for the story of Art and Technology in Southern California are the distinct socio-economic and aesthetic circumstances in Los Angeles during the late 1950s. Stemming from the economic development, the new middle-class affluence in the US, and a marked growth in higher education enrollment,

²² As an oppositional term, “low technology” implies a basic technology adapted to everyday life. “High-tech” eventually became shorthand for “high technology,” and, according to the Oxford English Dictionary, each term entered the vernacular at different historical moments. “High technology” first made its appearance in 1936, followed much later by the first instance of “high-tech” in *The Last Whole Earth Catalog* (1972). In Chapter 4 I discuss the ramifications and influence of *The Whole Earth Catalog*, a California publication of the counterculture that championed the back-to-the-land movement. “High technology, n. and adj.,” *OED Online*, March 2015, Oxford University Press, <http://www.oed.com/view/dictionaryentry/Entry/272258>; “High-tech, adj. and n.,” *OED Online*, March 2015, Oxford University Press, <http://www.oed.com/view/Entry/272251?redirectedFrom=high-tech> (both accessed April 08, 2015).

²³ See Douglas Davis’s excellent history and study of the interface of art and technology (across time and geographical borders). Davis, *Art and the Future: A History/Prophecy of the Collaboration between Science, Technology, and Art* (New York: Praeger, 1973).

California developed the infrastructure to become a cultural nexus in 1960s America.²⁴

As a result, the art produced in Southern California during these decades was considerably diverse and experimental, but there was also an emergent collector base to support this growth.

From the perspective of some critics, the identity of the emergent LA art scene operated as a resistance to New York's art hegemony. As the art scene in Los Angeles attempted to define its rather amorphous identity, dialectics of East versus West Coast sensibilities slowly began to emerge. A major premise in undertaking this dissertation has been to situate the scene's emergence beyond the prototypical frameworks used to analyze Southern California art of this period (i.e., hinging on the environment's light-saturated and idyllic views, the region's love of automobiles, and its beach body culture). For the past fifty years, postwar Southern California art largely has been read in relationship to these stereotypes and also presented as a type of experiential antidote to the cerebral art of New York. Such binaries tend toward defining the less-successful or less-iconic entity (in this case, the West Coast) in negative terms by borrowing the terms from the established practice (i.e., the East Coast). At the very least, it seems reductive to take an established movement like Minimalism or Pop and simply modify it with "California" or "West Coast." This project, in parallel with recent shifts in the historiography, problematizes such rigid portrayals of East versus West in American art. How the specific and self-aware dynamics of practitioners negotiating this emergent art

²⁴ Ibid., 27-28.

scene helped to shape such experimental tactics remains a crucial portion of this narrative.

Terms of Technology, Light, and Space

Glass, plastic, fire, smoke, acrylic paint, fluorescent lighting, sunlight, scrim, xenon projectors, and empty space: these are the light-transmitting materials with which many Southern California artists came to experiment during the postwar years. In the immediate postwar period, a combination of utopian and dystopian outlooks on science persisted, as Americans were virtually obsessed with technology and its consequences. This obsession stemmed from the unprecedented growth in the scientific landscape that they had witnessed during their lifetimes. Early twentieth-century advancements such as human aviation, Einsteinian Relativity, and the invention of the electron microscope marked the initial murmurs of a paradigm shift known as “Big Science.”

Coined by American nuclear physicist Alvin Weinberg in 1961, Big Science describes the exponential growth of funding and overall scope of science that gathered momentum during World War II and developed at break-neck speed in the years following the war.²⁵ As opposed to the long-standing Enlightenment model of a scientist conducting solitary table-top experiments, Big Science involves heavily-funded, capacious research using a highly collaborative model in experiment or project design.²⁶

²⁵ Weinberg first coined the term in a 1961 article: Alvin M. Weinberg, “Impact of Large-Scale Science on the United States” *Science*, v. 134, no. 3473 (21 July 1961), 161-164. He followed his thesis with a longer text: Weinberg, *Reflections on Big Science* (Oxford: Pergamon, 1967).

²⁶ Peter Galison and Bruce William Hevly, *Big Science: The Growth of Large-Scale Research* (Stanford, CA: Stanford University Press, 1992), 1-17. Big Science began in the US between the World Wars with

Since the early 1960s, historians of science have grappled with this exponential growth of modern science. “Using any reasonable definition of a scientist,” wrote Derek de Solla Price in 1963, “we can say that 80 to 90 percent of all scientists that have ever lived are alive now.”²⁷ Price mathematically charts the growth of science through numbers of published papers over the first half of the twentieth century and, surprisingly perhaps, the events and scientific pursuits of World War II (namely, the Manhattan Project) are *not* the exclusive reasons for the onset of Big Science. The growth represents a steady, rapid climb from the beginning of the twentieth century until the time of publication.²⁸ Price claims that a nation’s industrial, economic, and educational structures have a direct impact on the outcomes of techno-scientific growth, and by the 1960s the United States had the capital, infrastructure, and academic leadership to enable the widespread visibility of Big Science and its technological byproducts.

This increased specialization in the sciences exposed a symptom of what physicist and author C.P. Snow (1905 – 1980) famously termed the “Two Cultures” in 1956. The concept of two cultures signified a dichotomy of disciplinary realms—the humanities and the sciences—that Snow claimed had much to offer one another methodologically, yet in terms of a mutual sympathy and comprehension for one another, remained stridently separated.²⁹ Snow’s thesis was immediately lauded for his lament of the increasing

massive New Deal hydroelectric projects and university-backed small-particle experimentation, namely at Stanford and Berkeley.

²⁷ Derek J. de Solla Price, *Little Science, Big Science--and Beyond* (New York: Columbia University Press, 1963, 1986), 1-2.

²⁸ *Ibid.*, 18.

²⁹ C.P. Snow first articulated this argument in 1956 with “The Two Cultures,” *New Statesman*, 6 October 1956, although his more famous commentary on the concept was in the form of a May 1959 Rede Lecture at Cambridge University. The 1959 paper was then published in two installments in *Encounter* magazine in

polarization of Western intellectual life. Yet, it also revealed a Cold War bias in his warning against the spread of anti-democratic ideals: if the Western nations did not modernize the undeveloped ones, he advised, the Communist nations would.³⁰

The Atomic Age and Space Race together prompted increasingly large-scale government-sponsored and privatized scientific projects that were, on occasion, displayed visibly to the American public. From a visual and material culture perspective, this manifested as a type of “giganticism” in the built environment and as a display of national prowess in missile testing, space shuttle launching, and consumer technology for the American home. Yet, Americans were also aware that many cutting-edge developments remained classified as “Top Secret” by the federal government and, consequently, left much to the imagination of its “mad science” implications. This reality undoubtedly influenced attitudes toward science and technology. This revealed, to cite art historian Pamela Lee’s convincing argument, an overt obsession with technology matched by a crisis of “time”—or, chronophobia—her signifier for attitudes toward technological change. During the 1960s, Lee maintains, technology provoked conflicting attitudes: both “an erotics of technology,” but also anxieties and critical feelings toward the “technocracy” fashioned by the American military-industrial complex.³¹

1959. Relevant for this dissertation, Snow called for “literary intellectuals” and “scientists” to bridge the “gulf of mutual incomprehension,” yet he also addresses apocalyptic fears of overpopulation and nuclear war, and calls for the Western nations to industrialize areas of Southeast Asia and Latin America.

³⁰ Snow, “The Two Cultures and the Scientific Revolution,” *Encounter* 12 (June 1959): 17-24 and 13 (July 1959): 22-27.

³¹ Pamela Lee, *Chronophobia: On Time in the Art of the 1960s* (Cambridge: MIT Press, 2004), 9 and 31. Lee convincingly shows how time and technology were correlated in 1960s art, broadening her scope to include not only American artists Robert Rauschenberg and Andy Warhol, but also Swiss artist Jean Tinguely and English artist Bridget Riley.

Certainly, as Americans became palpably aware of scientific developments that were mounting in their visual and material culture, these currents bubbled quite feverishly out West. The American West—long an icon of the picturesque sublime with near limitless, bountiful resources—became an actual locus for diverse technologies and their exchanges with the American public. Cold War historian Kevin Fernlund notes this area of the country became a mixed bag of “airfields, army bases, naval yards, marine camps, missile fields, nuclear test sites, proving grounds, bombing ranges, weapons plants, military reservations, training schools, toxic waste dumps, strategic mines, transportation routes, lines of communication, laboratories, command centers, and arsenals.”³² The highest concentrations of these settings coalesced in California, which contributed to a boom in population. By 1963, California had surpassed New York as the most populous state, due largely to the state’s reputation as a beacon of economic opportunity in the immediate postwar period.³³

In Allen Scott’s close study of the region’s technological growth and mutability during the postwar period, he reminds the reader that “Southern California is unquestionably the largest high-technology industrial region in the United States, if not the entire world,” adding that liberal spending by the federal Department of Defense has driven this vigorous industrial development since the 1950s.³⁴ A map denoting the primary high-tech areas of Southern California reveals the two minor districts and three

³² Kevin J. Fernlund, “Introduction,” in Fernlund, ed., *The Cold War American West, 1945-1989* (Albuquerque: University of New Mexico Press, 1998), 1.

³³ Peter Schrag, *Paradise Lost: California's Experience, America's Future* (New York: New Press, 1998), 6.

³⁴ Allen John Scott, *Technopolis: High-Technology Industry and Regional Development in Southern California* (Berkeley: University of California Press, 1993), 12-13. This spending reached its apex in the 1980s, when it began to decline.

major districts sited in Los Angeles County alone (fig. 0.1). According to Scott, Burbank and El Segundo denote the original high-tech industrial districts of Southern California; this growth dates from the 1930s, with robust growth occurring from the 1950s onward. By the 1960s the region's aerospace-engineering complex was *the* dominant sector of the "entire local production system."³⁵ While the motion picture, agricultural, and aircraft industries laid the necessary infrastructure for California's postwar economic growth, the aerospace and electronics manufacturing industries propelled the region to its high-tech preeminence.³⁶

Part of this economic growth correlates to California's surge in immigrant populations. These populations comprised a mass of unskilled workers available to labor in low-wage jobs—both agricultural as well as high- and low-tech manufacturing positions—and became essential to such accelerated growth. Equally essential was California's available area, favorable climate, and proximity to the nations that rivaled America's ideological interests. From the perspective of Cold War geo-positioning, California strategically existed as the first line of defense against the threat posed by the Soviets as well as the point of departure for the growing conflict in Vietnam. In fact, the Oakland Army Base was the "largest military port complex in the world" during the Vietnam conflict, where 222,750 troops stopped on their way to their Pacific service assignments between 1965 and 1968.³⁷ Marcia Eymann sums up California's role in this

³⁵ Ibid., 3.

³⁶ Ibid., 3 and 13.

³⁷ Marcia A. Eymann, "Introduction," in Eymann and Charles Wollenberg, eds., *What's Going On? California and the Vietnam Era*, exh. cat. (Oakland: Oakland Museum of Art; Berkeley: University of California Press, 2004), 4.

regard, emphasizing, “Due to the state’s deep investment in the military-industrial complex, its importance as a center for both protest politics and conservative activism, as well as the state’s identity politics, media industries, and the presence of the largest Southeast Asian refugee population in the nation, California was at the vortex of the storm created by the Vietnam War.”³⁸ The state of California provided a general stage for the country’s various military requirements, while Southern California led the way in US aerospace engineering.

My argument relies on Big Science as a sociological matrix against which Southern California art/technology practices began to emerge in the 1960s. For example, the big budgets and infrastructure of Big Science forged such massive accomplishments as that of the Apollo missions for the US Space Program, but NASA’s Big Science trials also produced such “spinoff” consumer technologies as precise quartz clocks for use in the home.³⁹ Thus, the visibility of Big Science as a cultural apparatus inspired artistic experimentation with more high-tech approaches to art production, while the artistic appropriation of new technologies and materials can be read as the direct application of scientific pursuits.

How might this heightened scientific climate have influenced Southern California art practices? The ramifications of Big Science as a sociological structure were felt across

³⁸ Ibid., 3-4.

³⁹ To provide the American taxpayers with an awareness of the benefits of aerospace research and development, NASA began publishing reports in 1973 and, thereafter, the magazine *Spinoff*, aimed at addressing a U.S. Congressional mandate within the Space Act of 1958 that called for the “dissemination of NASA research and development to the public” issued through, whereby NASA was formed.” According to the Agency, “NASA spinoffs enhance many aspects of daily life, including health and medicine, transportation, public safety, consumer goods, energy and environment, information technology, and industrial productivity.” See NASA, “Spinoff Frequently Asked Questions,” *Spinoff: Technology Transfer Program*, URL: <http://spinoff.nasa.gov/spinfaq.htm#spinfaq> (accessed 8 April 2015).

the United States, and not solely on the West Coast. Although the formation of the art scene in Los Angeles during the 1950s was marked by provincialism distinct from New York's position as America's art center, it is important to stress that West Coast artists were not insular. There was a great deal of exchange between the coasts during this period, and many Los Angeles artists found commercial success quickly in New York, particularly around 1965. The 1962 founding of *Artforum* on the West Coast and its eventual move to New York reflects the bicoastal identity of many American artists during the decade.⁴⁰ Angeleno artists also participated in numerous high-profile gallery shows across Europe. Gallerist Denise René (1913–2012)—who specialized in kinetic and op art and launched kineticism in 1955 with the landmark show, *Le mouvement*—showed many California artists alongside other international artists working with phenomenal art forms. Historiographically speaking, the Art and Technology literature does not overtly correlate regional technologies to regional art practices, though some scholars have recently suggested that the appropriation of technology by Southern California artists distinguishes West Coast practices from their East Coast counterparts.⁴¹ This study extends the discussion and deepens the research on the links between art and technology on the West Coast.

⁴⁰ *Artforum* was established in San Francisco in 1962, then moved to Los Angeles for two years (1965–1967) before firmly establishing itself in New York.

⁴¹ To date the best attempts at connecting the techno-climate of the region to specific art projects in Southern California were published in two important catalogues coinciding with the Getty Institute's *Pacific Standard Time* initiative. However no studies to date have endeavored to plumb the topic in depth. See Robin Clark and Michael Auping, *Phenomenal: California Light, Space, Surface* (Berkeley, CA: University of California Press, 2011). Also, Donna Conwell and Glenn Philips, "Duration Piece: Rethinking Sculpture in Los Angeles," in *Pacific Standard Time: Los Angeles Art 1945-1980* (Los Angeles: Getty Research Institute and the J. Paul Getty Museum, 2011).

In the 1960s, scholars and critics seemed more interested in addressing general art/technology tendencies that were dominating contemporary American art practices. For example, in 1965 and 1966, *Art in America* contributing editor Barbara Rose mailed correspondence to a number of contemporary artists from each coast for the purpose of gathering primary source evidence about what might be motivating certain trends in 1960s art production.⁴² Rose's first queries included: "Is there a sensibility of the 1960s? Is there an avant-garde today? Has the sensibility of the 1960s hardened into an academy? Has the speed-up of communications and the increased attention of the mass media made yesterday's avant-garde today's academy?"⁴³ For those who responded—including Allan Kaprow and Robert Morris—most highlighted technology, science, systems, and politics as the leading art premises of the 1960s. Kaprow's take seemed especially prophetic: "I would guess that in order to beat the game of dying for a brief hour of life in art, the artist may have to begin thinking in modern, i.e. corporate terms. He [*sic*] may have to explore not only the nature of technological processes, but the effect these have on human life."⁴⁴ LA artist Craig Kauffman conveyed somewhat apathetic sentiments toward the interface of art and technology, emphasizing: "I find it further curious that any artist should be eulogized simply for using industrial techniques in the

⁴² She included questionnaires oriented toward assessing a "sensibility of the 1960s" as well as with the more practical aim of assisting artists in securing financial assistance for the otherwise cost prohibitive obstacles of realizing large-scale artworks using new technologies.

⁴³ Barbara Rose papers, 1962–ca. 1969, Archives of American Art, Smithsonian Institution (Washington, DC). In 1966, her purposes were more pragmatic, stating: "I'm gathering information about the difficulties encountered by sculptors trying to work with new materials and new techniques. I want to get as many concrete suggestions as possible about the a) execution, b) financing, and c) use of contemporary monumental sculpture."

⁴⁴ Allan Kaprow, in response to a questionnaire sent by Barbara Rose (1965). Kaprow was specifically addressing the question of the avant-garde. See *ibid.*

fine arts. Though to the best of my knowledge I was the first to take advantage of vacuum forming as a fine arts medium, that I or any modern artist should work with the materials and technology of his [/her] environment is something which should be taken for granted.”⁴⁵ He concludes by admitting that art/technology nonetheless shaped his career choices and artistic outlook: “Dealing with modern industry on its’ [*sic*] terms has changed my ideas and my personality, [. . .] and my sensual involvement with plastic has for me become even more explicit, more separate, more defined.”⁴⁶ Kauffman admits that Art and Technology had come to determine his artistic identity, while emphasizing that it is both logical and natural that his art milieu would mine local technologies.

Artist and critic Douglas Davis’s timely history on the subject (published in 1973) pictures the arc of this longstanding relationship beginning with Leonardo in the fifteenth century and culminating in the works of Davis’s contemporaries. In *Art and the Future: A History/Prophecy of the Collaboration between Science, Technology, and Art*, Davis touches upon the key movements and players in the modern era (e.g., the Futurists and Cubists, Duchamp and Moholy-Nagy, Tatlin and Gabo, among others) and delineates postwar American currents from that of their European predecessors. He writes:

What happened in the mid-1960s, at least in the United States, had as much to do with process as idea, with the growth of a new computerized, transistorized, televised landscape. In the *process* of trying to make art based on this landscape, younger artists discovered more and more about the new ways open to them, from the mundane to the esoteric.⁴⁷

⁴⁵ Craig Kauffman, in response to a questionnaire sent by Barbara Rose. Kauffman was addressing Rose’s questions about techniques and financing of work executed in industrial materials. Craig Kauffman, “Letter from Robert Craig Kauffman to Barbara Rose,” 16 June 1966, in *ibid.*

⁴⁶ *Ibid.*

⁴⁷ Davis, *Art and the Future*, 44 [emphasis Davis].

Davis's comprehensive study treats the developments of art/technology as concise, successive examples plotting along a rather linear chronology. There is no attempt (or, more precisely, not enough space in his thorough chronology) to develop the categories any further than listing the technologies that each artist employs. For example, Davis includes artists Bell, Irwin, and Kauffman—distinguishing them by region—alongside the more iconic artist, Dan Flavin, without suggesting that a regional subset is required for Flavin. At first glance, one might interpret this stance as an unbiased historical account. However, Davis's insistence on denoting the California artists with their respective geographical ties, coupled with his omission of New York when introducing Flavin, nonetheless reveals some of the study's inherent blinders.

While Davis does claim Southern California possesses a “highly charged technical climate,” he neglects to push the idea further than this singular statement in *Art and the Future*.⁴⁸ In *Sunset Muse*, Plagens devotes an entire chapter to the topic, nodding at the indoctrination of technology into the common culture with his chapter titling: “Art and Technocracy,” though his focus is on kinetic art rather than disparate modes of technological experimentation. That the topic required an entire chapter in *Sunset Muse* suggests there was a widespread artistic appropriation of technology in Southern California, though Plagens makes clear that, while popular in the 1960s, the subject had become passé—or, in his words, “a little tired,” by 1974.⁴⁹ Notably, Plagens's critique was aimed at the curatorial bandwagon (wherein a surge of Art and Technology exhibitions were staged simultaneously) and not the practice of appropriating technology

⁴⁸ Ibid.

⁴⁹ Plagens, *Sunshine Muse*, 162.

per se. In parallel with similar Art and Technology initiatives, curator Maurice Tuchman launched the Art and Technology (A&T) project at the Los Angeles County Museum of Art (LACMA) in 1966. From 1967-1971, Tuchman and LACMA Associate Curator Jane Livingston, among others, coordinated direct exchanges and collaborations between artists and scientists or engineers. The curators paired each artist—including established artists such as Andy Warhol and Claes Oldenburg—with prominent technology corporations. With utopian aims, the venture prescribed artists perform a type of “artist-in-residence” role and asked the companies to make their high-tech personnel and resources available to the on-site artists. The A&T collaborations, however, came to be viewed as a sympathetic affiliation with the American war machine. Plagens’s contempt for the uneasy relationship was clear:

Its candid and lengthy description/documentation of every attempted collaboration between the museum-matched artist and corporation admits to every artist’s arrogance, every corporate stubbornness, and the ubiquitous mutual vanity—as well as the easy alignment of artists with hard-core capitalism and war-related industries (while the war in Vietnam was at its height).⁵⁰

This comment alludes to a widespread critical attitude that many artists held toward the corporatization of the American war machine and, consequently, their parallel disdain for artist collaborations with any potential militaristic affiliate. According to Matthew Wisnioski, up to 70 percent of American engineers worked directly or indirectly on weapons-based research, development, and manufacturing during the Cold War.⁵¹ Inconsistent attitudes toward the ramifications of technology, particularly viewed through

⁵⁰ Ibid., 165.

⁵¹ Matthew Wisnioski, *Engineers for Change: Competing Visions of Technology in 1960s America* (Cambridge, MA: The MIT Press, 2012), 95.

the lens of the American military-industrial complex, remained an insidious aspect of Cold War culture. Wisnioski demonstrates that Americans initially held “near-utopian” outlooks on the benefits of technology in the postwar period (ca. 1945–1964), but in the following decade “technology took on ambiguous and ultimately sinister connotations.”⁵² Wisnioski indicates that engineers were not completely immune to this growing “anti-technology” position. By the late 1960s, a small faction of engineers had begun to vocalize their dissent, persuading their colleagues to reconsider their role in the production of military technologies. On March 4, 1969 this mobilization reached a tipping point when students and faculty staged a “teach-in” at Massachusetts Institute of Technology, symbolically ceasing work in an effort to show a desire for more ethical uses of science.⁵³

This ferment proved particularly visible in California art circles, where activist artists had already begun to stage antiwar protests as well as employ art as a polemical vehicle to criticize links between capitalism and technologies of annihilation.⁵⁴ Some West Coast artists produced works that addressed these anxieties toward technology, especially their apprehensions about the prospects of nuclear holocaust. Bay Area artist Bruce Conner, as a seminal example, was one of the earliest artists to appropriate declassified Department of Energy archival footage of atomic bomb tests for his

⁵² *Ibid.*, 3.

⁵³ *Ibid.*, 36 and 102.

⁵⁴ For an excellent study of the interface of postwar politics and the art of California, see Peter Selz, and Susan Landauer, *Art of Engagement: Visual Politics in California and Beyond* (Berkeley: University of California Press, 2005). Selz and Landauer suggest the political tumult was far more complicated than California existing as a place offering unrestrained expressionism. Rather, these dialectics developed out of a volatile clash between the New Left and the power of the Right, wielding its anti-Communist and pro-defense patriotism ideology alongside the success of those industries.

polemical films. Conner first included imagery of “the Bomb” exploding in *A MOVIE* (1958), although his use of archival footage from the once-secret tests at the Bikini Atoll in the thirty-six minute film, *CROSSROADS* (1976), represents a highly-developed critique of American technocracy (see fig. 0.2).⁵⁵ By blending extreme slow-motion replays of the 1946 underwater nuclear test with a soundtrack of synchronous and asynchronous site-specific sounds and hypnotic, scored music, Conner constructs a subversive interrogation of the ramifications of atomic power. As in Conner’s invective, Americans acknowledged the inner struggle over the costs and benefits of technology, but they also grappled with articulating its structure and characteristics.

In the A&T catalog, curator Jane Livingston spoke to this trend, problematizing the tendency to dichotomize human relationships with technology:

One of the fundamental dualisms inherent in the question of technology’s uses in a humanist context has to do with the conflict between the belief that, in a word, technology is the metaphysics of this century, and therefore has to be accommodated from within, and the view that technology is somehow self-perpetuating, implacable and *essentially* inhuman. Nearly all the positions taken by artists and by their scientific counterparts with respect to the art/technology relationship are conditioned by one or the other of these antithetical beliefs.⁵⁶

Livingston’s observations speak to the complexity of such outlooks on art/science hybridity, and, germane to this project, how the aesthetic integration of technologies into the artistic process was no longer strictly bound to the studio. In fact, the guiding premise behind the confluence of Art and Technology programs that paralleled A&T—including

⁵⁵ For a thorough account of Conner’s polemical films, as well as other artistic responses to atomic imagery, see Keely Orgeman, “Visualizing the Irradiated Body and Radioactive Landscape in American Art, 1945-1976” (PhD diss., Boston University, 2014).

⁵⁶ Jane Livingston, “Thoughts on Art and Technology,” in Maurice Tuchman, *A Report on the Art and Technology Program at the Los Angeles County Museum of Art, 1967-71* (Los Angeles: LACMA, 1971), 43.

NASA's "Agency Art Program," Gyorgy Kepes's Center For Advanced Visual Studies at the Massachusetts Institute of Technology (MIT), and Billy Klüver's Experiments in Art and Technology (EAT)—was that exchanges between artists and engineers could be mutually beneficial.⁵⁷ The goal of true interdisciplinary collaboration peaked in the late 1960s, and waned significantly by LACMA's exhibition in 1971. Despite the idealism that accompanied such arranged collaborations, the A&T pairings, in reality, functioned more like artist residencies within each institution rather than symbiotic art/science unions. This perceived failure signaled that the dream of interdisciplinarity was far more complex than originally hypothesized.

Political complications also plagued art art/technology pairings during the Vietnam Conflict, contributing to the lukewarm participation and lack of critical reception for LACMA's A&T program.⁵⁸ Art circles were well aware that the Santa Monica-based RAND (Research ANd Development) Corporation—one institution involved in LACMA's program and with which Larry Bell collaborated—had ties to the unpopular war. RAND played a key role in the US militaristic escalation in Southeast Asia, which led to artists picketing their corporate headquarters as early as 1965. Art and Technology collaborations between artists and institutions such as RAND drew harsh criticism from a wide range of antiwar voices, particularly the Artists' Protest Committee (APC)—a collective assembled by UCLA artist-in-residence Irving Petlin in 1965 that

⁵⁷ Anne Collins Goodyear provides an excellent overview of these four key programs that peaked during the 1960s. See Goodyear, "The Relationship of Art to Science and Technology in the United States, 1957-1971: Five Case Studies," (PhD diss., University of Texas, Austin, 2002).

⁵⁸ Davis, *Art and the Future*, 76-77. Writing two years after the conclusion of LACMA's "Art and Technology" program, Davis explains the "results were in the end physically impressive but conceptually disappointing." Artists and scientists alike reported that the collaborations felt "unnaturally forced" and "genuine interaction" was rare.

staged a number of protests against the Vietnam Conflict.⁵⁹ Writing in 1971, Maurice Tuchman admitted that he suspected that if the project was “beginning now 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.”⁶⁰

Despite the criticism from the APC (among others) and the perceived failure of Tuchman’s “A&T” program, some Southern California artists continued to appropriate technologies throughout the 1970s. However, aesthetic appropriations of technology were perceived permissible if no corporation or government entity benefited from such associations. For artists who continued using technologies in the studio—including Bell, Corse, and Eversley—the practice revolved around an autodidacticism that projected a sort of political neutrality. In other words, using such declassified technologies to make saleable art objects hardly registered as overtly critical of Big Science and its implications (in the manner that Bruce Conner’s films critiqued annihilation technologies). Nor did their appropriations signal overt jingoism or glorification of militaristic technologies. That the appropriations benefited their art practices—without pretenses of aiding the war machine as alliances with RAND might—left them generally outside of the controversy, at least initially.

⁵⁹ Although APC existed for one year (1965-1966), Matthew Israel maintains “it marked the beginning of artistic engagement on the West Coast, and it made a substantial impact on subsequent national antiwar engagement.” See Matthew Israel, *Kill for Peace: American Artists against the Vietnam War* (2013), 27. Also, Francis Frascina, *Art, Politics, and Dissent: Aspects of the Art Left in Sixties America* (Manchester and New York: Manchester University Press, 1999), 3-16; and Julia Bryan-Wilson, *Art Workers: Radical Practice in the Vietnam War Era* (Berkeley: University of California Press, 2009), 5-9.

⁶⁰ Tuchman, *A Report on the Art and Technology Program*, 17.

Toward the end of the 1960s, the industrial aesthetic associated with such minimalist forms, including the artworks discussed below, drew pointed criticism over its thematic link to the Vietnam conflict. Art historian Thomas Crow maintains that while Minimalism initially helped critique institutional structures of the art world, its objects of “residual formal purity” too easily found themselves a part of museological collections and, hence, institutionalized. Crow stresses:

And the Minimalists were also vulnerable to the charge that the irony entailed in their mimicking industrial regularities of form had declined to a helpless echo of the government’s own grotesque misapplication of systems logic to the Vietnamese conflict, with the Pentagon supplying nightly newscasts with body counts and abstract cost/benefit analyses applied to what had turned into ungovernable slaughter and devastation.⁶¹

Minimalism, it seemed, had come to project an ethos that too closely paralleled the repugnant indifference that the US military held toward human life. Despite its political neutrality, Minimalism could no longer escape the metaphorical links to war science.

Formulating a Framework

An obvious tension arises when one performs a study of a particular art tendency in a region while also questioning the adequacy of established art models for one’s analytical framework. As stated above, critics initially linked postwar Southern California art to a kind of regional vernacular but they also (rather innocently) aligned certain West Coast practices with established East Coast standards. The correlation between form and environment bolstered such labels. For example, Peter Plagens draws a distinct contrast

⁶¹ Thomas Crow, *The Rise of the Sixties* (New York: Abrams, 1996, 2004), 153.

between coasts in *Sunset Muse*, crediting the western coastal landscape with the obvious inspiration for LA art:

Southern California sunsets, neon, flowers, ocean, desert landscapes, and wide boulevards sifted their ways into the subconsciousnesses (or consciousnesses) of Los Angeles artists. If it wasn't necessary to be a loft-rat to be an artist, then it certainly wasn't necessary to employ "tough" composition, "heroic" scale, or "off" color to make good modern art.⁶²

Not only do the specific environmental aspects of Southern California inspire local artists, Plagens rationalized, but LA art also encompasses qualities that are diametrically opposed to those associated with high modernism and, by implication, New York. While many have praised Plagens for his groundbreaking monograph, he was not alone in his manner of picturing Southern California art.⁶³ In an even earlier articulation of 1960s trends in art of the West Coast, John Coplans maintains the artists' attention to craft and finish is best ascribed to the "Los Angeles sense of surface."⁶⁴ Coplans also links the color choices of West Coast artists to "ambience" and the "sun-drenched quality" of the locale.⁶⁵ Perhaps most interesting is Coplans's claim that these West Coast artists are revitalizing a central tenet of modern art—abstraction—but that their inventiveness resides in their California ties.

The predominant scholarly characterization of Southern California art, as in Plagens's and Coplans's early framing, links its formal visual intersections (surface,

⁶² Plagens, *Sunshine Muse*, 123.

⁶³ Andrew Perchuk critiques Plagens for his use of "self-defeating" language in *Sunshine Muse*. In his dissertation, Perchuk reframes Los Angeles postwar art by countering the traditional regionalist methods for analyzing these art forms. Andrew J. Perchuk, "From Otis to Ferus: Robert Irwin, Ed Ruscha, and Peter Voulkos in Los Angeles, 1954-1975," PhD diss. (Yale University, 2006), 5.

⁶⁴ John Coplans, "The new abstraction on the West Coast U.S.A.," *Studio International*, 169, no. 865 (May 1965), 195.

⁶⁵ *Ibid.*, 199.

color, and the use of light) with the environmental qualities of place. As these West Coast artists began to produce art that shared formal similarities in line with New York Minimalism, critics grappled with the proper language to distinguish and frame it. For ease of discussion, minimalist forms in Southern California simply became “West Coast Minimalism” and the Pop idiom came to be termed “LA Pop.”⁶⁶ The “industrial” aesthetic in Southern California comprised geometric forms that aligned with Minimalism. Distinct from Minimalism, however, were the materials employed by Southern California artists. As opposed to the subdued palettes and humble materials of Robert Morris’s or Carl Andre’s versions of Minimalism, for example, the radiant, color-inflected media used by Bell and colleagues invited critics to first couch it as an effusive—or distinctly Southern Californian—strain of Minimalism. A few early voices do sidestep the East/West dichotomy by including West Coast artists in their surveys of the New York idiom that would come to be termed “Minimalism,” and, to a lesser degree, in texts on Pop art.

As early as 1965, Donald Judd includes some West Coast artists in his canonical comments on the minimal aesthetic, including Bell and Kenneth Price, though his observations seem generally aimed at inclusivity for his “Specific Object” rubric rather than focusing on contributing to a West Coast art discourse.⁶⁷ Barbara Rose is intriguingly silent on an East/West dichotomy in her 1967 essay on the “New Aesthetic”;

⁶⁶ Rather than apply established Pop art models to art in Los Angeles, for example, Cécile Whiting nuances her reading of Pop art in Los Angeles through a myriad of pre- and postwar urban lenses, including early photographic images of California as a pristine Eden. Whiting especially challenges the superficial readings of postwar LA art through simplistic binaries, such as “sunshine and noir.” See Whiting, *Pop L.A.: Art and the City in the 1960s* (Berkeley: University of California Press, 2006), 24-47.

⁶⁷ Donald Judd, “Specific Objects,” *Arts Yearbook*, 8 (New York, 1965): 74-82.

her essay's objective appears to be more of a concerted attack on Michael Fried's dismissal of the "literalist" style due to its theatricality.⁶⁸ A year prior to the publication of "A New Aesthetic," however, Rose asserted: "Like American art in general, California art is closely tied to its environment, so one is not surprised to find that the brilliantly sunny, palm studded, DayGlo-spangled Los Angeles landscape inspires an art quite different from that made in reaction to New York's frigid lofts and littered slums."⁶⁹

This strict dichotomy of camps—i.e., the hubris of New York intellectualism versus the deeply affective existentialism of Los Angeles—had developed into humorous (if mildly accurate) stereotypes by the end of the decade. In 1969, artists and spouses Nancy Holt and Robert Smithson created an experimental film titled *East Coast, West Coast*, in which they portrayed a fictional dialogue between a West Coast artist (played by Smithson) visiting an East Coast artist (played by Holt) in her studio. Through deliberate language aimed at presenting a Cartesian division within these coastal art postures, Holt underscores the centrality of the mind (and conceptualism) to New York whereas Smithson identifies with the presence of the body (and experiential feeling) to Los Angeles. "You are overemphasizing environmental influences," Holt accuses, adding, "You really should think about finances [. . .] or you'll be a victim." Smithson returns, nonchalantly, "They just read books here, make systems," and emphasizes, "Definition is for really uptight types." He adds, "You should just go out and visit the

⁶⁸ Barbara Rose, "A New Aesthetic," in *A New Aesthetic* (Washington: Washington Gallery of Modern Art, 1967).

⁶⁹ Barbara Rose, "Los Angeles: The Second City," *Art in America*, 54, no. 1 (Jan-Feb 1966), 111.

Indians.”⁷⁰ By portraying these two oppositions—through character portrayal, precise language, and even name-calling—Holt and Smithson question the validity of such stereotypes, but also interrogate art institutions that cast such binaries in the first place.

Though Holt and Smithson burlesque the coastal stereotypes in a seemingly lighthearted manner, West Coast artists did, in reality, suffer from anxiety over such tropes. Plagens phrases it well:

That time, '65-'70, let's say to give it a five-year shot, that was the heyday of LA art. That was the heyday of De Wain Valentine, Peter Alexander, Larry Bell, Ron Cooper, Robert Irwin, and Jim Turrell. That whole light-and-space thing. And from highly tailored plastic and glass and metal objects to phenomenological, altered architectural environments—that was like the whole art world. There was a sense in LA of, 'We got *this*, and *this* is what makes us different,' and, 'We got this and they *don't* got this in New York.' Okay. Along comes this conceptual stuff, which even though there are people on the West Coast doing it, seems to be connected up with people like Larry Weiner, Joe Kosuth, Art & Language, and stuff like that. In retrospect, I see it now, it's a threat. Some guy's going to come along with eight little typewritten instructions in a frame and this is going to take the news value away from Robert Irwin or Jim Turrell, who need a whole crew of drywallers to alter some kind of structure. This was always my theory: that Minimalism split, and on the West Coast the metal cube dissolved into phenomena, and on the East Coast people started taking the measurements and just putting out the specs.⁷¹

While art historians and critics did include West Coast artists in their initial analyses of Minimalism, adequate attempts to describe the minimalist idiom as it was developing, independently, in Southern California remain nonexistent, save Plagens's text. Andrew Perchuk attributes this void in the literature to the longstanding bias that “almost

⁷⁰ Nancy Holt and Robert Smithson, *East Coast, West Coast*, black and white film and sound, 22 minutes (1969). Available for open-access viewing on UBUweb archive at URL: http://www.ubu.com/film/smithson_east.html (accessed 16 November 2013). Friends and artists Joan Jonas and Peter Campus make small contributions. The implied comedic intent is obvious in each artist occasionally breaking from character to smile or chuckle at the dialogic absurdity.

⁷¹ Peter Plagens, quoted in Amy Newman, *Challenging Art: Artforum, 1962-1974* (New York.: Soho Press, 2000), 258-259.

everything of consequence was seen, and is largely still seen, as emanating from New York.”⁷² On the one hand, the literature’s inclusion of key Los Angeles artists within the minimalist discourse appears impartial in its refusal to label these artists “LA Minimalists.” On the other hand, Rebecca Ann Weller has critiqued the ways in which Southern California artists are routinely squeezed into an uncomfortable New York rubric when the LA Look (her chosen aesthetic label, after Plagen’s canonical usage) shared only a few characteristics with Minimalism.⁷³ Weller’s point is well taken. The impulse to group visually similar art forms (i.e., the so-called LA Look) into established labels that were codified in a completely distinct art milieu (i.e., Minimalism in New York) raises questions about the logic of art historical narratives and the efficacy of such brackets. Even so, a discussion of art produced in Los Angeles warrants an acknowledgment of the longstanding impulse for writers—as well as the artists themselves—to describe the “LA-ness” of it.

West Coast artists vary significantly in their opinions of the environment’s effects on their art forms as well as how they view their roles in the scene’s establishment. For example, some artists openly claimed that the local landscape and culture inspired their forms, others, including Ed Ruscha (b. 1937), rejected it outright: “Being in Los Angeles has had little or no effect on my work,” Ruscha opined in 1966. “I could have done it anywhere. I don’t see any independent trends here.”⁷⁴ In contrast, LA artist John

⁷² Perchuk, “From Otis to Ferus,” 2.

⁷³ Rebecca Ann Weller, “Los Angeles Look(ing): Process, Perception, and Popular Culture in the Art of Larry Bell, Craig Kauffman, and John McCracken,” PhD diss. (University of Delaware, 2008).

⁷⁴ Ed Ruscha, originally quoted in *Art Voices*, 5 (fall 1966). Reprinted in Alexandra Schwartz, *Ed Ruscha's Los Angeles* (Cambridge, Mass: MIT Press, 2010), 2.

McCracken (1934–2011) reflected that he drew inspiration from the locale: “And the cars, with their sometimes attractive finishes, were one thing I looked at. [. . .] Not that many of them had great finishes—but the light in Los Angeles does something, too, and anyway, there were some ‘inspiring’ glints of things here and there in Los Angeles that I was able to bounce off of in my track toward making what I felt in my intuitions was possible.”⁷⁵ De Wain Valentine (b. 1936) recently admitted that the atmosphere of Los Angeles—literally the smoggy, particulate-filled “airscape”—made the surrounding light a perceptible and substantive material. For Valentine, the “light had a body to it that was just thrilling.”⁷⁶ While Valentine acknowledged his large-scale polyester sculptures were decidedly about his “love affair with the sky,” others remained skeptical or openly rejected such ties.⁷⁷ Curator Hal Glicksman asserted in 1977 that Southern California artists “investigating light phenomena were *not* reacting to the specific quality of natural light here.”⁷⁸ And in her recent essay titled “The Material of Immateriality,” Stephanie Hanor strikes a balance in the debate, conceding that a handful of Southern California artists make obvious reference to the sky or natural light, but for the most part these artists broadly sought to establish a perceptual engagement for their audience using a

⁷⁵ John McCracken, interview originally published in Bell, Kristine, Greg Lulay and Alexandra Whitney, eds., *Early Sculpture* (New York: Zwirner & Wirth, 2005). Reprinted in California College of the Arts, *Artists of Invention: A Century of CCA* (San Francisco, CA: California College of the Arts, 2007), 77-78.

⁷⁶ Valentine is quoted in a film produced in conjunction with a book of the same title. See Tom Learner, Rachel Rivenc, Emma Richardson, and De Wain Valentine, *From Start to Finish: De Wain Valentine's Gray Column* (Los Angeles: Getty Conservation Institute, 2011).

⁷⁷ *Ibid.*

⁷⁸ Hal Glicksman first showed many of these artists while serving as Gallery Director at Pomona College from 1969-1970. Glicksman quoted in an interview with Marge Goldwater, in Michael Asher, et al., *Los Angeles in the Seventies* (Fort Worth: Fort Worth Art Museum, 1977), 5 [emphasis Glicksman].

wide variety of materials, lighting scenarios, and/or spatial dynamics to create their works.⁷⁹

The application of a regionalist lens to Los Angeles art practices—particularly when a good deal of cross-pollination was occurring in the postwar years—also feels inadequate. In fact, with regards to Minimalism, James Meyer points out that these binaries were not absolute and the prickly debates that stud its art historical evolution are *precisely* what have come to define the movement over the past half-century.⁸⁰ By the late 1960s, new offshoots of the style (namely immersive environments) obliged the use of the seemingly more accurate “Light and Space.”⁸¹ Today, scholars of postwar California art generally agree that regional terms have reached their critical limits. Donna Conwell and Glenn Phillips recently argued that, whether these artists agree or disagree with the Light and Space label, their technological appropriation and collective interest in perception overlapped to the degree that a like-minded community is identifiable.⁸²

Despite many vocal rejections of the interpretive grouping, Conwell and Phillips

⁷⁹ Stephanie Hanor, “The Material of Immateriality,” in Clark and Auping, *Phenomenal*, 126-127.

⁸⁰ Meyer is one of the leading scholars on Minimalism and has published two books on the movement. He contends this sensibility generally entailed sculpture and painting that was characterized by an industrial aesthetic, simplified geometric forms with reduced surfaces, and produced with minimal artistic labor. Minimalism, he adds, also can be viewed as rooted in Russian Constructivism and Dadaism, and as reactionary to the existential qualities of Abstract Expressionism, particularly the trace of the artists’ handicraft and subjectivity that imbued High Modernism. See Meyer, *Minimalism: Art and Polemics in the Sixties* (New Haven: Yale University Press, 2001) for a critical analysis of the movement’s chronological developments. Hal Foster counters that, as opposed to stressing the formal aspects of color and form, Minimalism reorients an emphasis on medium to viewer perceptual experience. See Foster, “The Crux of Minimalism,” in *Return of the Real* (Cambridge, MA: MIT Press, 1996), 38-40.

⁸¹ “Light and Space” as a descriptive label was hinted at as early as 1971, with Frederick Wight’s exhibition title “Transparency, Reflection, Light, Space: four artists.” The term is firmly established by 1979 with curator Melinda Wortz’s exhibition title, “California Perceptions, Light and Space.” See Frederick Stallknecht Wight and Peter Alexander, *Transparency, Reflection, Light, Space: Four Artists*. (Los Angeles: UCLA Art Galleries, 1971). Melinda Wortz and Dextra Frankel, *California Perceptions, Light and Space: Selections from the Wortz Collection* (California State University, Fullerton, Art Gallery, 1979).

⁸² Conwell and Phillips, “Duration Piece,” *Pacific Standard Time*, 191.

emphasize that, “Across Los Angeles, experimentation with new plastics and resins and the creation of perceptual environments were widespread phenomena that seem to have seized the imagination of numerous artists, both well-known and obscure.”⁸³ Essentially, current art historical voices are beginning to acknowledge the inadequacy of these terms, deferring instead to historical, sociological, technical, and theoretical accounts of the artists and their aesthetic choices.

One productive framing concept for considering high-tech experimentation in Southern California art is the “technological sublime”—a term I borrow from Perry Miller, Leo Marx, David Nye, and others to describe American enthusiasm for technological innovation set against the nostalgia for the roots of an agrarian past. While historian Perry Miller coined the term in 1961 to articulate the quasi-religious overtones American culture held for technology throughout its history, Marx viewed the “technological sublime” as a rhetorical binary that pictured the mid-nineteenth century achievements of steamboats and locomotives against a sincere yearning for the pastoral.⁸⁴ As Caroline Jones points out, Marx’s iconic 1964 book, *The Machine in the Garden*, arrived when American science was undergoing yet another paradigm shift.⁸⁵ Jones emphasizes that during the 1960s,

a growing ecology movement paradoxically coexisted with a sometimes utopian, sometimes cynical belief in technology as a pragmatic or aesthetic solution to the problems of the day. The 1960s appearance of the technological sublime was

⁸³ Ibid., 205.

⁸⁴ Miller first proposed this idea in an essay, “The Responsibility of Mind in a Civilization of Machines,” published in *American Scholar* in 1961. Miller expanded upon the tenuous relationships between technology and society in a book that was published posthumously in 1965: *The Life of the Mind in America, from the Revolution to the Civil War* (New York: Harcourt, Brace & World, 1965).

⁸⁵ Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (New York: Oxford University Press, 1964). Jones honors Marx with the titling of her book: *Machine in the Studio*.

necessarily specific to its time—moon shots, superhighways, and the penetration of the technological into human nature all changed the impact of this discourse dramatically.⁸⁶

As one key lens for this dissertation, the technological sublime emblemizes art practices that helped crystalize this discursive shift across studio practices in America. Yet, it also represents the marriage of two fundamental influences for many West Coast artists: an artistic preoccupation with using new technological processes and media while fashioning art forms that virtually masked such technical aptitudes. I contend that the technological sublime in California art projects what R.L. Rutsky terms a “high-tech aesthetic,” which, he has argued, is an aesthetic style that represents its technological currency vis-à-vis its specific design structure mirroring its functionality as a technological object.⁸⁷ Thus, the technological sublime takes on the appearance of being high-tech (that is, takes on an industrial aesthetic) without the technological applications or factors necessarily being explicit or obvious.

As a hybrid term comprised of two concepts, my usage of the technological sublime expands it beyond “enthusiasm for technology,” as Nye and others define it, to frame the relationship between technology and other regional influences in Southern California. (I do not suggest the technological sublime exists as a *solely* West Coast idiom.) Historically, the sublime has been linked to, among other things, the representation of awe-inspiring, luminous landscapes. More specifically, twentieth-century landscape photographers such as Ansel Adams and Edward Weston had

⁸⁶ Jones, *Machine in the Studio*, 54-55.

⁸⁷ R.L. Rutsky, *High Technē: Art and Technology from the Machine Aesthetic to the Posthuman* (Minneapolis, MN: University of Minnesota Press, 1999), 5.

emblazoned the image of California as a sublime, Edenic locale in the American consciousness.⁸⁸

With regards to its operation in Southern California art, Rosalind Krauss has offered another nuancing vehicle for the technological sublime. In a 1991 essay aimed at delineating East and West Coast minimalist preoccupations, Krauss termed the works of Bell and other California artists the “California Sublime.” For Krauss, the California Sublime—a strain of Minimalism predicated upon transparency, reflection, and color—was a more specific identifier for what Plagens, and others, termed the LA Look. Krauss asserted:

If Minimalism was characterized through this worry about surface, about the interface formed by materials [. . .], aligning the meaning of the work with its physical medium, as the medium ‘surfaced,’ contingently, into the world, the California art of the sixties had an abhorrence of the physicality signaled by surface. The real medium of this work, John Coplans was fond of saying, was the viewer’s perceptual process.⁸⁹

Krauss argued that the practices of the California Sublime were in direct lineage from the “abstract sublime” of Barnett Newman (1905–1970) and other high modernists as well as the transcendental landscapes of J. M. W. Turner (1775–1851) and colleagues.

In her book on the relationships between Pop art and Los Angeles, Cécile Whiting shows how Los Angeles artists altered the concept of the historical sublime in their Pop representations of the 1960s: “In their landscapes and marines they initiate a dialogue between the mechanical medium of the camera and the touch of the handheld paintbrush

⁸⁸ Whiting, *Pop L.A.: Art and the City in the 1960s*, 24-47.

⁸⁹ Rosalind Krauss, “Overcoming the Limits of Matter: On Revising Minimalism,” in *American Art of the 1960s*, Studies in Modern Art, vol. 1, John Elderfield, ed. (New York: Museum of Modern Art, 1991), 129-131.

or pencil, questioning the very possibility of a direct visual access to the sublime in Southern California.” She adds, “Their works represent sublime nature—but only as Los Angeles’s memory of a lost past.”⁹⁰ For Whiting, Pop art in Los Angeles openly hijacked the historical sublime to represent alternative versions of the sublime via contemporary views of its infrastructure, industry, and rapid modernization.⁹¹ While the works analyzed in this dissertation depart from the consumer and media imagery represented in Pop art, Whiting’s contention that Los Angeles artists revamped the historical sublime to suit their aesthetic vision remains applicable here. In many ways, the historical sublime is so deeply entwined in the public’s consciousness of Southern California—i.e., the landscape’s light, space, and color—that artists (unconsciously or deliberately) responded to these qualities in their abstractions during the 1960s and 1970s.

Thus with regards to the interface of art and technology in Southern California, my use of the technological sublime conveys both the tendency for LA artists to feature luminous materials in their perceptually heightened works and the region’s dramatic postwar technological development in a more general sense. In other words, the visual qualities of the technological sublime represent equal parts luminous, phenomenal transparency and direct technological appropriation by artists.

Performing Mobile Spectatorship

In the “technopolis” of Los Angeles, this autodidactic paradigm of the technological sublime often operated as a synthesis of direct technological sourcing from

⁹⁰ Whiting, *Pop L.A.: Art and the City in the 1960s*, 24.

⁹¹ *Ibid.*, 59.

local industries (i.e., materials, equipment, processes, and/or concepts) with a sustained commitment to craftsmanship. The fusion of high-tech industrial resources with an unwavering devotion to surface treatment and craft manifested in artworks that emphasized corporeal relationships with light and space, encouraging mobile spectatorship. The specific material qualities of these works require real-time phenomenological engagement negotiated by the body's movement through space—an embodied phenomenon of mobile spectatorship. These mobility patterns rely on correlations between light, space, surface, and technology and, as such, part of my analysis describes how the technological sublime initiates such programmatic movements.

Mobile spectatorship is enacted in detectable patterns during engagement with the works in the following four chapters. Chapter 1 traces particular ways of viewing Larry Bell's iconic glass cubes, including circumambulation and gazing through the object, but also introduces how the science of Gestalt psychology necessarily prefigured his oeuvre. Though Bell represents one of the most recognizable artists discussed below—and as a result the artist with a significant bibliography—very few writers have pictured him primarily as the elite technologist that he is.

While Bell serves as a sort of inaugurator of high-tech appropriation in the studio, I include Mary Corse and Fred Eversley to show how lesser-known artists adapted novel, disparate technological processes in two- and three-dimensional works. In Chapter 2, I show how Corse manipulated high and low technologies in order to expand the parameters of painting alongside similar artists working in a post-painterly mode during

the 1960s. Corse's expansion of painting involved experimentation with Tesla coils and, subsequently, microscopic glass spheres. The mobile spectatorship orchestrated by Corse's works involves both transambulation (with respect to the experience of her microsphere paintings) and retinal activation initiated by the flickering fluorescent bulbs in her light boxes.

In comparison, Eversley joined other Southern California artists by working with the sculptural potential of newly available thermosetting plastics (namely polyester resin). While many of Eversley's fellow "plastics artists" poured polyester into molds before hand-buffing the plastic to a highly reflective sheen, Eversley instead devised a novel method for plastic shaping: centrifugal casting. Eversley's polyester sculptures call for a variety of viewing patterns, though as many function as optical lenses, they primarily call for precise body alignments for looking *through* to the space beyond. Corse and Eversley's oeuvres are especially noteworthy, because like Bell, both innovated within their own studios by implementing processes completely separate from colleagues working with similar technologies and/or materials. More than each artist's inclusion of a novel technical process in the studio, however, Corse and Eversley remain generally outside of the critical literature. Their inclusion in this dissertation is as much an historiographic expansion of the oeuvres of Corse and Eversley as a presentation of their discrete technological interventions in painting and sculpture.

By the 1970s, the experimental model forged in Southern California had morphed from high-tech studio appropriations into diverse tactics that incorporated various technologies in post-studio sites. While Bell, Corse, and Eversley all produce objects that

viewers walk around, in front of, or adjust to look through, the perceptually-charged experiences outlined in Chapter 4, including works by Michael Asher, Robert Irwin, James Turrell, and Maria Nordman, demand cerebral movements as much as (or perhaps more than) the spatial positioning of the body. These psychological patterns of experience relate to the “embodied” viewing articulated by art historian Claire Bishop. While the artists I discuss in Chapter 4 represent a spectrum of appropriated technologies for realizing their immersive environments, they all create spaces wherein the “viewer is arguably the key characteristic” of the work.⁹² The foregoing narrative highlights the role of Southern California in the technically complex and globally evolving postwar American matrix and strives to picture these currents in an interdisciplinary account of art and technology during the 1960s and 1970s.

⁹² Claire Bishop, *Installation Art: A Critical History* (London: Routledge, 2005), 6.

CHAPTER 1

Radiant Glass: Larry Bell's Studio Appropriation of Dielectric Vacuum Deposition

Artists have other artists as teachers. Those artists can be scientists, they can be shoemakers, they can be anything. –Larry Bell (1980)¹

My work is my teacher. –Larry Bell (2012)²

When Larry Bell entered Chouinard Art Institute in 1957—the same year that Edward Keinholz and Walter Hopps opened the Ferus Gallery—the progressive art scene in Los Angeles was in its infancy.³ The city's small collector base largely sought out works by modern masters and the local galleries fostered this taste, promoting local art that was, according to curator Hal Glicksman “quasi-cubist, Paul Klee-like” and “meaningless.”⁴ Los Angeles was culturally conservative during the 1950s. Throughout the 1950s, with the exception of dealers Frank Perls and Paul Kantor, the Los Angeles collector base predominantly sought out blue-chip examples of early European Modernism.⁵ In fact, while New York and San Francisco witnessed the rise of Abstract Expressionism, Angelenos and their tastemakers were initially skeptical of the High Modern idiom,

¹ Larry Bell, “In Reflection,” in *Larry Bell: New Work* (Yonkers, NY: Hudson River Museum, 1980), 77.

² This is an oft-repeated quote by Larry Bell that can be found in countless artist statements in catalogues and interviews. Apparently, Bell gleaned this maxim from artist and friend, John Chamberlain (1927-2011). Larry Bell, statement shared from his studio via electronic mail (10 May 2012).

³ There is inconsistency in the literature about the year Bell began his art education. For example, Hunter Drohojowska-Philp dates Bell's matriculation to 1958 in her “Timeline: 1955-1969” in *Rebels in Paradise*, xv. Bell confirms he attended Chouinard from 1957-1959 in Larry Bell, interview by Michele D. DeAngelus, 25 May—30 June 1980, tape recording and transcript (Washington, DC: Archives of American Art Oral History, Smithsonian Institution). He recalls his first semester was also Robert Irwin's first semester teaching at Chouinard. Prior to 1961, the Los Angeles County Museum of Art (LACMA) was part of the comprehensive institution, the Los Angeles Museum of History, Science, and Art.

⁴ Hal Glicksman, quoted directly from Morgan Neville, et al., *The Cool School: How LA Learned to Love Modern Art* (New York, NY: Arts Alliance America, 2008), DVD.

⁵ Peter Plagens, *Sunshine Muse: Contemporary Art on the West Coast* (New York: Praeger, 1974), 23-24.

considering it obscene or, worse, Communist.⁶ In less than five years this reality would change significantly, with Bell becoming a leading member of the Los Angeles avant-garde that emerged in the early 1960s.

The story of the Los Angeles art scene's development has recently undergone reevaluation. As described in the Introduction, contemporary accounts of the scene tended toward characterizing it as derivative of New York, with the work simultaneously possessing a bejeweled or sensuous surface quality; others simply referred to it as insular or provincial. Over the past decade a number of scholars and exhibitions, particularly the large-scale initiative *Pacific Standard Time* organized by the Getty Foundation, have contributed to an expansion of the formerly limited discourse.⁷ Today the prevailing scholarly consensus recognizes the inimitable qualities that distinguished the postwar Los Angeles art scene from its counterparts in New York and San Francisco, and more importantly, the number of narratives yet to be told.⁸ This chapter, along with the subsequent chapters, endeavors to contribute an untold story to this emerging discourse by examining a correlation between the high-technology landscape of Southern

⁶ Walter Hopps claims that before he and Ed Keinholtz opened Ferus Gallery, modern art was either ignored or deemed anti-American. See his comments in Neville, et al., *The Cool School*. Of course, this logic runs counter to the prevailing rhetoric surrounding Abstract Expressionism during the beginning of the Cold War: that the American postwar Abstraction was uniquely American and—in opposition to Soviet Socialist Realism—was emblematic of US politics and Capitalism. See Serge Guilbaut, *How New York Stole the Idea of Modern Art: Abstract Expressionism, Freedom, and The Cold War*, trans. Arthur Goldhammer (Chicago; University of Chicago Press, 1983).

⁷ Getty Research Institute (GRI) organized a long-term initiative, *Pacific Standard Time: Art in LA, 1945-1980*, dedicated to preserving, archiving, and celebrating the art of Southern California during this period. Along with cultural institutions across the region, the GRI has helped launch an unprecedented number of exhibitions and events in 2011-2012 that broaden previously narrow interpretations of Southern California art.

⁸ In the "Introduction" of her monograph on the Ferus Gallery, Kristine McKenna maintains that her narrative is "just one of many LA art stories that deserve to be told." See McKenna, *The Ferus Gallery: A Place to Begin* (Göttingen, Germany: Steidl, 2009), 15.

California and artistic responses to that environment. In what follows I reveal how this environment fostered a culture of experimentation that enabled Larry Bell to outsource and, eventually, directly appropriate a specific form of high-technology. The appropriation of a vacuum-coating technology became an integral process in Bell's studio that would remain with him throughout his career. In fact, I show that Bell developed such a knack for vacuum deposition that the process itself would come to exemplify his art as much as his iconic glass sculptures. I read his labor—his use of “the machine in the studio”—as a performance of technical expertise that denotes interdisciplinarity.⁹ By implementing a vacuum-coating machine in his studio activities, Bell helped usher in a 1960s studio practice that transformed the studio into a virtual techno-laboratory.

Literalism on the West Coast

By most accounts, Larry Bell's art, particularly his sculptures and installations from the mid-1960s through the early 1980s, should be characterized as the quintessence of West Coast Minimalism. This classification is at base valid, namely in that Bell is an artist who began his career in Los Angeles and also in that scholars initially assimilated Bell's oeuvre into Minimalism. In fact, Bell asserted in 1995, saying, “Actually, I always thought of myself as the ‘only’ minimalist—a club with only one member! [. . .] But, as

⁹ Jones, *Machine in the Studio: Constructing the Postwar American Artist* (Chicago: University of Chicago Press, 1996). Jones also questions the disciplinary boundaries of science and art in *Picturing Science, Producing Art*, co-authored with Peter Galison. Rather than pinpointing where both systems collide, however, the authors delve further into philosophical observations about the taxonomies of boundaries between fields—i.e., how and why such boundaries emerge—and analyze ways in which artistic and scientific images help to reinforce this well-established binary. See Caroline A. Jones and Peter Galison, eds., with Amy E. Slaton, *Picturing Science, Producing Art* (New York: Routledge, 1998).

with any club, one may drop in or out, one just has to pay the dues to get back.”¹⁰ This statement demonstrates not only the inclusion of his own works in the minimalist aesthetic, but his equal rejection of art historical categories aimed at bracketing artists in types based strictly on visual cohesion. Bell’s geometric glass sculptures fit the minimalist rubric so well that, appropriately, his *Memories of Mike* donned the cover of the June 1967 *Artforum* issue that published Michael Fried’s famously scathing attack on Minimalism (fig. 1.1). Pamela Lee expressed this coincidence well, writing that it is

[f]itting, then, that a Larry Bell cube in Plexiglas [*sic*] graces the magazine’s cover, emblematic as it is of the contents held within. In its blankness of form and liquid translucency, a thin veil of iridescence skimming its surface, it suggests a critical starting-from-scratch. This, then, is sculpture at its zero degree, sculpture as tabula rasa—awaiting new thoughts to be impressed upon it. And inside the magazine’s covers, many critics and artists would project such thoughts—and with a vengeance.¹¹

Bell’s art can be seamlessly discussed within the minimalist rubric and, as such, scholars have justifiably included his art in the movement’s canon.

In his recent reappraisal of the movement, Minimalism’s leading scholar, James Meyer, defines it “not as a movement but as a debate that surrounded a new kind of abstraction during the 1960s.”¹² For Meyer, Bell’s iconic sculptures are “classic example[s] of the so-called Finish Fetish/Light and Space aesthetic of 1960s Los Angeles.”¹³ Meyer also admits there is a problem with categorically distinguishing the colorful version of Minimalism in Los Angeles from a drabber New York Minimalism.

¹⁰ Larry Bell, *Fractions* (Paris: Jannink, 1995), 35.

¹¹ Lee is referring to Fried’s canonical text, “Art and Objecthood,” in which the critic attacked Minimalism as theatrical and literalist, and riffed on Judd’s defense of a new medium, “Specific Objects,” with his titling. Lee, *Chronophobia*, 40. Lee incorrectly identifies Bell’s material as Plexiglas. See Judd, “Specific Objects,” *Arts Yearbook* (New York, 1965): 74-82; Fried, “Art and Objecthood,” *Artforum* (June 1967).

¹² James Meyer, *Minimalism* (London: Phaidon, 2011), 11.

¹³ *Ibid.*, 28.

After all, he adds, “[Donald] Judd was just as likely to use Harley Davidson lacquer as the Californians” and Robert Morris and Robert Smithson both incorporated reflective glass in their works from the mid-1960s (figs. 1.2 and 1.3).¹⁴

While my approach generally does not resist the interpretation of Bell’s art as Minimal, I nonetheless contend that a formalist analysis presents methodological limitations to a complete appraisal of his work. Throughout his career, the literature on Bell has highlighted the formal aspects of his oeuvre while downplaying the exclusive process that he adapted to produce his art.¹⁵ This tendency both overlooks the significance of his technological appropriation and, especially, his increased specialization in this mode, which enabled those visual qualities for which his works are best known. Against this trend in the literature, my analysis weighs Bell’s technical processes equally with viewer reception of his artworks.

Why have scholars termed Bell’s brand of Minimalism “West Coast”? As shown in the previous chapter, critics and scholars actually did not initially draw distinctions between minimalist practices on each coast. Scholarly divisions between the *main* Minimalism (i.e., New York, the originator) and supposed derivations in Los Angeles did not appear until ca. 1968. For the most part, these early debates hinged on New York currents, with a handful of Los Angeles artists sprinkled into the narrative for good measure. Bell’s spare, glass forms became one exemplar cited in early curatorial

¹⁴ Ibid., 29.

¹⁵ This trend is most obvious when Bell’s art is used to illustrate the characteristics of Minimalism or the so-called “Finish Fetish” movement. James Meyer routinely employs Bell’s art while problematizing the East Coast/West Coast paradigm of minimalist forms. See, Meyer, *Minimalism*, 11. Also, Meyer, “Another Minimalism,” in Ann Goldstein, ed., *A Minimal Future? Art as Object 1958-1968*, exh. cat. (Los Angeles: Museum of Contemporary Art. Cambridge, MA: The MIT Press: 2004): 32-49.

narratives on the embryonic movement; Minimalism became the label that stuck to his oeuvre. For example, curator Kynaston McShine exhibited Bell's work alongside sculptures from both coasts as well as the United Kingdom in the landmark exhibition, *Primary Structures* (1966).¹⁶ And two years later Barbara Rose highlighted Bell's sculptures in the equally important show, *A New Aesthetic*.¹⁷ The major players who helped shape the early literature on Minimalism—Donald Judd, Robert Morris, and Michael Fried, as well as McShine and Rose—all grouped Bell's cubic sculptures in the emergent sensibility.¹⁸ Logically, one might argue, Bell's sculptures helped Judd, Fried, and others picture what Minimalism was shaping up to be in the mid-1960s. After all, his unwavering production of his iconic, austere cubes—the quintessential minimalist form—was not unlike Josef Albers's near-obsessive exploration of the square in painting.

Those concerned with chronicling Minimalism included Bell's art in their codifications almost as a rule due to its simplified geometry. And once critics began to differentiate between each coast's particular minimalistic attributes, they understandably drew upon Bell's perceptually charged, reductive, geometric sculptures to illustrate a new articulation of specific California practices in the minimalist idiom. Peter Plagens put California practices on the map in 1974, referring to this brand of Minimalism as the “LA

¹⁶ Kynaston McShine, *Primary Structures: Younger American and British Sculptors* (New York: Jewish Museum, 1966).

¹⁷ Barbara Rose, *A New Aesthetic* (Washington: Washington Gallery of Modern Art, 1967).

¹⁸ Of highest importance to all of these theorists initiating the debates on Minimalism was to define the aesthetic—i.e., is it painting, sculpture, or a hybrid of both—and to find an appropriate name that was not viewed pejoratively (primary structures, specific objects, literalist art, ABC art, reductive art, etc.). Towards the end of the 1960s, the debates expanded into Minimalism in relation to other concepts, including seriality, negation, displacement, and gender. See Meyer, *Minimalism: Art and Polemics in the Sixties* (New Haven and London: Yale University Press, 2001), for an exhaustive (albeit New York centered) chronology and historiography of the movement.

Look” and citing Bell as the embodiment of the style.¹⁹ In his words: a “cool, semitechnological, industrially pretty art made in and around Los Angeles in the sixties by Larry Bell, Craig Kauffman, Ed Ruscha, Billy Al Bengston, Kenneth Price, John McCracken, Peter Alexander, De Wain Valentine, Robert Irwin, and Joe Goode, among others.”²⁰ Curators and critics alike had identified a shared aesthetic amongst Bell, et al., prompting the search for a proper stylistic label. From Plagens’s “LA Look,” to critic John Coplans’s “Finish Fetish,” to Robert Morris’s “Existence Art,” to curator Melinda Wortz’s “California Light and Space,” to the lesser known label “LA Glass and Plastic,” and curator Robin Clark’s most recent use of “Phenomenal.”²¹ In one of the last lectures delivered before his death, Kurt Varnedoe included Bell and his colleagues in his discussion of what he termed “West Coast Minimalism,” claiming their “Finish Fetish” art emerged from LA car culture. “It is an aesthetic of high color,” Varnedoe contended, “without the grim insistence of the East Coast version of Minimalism.”²²

My intention is not to combat any of these labels because, fundamentally, they all effectively describe a unifying visual element across the described works (including their

¹⁹ Peter Plagens, the first writer to chronicle the West Coast scene in a survey form, apologetically linked the minimalist tendencies in Southern California to “sunsets, neon, flowers, ocean, desert landscapes, and wide boulevards” in his use of the LA Look. See Plagens, *Sunset Muse*, 122.

²⁰ Plagens, *Sunset Muse*, 120. Notably, Plagens lists only male artists as progenitors of the LA Look. Plagens’s coinage of the term appears in the literature two years earlier than *Sunset Muse*’s publication. See Plagens, “Larry Bell Reassessed,” *Artforum*, 11, no. 2 (October 1972): 72-75.

²¹ John Coplans, *Ten from Los Angeles: An Exhibition, Seattle Art Museum Pavilion, July 15th to September 5th, 1966* (Seattle: The Council, 1966). Robert Morris, “The Art of Existence: Three Extra-Visual Artists: Works in Process,” *Artforum*, 9, no. 5 (Jan. 1971): 28-33. Melinda Wortz, *California Perceptions: Light and Space, Selections from the Wortz Collection* (Fullerton: California State University Art Gallery, 1979). Also, Robin Clark, “Phenomenal: An Introduction,” *Phenomenal: California Light, Space, Surface* (Berkeley, CA: University of California Press, 2011). Clark may honor Robert Irwin with her use of phenomenal, as Irwin was known to use the term to describe the experience of his “situations.”

²² Kirk Varnedoe, “Minimalism,” in *Pictures of Nothing: Abstract Art Since Pollock* (Princeton, NJ: Princeton University Press, 2006), 111.

shared surface quality, im/materiality, and phenomenological underpinnings). In fact, to argue against Southern California's unique quality of light as inspiration would be a fruitless task. After all, as Hunter Drohojowska-Philp has pointed out, the regional obsession with light "was a historic preoccupation in Los Angeles and the principal reason that the movie studios had moved there from the gloomy East Coast. Directors valued the smooth, golden quality of early morning light as the most flattering for their leading ladies."²³ Discrediting the quality of light as negligibly influential to Southern California artists overlooks the reality that certain industries actually favored the climate for commercial success. In essence, there really *is* something about the light on the West Coast.

My analysis of Bell's 1960s and 1970s works cannot discount the likelihood that he and his milieu may have incorporated—consciously or otherwise—materials that reflected, transmitted, and projected the luminous environment in which they worked. Even so, Bell's process also responded directly to Southern California's concentration of high-tech industries as well as the avant-garde scene of Venice Beach. As introduced in the previous chapter, I contend that Larry Bell represents one of the earliest purveyors of the "technological sublime" in Los Angeles.

As a student of Robert Irwin (b. 1928), Bell progressed from initially creating paintings in a "Hard-edge" style to increasingly using newer technologies to execute his works. By the early 1960s, Bell was outsourcing and, eventually, directly appropriating dielectric optical coating (also known as vacuum deposition). This technology, according

²³ Drohojowska-Philp, *Rebels In Paradise*, 85.

to scientist and inventor Donald Mattox, had its infancy in the nineteenth century (in terms of early experimentation in the required physics and chemistry). The vacuum deposition technology, which Bell has employed directly for the past five decades of his career, had found its way into industrial applications by the 1930s.²⁴ Vacuum deposition came to play an important role in a myriad of scientific applications, with notable impact in military technologies during World War II. Just prior to the war, successful vacuum deposition techniques afforded the production of anti-reflective coatings on lenses and aluminizing of front surface mirrors; extremely precise optics, including powerful spotlights necessary for locating enemy aircraft, were a direct result of this scientific application.²⁵

Today, dielectric optical coating is exceedingly common and used pervasively by academic researchers and commercial industrialists alike. From precision lens manufacturing to forensic science applications to compact disc (CD) production, vacuum deposition processes facilitate the coating of any substrate with gossamer layers of a chosen vaporized material. Essentially the process involves the following general steps: the operator first cleans the substrate to prepare the surface for coating, then places the substrate in the vacuum chamber, loads the coating material onto the filament (the electrical component that ignites the agent), depressurizes the chamber, and finally passes electrical current through the filament. The filament's ignition vaporizes the material,

²⁴ Mattox presents an excellent, concise overview of the technology's development and most popular applications. Donald M. Mattox, *The Foundations of Vacuum Coating Technology* (Norwich, NY: Noyes Publications/William Andrew Publishing, 2003).

²⁵ Leslie Holland, "Author's Preface," *Vacuum Deposition of Thin Films* (London: Chapman & Hall Ltd., 1956), ix.

which deposits a sheer, even coating onto the prepared substrate. When Bell began incorporating vacuum deposition into his sculptures' fabrication in the early 1960s, the technology had found its way into myriad industrial applications, which made it available (but not necessarily economical).²⁶

Though Bell's usage of vacuum deposition has long been associated with his oeuvre, most writers mention but do not provide in-depth descriptions of his technical process. Typically his deep investment in the technology takes a back seat to thick descriptions of how his works *look*. For example, in a 1983 *Los Angeles Times* article, staff writer Suzanne Muchnic downplayed Bell's technological appropriation, opening her review by writing, "Technology is a means to perceptual awareness in Larry Bell's assiduously designed, impeccably fabricated sculpture of industrial material," and then adding, "[the technology] flows into the background or seems beside the point as viewers confront an artwork that transports them to a state of contemplative wonder."²⁷ Her assertion that Bell's glass sculptures and installations have the potential to transfix the viewer is well taken, although I question whether his technological appropriation actually "fades" away for most viewers as Muchnic asserts. And Jan Butterfield, writing in the first book-length study of *Light and Space*, downplayed the technological focus in her discussion of Bell's oeuvre, maintaining, "Although a sophisticated knowledge of

²⁶ By 1985, vacuum coating had become an established trade—enough to warrant the incorporation of the Society of Vacuum Coaters, a consortium of like-minded members with the core goal of being "the global source for learning, applying, and advancing vacuum coating, surface engineering, and related technologies." See the society's website for more information: Society of Vacuum Coaters, URL: <http://www.svc.org/index.cfm>, accessed 31 January 2013. I will explain Bell's process at length in the following pages.

²⁷ Suzanne Muchnic, "Larry Bell Gets into Flow of Things," *Los Angeles Times* (3 October 1983): G1, G3, ProQuest Historical Newspapers: Los Angeles Times (1881-1988).

technology played a crucial part in the execution of his pieces, it was never an end in itself. What Bell was concerned about was the subjectivity of perceiving color and light.”²⁸ Writers like Muchnic, Butterfield, and others have predominantly focused (not unjustly) on the phenomenological experience and perceptual qualities of Bell’s art. In essence, the literature is heavy on the sublime, and light on the technological.

In their respective analyses both Muchnic and Butterfield make strong cases for what they perceive to be the *raison d’etre* of Bell’s oeuvre. From their perspectives, the viewer’s individual meditative and perceptual experience of Bell’s art transcends the processes involved in the works’ construction. These qualities (and more) abound in an encounter with a Bell sculpture. I contend there is an equal presence of the technological sublime that does not recede into the background. Rather, an interaction with a Bell sculpture, especially his works that are of human scale or smaller, yields viewer actions that include perception and movement *but also* reflection upon Bell’s process, choices, and use of materials. In my view, close engagement with the work compels one to scrutinize the surface—both the brilliance of its reflective properties but also the obvious intricacies of material coating the glass.

In some examples, very close examination reveals individual specks of often subtly colored material deposited upon the surface of the glass. Bell’s coatings also offer a wide range of light reflection and transparency. This range, at times, reflects the viewer’s visage back at him/herself akin to a hued mirror. In other instances, the translucency provides a view of the spectator’s ghostly reflection that one looks *through*

²⁸ Jan Butterfield, *The Art of Light+Space* (New York: Abbeville Press, 1993), 179.

to the space beyond the sculpture (fig. 1.4). These perceptual effects are fun, beguiling, and appear inspired by aerospace design—as if the glass were borrowed from NASA directly. Even to our twenty-first century eyes, engagement with a Bell cube communicates that the work demanded a serious amount of technical craft to produce. There are strong ties between his art/technology practice and the high-tech appearance of his work, delivered by the interplay of material, light, and space on its surface. In the words of Bell, “My work is about the light that strikes the surfaces. The interface of light and surface is my medium.”²⁹

The literature on Bell and other “LA Look” practitioners often return to methodologies that link these formal elements (i.e., the art’s use of light and space) to stereotypical qualities associated with Los Angeles (i.e., LA’s sun, beaches, car culture, and the laid-back “cool” attitudes of Angelenos). Anyone who has visited, or resided in, Los Angeles can attest to its seemingly endless, gorgeous—albeit smog-filtered—sunsets as well as the exhilaration of driving on Interstate 405 (if traffic is not at a stand-still, of course). When asked if the mild climate had an impact on his works’ ethereal look, Bell replied that he was simply unsure about any direct correlation.³⁰ Whether or not the sunshine and car culture of Southern California influenced his practice, however, the technology itself certainly has played one of the largest, if not the largest, role in the development of Bell’s oeuvre. In fact, in a recent conversation Bell admitted that he is “very enthralled with the process [of dielectrical coating],” adding that his dedication to

²⁹ Larry Bell, “The Art of Larry Bell: Introduction,” website, URL: <http://www.larrybell.com/catalog/index.html> (accessed 12 Dec 2012).

³⁰ Larry Bell, comments via electronic mail (10 May 2012), shared electronically with the author by Bell Studio, Taos, New Mexico (7 January 2013).

this method has been largely due to its prolonged capacity to intrigue and surprise him.³¹ Understanding his affinity with the technical process casts his objects into an entirely new light; from this viewpoint, his works are attractive byproducts of a compulsive, artistic enterprise grounded in technological exploration. Crucial to Bell's oeuvre, in fact, is his experimental process—a fact that Bell conceded as early as 1971.³²

The arc of Bell's career in many ways follows similar artistic arcs of the period—from his beginnings in painting, to his early experimentation with constructions, to his mature glass sculptures, to his expansion upon the medium in large-scale installations. Once Bell latched on to the dielectrical coating, however, he remained committed to the process. Below I trace Bell's evolution of the technological process through the three phases of his career in the 1960s and 1970s. I reveal how the establishment of his perceptual interests early in his career created a foundation for the technological sublime, how a sustained preoccupation with perception led him directly to appropriate technology in the execution of the iconic cubes (the *Terminal Series*, as he refers to them), and finally how his deep commitment to this technology manifested in larger-scale enactments of dielectrical coating.

³¹ Larry Bell (2012) interview with the author (26 October).

³² In a 1971 interview, published in conjunction with the catalogue for the UCLA exhibition *Transparency, Reflection, Light, Space*, Bell admitted his work could be viewed as one long process of experimentation. See Frederick Stallknecht Wight and Peter Alexander, *Transparency, Reflection, Light, Space: Four Artists* (Los Angeles: UCLA Art Galleries, 1971), 41.

The Early Years (1957-1963)

Larry Bell is a so-called “War Baby”—a term culled from the American vernacular to describe the generation preceding “Baby Boomers” and the title of his first group exhibition at Huysman Gallery in Los Angeles in 1961 (fig. 1.5).³³ Born in Chicago in 1939, his family relocated to the San Fernando Valley after World War II and he attended Chouinard Art Institute (California Institute of the Arts, today) during the late 1950s. In a recent group interview Bell admitted his initial interest in Chouinard stemmed from its reputation for being a training ground for the Walt Disney Company; his original aspirations involved becoming a Disney cartoonist. Influenced heavily by then painting instructor—and now fellow artist—Robert Irwin, Bell initially chose painting as his preferred medium.³⁴

By the end of the 1950s, Angelenos’ conservative art opinions were more relaxed; Abstract Expressionism was no longer deemed anti-American. Gestural and Hard-edge painting became the dominant trends in the budding Los Angeles art scene, with Jules Langsner’s codification of Hard-edge abstraction in his exhibition *Four Abstract Classicists* rounding out the decade.³⁵ Hard-edge (a subcategory of Color-field painting

³³ The accompanying poster for “War Babies” pictures the four artists—Ed Bereal, Bell, Joe Goode, and Ron Miyashiro—seated at a table draped with an American flag and eating foods associated with their racial or ethnic backgrounds. Bell holds a bagel, Goode with a mackerel, Bereal eats a watermelon, and Miyashiro poses with chopsticks. The John Birch Society criticized the poster for openly desecrating the American flag. The show’s curator, Henry Hopkins, later claimed in an interview that it was the first racially integrated show on the West Coast. See Henry Hopkins, “Interview with Henry Hopkins,” in Lars Nittve, and Lena Essling, *Time & Place: Los Angeles 1957-1968* (Stockholm: Moderna Museet, 2008), 62.

³⁴ Larry Bell, *Modern Art in Los Angeles (videorecording and transcript): Oral history interview with: Larry Bell, Ron Miyashiro, Joe Goode, and Jerry McMillan* (Los Angeles: Getty Research Institute, 2010). According to Bell and his colleagues in this interview, Irwin’s charisma and ability to relate directly to students inspired many students to follow his personal vision and intuition in their art.

³⁵ Unlike, Abstraction Expressionism, Hard-edge Abstraction emerged directly from the avant-garde in Los Angeles. Jules Langsner, *Four Abstract Classicists* (San Francisco: Koltum Bros, 1959).

linked geographically to West Coast practices) gave the new California scene a sense of identity; it emerged in the region with Los Angeles tastemakers as its loudest champions. Bell painted in both a gestural and Hard-edge style (for example, figs. 1.6 and 1.7), although the development of his perception-focused vision crystalized in the latter.

After just two years of training, Bell withdrew from Chouinard and put his tuition money toward renting a studio.³⁶ Following the lead of Bengston, Irwin, and Kenneth Price, Bell moved close to the ocean in a Venice studio on Marine Street. During this time he had pared down his painting style considerably, recalling that when he “moved down to the beach [his] painting started to get very organized and very geometric with simple and clean shapes, one color or two colors.”³⁷ In fact, Bell’s paintings ca. 1960 through 1962 aligned with the Hard-edge proclivity for simple, geometric forms executed in vibrant colors. His first exhibitions supported this idiom, including his first solo show at the Ferus Gallery in 1962 and his inclusion in the 1964 Pavilion Gallery exhibition *California Hard-edge Painting*.³⁸ The style’s influences are detectible, particularly the Hard-edge innovator John McLaughlin’s perceptual investigations in painting via rectilinear forms in complementary palettes (e.g., figs. 1.7 and 1.8). In a significant reappraisal of phenomenal art, Robin Clark demonstrates that for Bell, Irwin, and Doug

³⁶ Bell left Chouinard over what he viewed as a betrayal of trust with his drawing instructor, Herb Jepson. Rather than draw the assigned figure Bell repeatedly drew squares and rectangles, explaining to Jepson that he was transcribing the metaphysical essence of the figure. Jepson sent Bell to the school’s “aesthetic advisor,” who Bell later learned (after attending several sessions) was a psychologist placed by the school to “weed out the weirdos.” The betrayal, particularly that a respected teacher thought he was “nuts,” led Bell to clean out his locker and never return. Drohojowska-Philp, *Rebels In Paradise* (2011), 82.

³⁷ Larry Bell (1980), Oral history interview by Michele D. DeAngelus, 14-15.

³⁸ *California Hard-Edge Painting*, an exhibition curated by Jules Langsner and presented by the Fine Arts Patrons of Newport Harbor at the Pavilion Gallery, Balboa, California (March-April, 1964).

Wheeler, perceptual investigations in painting were necessary precursors to their eventual explorations of light and space.³⁹

In the early 1960s Bell pushed his own perceptual investigations further, moving interchangeably between two-dimensional and three-dimensional forms. Regardless of the medium used, perception—especially the perceptual qualities that glass holds—remained the common thread in his work. An oft-repeated anecdote in essays on Bell attests to the development of this concern. Working in a framing shop near his childhood home, he began experimenting with arrangements of glass scraps and pre-fabricated shadow boxes; the result was a piece of transparent glass—cracked with an irregular, horizontal line running through it—displayed within a common shadow box and backed with colored paper (fig. 1.9). Bell remarked that what intrigued him about executing this work was the three phenomena that he observed simultaneously: the line of the crack’s shadow, the line of the crack’s reflection, and the line of the crack itself.⁴⁰ Just as Bell’s interest in visual perception can be traced to this watershed moment, his exercises in medium experimentation are similarly evident in experimental constructions of ink, paper, glass, and paint (fig. 1.10).

Both Bell’s Hard-edge paintings, as well as his mature works from the mid-1960s and the 1970s, encouraged, even privileged, the viewer’s mobile spectatorship. Bell’s Hard-edge paintings—many of which included precisely shaped canvases—resonated

³⁹ Robin Clark and Michael Auping, *Phenomenal: California Light, Space, Surface* (Berkeley, CA: University of California Press, 2011), 23.

⁴⁰ Larry Bell, video recording of the artist speaking about his work in March 2011, “Pacific Standard Time,” Getty Research Institute, <http://www.getty.edu/pacificstandardtime/explore-the-era/archives/v1-2/> (accessed 12 Sept. 2012).

with the minimalists' use of Gestalt psychological theory to underwrite their aesthetic, though his work has been read in those terms only in more recent scholarship. Additionally, his employment of the shaped canvas held affinities with contemporary Frank Stella's works on canvas.⁴¹ Gestalt theory claimed to enable the subject to get a holistic sense of an object through the mind's ability to fill in perceptual information by drawing upon the surrounding visual context.⁴² Of theoretical influence to Minimalism was Maurice Merleau-Ponty's articulation of Gestalt theory alongside phenomenology in the canonical *Phenomenology of Perception* (first published in France in 1945, but available in English translation in 1962). Merleau-Ponty fundamentally linked the mind's use of simplified gestalts to human perception. Without Gestalt theory, Merleau-Ponty claimed, "a phenomenon cannot be said to be perception at all."⁴³ Many of Minimalism's earliest practitioners took to citing Merleau-Ponty's ideas in their justifications of the new aesthetic. Most notably, Robert Morris delivered early statements on minimalist theory linking Gestalt theory to the "Minimal style."⁴⁴ The roots of Gestalt psychology extend

⁴¹ Robert Rosenblum discusses the innovative nature of Stella's shaped canvases, crediting Stella with being the progenitor of this trend (as early as 1960). Rosenblum writes: "This innovation both created and reflected the internal geometries of stripes that now ran only parallel, and not perpendicular, to the enclosing edges. If the black striped canvases implied that the picture was a plane surface defined by the frame, these new aluminum paintings made the point explicit." Rosenblum, "Frank Stella: Five Years of Variations on an 'Irreducible' Theme," *Artforum*, 3, no. 6 (March 1965): 23.

⁴² For an in-depth account of the development of Gestalt psychology, beginning with intellectual roots in Germany at the turn of the twentieth-century, see Mitchell G. Ash, *Gestalt Psychology in German Culture, 1890-1967: Holism and the Quest for Objectivity* (Cambridge: Cambridge University Press, 1995).

⁴³ Maurice Merleau-Ponty, *The Phenomenology of Perception*, trans. by Colin Smith (New York: Humanities Press, 1962), 3.

⁴⁴ Robert Morris discusses the relationship between Gestalt psychology and minimalist practice at length in his canonical essay, "Notes on Sculpture," published in two parts in *Artforum* (February and October 1966, respectively). He argues that "one need move around the object for the sense of the whole, the gestalt, to occur. One sees and immediately 'believes' that the pattern within one's mind corresponds to the existential fact of the object." See "Notes on Sculpture," reprinted in Gregory Battcock, ed., *Minimal Art: A Critical Anthology* (Berkeley: University of California Press, 1986), 226.

back to nineteenth-century philosophical theories, though the popularity of Merleau-Ponty's book fueled all sides of the minimalist debates in American art discourse.⁴⁵

Bell's paintings from the early 1960s overtly employed the Gestalt theory of multistable perception, which acknowledges the tendency for ambiguous shapes to shift along borders when perceived. Iconic examples of multistability include the Rubin vase and Necker cube (see fig. 1.11).⁴⁶ As we endeavor to focus upon the simplest gestalt within the Rubin vase illustration, for example, we experience a tension between perceiving a centered vase against a neutral background or the profiles of two opposing faces. Through our desire to perceive the simplest gestalt, the tension results in a vacillation between seeing the vase and seeing the two profiles. Our eyes/minds—and here I deliberately underscore the ongoing consensus that vision is an immensely complex process wherein our eyes work in concourse with our minds to see⁴⁷—are unable to view both vase and profiles simultaneously.⁴⁸ The simpler and higher in contrast the forms are, the stronger the tension of multistability that we experience.

Bell's perceptual concerns appear early on in acrylics on canvas. Typically, these paintings incorporate austere color schemes—using two or three colors—with shaped canvases and refined surfaces and edges, such as *Lux at the Merritt Jones*, 1960 (fig. 1.7)

⁴⁵ James Meyer presents an excellent theoretical overview of the major players, and their theoretical perspectives on Merleau-Ponty's book, in *Minimalism: Art and Polemics in the Sixties*.

⁴⁶ Fred Attneave gives a succinct explanation of this theory and its direct relationship to the visual arts. See Attneave, "Multistability in Perception." *Scientific American*, 225, 6 (December 1971): 62-71. The Necker Cube is an optical illusion, first published in 1832 by Swiss crystallographer Louis Albert Necker.

⁴⁷ As a seminal example, Leo Steinberg emphasized the eye/mind interface in vision, arguing in favor of the act of viewing and eschewing formalism as *the* privileged methodology of the time. Steinberg, "The Eye is Part of the Mind," *Other Criteria: Confrontation with Twentieth-Century Art* (Oxford: Oxford University Press, 1972): 289-306.

⁴⁸ Vasco Ronchi and Edward Rosen, *Optics, The Science of Vision* (New York: Dover Publ, 1991), 67-68.

or *Little Blank Riding Hood*, 1962 (fig. 1.12).⁴⁹ At first glance, paintings like *Little Blank Riding Hood* might appear to align first and foremost with Jules Langsner's 1959 articulation of Hard-edge abstraction as classically formal—that is, “the relation of form to form constitutes a *raison d'être* in itself.”⁵⁰ However, Bell's paintings demonstrate his fundamental artistic preoccupation with the viewer's experience of looking.⁵¹ Despite the refined surfaces, clean edges, and simplified compositions of basic geometric forms, Bell devises optical exercises for the viewer by representing isometric projections (i.e., a perspectival representation based upon the orientation of three spatial axes to the surface of the painting). Specifically, he paints the isometric projections wherein the angles of the shaped canvas echo the interior forms.

In *Little Blank Riding Hood*, for example, he presents a simple red form in acrylic on unprimed canvas. At base our eyes/mind first register what appears to be an irregular hexagon floating within a shaped canvas, which oddly shares two of its sides with the angled edges of the canvas's two smallest edges. Persistent looking is rewarded, however. Rather than executing a purified formalism in his painting—in Langsner's words, forms with a meta-contextual reference that are “flat and finite”—*Little Blank*

⁴⁹ Perhaps an obvious progenitor of hard-edge, geometric abstraction (using three-color schemes) would be artist Josef Albers (1888-1976). However, there is no evidence that Bell was acutely aware of or influenced by Albers's art and teaching, though a tenuous connection can be made vis-à-vis Bell's first painting instructor at Chouinard: Robert Irwin. Irwin, Bell recalls, was exceedingly well-read in art theory and philosophy more generally. See Bell, (1980), interview by Michele D. DeAngelus, 10 and 15.

⁵⁰ Langsner, *Four Abstract Classicists*, 8.

⁵¹ The show presented the Hard-edge painting of Karl Benjamin, Lorus Feitelson, Frederick Hammersley, and John McLaughlin, while arguing that their art projected classical ideals of “thought, feeling, intelligence, intuition, reason, and emotion” that were achieved through pristine attention to color, balance, form, and space. Langsner, *Four Abstract Classicists*, 8-9. It was first mounted at San Francisco Museum of Modern Art (not at the Pomona Art Gallery as originally intended). The show traveled to the Los Angeles County Museum of Art, then to London's Institute of Contemporary Art in March 1960 (curated by Lawrence Alloway) and to Queen's University, Belfast, Ireland.

Riding Hood intentionally represents a volumetric shape and, importantly, omits the interior lines that typically reinforce the outline of each plane.⁵² The shaped canvas, coupled with the illusionistic rendering of a perspectival geometric shape, provides a perceptual exercise for the viewer enacted through mobile spectatorship.

Little Blank Riding Hood employs multistability for the perceptual effect of the fluctuating shape. By walking back and forth across the gallery space and observing the painting, Bell's perceptual intentions crystalize. The mind necessarily fills in the imaginary edges of the red rectangular prism, which calls direct attention to how one's vision employs multistability in order to reconcile this fluctuating shape. The shape optically bulges and morphs with shifts in bodily placement. Bell's omission of the outlined planes nonetheless results in viewer perception of those (implied) lines, causing a trompe l'oeil effect of the shape protruding and recessing from the canvas support.

It is worth emphasizing at this point that Bell was among many postwar artists exploring the nature of perception in their work; my exposition of Bell's early concerns with perception lays the necessary groundwork for understanding his technological turn. Certainly, artistic interest in the science of perception extended back to the nineteenth century. The Impressionist painters, in particular Neo-Impressionist Georges Seurat, became heavily invested in the ideas put forth by French chemist Michel-Eugene Chevreul in *The Principles of Harmony and Contrast of Colors* (first published in 1839 and translated into English in 1855).⁵³ Amongst other perceptual theories, Chevreul

⁵² Langsner, *Four Abstract Classicists*, 10.

⁵³ Chevreul was exceedingly influential in the movements of impressionism, postimpressionism, and the lesser-known cubist offshoot, orphism. The chemist was well aware of this application, subsequently co-

crucially articulated the theory of *simultaneous contrast*, which asserted that a given color's perception was directly influenced by any surrounding color(s). The influence of Chevreul's text on nineteenth- and twentieth-century artists was remarkable, namely because he helped articulate scientifically what artists already practiced instinctively.⁵⁴

There is no evidence that Bell read the color theories of Chevreul, or any theory, for that matter. Bell rejected the theoretical girding of his work, maintaining, "I was not an intellect, really, at all. I never have been, and I couldn't really talk about my work very well."⁵⁵ Like Bell, most of those in his milieu were frankly opposed to discursive readings of their works. The exception to this oppositional attitude is artist Robert Irwin, Bell's Chouinard painting teacher who was a committed student of philosophy and perceptual science. Undoubtedly an influence on Bell and others Chouinard students' perceptual interests, Irwin kept copious notes and theoretical observations for years in an extensive collection of personal journals.⁵⁶ According to Irwin, Los Angeles artists—particularly the contemporaries with whom he interacted most—were especially

publishing a revised edition of the book, titled *The Principles of Harmony and Contrast of Colours, and Their Applications to the Arts*. See M. E. Chevreul and Charles Martel, *The Principles of Harmony and Contrast of Colours, and Their Applications to the Arts* (London: Longman, Brown, Green and Longmans, 1854).

⁵⁴ See "Reflections on painting: Seurat's transcription of a passage from Chevreul's "De la loi du contraste simultané des couleurs" in Linda Nochlin, *Impressionism and Post-Impressionism, 1874-1904; Sources and Documents* (Englewood Cliffs, N.J.: Prentice-Hall, 1966), for a primary source demonstrating this link. A concise examination of Chevreul's theoretical influence (from Seurat to Albers) can be found in: Alan Preston Lee, *Art and Colour Perception: A Critical Examination of Some Theories Associated with Chevreul, Seurat, Impressionism, Itten and Albers*, Thesis (Ph. D.), (Flinders University of S. Aust., 1984, 1983).

⁵⁵ Bell (1980), interview by Michele D. DeAngelus, 24.

⁵⁶ These journals are now held, along with the entire cache of Irwin's papers, at the Getty Research Institute. Irwin organizes his notebooks according to philosophical and scientific topics, including reason, logic, questions of reality, and theoretical physics. Each journal attends to the philosophical quandary (e.g., reason) and notates his personal observations alongside the ideas of influential thinkers, including Aristotle, Nietzsche, Hegel, and Wittgenstein, among others.

antagonistic toward any type of theoretical dialogue.⁵⁷ As the West Coast exception to this oppositional posture, Irwin's philosophical interests aligned more closely with his East Coast counterparts who wrote prolifically during their careers, including Robert Morris, Donald Judd, and Robert Smithson. Compared to Morris, Judd, and Smithson, Irwin's writings focused primarily on the perception of color and light in space (and eventually notions of site-specificity); this focus, to be sure, is indicative of a general sensibility that coalesced in Southern California. Irwin famously observed, "That was the difference between the artists on the East Coast and those on the West. We saw it and they didn't. They relied on *conception* while we worked in the domain of *perception*."⁵⁸

As a strict dichotomy, Irwin's assertion here perpetuates the East/West stereotypes but is also somewhat inaccurate. By the 1960s, perceptual science had become a hot topic in American pop culture, and US art circles were implementing a wide variety of approaches to the perceptual tendency in visual art. Curator William Seitz included Bell in his exhibition, *The Responsive Eye*, which exhibited contemporary examples of perceptualism (works ranging in date from 1952-1964) from artists representing over fifteen individual nations.⁵⁹ Taking their cues from Renaissance theories of symmetry, Impressionism and nineteenth-century color theory, as well as turn-of-the-twentieth-century scientific studies in perception and De Stijl, the exhibition,

⁵⁷ Robert Irwin (1975-1976), Oral history interview by Frederick S. Wight, in *Los Angeles Art Community: Group Portrait* (Los Angeles: Oral History Program, University of California, Los Angeles), 54.

⁵⁸ Robert Irwin, quoted in Lawrence Weschler, *Seeing Is Forgetting the Name of the Thing One Sees: A Life of Contemporary Artist Robert Irwin* (Berkeley: University of California Press, 1982), 78.

⁵⁹ Museum of Modern Art (New York) and William Chapin Seitz, *The Responsive Eye* (1965). Seitz traces the teleology of perception, from Seurat's pointillism, to the importance of design education in the German Bauhaus, to the postwar proclivity for optical art. Bell's *Glass Sculpture Number 10*, 1964, is not illustrated in the catalogue.

according to Seitz, seeks to “dramatize the power of static forms and colors to stimulate dynamic psychological responses.”⁶⁰ In his catalogue essay, Seitz reveals how optical theory, including Gestalt psychology, informs reception of these works, which he organizes through subgroupings (including perceptual abstraction, movement, opticality, reliefs/constructions, as well as color versus black and white). In 1980, Melinda Wortz correctly observed that Bell’s inclusion in *Primary Structures* and *The Responsive Eye* demonstrates that Rose and Seitz viewed “his work in relation to major issues of perception being explored at the time, rather than as an isolated West Coast phenomenon.”⁶¹

And while perceptual science and phenomenology were major, if not *the major*, guiding premises of 1960s art in America and across Europe and Asia, Irwin’s assertion somehow does offer a legitimate dichotomy for each coast’s identity. Besides the enjoyable wordplay involved, an East Coast *conception* versus a West Coast *perception* underscores, fundamentally, the West Coast artists’ unequivocal refusal to dialogue theoretically with their contemporaries. In other words, Irwin’s comment alludes to a coastal divide in terms of how an artist articulates her/his inspiration, intention, and process: open discussion of the cognitive steps involved in art-making, and its theoretical justifications, versus letting the work and its reception speak for itself. (Admittedly, refusing such discursive engagement also positioned West Coast artists, Bell included, as provocative or otherwise as possessing a “misunderstood, genius” talent.)

⁶⁰ Ibid., 41.

⁶¹ Melinda Wortz, “In Consideration,” in *Larry Bell: New Work* (Yonkers, NY: Hudson River Museum, 1980), 11.

Besides the divide between how West Coast and East Coast artists dis/engaged with theoretical discourse, there was a clear distinction between how each coast's artists initially attended to questions of perception. If both coasts reacted against High Modern aesthetics vis-à-vis reductive surface treatments, incorporation of industrial materials, and a fondness for geometric forms, the West Coast artists tended to accomplish this through the technological sublime. Whereas the technological sublime brand of Minimalism involved a predilection for materials and spaces saturated with color and light, the East Coast minimalists often exhibited works of achromatic materials with raw or less-finished surfaces. Of course, these categories are not absolute. Even in his early works on canvas, Bell employed color judiciously and economically to achieve his desired perceptual effects. His reduced color palette typically juxtaposed one or two colors with white or unprimed canvas. Gestalt psychology necessarily governs the spectatorship of Bell's works on canvas via his employment of bi- or tri-chromatic schemes and shaped canvases. Thus, it is unsurprising that he continued an investigation of these concepts using new media and formats.

Bell's first experiments with three-dimensional forms occurred in tandem with his perceptual designs in painting. His interest in perception, as well as his experimental attitude toward art making in general, were initiated during his time working in the San Fernando Valley frame shop. As noted above, Bell first began experimenting with arrangements of glass scraps and pre-fabricated shadow boxes (resulting in experiments such as fig. 1.9). The phenomena that a single crack created *with light*, Bell emphasized,

was most intriguing to him.⁶² Interestingly, he thought little of them at the time, giving most of these experimental projects away.⁶³ His preference for the medium of glass, as well as his pronounced interest in light as the key ingredient in viewer perception, can be traced to these early moments of experimentation.

By 1961, Bell was incorporating transparent and mirrored glass in his paintings. In some instances, these experiments with glass maintained the refined surfaces for which Bell has become known, such as *Conrad Hawk*, 1961 (fig. 1.13) or *Untitled*, 1962 (fig. 1.14). In other works, Bell's intentions appear to have been a much freer approach to experimentation in materiality (as in fig. 1.9). In the refined exercises, as in *Conrad Hawk*, Bell combines the two-dimensional quality of painting (i.e., bound to the wall, disallowing complete circumambulation) and the three-dimensional quality of relief sculpture. *Conrad Hawk*, completes a sophisticated optical illusion in which a hollow, black cubic form appears to hover within a larger beige cube. Again, Bell uses a shaped canvas to reinforce the perceptual exercise. By incorporating transparent glass to operate as the small cube's inner space, the isometric black lines create the exterior planes of the hollow cube; the beige field, in conjunction with the canvas's shape, represents a larger cube. As in *Little Blank Riding Hood*, the tension of multistability renders a continual push/pull of the forms and our vision repeatedly tries to reconcile which shape we are meant to focus upon (the inner cube or the outer one) and which orientation each maintains. As a continuation of his perceptual experimentations, works like *Conrad*

⁶² Larry Bell, video recording, "Pacific Standard Time," Getty Research Institute, <http://www.getty.edu/pacificstandardtime/explore-the-era/archives/v1-2/>.

⁶³ Larry Bell, "Another Lesson," artist statement in *Larry Bell, the Sixties: Exhibition* (Santa Fe, NM: Museum of Fine Arts, Museum of New Mexico, 1982), 4.

Hawk also demonstrate Bell's sustained interest in refining the object's surface. By employing reflective materials Bell provides a locus to connect subject and space in the perceptual spectatorship of these works.

Arguments like those presented by Muchnic and Butterfield become convincing if we follow this logic—that, above all else, perception guides the direction of Bell's oeuvre. This reasoning would remain true if Bell had continued painting exclusively since the early 1960s, foregoing any contact with local technology. On the contrary, he knew he was onto something with works like *Conrad Hawk*; the response from friend and fellow artist, Billy Al Bengston, sums it up nicely. Bell recalls:

I was looking for something else to combine in the canvases so I thought I'd stick a piece of glass in one of these things to see how it looked—and it looked great. Some of the guys came over and they all said 'wow.' But when Bengston saw the piece he tried to discourage me from making them. They were real expensive to produce and he said 'you can't afford to make these. If you could afford to make them then I would be making them.' Finally, I'd done something that he'd wished he'd done, so I completely threw myself into making them.⁶⁴

It was Robert Irwin who introduced Bell to Ferus gallerists Walter Hopps and Irving Blum. Wanting to be a part of the avant-garde scene that was emerging from Ferus, Bell approached Hopps, entreating, "Walter, I think I'm going to have to go into the army. I'd like to have a show."⁶⁵ After Blum and Hopps paid a visit to Bell's studio, they agreed to give him his first solo show in 1962.

Bell executed a fixed number of these paintings and constructions during the early 1960s, though he would eventually move on to strictly (and prolifically) making his

⁶⁴ Larry Bell, quoted from a conversation with Kristine McKenna at his studio, Venice, CA, 2004. See McKenna, *The Ferus Gallery: A Place to Begin*, 276.

⁶⁵ Drohojowska-Philp, *Rebels in Paradise*, 83.

iconic, cube sculptures. *Conrad Hawk*, Bell states, was the last painting he created.⁶⁶ Both his paintings of isometric projections and his experiments with the incorporation of glass and mirrors into works on canvas represent one transitional phase for Bell. Recently, he reflected on this phase, admitting that while they were “easy to look at,” they were nonetheless illustrations of volumes. In his words, he “no longer wanted to make pictures of volumes”—he simply wanted to create the volumes themselves. The moment of this realization is when Bell transitioned from strictly painting to executing mixed-media representations of geometric volumes.⁶⁷

The Technological Sublime of Dr. Lux (1963-1968)

From 1961 to 1963, Bell produced wall-bound sculpture that functioned like hybrids of painting and relief constructions. Many of these constructions (e.g., fig. 1.15) incorporated mirrors or glass, as well as isometric projections of cubes and rectangles. By 1963, he transitioned to exclusively producing three-dimensional sculpture in the round that, in line with the central objective of his painting and constructions, were designed to engage viewer-sensate perception. Eventually, his experiments with three-dimensional sculpture matured into his iconic glass cubes—the sculptural form that earned him critical acclaim and its reproduction on the cover of *Artforum* four years later.⁶⁸ The success of his first Ferus show in March 1962—exclusively his works on shaped canvases—resulted

⁶⁶ Larry Bell (2011), *Modern Art in Los Angeles, videorecording and transcript: Oral history interview with Larry Bell*, 9 March (Los Angeles: Getty Research Institute), 8. Also, Janet Kutner, “Larry Bell’s Iceberg,” *Arts Magazine*, 50 (Jan. 1976), 63-64.

⁶⁷ Larry Bell, video recording, “Pacific Standard Time,” Getty Research Institute, <http://www.getty.edu/pacificstandardtime/explore-the-era/archives/v1-2/>.

⁶⁸ *Artforum*, 5, no. 10 (June 1967).

in a \$2,000 grant from the Copley Foundation.⁶⁹ He was just twenty-two. With a boost to both morale and his finances, Bell began to consider expanding his repertoire to include costlier materials. Those who discuss Bell's oeuvre often refer to this as revelatory of Bell's ambition for artistic development. After this moment, Bell's perceptual concerns spurred a series of experiments in a range of processes. Eventually, these interests, coupled with his predilection for glass as a primary material, matured into an appropriation of dielectrical coating into his art making. In some ways, Bell admits, he imagined this transition as a means to physically realizing the forms that he was representing in the isometric projection paintings of 1960 and 1961.⁷⁰

Just prior to outsourcing dielectrical coating to achieve his aesthetic vision, Bell devised a reductive method in which he painstakingly scraped away the opaque layers of a mirror to present mirrored patterns within the surface of the mirrored plane. This labor-intensive process allowed for transparent glass to remain in patterns (i.e., stripes or isometric projections) wherever he scraped the opaque backing away; Bell also applied paint directly to the glass in certain sections. Once Bell completed the surface treatment of each plane, he initially incorporated the dual-sided mirrors into his wall reliefs. Not long after, he began assembling the sides into three-dimensional constructions of rectangular prisms, isometric projections, and the shape for which he is best known: the cube. In specific instances, these transitional works were iterations of his shaped-canvas paintings but intended to stand in the round (fig. 1.15).

⁶⁹ Drohojowska-Philp, *Rebels in Paradise*, 83. Adjusted for inflation, \$2000 in 1962 has the same buying power as over \$15,000 in 2013. See the United States Department of Labor Statistics for inflation calculator, available at URL: http://www.bls.gov/data/inflation_calculator.htm.

⁷⁰ Larry Bell (2011), *Modern Art in Los Angeles: Oral history interview with Larry Bell*, 10.

Bell's first cube construction, *Larry Bell's House, Part II*, 1962-63 (figs. 1.16, 1.17, 1.18), involved this devised process of scraping material away from mirrors. After purchasing mirrors at the Thrifty Drugstore, Bell scraped away patterns and applied black epoxy paint to clean up the edges as well as to cover any mistakes. As Bell put it, "I think the piece still has its charm, but making it was a great pain in the ass, and I screwed up left and right with things."⁷¹ The piece, he adds, is exceedingly heavy because if he did make a mistake or the mirror cracked, he simply covered it up with an entirely new, mirrored plane. Each side of the cube is comprised of two mirrored planes glued back-to-back, with patterns carefully aligned, so that each side is reflective on the exterior and the interior of the cube. Bell finished the frame of the cube with mirrored strips.

Peering into *Larry Bell's House, Part II* is like peering into a miniature hall of mirrors; optical illusions abound. Rather than being immersed in mirrored space, as in a fun-house environment, the viewer is confronted with a fractured reflection of her/his gaze on several interior and exterior planes. This incomplete reflection repeats variably as one circumambulates the sculpture (fig. 1.19). Bell achieved these sophisticated effects by making each side reflective on the front and back surfaces (that is, he glued the mirrors back to back after scraping away the patterns). Looking through the transparent areas that Bell has scraped away provides the viewer with additional reflections of patterned mirrors. Moreover, the isometric projection that Bell did not remove appears to hover in the middle of the cube. Despite intensive study, it remains unclear if the hovering form is a reflection of the interior surface of one of the cube's sides, or if it is

⁷¹ Larry Bell (2011), *Modern Art in Los Angeles: Oral history interview with Larry Bell*, 11.

actually another mirrored plane that bisects the cube at an indeterminate point of intersection. An inexplicable sense of space reflecting infinitely exists inside this work.

While *Larry Bell's House, Part II* yielded the perceptual effects he desired, Bell believed the effects could be more easily achieved by appropriating technology. Having the financial means, he began searching for a technologist who could manufacture dual-sided mirrored planes within his prescribed designs. Bell learned that dual-sided mirrors could be made to his specifications and selected Keim Precision Mirrors at random from the Yellow Pages. The proprietor, Gordon Keim, primarily manufactured specialty mirrors for the local motion picture studios. Bell recalls that when he first walked into the small shop, Keim pulled out a small mirror that was dual-sided: exactly what Bell needed. But Keim was notoriously secretive about the process, most likely a tactic of keeping his corner of the market for specialty mirror production. Bell recalls asking if patterns could be integrated into the mirror's surface. "Sure," Keim replied, "You mask it off somehow."⁷² Keim stated (but did not explain further) that certain materials gassed during vacuum coating and, as such, some masking agents would not be a possibility. Gassing, Bell learned later, involves the masking agent deteriorating during the coating process. The invasive process of depressurizing the chamber coupled with the ignition of the filament can pull materials apart and into the vacuum. Consequently, the deposited material fills in wherever the masking agent "gassed off" of the substrate.

Slightly intimidated and afraid to ask what gassing meant, Bell was at the mercy of Keim (who was more concerned with selling the process to Bell than suggesting a

⁷² As recalled by Larry Bell in a 2011 Oral history interview. Larry Bell (2011), *Modern Art in Los Angeles: Oral history interview with Larry Bell*, 12.

solution).⁷³ Despite his intimidation, however, Bell elected to proceed with Keim's outfit performing the vacuum coating on his glass. Bell first silkscreened his patterns onto the glass, which he would wash off with acetone once Keim and his associates had metalized the glass.⁷⁴ Screen-printing was effective, yet Bell admits that the silkscreened edges also tended to gas slightly. After experimenting with various materials he discovered that contact paper worked the best; he recounts that he could apply the contact paper and use an X-Acto knife to precisely apply his design on the glass, leaving no trace of gassing on the edges once the glass had been dielectrically coated.⁷⁵

Extremely pleased with this technology's results, Bell incorporated some of the coated mirror planes into his canvas constructions, as in *A Wisp of the Girl She Used to Be*, 1963 (fig. 1.20). He also began assembling the planes into cubic sculptures with the coating protected safely on the inside. This breakthrough streamlined his process dramatically, allowing him to work faster and facilitating much lighter, less cumbersome sculptures. The downside, of course, was how much more costly a mistake had become; purchasing spare mirrors from Keim rather than the Thrifty Drugstore was exponentially higher in cost. Bell became increasingly efficient in his process, producing a range of relief constructions and sculptures that began to draw even more interest than his paintings had received. Immediate corollaries between Bell's new work and the Art Deco luxuriousness of the 1920s were drawn, not to mention that "Lux" had found its way into some of Bell's titling of works. In a review from Bell's 1963 show at the Ferus Gallery,

⁷³ Larry Bell (1980), interview by Michele D. DeAngelus, 25-26.

⁷⁴ Larry Bell (2011), *Modern Art in Los Angeles: Oral history interview with Larry Bell*, 12.

⁷⁵ Larry Bell (1980), interview by Michele D. DeAngelus, 26.

art critic Fidel Danieli directly referenced the presence of an aloof Duchampian posture as well as the “onyx, jewel-window luxury” of the 1920s in his appraisal of Bell’s works.⁷⁶ In fact, Hopps and the Ferus stable had nicknamed Bell “luxury”—referencing both his penchant for dressing in a dapper manner and the luxurious surfaces of his constructions and sculptures.⁷⁷ Later, Bell would assume a type of alter ego named Dr. Lux when he began creating furniture, titled *Chairs de Lux* and *Furniture de Lux*, ca. 1980 (fig. 1.21).⁷⁸

Danieli’s review of Bell’s 1963 Ferus show was exceedingly laudatory, emphasizing that “[...] one may properly admire the indomitable spirit of repetition and development, the consummate craftsmanship and mechanical precision, the hard chrome-lined calculation of symmetry and surface, and the rigorous demands made upon the viewer under the guise of a concept of beauty as seeming stylishness achieved by unadulterated guts.”⁷⁹ The success of the Ferus exhibition earned him a place in Virginia Dwan’s 1964 show, *Boxes*, which thematically grouped thirty-nine artists together around the concept of the container.⁸⁰ Bell’s *Lux of the Ferus*, 1963—a rectangular box comprised of mirror and glass—shared space with a range of established artists’ works,

⁷⁶ Fidel Danieli, “Reviews: Los Angeles: Larry Bell, Ferus Gallery,” *Artforum*, 2, no. 7 (Jan. 1964), 41.

⁷⁷ According to Drohojowska-Philp, Bell and Bengston would mine local thrift stores for handmade silk suits. Bengston shortened it to “Lux” and handed out nicknames to the rest of the stable. Newcomer Ed Ruscha earned the stinging nickname, “Waterboy” (presumably implying he was inexperienced and fated to remain on the sidelines.) See *Rebels In Paradise* (2011), 86.

⁷⁸ Peter Frank, “Larry Bell: Understanding the Percept,” *Zones of Experience* (Albuquerque, NM: Albuquerque Museum, 1997), 40-41.

⁷⁹ Danieli, “reviews: Los Angeles: Larry Bell, Ferus Gallery,” *Artforum*, 2, no. 7 (Jan. 1964), 41.

⁸⁰ An *Art in America* review of the Dwan exhibition linked Bell’s work to the mirror of Narcissus. See “Boxes,” [Review of Virginia Dwan Gallery exhibition] *Art in America*, 52, no. 3 (June 1964): 98-101.

including Duchamp's *Boite-en-Valise*, 1938-42, Andy Warhol's *Brillo and Heinz Boxes*, 1963, and Louise Nevelson's iconic constructions.⁸¹

Bell became increasingly adept at his appropriation of dielectrical vacuum coating, developing a quintessential style (that is, reflective glass planes that contained various perceptually-focused patterns) and form (namely, the exclusive use of the cube) in his sculptures. During this transitional moment, Bell's technological engagement involved the outsourcing of dielectrical coating from Keim; Bell's experimentation hinged on the development of appropriate masking techniques and his aesthetic experimentation involved making decisions about patterning and scale. A clear example of Bell's early appropriation of technology is *Bette and the Giant Jewfish*, 1963 (fig. 1.22), which James Meyer has called one of "Bell's most arresting works."⁸² Not yet settled on the contact paper solution for masking, Bell silkscreened the checkerboard pattern onto the glass before outsourcing to Keim for vacuum coating. Not only is *Bette and the Giant Jewfish* "layered and visually complex," according to Meyer, but the work represents an early example of Bell's longstanding exploration of "the contradiction of transparency and reflection" in his sculptures and installations.⁸³

⁸¹ *Boxes* included two of Nevelson's constructions, *Night Plant VI*, 1959, and *Skyscape II*, 1963. Dwan Gallery records, 1959 - circa 1982, box 5, folder 47 (Archives of American Art, Smithsonian Institution). The exhibition catalogue consisted of a continuous scroll of paper, housed in a decorative box. Viewed by the author in Special Collections of the Getty Research Institute (1376-687). Dwan Gallery, *Boxes*, exh. cat. (Los Angeles, CA: Dwan Gallery, 1964). Bell's *Lux of the Ferus* was included in the 2011 exhibition, *Phenomenal: California Light, Space, Surface*, at the Museum of Contemporary Art, San Diego.

⁸² James Meyer, *Minimalism* (2011), 71. The sculpture's title refers to an old postcard which, bearing the legend "Bette and Giant Jewfish," was used as the announcement of Bell's second show at the Los Angeles Ferus Gallery in 1963.

⁸³ James Meyer, *Minimalism* (2011), 71.

Bell's interest in technology was shared amongst the close-knit Ferus stable. In Bell's words, a mutual influence occurred between "Bob Irwin, Billy Al Bengston, Kenneth Price, John Altoon, and others—artists who shared that kind of attitude toward experimentation and discovery."⁸⁴ Bell was becoming increasingly aware of the importance of light in his work—not only qualities of reflection, but crucially, qualities of transparency. Bell admits this awareness stemmed from his observations of the interaction of light with friend Ken Price's sculptures. Conscious of his works' emergent transparency, Bell began using transparent Plexiglas pedestals in conjunction with his works' display. Bell soon moved from technological outsourcer to direct appropriator. The opportunity, interestingly, would present itself on the East Coast.

Bell's works had drawn serious attention from New York by 1964. Sidney Janis Gallery and Pace Gallery in New York each included Bell in a group show (1964 and early 1965, respectively). This recognition led to unprecedented sales for Bell, and art dealer Arnold Glimcher additionally offered Bell a solo exhibition at Pace for winter 1965 (see fig. 1.23). Glimcher requested that Bell produce ten new cubes for the show. Knowing the costs associated with outsourcing to Keim, Bell estimated it would take six months and cost \$20,000 to meet Glimcher's request. Glimcher agreed, sending a \$10,000 check to Ferus; Blum took a \$10,000 loan from Sayde Moss (the wealthy, silent backer of the Ferus Gallery). Once Bell had the necessary funds, he set to work.⁸⁵

Disaster—and veiled providence, as it turns out—struck before the launch of Bell's solo show at Pace. Just two weeks prior to opening, Bell learned that two cubes

⁸⁴ Larry Bell, "Another Lesson," 4.

⁸⁵ Drohojowska-Philp, *Rebels in Paradise*, 87.

arrived in New York in a damaged state. With the knowledge that he could replace the compromised glass planes, Bell approached Pace management about the prospect. “Fix it,” he was told while a wad of money was placed in his hand.⁸⁶ In the same manner that he discovered Keim in Burbank, Bell scoured the Yellow Pages for an East Coast dielectrical fabricator and located Ionic Research Labs in the Bronx. Bell had the notion (probably due to the outfit’s name) that Ionic Research Labs would be a sterile, high-tech environment. The opposite was the case. He recalls, “[...] I went in there and my heart just fell right into my shoes. Because what the guy did was commercial metalizing. Like he aluminized six million cap pistols a year for some toy manufacturer, and [...] I didn’t think he could do it, because how could you clean glass in a place like this?”⁸⁷ After introductions, however, the proprietor, Dr. Benjamin Koenig, assured Bell that they could coat his replacement planes within his short timeframe. Unlike Keim, Koenig allowed Bell to see the equipment and made Bell feel comfortable about trying to understand the process.

After a few more consultations, Koenig halted operations for one day at Ionic Research Labs to ensure a sterile environment for the production of Bell’s replacement glass planes. To prepare, Bell masked and cleaned the glass thoroughly in his hotel room before taking it directly to Koenig to be coated. One day of exclusive access to their operations cost Bell \$1000, which was, in his words, “a shitload of money in 1965.”⁸⁸ The upfront costs for repairs were worth the gamble, however. Bell’s first solo show at

⁸⁶ Larry Bell, interview by Michele D. DeAngelus, 27.

⁸⁷ *Ibid.*, 28.

⁸⁸ Larry Bell (2011), *Modern Art in Los Angeles: Oral history interview with Larry Bell*, 16.

Pace sold out before the opening. With encouragement from Arne Glimcher—as well as financial support—Bell decided to ride out the momentum of this success by remaining in New York. Bell secured a studio on East 9th Street, though he stayed just one year before returning to Los Angeles in 1967.⁸⁹

Working with Ionic Research Labs, and particularly Koenig, had also instilled in Bell a keen interest in the vacuum-coating process. During one of their interactions, Koenig provided Bell with an epiphany-inducing observation: “You know, it’s crazy for you to spend this kind of money. I can imagine how much the optical coater is charging you out there for doing this,” Bell recalls him saying. “Why don’t you get the equipment and do it yourself?”⁹⁰ After further discussion Koenig sold Bell a used Kinney P5 Coater for around \$3000, which used a rotary pump to create the vacuum conditions in the chamber.⁹¹ Koenig’s assistant, Phillip Gargiulio, delivered the machine to Bell’s newly rented studio; Bell had already prepped his studio to power the machine, which he bolted to the floor to prevent unnecessary vibrations caused by the pump. Koenig followed up with a studio visit and brought Bell the industry’s canonical text, *Vacuum Deposition of Thin Films*. After handing him the book, Koenig announced, “Start on page one,” and quickly departed.⁹²

⁸⁹ Larry Bell (2012), interview with the author (26 October).

⁹⁰ Larry Bell (2011), *Modern Art in Los Angeles: Oral history interview with Larry Bell*, 16.

⁹¹ Larry Bell (1980), interview by Michele D. DeAngelus, 29. J. Royal Kinney in Boston, Massachusetts, established the Kinney Vacuum Company in 1907. J. Royal Kinney is known for his introduction of the first rotary piston vacuum pump—which enjoyed widespread adoption in thin-film industrial applications—not long after the company’s founding. See L. Holland, W. Steckelmacher, and J. Yarwood, *Vacuum Manual* (London: E. & F.N. Spon, 1974), 334.

⁹² L. Holland, *Vacuum Deposition of Thin Films* (New York: Wiley, 1956).

As a technical book, *Vacuum Deposition of Thin Films* provides the reader with a general overview of a range of industrial applications provided by vacuum deposition. Koenig did not give Bell a layman's manual for the operation of a Kinney P5 Coater. For example, chapter titles in *Vacuum Deposition of Thin Films* include "The Degassing of Plastic Materials *in vacuo*" and "The Preparation and Properties of a Range of Oxide Films." The book's language and diagrams did not necessarily correlate directly to the machine Bell purchased, but described, rather generally, the processes involved in vacuum deposition.

By 1980, Bell had read *Vacuum Deposition of Thin Films* at least thirty times, maintaining it remains one of the best handbooks on the subject.⁹³ At that moment in 1965, however, Bell understandably felt overwhelmed with the requisite technical knowledge that the book's navigation demanded. Overall, he felt duped by Koenig.⁹⁴ After staring at the machine for a few days, Bell recalls calling Koenig to accuse him: "You really pulled a number on me."⁹⁵ It seems Bell had come to understand how vacuum deposition basically worked, but felt paralyzed to proceed on his own. After all, the production of his iconic works required costly materials and sophisticated equipment. Koenig responded by sending a colleague, Mike Glicksman, to provide Bell with hands-on tutorials; they arranged for Bell to compensate Glicksman for each visit, plus cab fare. Glicksman visited Bell's studio regularly, teaching him the proper sequences to use with the valves and other requisite order of operations. Their first collaborations using Bell's

⁹³ Larry Bell (1980), interview by Michele D. DeAngelus, 31-32.

⁹⁴ Larry Bell (2011), *Modern Art in Los Angeles: Oral history interview with Larry Bell*, 16.

⁹⁵ *Ibid.*

vacuum coater involved the metalizing of a glass Coca-Cola bottle. Bell was giddy, recalling that he was initially “clumsy,” but quickly gained enough confidence to begin experimenting with the machine outside of his consultations with Glickman.⁹⁶

Since 1966, Bell has directly engaged with the technological processes of vacuum coating in some manner; what has varied is the type and size of his vacuum coaters and the objects produced using the process. Importantly, the size of his vacuum coater initially restricted the scale of his finished sculptures. This restriction correlates directly to the size of the chamber within which the objects to be coated are placed. In Bell’s case, each glass plane could not exceed about 24 square inches. A poster for his 1967 solo exhibition at Pace Gallery depicts Bell seated with his first coating machine in his New York studio (fig. 1.24). With his straightforward, debonair gaze and a hand-written signature of “Sincerely Yours, Larry Bell” in the lower corner, the poster directly references classic Hollywood pin-up shots and markets Bell’s work as exporting a particularly cool, LA style. The photograph also reveals the relative scale of Bell’s first coating chamber.

Dielectrical coating entails three main components: the system of pumps to create the vacuum conditions, the coating chamber apparatus (often referred to as the “bell,” coincidentally, due to its shape), and the electrical services.⁹⁷ The process is fairly straightforward. In Bell’s words:

Essentially, you insert the glass and load the material (metallic inconel and quartz) into a vessel, and you pump the air out of the vessel or vacuum chamber. In some precalculated proximity to the glass is a filament of tungsten metal that

⁹⁶ Ibid.

⁹⁷ L. Holland, *Vacuum Deposition of Thin Films*, 7.

takes high heat; it is similar to the filament in a light bulb, which is also made of tungsten. When the pressure inside the vessel is low enough you pass a current through the filament (you light up the filament). The material that's on that filament gets very hot and changes from a solid to a vapor; that vapor fills the tank and deposits on the glass in the form of a thin film coating, which is permanent.⁹⁸

Since treatment of the metalized glass is permanent, Bell adds, he must scrutinize the surface for any defects and cleans the glass exceptionally well before loading the plane into the chamber.⁹⁹ If a fleck of dust remains on the surface prior to coating, it will remain as an obvious inclusion on the surface, thereby rendering that glass plane useless to Bell.

I should emphasize that by 1965, vacuum deposition was no longer a novel technology. Moreover, the technology was not strictly tied to the West Coast. Part of Bell's mythology in the literature has inaccurately tied vacuum deposition to the strong presence of the aerospace industry on the West Coast. In reality, this link is a half-truth. When asked what part of the airplane's fabrication required vacuum deposition, Bell replied emphatically, "The technology was used to bring down planes, not make them."¹⁰⁰ During World War II, American military science used the emergent technology of vacuum deposition to manufacture optical lenses necessary for focusing spotlights on enemy bombers. Vacuum deposition allowed for spotlight lenses to be both translucent and highly reflective. In the postwar period, the technology became increasingly available and employed for a wide range of commercial uses (e.g., Keim Precision Mirrors supplied Hollywood with its lighting needs and Ionic Research Lab produced

⁹⁸ Larry Bell quoted from an interview in Janet Kutner, "Larry Bell's Iceberg," 63. Inconel is an alloy of nickel and chrome.

⁹⁹ *Ibid.*, 63.

¹⁰⁰ Larry Bell (2012) interview with the author (26 October).

children's toys). Despite the fact that companies on both coasts took up applications of vacuum deposition, Southern California nonetheless remained a region of pronounced high-tech activity. As shown in the Introduction, Los Angeles County contained three major and two minor high-tech districts during the time Bell began mining technology for his sculptures' production (fig. 0.1). Moreover, Burbank—where Bell first outsourced the vacuum deposition technology from Keim—was one of the original high-tech industrial areas of Southern California. Even if vacuum deposition became a common industry on both coasts, West Coast industries undoubtedly surpassed their Eastern counterparts in concentrations per capita of high-tech industrial sites as well as available services and equipment.

As described above, the technological sublime operates as a direct correlation between high-tech industry and the particular aesthetic that came to dominate art in Southern California. Bell himself has maintained this connection: “I think [my work] has more to do with the quality of the light, and sort of the high-tech edge that Los Angeles in particular was – you know, the aerospace industry and all that stuff was going on. So there was a lot of stuff going on that you – resources that you could draw on.”¹⁰¹ Yet, I also draw a firm distinction between the stripped-down presentation of technology as visual art (e.g., Nam June Paik's *McLuhan Caged*, 1967, fig. 1.25) and the *appropriation* of technology to produce art objects that embody the historical ideals of the West as

¹⁰¹ Bell adds: “You see, most artists that I know of that have dabbled into any kind of high-tech work tend to do one project and then move on to more expressive kinds of things, whereas I just stuck with it. I found one thing that I liked to do and just tried to do it as well as I could, just keep getting better, using essentially the same tools, the same kind of visual elements.” Larry Bell (1980), interview by Michele D. DeAngelus, 35-36.

sublime landscape. The distinction, albeit subtle, lies in a question of utility versus surface treatments that mediate particular industrial appropriations.¹⁰²

There is a lineage between Bell and those who helped crystalize the paradigm of the West Coast sublime (i.e., Albert Bierstadt, Thomas Moran, and, later, Ansel Adams). Bell's employment of light, space, and color, when considered in the context of the local landscape, relates directly to this tradition. Moreover, Bell's direct appropriation of vacuum deposition mimics industrial applications of thin films for embellished surface treatments. In comparison, Paik's *McLuhan Caged* operates differently. *McLuhan Caged* is one of a number of works in which Paik used magnets to distort television signals. *McLuhan Caged* delivers an open-ended McLuhanian commentary on the media (and their messages) by presenting the manipulated television directly as art object. Paik's thoughtful inclusion of communications theorist Marshall McLuhan delivers a conceptual commentary on the nature of television, as McLuhan claimed that changes in the medium of communication resulted in a different perception of the intended message. Though *McLuhan Caged* is undeniably an aesthetically engaged manipulation of a technological object, the television's inclusion nonetheless displays signifiers of utility in its aesthetic mediation.

In similar fashion as *McLuhan Caged*, the technological representations by Claes Oldenburg (e.g., *Giant Soft Fan*, 1966-67, fig. 1.26) functions on a conceptual level of utility versus obsolescence, in addition to its aesthetic component. The fan signifies a utilitarian aspect of technology that has been rendered obsolete through its flaccidity.

¹⁰² I use "surface treatment" here deliberately to encompass surface embellishments in line with the historical sublime and predicated upon light, space, and color.

Bell's studio incorporation of a vacuum coater departs from these examples by circumscribing the high-tech process onto the surface of his sculptures. Rather than representing a machine, as in the example of Oldenburg, or providing a straight, Duchampian appropriation of technological equipment, as in the case of Paik, the surface of a Bell cube abstracts the high-technology used in a manner that obscures its primary utilitarian function. In other words, *Giant Soft Fan* clearly reads as a machine designed to circulate air and *McLuhan Caged* overtly uses a ubiquitous device for viewing broadcast messages. Conversely, an iconic cube by Bell suggests the "aerospace-inspired" look of Southern California, but conceals his studio appropriation of a dielectrical coating machine. Engagement with *Memories of Mike* (fig. 1.1) for example, would likely spur a viewer to wonder about the industrial technology used to create it but would not necessarily register "vacuum coating" as the process invoked. The technological sublime manifests as a phenomenon wherein the industrial materials used and the viewer's perceptual experience coalesce to blur the explicit operation of the appropriated technology.

Though I purposefully digress here to detail the nuances of the technological sublime, I must stress that 1965 represents another moment of transition for Bell. Once Bell acquired the vacuum-coating apparatus, he worked more efficiently and, in particular, more cost effectively than ever before. His direct appropriation of the technology also marks the moment when he shed the perceptual patterning from his objects' surfaces. Bell claims, "Even though I started doing the work myself in New York, the whole thing was born in LA. I don't see how it could have been born in New

York; it just couldn't have happened."¹⁰³ For the first three years, Bell emphasizes, he produced some of his best work—due largely to his intense commitment to experimentation with the process.¹⁰⁴ He stopped masking the glass and, instead, focused intently on how the materials performed under certain conditions.

A significant element of variability involved direct experimentation with the vaporizing material (i.e., Inconel, aluminum, rhodium, and a form of quartz called silicon monoxide). By using different quantities and ratios of these materials, Bell could achieve different densities and spectral effects on the substrate's surface. In his words, "a lot of the mysteries about the thing just fell away. Even though I didn't understand anything about chemistry or physics or anything like that, I certainly knew what would happen if you did this or that, and at a certain point I started to make up my own rules for how to do things."¹⁰⁵ Bell's words convey modesty about his intellect (not to mention the fact that Bell spoke them more than thirty years ago). A point worth emphasizing is how Bell's commitment to the process has rewarded him with a significant command of vacuum deposition. In fact, I would go so far as to consider him a scholar of the process itself. In the same interview as the previous quotation, Bell explained with nonchalance to his interviewer, "Well, I use a form of quartz, it's called silicon monoxide. Quartz is silicon dioxide. One part oxygen less than quartz. Quartz doesn't absorb infrared energy very well. So it means it takes more heat to evaporate it, whereas silicon monoxide readily

¹⁰³ Larry Bell (1980), interview by Michele D. DeAngelus, 35.

¹⁰⁴ *Ibid.*, 31.

¹⁰⁵ *Ibid.*

absorbs I-R, so you can evaporate it easier.”¹⁰⁶ And in my own experience interviewing Bell, I found him to be most comfortable and loquacious when explaining the technical processes of vacuum deposition. During our conversation he explained—in fluid, comprehensible terms—a range of technical aspects: including the history of vacuum deposition, its industrial applications, the functionality of the various materials used, and why outcomes result from the choices he makes. Bell also divulged that industrial technicians value his expert opinion to the extent that he has consulted in recent years with engineers on the process.¹⁰⁷ Indeed, that Bell sought out the process in Los Angeles and purchased a vacuum-coating apparatus in New York laid the necessary groundwork for a career-long engagement with the technological sublime.

The impact of his year and a half in New York on his oeuvre was significant. Not only did Bell develop his process substantially by bringing dielectrical coating directly into his studio, he had also integrated into the New York scene and developed a market for his work. Bell remembers his time in New York quite positively, asserting, “I never found New York the sort of cold, grim place that a lot of people make it out to be.”¹⁰⁸ Bell also revealed in a 1980 interview that he made lifelong friendships while working in New York, including Donald Judd, John Chamberlain, and Neil Williams.¹⁰⁹ Bell decided consciously to preconceive and experiment with the technological processes involved in

¹⁰⁶ *Ibid.*, 32.

¹⁰⁷ Larry Bell (2012) interview with the author (26 October).

¹⁰⁸ Larry Bell (1980), interview by Michele D. DeAngelus, 34-35.

¹⁰⁹ *Ibid.*, 33

his art practice, whereas Judd continued to outsource his works' fabrication to shops like Bernstein Brothers and R.A. Rowan & Co.¹¹⁰

Despite the differences in Bell's and Judd's methods, the aesthetic resonance between their oeuvres is undeniable (and their friendship, likewise, implies that it manifested a mutual influence). Indeed, James Meyer notes this possibility in a 2004 essay aimed at distinguishing East and West Coast minimalist art: "I would suggest that the effects of transparency and reflection, which only became manifest in Judd's art in 1965 and 1966, may well have been in response to Bell's Pace show and their burgeoning friendship."¹¹¹ To be sure, Judd retains a firm grip on his oeuvre's direct association with Minimalism and, particularly, in having his name strongly linked to the movement that he helped define in 1965. Clearly, as an intellectual and Minimalism's leading theorizer, Judd has become a household name. Still, we cannot turn a blind eye to the fact that Bell befriended Judd ca. 1965, which was contemporaneous with Judd's publication of "Specific Objects" (and within which Judd cites Bell's work). Their friendship also notably paralleled Judd's experimentation with Plexiglas as a key material for sculpture fabrication. Judd first employed Plexiglas in 1964 to incorporate color as well as to expose the interiors of his boxes.¹¹² In fact, Sol LeWitt purportedly quipped to a friend at

¹¹⁰ Leo Castelli Gallery Records: Donald Judd Artist File, 1965-1973 (Washington, DC: Archives of American Art, Smithsonian Institution).

¹¹¹ Meyer adds in a footnote, "Certainly, Judd had already incorporated a piece of purple Plexiglas in one of the earliest objects exhibited in his first solo show at the Green Gallery in 1963. The Plexiglas is reflective but not transparent. [. . .] Judd only begins to explore the transparent qualities of Plexiglas in 1965-66, presumably after seeing Bell's work." James Meyer, "Another Minimalism," in Ann Goldstein, ed., *A Minimal Future? Art as Object 1958-1968*. Exh cat (Los Angeles: Museum of Contemporary Art; Cambridge, MA: The MIT Press: 2004), 43.

¹¹² I do not claim Judd's proclivity for the incorporation of bold color choices was influenced by Bell. Judd's breakthrough exhibition at Green Gallery in 1963 comprised nine proto-minimalist works all painted

a Judd exhibition in the mid-1960s “This establishes Judd as our leading West Coast artist.”¹¹³

From the perspective of Meyer, Bell’s short presence in New York may have meaningfully influenced minimalist practices on both coasts. To put it in basic terms, it is possible to evaluate Bell’s arrival in New York as playing a role in the technological sublime’s importation to the East Coast and his return to Los Angeles as a subsequent exportation of Minimalism *par excellence* to Southern California.¹¹⁴ In addition to revealing the link between Judd and Bell, Meyer also highlights how Bell’s iconic cubes escaped the ire of critic Michael Fried, possibly because the theory-accompanied minimalist works by Judd and Robert Morris made the latter two far more suitable examples for his argument against *literalism* than Bell’s. In Fried’s own words, however, he simply appreciated them for their aesthetics (regardless of his critical impetus): “Whatever my larger stance, I quite simply loved [Bell’s] things as gorgeous baubles—I remember saying to friends at the time that Attila the Hun or Genghis Khan...would probably have given anything (like an entire province) to own one of them!”¹¹⁵ Due to his high esteem for Bell’s work, Fried omitted a discussion of the artist’s work in the now

in cadmium red. In the catalogue for *A Minimal Future?*, Ann Goldstein, among others, presents a nice overview of the arc of Judd’s oeuvre (as well as other key minimalists). Goldstein, ed., *A Minimal Future?*, 254-261.

¹¹³ Kirk Varnedoe does not provide a citation for this quote, but rather chalks this up to “art-world lore.” See Varnedoe, *Pictures of Nothing*, 111.

¹¹⁴ To be sure, I do not suggest that this cross-pollination hinges solely on Bell’s developments in New York. There are examples of other Southern California artists affiliated with the so-called LA Look spending time in New York (e.g., John McCracken) as well as many East Coast proto-minimalists, minimalists, and post-minimalists visiting Los Angeles. A key example of Minimalism’s exportation would be the influential LA printmaking house, Gemini G.E.L., hosting many East Coast masters (with Josef Albers completing the first major project there in 1966).

¹¹⁵ Michael Fried (17 April 2003) quoted from a letter to James Meyer, in Meyer, “Another Minimalism,” *A Minimal Future?*, 44.

canonical essay “Art and Objecthood.” And according to Meyer, this decision led to Bell’s oeuvre becoming largely absent from the minimalist discourse (for better or worse).¹¹⁶ With Minimalism in full swing, Bell returned to California in 1967 with his vacuum deposition apparatus in tow.

Experimenting with Installations and Large-scale Glass

From 1967 to 1968, Bell continued his experimentation with the vacuum deposition process. As he became more adroit at his craft and perfected the process of constructing the sculptures, the metal armatures of his cubes became increasingly thinner. In a visual sense, this development transitioned from the weighty-looking cubes with patterned surfaces and thick armatures to the airy, ethereal cubes with thin frames and subtle color gradations (fig. 1.27). By 1970, Bell had eliminated the need for the armatures altogether.¹¹⁷

Beyond his nearly exhaustive experimentation with the color gradations on the surface—engineered by the proportion of vaporized material and the proximity of the filament to the glass—he took the logical next step and began manipulating the scale of the cubes. He designed and ordered a custom-built vacuum deposition apparatus to accommodate the larger scale pieces in ca. 1970 (fig. 1.28). The new tank—ten feet long and seven feet in diameter—would not limit the dimensions of his pieces in the way his

¹¹⁶ Ibid.

¹¹⁷ Bell claims that the frames were pragmatic first and foremost, as he needed a solution to hide the “choppy edges” of the glass. Once he solved the issue of irregular edges, he began assembling the cubes with mitered edges and thin layers of glue. See Larry Bell (2011), *Modern Art in Los Angeles: Oral history interview with Larry Bell*, 18.

first machine had.¹¹⁸ Bell began producing 40-inch cubes and, eventually, the more ambitiously scaled glass walls. The larger cubes appear more commanding in their physical presence than the 24-inch cubes first made with the machine procured from Koenig. While all of Bell's sculptures compel the viewer to circumambulate while examining their surface details, the large-scaled cubes impart an even greater sense of fragility. Bell's elimination of the metal frames from the larger cubes makes them appear more precarious—as if the six planes are balanced rather than glued. Bell's decision to use such a risky material comes to the forefront of the work's encounter. Moreover, the ability for the larger planes to inhabit the viewer's total field of vision results in a more environmental experience enabled by mobile spectatorship.

For example, *Untitled*, 1969 is a 40-inch cube that Bell constructed without metallic armatures on its edges (fig. 1.29). Its dark-tinted surface provides the viewer with alternating planes that either reflect back or transmit light through the cube.¹¹⁹ As the viewer examines these larger planes by circumambulating the sculpture, s/he experiences the effect of seeing a mirror-mimicking reflection on one plane followed by its adjacent plane allowing her/him to see directly into the cube's interior. The effect is mesmerizing, yet the technological requirements to enact such an object hover over the entire experience. The surface of the glass has a high-tech look—at once reflective like a mirror

¹¹⁸ Larry Bell in an interview with Janet Kutner, "Larry Bell's Iceberg," 64. Bell does not name a precise year that he acquired the large vacuum coater, however a photograph documenting its delivery (published in Clark, *Phenomenal*) is dated 1970. It is possible that Bell outsourced vacuum-coating locally while his large-scale coater was produced. Another possibility is that the photograph has been inaccurately dated in *Phenomenal*.

¹¹⁹ Bell notes that he uses much darker coatings in the larger cubes due to the greater challenge of hiding blemishes that result from their construction and, especially, the difficulty he finds in completely cleaning them out before assembly. Larry Bell (2011), *Modern Art in Los Angeles: Oral history interview with Larry Bell*, 19.

and translucent liked stained glass. Close scrutiny of the glass's surface reveals the effect that material has been deposited on the surface rather than the glass being cast with color amalgamated as a material component. Whether or not the viewer is aware of dielectrical coating as a process, the surfaces of his vacuum-coated cubes nonetheless appear to be culled from high-tech industry.

Bell eventually saw his variations on the cubes as a possible dead end. In fact, he has titled one series of the cubes the *Terminal Series*. By the late 1960s, this repetition in his body of work began to feel redundant to Bell. He recalls, "At a certain point the work with the cubes started getting really sloppy; I didn't care [and] they all looked the same."¹²⁰ To combat this creative impasse, Bell stopped all art-making and devoted a few months to strictly scrutinizing and meditating upon his body of work. This respite proved fruitful; Bell eventually realized that his most recent work involved his experimentation with how the coatings faded away from the corners. In a more recent essay, Bell reflects on how he arrived at this insight:

Probably the most ubiquitous shape in our environment is the right angle. We live with it every day and have learned not to see it. I challenge the reader to take a moment from this text, look around, and count the number of ninety-degree relationships they see. I don't believe it can be done; there are too many. I decided to use the ninety-degree angle as a vehicle in my art because it is so common an element.¹²¹

The late 1960s represent a moment in Bell's career when he became more self-aware.

Bell not only came to understand that right angles are what dominate his sculptures, but, especially, that light is the cornerstone of his oeuvre.¹²²

¹²⁰ Larry Bell (1980), interview by Michele D. DeAngelus, 34-35.

¹²¹ Larry Bell, "In Reflection," *Zones of Experience* (Albuquerque, NM: Albuquerque Museum, 1997), 55.

Even before he designed his large-scale dielectrical machine, Bell devised a way to push the right-angle concept and increase his sculptural scale to more ambitious installations. In 1968, his concept involved propping taller-than-human glass panels against one another at their corners. Without a properly sized machine to coat the scale of the planes he desired, he initially presented uncoated, factory glass planes. These works were exhibited for the first time in *Los Angeles Six*, a 1968 show organized by John Coplans for the Vancouver Art Gallery (fig. 1.30), which grouped Bell alongside Ron Davis, Robert Irwin, Craig Kauffman, Ed Kienholz, and John McCracken.¹²³ For *Standing Wall*, 1968, Bell assembled seven alternating transparent and gray-glass rectangular panels; Bell used the weight of the panels, combined with mitered edges and undetectable glue at the corner seams, to stabilize the installation. These sculptural installations balance with improbable dignity like an over-sized house of glass cards. Indeed, in my own encounter with one of Bell's glass walls in 2011, I fought in vain to banish the anxiety that my foot patterns might cause the sculpture to topple. "What then?" I thought to myself, "Would I be held responsible?"

So much of what makes Bell's glass works compelling is the materiality of the glass itself. Bell's process, combined with the surface sensuality of the glass, invokes a continuous tension between readings of hard and soft for the viewer. Bell's works are all about edges—our eyes are drawn to the where the corners meet in severe right angles. Yet, the play of light upon the surface, and particularly the precariousness of the glass,

¹²² Melinda Wertz, "In Consideration," in Larry Bell, *Larry Bell, New Work: An Exhibition* (Yonkers, N.Y.: The Museum, 1980), 10.

¹²³ John Coplans, *Los Angeles 6; An Exhibition Organized for the Vancouver Art Gallery* (Vancouver, BC: 1968).

convey a sense of instability—or, conceptually, of softness. The fragility of Bell’s works has proven to be somewhat of a maintenance nuisance for Bell through the years. His incorporation of vacuum deposition makes the repair of a damaged work highly specialized. For example, in 1974 Felicity Samuel Gallery in London helped coordinate Bell’s repair of one 8 x 5 foot panel that was damaged during shipping to the sculpture’s new owner: Count Giuseppe Panza (a leading collector of East and West Coast Minimalism) in Milan.¹²⁴ In fact, Bell was obligated to repair the damage, according to a signed agreement to Panza. Bell affirms in the signed statement, “I Larry Bell agree to repair and/or remake any damages done to my glass panel sculpture/s owned by Dr. Giuseppe Panza di Biumo, Milan, at his expense [in typescript]”—“while I am in a position to do so. If the equipt [*sic*] used in making these panels is no longer at my disposal I will not be able to repair or remake these parts [handwritten].”¹²⁵

By 1974, the repair of Panza’s glass panel had become far more involved than ordering factory glass (as he would have done for *Standing Wall*, exhibited in *Los Angeles Six*). Going against Coplans’s advice in 1970, Bell ordered a custom-built vacuum-coating apparatus to accommodate the new direction (that is, large-scale installations) that he was pursuing.¹²⁶ Bell describes his decisions about scale accordingly: “I decided that [the panels] should never be wider than I could reach this

¹²⁴ This agreement is communicated via correspondence between Felicity Samuel and Giuseppe Panza. See Felicity Samuel, London, to Giuseppe Panza, Milan, 13 May 1974, Special Collections, Giuseppe Panza papers, 1956-1990, Getty Research Institute, Los Angeles. See Chapter 4 of this dissertation for more on Panza’s crucial role as a collector.

¹²⁵ Signed Larry Bell [emphasis Bell]. Larry Bell, via Felicity Samuels Gallery, London to Giuseppe Panza di Biumo, Milan, Italy, 27 November 1973, Special Collections, Giuseppe Panza papers, 1956-1990, Getty Research Institute, Los Angeles.

¹²⁶ Larry Bell (2012), interview with the author (26 October).

way, they should never be taller than I could jump, and any single part should never be heavier than the maximum amount of weight that I could lift off the floor,” adding that he has always considered his work to be directly engaged with his own human scale.¹²⁷

Throughout the 1970s, Bell pushed the idea of glass installations further, creating his *magnum opus* in 1974, *The Iceberg and Its Shadow* (figs. 1.31 and 1.32). *The Iceberg and Its Shadow* consists of 56 large mineral-coated panels, which as Bell envisioned during its conception, can be assembled in myriad arrangements. Bell insisted that it had to be sold “intact,” as opposed to separating it into a series, although he admits it would certainly have been more lucrative to do so.¹²⁸ Upon its completion, it toured a number of American museums before the List Visual Arts Center at the Massachusetts Institute of Technology (MIT) acquired it for their collection.¹²⁹ Undoubtedly this acquisition by MIT, an institute of technology, heralds *The Iceberg* as a triumph of the technological sublime. Viewers often misconstrue Bell’s titling to be a direct reference to its literal resemblance of an iceberg; however, conceptually, much more resides beneath the surface. In a 1976 interview, Bell admitted that the title refers to the open-ended possibility offered by *The Iceberg*’s interchangeable parts—a factorial of 56 (expressed mathematically as “56!”) possible combinations, which is computed by multiplying 56 x 55 x 54 (and so on, down to 1). While 56 panels comprise the entire piece, not every installation has included all 56. Bell admits that he “learned from *The Iceberg* that it was

¹²⁷ Larry Bell, interview by Michele D. DeAngelus, 25 May–June 30, 1980, tape recording and transcript (Washington, DC: Archives of American Art Oral History, Smithsonian Institution), 48.

¹²⁸ *Ibid.*, 93.

¹²⁹ Peter Frank, “Larry Bell: Understanding the Percept,” *Zones of Experience* (Albuquerque, NM: Albuquerque Museum, 1997), 38.

not necessary to use every part of any sculpture, should a space be inadequate to accommodate it.”¹³⁰

With *The Iceberg*, Bell relates the artwork directly to the site in which it is installed (and, as such, necessarily configures the number of panels to the specific dimensions of the site). With *The Iceberg*'s 56 factorial variations, Bell extends his work beyond the more classical minimalist framework of site-specificity. Certainly, Bell's *Iceberg* does not fully align with Thomas Crow's compelling articulation of what constitutes “strong” site-specific work—as in Crow's chosen exemplar of Gordon Matta-Clark's *Day's End*, 1975 (fig. 1.33). However, *The Iceberg*'s conceptualization as a grouping of highly fragile and costly building blocks nonetheless extends it beyond the weaker variant of site-specificity: Minimalism. As Crow points out, a site-specific work's inherent contradictions (such as, its terminal contradictions, method of Institutional Critique, or deep conceptual underpinnings) render it strongly site-specific. In contrast, the perpetual preservation of Walter De Maria's *Earth Room* (1968) by the Dia Foundation “deadens” the work to a weakly site-specific status.¹³¹ *Iceberg*, through its conceptualization as a nonpermanent installation with site-adaptability via its countless arrangements, is an average-strength example of site-specificity. In other words, *Iceberg* pushes beyond Minimalism's phenomenological parameters by incorporating unrestricted arrangements as a fundamental aspect of its design.

¹³⁰ Larry Bell, “In Reflection,” *Zones of Experience*, 58.

¹³¹ Thomas Crow, “Site-Specific Art: The Strong and the Weak,” *Modern Art in the Common Culture* (New Haven and London: Yale University Press, 1996), 140-141.

With the expansion of his art's scale as well as the injection of mutability into the arrangement of some of his installations (as in *Iceberg*'s innumerable configurations), parallels exist between Bell's glass installations and the immersive environments that I survey in Chapter 4. In particular, these parallels entail the ways in which viewers phenomenally experience the works. However, an important distinction between Bell's installations, such as *The Iceberg*, and the range of art/technology installations detailed in Chapter 4, are the methods and siting of art production for each. Bell has maintained a traditional studio model for his art-making, continuing the longstanding practice of using his custom-built machine to coat glass planes within a physical studio space. *The Iceberg* absolutely resonates with another strongly site-specific work—such as Robert Irwin's *Fractured Light—Partial Scrim—Eye Level Wire*, 1970-71 (fig. 1.34)—in that both relate directly to the site and are constructed in-situ.¹³² However, the practices surveyed in the fourth chapter depart from Bell's approach in that their components are not necessarily prefabricated in a studio setting (or, in the case of Irwin, the site of installation was often used as a makeshift studio). These post-studio practices entail phenomenological installations often realized in non-traditional venues, but they are divorced from conventional studio methods otherwise embraced by Bell.

Conclusions

What are the implications of an art practice that blurs art and science in the manner that Bell's does? His oeuvre exemplifies the technological sublime in two

¹³² I expand my discussion of the key minimalist and installation art positions in my exposition of post-studio practices in Chapter 4, including a longer discussion of Irwin's *Fractured Light*.

significant ways. First, he represents a chief originator of the technological sublime through his incorporation of a novel high technology into his studio praxis. Secondly, he operates as a liminal figure between minimalist practices on the East and West Coasts, by achieving success quickly and early on.

One way to consider the art/science binary operating in the Southern California art scene is by analogizing high-tech experimentation and art production. By privileging artistic process, both investigational and experimental acts become critical components of the artwork in the same way that scientists rely on the scientific method for their work's success. Distinct from traditional studio methods, this experimental model invokes alternative means of resource gathering—by directly mining scientific theory and appropriating new technologies (as in Larry Bell's appropriation of dielectrical vacuum coating). In other words, rather than positioning the "machine in the studio" as a means to an end, I contend it functions as *an essential component* of the end product.¹³³ My analysis of Bell's oeuvre binds his art-science methods to the critical reception of his art. The vacuum-coating process is inextricably layered onto our experience of his sculptures—which exist simultaneously as dynamic, phenomenologically charged objects and as an expression of technological skill. In the same way that we cannot remove the technological subtext from our aesthetic experience of an atomic mushroom cloud, so does our knowledge of Bell's art/technology method edify our experience of his sculptures' radiant glass.

¹³³ Here I reference Caroline Jones's thesis, as well as literally refer to Bell's appropriation of a machine. See pages 2 and 32 of the Introduction for elucidation of Jones's thesis.

With the purchase of his first machine in 1965, the integration of dielectrical vacuum coating into his art production has remained predominantly studio-centric and inherently autodidactic. Bell continued to experiment with the technology's applications in large-scale installations, as in *Iceberg*. In contrast to his chiefly self-directed approach to coating glass in the traditional studio space, however, Bell has applied his technology to a small number of public art projects. In a few key examples, i.e., public art and select immersive installations, Bell bridges his somewhat insular studio techniques and the distinct post-studio production model. In the late 1970s, he collaborated with fellow LA artist Eric Orr (1939 – 1998) on a public art piece—*Solar Fountain* (1976-1983, dismantled 1996)—which I use as a key example in this dissertation's Conclusion.¹³⁴

The early success of Bell's technological appropriation in the 1960s inspired other artists to experiment with new processes and industrial materials, including Chapter 3's case study, Fred Eversley. By seeking alternative, especially technological, modes of art production and appropriating minimalist art forms, Bell and his contemporaries helped usher in a quintessentially LA aesthetic. And while the technological sublime is undeniably a male-dominated mode of art praxis, female artists (such as Chapter 2's case study, Mary Corse) did push against such stigmas. The fact remains that far more male artists in Los Angeles appropriated technology than their female counterparts and, in parallel, a far greater number of male artists received commercial success than female artists (Judy Chicago remains an important exception). The oeuvre of Mary Corse openly

¹³⁴ Additionally, Bell began experimenting with using his machine to vacuum-coat minerals onto paper and other less-rigid materials. The perceptual intrigue is not fully developed in the works on paper in the direct way that the mineral-coated glass works are, though they are arguably equal to or more experimental in their posture. Beginning in 1978, Bell titled the first series of experiments the "Vapor Drawings."

rejects this masculinizing of technology in LA art practices of the 1960s and 1970s. Corse's appropriation of high-frequency wireless generators—in particular her self-directed commitment to research their functionality and construct them independently—remains a straightforward counterpoint to the problematic interpretations of art/technology projects as somehow contextualizing maleness in their execution. The following chapter chronicles the ways in which Corse employed both high and low technologies in order to expand the phenomenological experience of a painting.

CHAPTER 2

Buddhism and Physics: Mary Corse's Studio Appropriation of Electromagnetic Generators and Glass Micro-beads

An idea is defined in its form, and an artist's idea is defined in the actual piece. And words are too deceptive. So words are very difficult. That's why it doesn't really make any sense to talk about art at all because art is the experience. That's the place it only has any reality. [It] is in the experience. – Mary Corse (1969)¹

You are plugged into an endless, beginningless stream (Where does the damn thing start anyway?) of herded, lacquered metal that, ordinarily friendly, can turn vicious on you, thundering towards indefinable ends. You are thrown together laterally on the freeway, and always bothered by those keeping the same speed as you; it's a blockade if you're in a hurry trying to weave between the shuffling buffaloes. You seem a daredevil Kamikaze if you go any slower. – Walter Gabrielson (1974)²

A vast, congested network of highways connects the sprawling metropolis of Los Angeles. Practically as synonymous with the city as its sunshine, the automobile's role in Los Angeles has become legendary. In the first fifteen years following World War II, the Los Angeles freeway system grew to ten times its original size.³ Indeed, the freeway system typifies Los Angeles to such an iconic degree that Reyner Banham identified it in 1971 as one of the four ecologies in his canonical study of the city.⁴ Banham suggested that for Angelenos, automobile interiors were psychologically an extension of domestic spaces. He observed, "A domestic or sociable journey in Los Angeles does not end so

¹ Mary Corse speaking about her art in Andy Eason, dir. and ed., with Mary Corse, narr., *White Light*, 9 min. 10 sec. (Los Angeles: Eason Design Films, 1969). Screened remotely by the author courtesy of Ace Gallery, Los Angeles, via YouTube, at URL: <http://www.youtube.com/watch?v=v4ztf8A47mY>, accessed 8 July 2013).

² Walter Gabrielson, *Architectural Design* (September 1974), quoted in Los Angeles County Museum of Art, and Stephanie Barron. *California, 5 Footnotes to Modern Art History: (Exhibition), 18 January-24 April, 1977, Los Angeles County Museum of Art* (Los Angeles: The Museum, 1977), 120.

³ Sam Hall Kaplan and Julius Shulman, *LA, Lost & Found: An Architectural History of Los Angeles* (New York: Crown, 1987), 151.

⁴ Reyner Banham, *Los Angeles: The Architecture of Four Ecologies* (Harmondsworth, UK: Penguin Books, 1971, 1973).

much at the door of one's destination as at the end of the off-ramp of the freeway, the mile or two of ground-level streets counts as no more than the front drive to the house."⁵ Angelenos spent such a large percentage of their time in "autopia," Banham argued, that the freeway system had come to signify "outdoors" and any exit ramp signaled that the commuter was crossing a threshold to an alternate, "interior" space.⁶

Though Banham's analysis drew criticism from a few local art figures, due in part to his outsider perspective, his characterization of Los Angeles's autopia still holds merit.⁷ The spatial requirements of the LA freeway system and the time that Angelenos spend within that space cannot be denied. All the same, reading the city's car culture as one of the primary frameworks for analyzing local art forms remains a problem in the current literature. As discussed in the Introduction, Southern California art has been routinely analyzed through a handful of simplistic frameworks that relegate local art currents to nothing more than direct responses to the region's beauty, its laid-back attitude, and the "cherry" look of hot rods. I am interested in nuancing these stereotypes to determine when they did serve as inspiration for LA artists and, specifically, how those reactions were incorporated into the art. While many postwar Los Angeles artists did associate regional and environmental conditions with their art's inspiration, artist Mary Corse did not. In addition to working outside of such LA trends, Corse has remained

⁵ Ibid., 195.

⁶ Ibid., 195-204.

⁷ As a British architectural historian, Reyner Banham's study has been critiqued for being written by an outsider performing such a laudatory, starry-eyed examination of Los Angeles. After all, the guiding premise of LA architectural histories necessarily involved critique of its alienating sprawl and superficial surface. While Banham's celebration especially drew the ire of Angeleno artist and writer Peter Plagens, Banham unveiled a novel approach to the analysis of urbanism and architecture by relating non-traditional ecologies (the beach, the flatlands, the foothills, and the freeway) to his analysis of the built environment.

relatively unknown in the art world for the majority of her career. Her inclusion is as much an expansion of the literature on an underrepresented artist as it is an illustrative case study of technological interventions in painting for this dissertation.

I intentionally introduce Los Angeles artist Mary Corse with an analogy to the road not for her work's affinity with hot-rod finishes, but for the freeway's kinship with a core principle in her aesthetic approach. Metaphorically, the road as icon symbolizes infinite possibilities: both in the temporal and in the physical sense. It emblemizes the potential for nearly limitless travel through its vast interconnected arteries and also—through that boundless connectivity—there is the sense of one's car touching an expansive surface that touches everything else simultaneously. While Corse avoids the most repetitive LA clichés in her art production, she draws on a less obvious metaphor that derives directly from the city's physical structure. Like this metaphor of infinity, Corse delivers perceptual experiences for the viewer that she claims are rooted in the expansive make-up of the universe and the abstract realm of mathematics. She recently explained, "It always amazes me: you have a grid, and then you have the numbers, plus, on the top and you have minus numbers on the bottom. They use those minus numbers in describing, in creating things, but I call it the minus apple. There is no minus apple. That is the abstract realm."⁸ For Corse, mathematical equations are nothing more than representations of universal phenomena in the same way that her art provides an abstracted interface for a meta-awareness of one's own perception. Thus, her art works parallel the idiom of the city's unending roadways vis-à-vis the metaphor of infinite

⁸ Mary Corse (2011), Oral history interview by Rani Singh, 21 April, video recording and transcript (Los Angeles: Getty Research Institute), 16.

mathematics, but her particular intervention in painting (from 1968 onward) also draws literally upon a low technology used in highway construction.

Corse's oeuvre demonstrates how technological applications could and did expand the traditional medium of painting. The arc between her early experiments and longstanding commitment to painting ca. 1968 exemplifies the technological sublime, first with her experiments in high-frequency energy and, thereafter, with her interventions in painting that encourage mobile spectatorship. Heightened by her incorporation of both obvious and subtle elements of technology, the viewing experience of her works requires real-time phenomenological engagement negotiated by the body's movement through space. Thus, the mobile spectatorship of Corse's paintings, as well as their elements of "all-over" abstraction, resonates with the typifying attributes of the Los Angeles topography: i.e., sprawl, decenteredness, and interconnectivity negotiated by movement along the highway.

Abstract Beginnings: Education and Artistic Influences

Corse was born in Berkeley in 1945 and attended an all-girls' school in the Bay Area, which allowed her three hours of art education daily. At this school—and under the tutelage of a Chouinard Art Institute graduate—she studied the careers of such masters of abstraction as Josef Albers, Willem de Kooning, Hans Hofmann, and Victor Vasarely. By 1964 Corse had already studied both art history and psychology, traveled throughout

Europe, and had been awarded a scholarship to attend Chouinard.⁹ 1964 also marks the moment when Corse began her career in earnest, sharing a studio in downtown Los Angeles with artist Emerson Woelffer.¹⁰ Corse maintained this downtown studio while pursuing her studies at Chouinard, benefitting from regular studio visits from Woelffer as well as cultivating her personal training in Tibetan Buddhism. While Larry Poons's iconic dot paintings proved to be influential to the development of her oeuvre, she found the Hard-edge tendency in Los Angeles "uninteresting."¹¹

Though she claims living in California has had no influence on her aesthetic, the emergent "technopolis" of Los Angeles likely informed Corse's experimentation. Her decision to enroll in a physics course at the University of Southern California speaks to her conscious participation in the Art and Technology phenomenon that was bubbling in the LA art community. Even so, she recently reflected that her work is about the "inner conversation" and, as such, could have just as easily been made in New York. In her words, she has never responded to the unique lighting conditions of California; rather, she maintains that she appreciated Los Angeles for its laid-back insularity and lack of art critics.¹² In the early 1960s, Los Angeles was a hotbed of visible technological growth, which consequently supported a growing contemporary art scene in Venice Beach. Quite

⁹ The school, Anna Head School For Girls, merged with neighboring Royce School to form Head-Royce School in 1979. Ace Gallery, Los Angeles (2012) "Mary Corse: Chronology," available at URL: http://www.acegallery.net/bio/Mary_Corse_Chrono.pdf (accessed 12 March 2013). Corse studied art history at Oakland Museum of Arts and Crafts and psychology at UC, Santa Barbara.

¹⁰ Emerson Woelffer (1914-2003) was born and educated in Chicago, after which he joined the WPA, taught at Black Mountain College, and then moved to Los Angeles to teach at California Institute of the Arts (which merged with Chouinard in 1969). Woelffer painted predominantly in an abstract expressionist idiom.

¹¹ Ace Gallery, Los Angeles (2012) "Mary Corse: Chronology." Despite her use of "hard edges" in some of her early abstract paintings, Corse emphasized in a 2011 interview that the Hard-edge movement was not interesting to her. See Mary Corse (2011), Oral history interview by Rani Singh.

¹² Mary Corse (2011), Oral history interview by Rani Singh, 10.

precocious for her age, Corse began to involve herself in this early milieu at eighteen years old.¹³

The nascent avant-garde community in Los Angeles developed two identifiable aesthetic modes. Despite their visual differences, both were predicated upon experimentation with nontraditional art forms and a strong resistance to hegemonic art narratives. One category, the so-called LA Look, entailed extensive attention to the presentation of objects with impeccable, often reflective surfaces; the other camp drew on Bay Area assemblage and funk styles, with Ed Keinholz and Wallace Berman as the group's leading figures.¹⁴ In communion with the LA Look, Corse's own aesthetic experimentations initially involved phenomenological interests and would come to incorporate electromagnetic generators in their configurations. Her works ca. 1964 include minimalist paintings on shaped canvases (fig. 2.1)—not unlike Frank Stella's iconic early works or Larry Bell's paintings of 1960-1962 (fig. 1.6). Similar to Bell's trajectory, Corse's early canvases signify the establishment of a sustained interest in viewer perception, punctuated by a variety of projects, which have been oriented toward this goal. Corse also produced minimalist constructions—akin to works by contemporaries Carl Andre, Robert Morris, and Anne Truitt (fig. 2.2).¹⁵ Corse maintains

¹³ Corse states she sold her first painting at the age of fifteen for thirty dollars. She has also implied that this involvement shifted once she became a mother. See Mary Corse, and Chloe Wyma, "19 Questions for Light and Space Artist Mary Corse," *Blouin ArtInfo* (21 February 2012), URL: <http://www.blouinartinfo.com/news/story/760526/19-questions-for-light-and-space-artist-mary-corse>.

¹⁴ Berman was famously arrested for lewdness by the L.A.P.D. vice squad for exhibiting his self-published mail-art project *Semina* at his first and last solo show at the Ferus Gallery in 1957. After his release, Berman moved himself and his family to San Francisco. See Drohojowska-Philp, *Rebels In Paradise*, 30.

¹⁵ Corse executed the geometric, white columns from ca. 1964 to 1965, which involved constructing structures out of wood and painting them in perfectly finished white paint. The surfaces of these constructions are exceedingly smooth and free of the trace of the artist's hand.

that these initial investigations were ardent explorations into the implications and meanings of reality. Whether she applies paint to canvas or to minimalist structures, she explains that she wants the viewer to “converse with the abstract” while engaging with her art: “It’s all about creating the inner experience for the viewer. The intuitive.”¹⁶

An important point to make here is that, although Corse involved herself in the art community and shared studio space with Woelffer, her peers still exercised a generous amount of exclusion towards women artists. Judy Gerowitz (known today as Judy Chicago) was an exception. Gerowitz ran in the “Ferus Studs” circle and smoked cigars with the male artists at Barney’s Beanery—a privilege rarely extended to women.¹⁷ Unlike Chicago, most women artists still found themselves under a rather overt glass ceiling in Los Angeles during the 1960s. Vivian Kauffman Rowan recalls that the entire Venice scene was a “boy’s club” but its members were also tenaciously loyal to everyone in the intimate circle. Rowan suggests that all the Ferus machismo stemmed from the fact that “[the male artists] didn’t have much control over their careers or their lives. They could control what was immediately around them, though, and boy did they.”¹⁸ Indeed, when pressed about her feelings toward the gender divide in 1960s Los Angeles, Corse quipped humorously, “I didn’t want to bring up the LA mafia.”¹⁹ However, she also rationalized that there was a bit of distance between her and the social network of Venice

¹⁶ Mary Corse (2011), Oral history interview by Rani Singh.

¹⁷ Drohojowsk-Philp, *Rebels In Paradise*, 151.

¹⁸ Vivian Kauffman Rowan quoted from a conversation with Morgan Neville at her home in Pasadena (2004), in Kristine McKenna, *The Ferus Gallery*, 174. Rowan became affiliated with the Venice art scene through her marriage to artist Craig Kauffman (1959-1966). She became more deeply involved, however, when she began working as Irving Blum’s assistant in his newly opened Irving Blum Gallery in 1967.

¹⁹ Mary Corse (2011), Oral history interview by Rani Singh, 18.

towards the late 1960s; she attended gallery openings infrequently due to the fact that she was a single mother raising two young children.²⁰

Even with that distance, her reference to the “LA mafia” betrays the existence of a distinct patriarchy within the Los Angeles art community—a patriarchy that was palpably felt and operated insidiously to the benefit of male artists, critics, and curators. My point with this aside is not to argue for a feminist reading of Corse’s oeuvre (although Pepe Karmel tried to make the case for the paintings of Corse, along with those of Jo Baer, to be read as an attempt to feminize the grid).²¹ Rather, I suggest that despite some early career successes, Mary Corse labored in relative obscurity potentially due to the fact that the LA art scene was nothing more than a microcosm of American societal structures in the 1960s.²² Insidious or not, male artists were more successful during that period and Feminist art currents would not enter the discourse broadly until ca. 1970. Furthermore, Corse did not view Feminism as her cause and her work shared no visual resemblance with the projects that artists such as Judy Chicago and Miriam Schapiro would later initiate.²³ Corse appropriated technology that, in the 1960s in particular, wielded heavy connotations of maleness in art circles as well as in science disciplines more broadly. As

²⁰ Ibid.

²¹ Pepe Karmel, “Women Inside and Outside the Grid,” *New York Times*, art review (15 Dec. 1995), C37. As a woman and as an art historian writing in 2013, I recoil at Karmel’s language in this review. He opines, “Ms. Corse’s other materials are even more problematic. [. . .] The glittering black chips look like sequins on a cocktail-party dress. Seeing them applied to a severe grid format is like seeing Ad Reinhardt in drag, teetering along on spike heels.”

²² Corse won the Los Angeles County Museum of Art’s “New Talent Award” in 1969 and Guggenheim Museum’s “Theodoran Award” in 1970. The momentum was short-lived, however, as she received far less attention for her subsequent series incorporating glitter (ca. 1973) and glazed and fired earth tiles (ca. 1979).

²³ Corse adds: “[E]ven though I liked Judy Chicago a lot, and thought she was very smart, I didn’t participate in the Women’s Lib type things, so they weren’t too fond of me. Then the guys, forget that.” Mary Corse (2011), Oral history interview by Rani Singh, 8.

a woman artist working in Los Angeles, she was making art that defied ready categorization and, as such, received little attention in the California market during the second half of the twentieth century. She found more success in New York, thanks in large part to the diligent support of art dealer Richard Bellamy.²⁴ Even so, Corse has remained committed to explorations of technological applications in her art for the past fifty years because, in her words, “What else are you gonna do if this is who you are?”²⁵

In the Wake of Minimalism

Mary Corse’s education in both the fields of art and psychology spurred a longstanding interest in the nature of being, perception, and the principles of the universe. While attending Chouinard (ca. 1964), her work in the instruction in painting initiated a particular interest in color perception—specifically perceptual shifts that occur when certain fields of color meet. For example, Corse noticed she perceived the color white precisely where a red field and blue field met in one of her paintings.²⁶ That white perceptually occupied that liminal space between two painted fields of color proved to be revelatory to her, causing her to reconsider color theory and the significance of her color choices entirely. Thus, her palette became exceedingly reductive, and she began painting solely in white monochrome with no visible surface texture. She maintains that she “was

²⁴ Ibid., 9. Bellamy represented Corse in New York from 1968 until his death in 1998, predominantly through the Oil & Steel Gallery (1980-1998). She has been represented by the Ace Gallery, Los Angeles, since 1999.

²⁵ Linda Yablonsky, “Artifacts: Mary Corse,” *The New York Times Style Magazine* (24 February 2012), reprinted online by the Ace Gallery, Los Angeles, at URL: http://www.acegallery.net/artists/corse/press/nytimesmagazine_022412.pdf.

²⁶ Ace Gallery, Los Angeles (2012) “Mary Corse: Chronology.”

getting rid of color [because] color wasn't necessary."²⁷ At the same time, her paintings also became more three-dimensional as she began to question the limitations of painting while investigating new possibilities for art production. This ambition manifested in her monochrome white works on board encased in vitrine-like Plexiglas dating to the mid-1960s, such as *Untitled*, 1966 (fig. 2.3).²⁸ By enclosing them in Plexiglas, she situates the viewer's focus upon the indefinite space within the area framed by the vitrine.

This development corresponds to artist Donald Judd's 1965 articulation of "Specific Objects"—a theory wherein Judd described the emergent trend of medium divisions becoming less distinct and relevant. "Half or more of the best new work of the last few years has been neither painting nor sculpture," Judd famously began his canonical text, adding that when artists incorporated novel, industrial materials directly, "they are more specific."²⁹ Corse's presentation of a stripped-down, white acrylic surface encased in a Plexiglas vitrine (which, I argue, semiotically references the tradition of sculpture and pedestal) precisely emblemizes what Judd's text outlines. It blurs the parameters of painting and sculpture or, in Judd's words, exists three-dimensionally as neither painting nor sculpture. This development pushes against the Greenbergian dogma that claimed, as the prevailing modernist narrative at that moment, that painting is a two-dimensional medium and should remain true to its inherent nature of *flatness* and *purity of medium*.³⁰

²⁷ Mary Corse (2011), Oral history interview by Rani Singh, 3.

²⁸ Mary Corse, (2013), interview with the author, 16 January (Los Angeles).

²⁹ Donald Judd, "Specific Objects," in *Donald Judd: Complete Writings 1959–1975* (Halifax: The Press of the Nova Scotia College of Art and Design, 1975), 181–89. First published in *Arts Yearbook*, 8, 1965.

³⁰ Clement Greenberg was the preeminent art critic and authority on Abstract Expressionism—the style he both endorsed and helped canonize. By 1961, Greenberg was attempting to establish an essential teleology

Working against the grain of this orthodoxy and sharing affinity with minimalist practices that Judd and Robert Morris were theorizing, Corse's use of the vitrine structure became phenomenological and (unintentionally) wry. To hear Corse discuss these works in retrospect, she unequivocally maintains that her artistic intention was to draw the viewer's gaze to the space hovering between the painted surface and the viewer's eyes. She explains, "They were form and space: a white form, and then it had a space, like a box in front, and that was white. [. . .] See, I was questioning how flat a painting could be [and] where's the difference between two-dimensional and three-dimensional [space]."³¹ Despite this cerebral justification for her conflation of two- and three-dimensional media, Corse nonetheless layers an element of critique into *Untitled's* display configuration (fig. 2.3). Separate from the parameters of her stated phenomenological aims, *Untitled* can be read as a possible reconfiguration of the conventional modes of object presentation.

If *Untitled* deliberately recasts the functions of painting and sculpture, its formal elements also offer an alternative interpretation as an avant-garde display tactic. By reading the Plexiglas as a shallow vitrine resting atop its white, equally shallow pedestal, *Untitled* forces our vision to view a support and its appended vitrine jutting from the wall in perpendicular alignment to our bodies. Similar to the manner in which Robert Rauschenberg's paradigmatic combines reoriented exhibition criteria (vis-à-vis Leo Steinberg's poignant articulation of the "flatbed picture plane"), *Untitled* provides a

between Cimabue/Giotto and Late Modern masters (e.g., Pollock) vis-à-vis the Kantian logic of self-criticality. See Greenberg, "Modernist Painting," published lecture from initial radio broadcast titled *Voice of America's Forum Lectures*, in *Arts Yearbook 4* (1961).

³¹ Mary Corse (2011), Oral history interview by Rani Singh, 4.

subtler resistance to the rhetoric of display.³² While the critique of institutions likely falls outside of Corse's primary objective, the positioning of *Untitled* relative to the body instigates fluctuations in viewer perception of the object's proper orientation.

A work such as *Untitled* demonstrates Corse's fundamental interest in raising questions about an object's materiality, painting's function, and the ensuing production of perceptual shifts. Inquiries such as these certainly weighed heavily on artists' minds during the 1960s. In part reacting to the gestural automatism of Abstract Expressionism, Minimalism rejected the New York School's Surrealist underpinnings (i.e., the unconscious) but, in contradiction, also upheld its High Modern ideals of abstraction. In fact, Kirk Varnedoe has asserted that Minimalism "was so drastically reductive that it appeared utterly nihilistic."³³ As demonstrated in the previous chapter, Varnedoe acknowledged two strains of the idiom: an East Coast version predicated upon reductive exteriority—e.g., Robert Morris's now iconic gray forms (fig. 2.4)—and a West Coast strain that conversely lionized illuminated and dematerialized space—as demonstrated in James Turrell's first corner projection, *Afrum (White)*, 1966 (fig. 2.5).³⁴ Varnedoe notably claimed that Donald Judd, with his "Harley-Davidson paint, galvanized metal, and

³² Leo Steinberg importantly argued against the Rosenbergian notion [put forth in "The American Action Painters," *Art News* (New York) 51, no. 8 (Dec. 1952): 22-23, 48-50] that Abstract Expressionism was resolutely artistic emotion left upon the canvas. Steinberg claimed that, despite the fact that artists from the Renaissance through High Modernism continually grapple with many of the same themes in their art, there is a fluctuation in how the viewing audience ascertains whether or not a work of art is modern or relevant to current tastes, etc. Steinberg, "Other Criteria," first published in 'Reflections on the State of Criticism', *Artforum* (March 1972), in *Other Criteria: Confrontations with Twentieth-Century Art* (Chicago: University of Chicago Press, 1972): 61-98.

³³ Kirk Varnedoe, "Minimalism," in *Pictures of Nothing: Abstract Art Since Pollock* (Princeton, NJ: Princeton University Press, 2006), 111.

³⁴ "*Afrum-Proto* was James Turrell's first corner projection, which employs projected light against the architectural corner to form the illusion of a cube of light. See "James Turrell," *art21 on PBS*, website at URL: <https://www.pbs.org/art21/artists/turrell/card2.html> (accessed 8 July 2013).

colored Plexiglas,” emblemized a hybrid of these two coastal aesthetics.³⁵ Like Judd, Corse’s *Untitled* (fig. 2.3) aligns with each term in the binary. Its whitewashed board subscribes to Morris’s banal, gray, ambiguously hollow forms and its Plexiglas vitrine (that encases nothing more than empty space) seems to champion the transparency that characterized Larry Bell’s iconic cubes. *Untitled* represents a hybridization of both ideas, though Corse explains it less theoretically and more intuitively. “The Plexi was part of [the painting],” she emphasizes. “It was all one. It was space, light and space, form and space.”³⁶ Corse adds that her commitment to simplified color and form necessarily initiates the metacognitive awareness of time while perceiving.³⁷ Pushing this principle further, Corse began exploring how direct technological appropriation could enhance viewer perception. “The next step,” Corse recently rationalized, “was to light up the white.”³⁸

This revelation—to imbue her works with electrical light—spurred Corse’s foray into the study of theoretical physics and quantum mechanics. Initially, her pursuit of electronic lighting technologies led to her experimentation with fluorescent and neon. Particularly dissatisfying, she found, was her works’ technical reliance on a local power source and the necessary visibility of the cord-plug-outlet appendage to the art object.³⁹ To solve this aesthetic problem, Corse began studying physics in 1967 at the University of Southern California (USC) with the goal of learning both the theoretical underpinnings

³⁵ Kirk Varnedoe, “Minimalism,” in *Pictures of Nothing*, 12.

³⁶ Mary Corse (2011), Oral history interview by Rani Singh, 4.

³⁷ Corse rationalizes, “As soon as you have perception, it seems you have time.” *Ibid.*, 4.

³⁸ Mary Corse (2013), interview with the author.

³⁹ Mary Corse (2011), Oral history interview by Rani Singh, 5.

and practical applications of high-frequency lighting schematics.⁴⁰ She learned that Tesla coils could fill this practical need and gained the requisite knowledge at USC to construct the coils herself (fig. 2.6).⁴¹ But her physics education also exposed her to theoretical quantum mechanics—namely the ideas of Werner Heisenberg, Niels Bohr, and Wolfgang Pauli—which intensified her deep-seated interest in phenomenology and the relationship between cognition and perception. As a result, both practical and theoretical physics became dominant concerns in her oeuvre.

Parallel Disciplines: Buddhism and Physics

Corse's physics education and experiments with technology gave rise to her late 1960s *White Light* series of light boxes, though she would only create them for a short period. The series comprises objects that bridge painting and sculpture with a unique technological flair. They channel high-frequency energy to achieve striking visual and aural effects. A 1969 film titled *White Light* and directed by Andy Eason showcases Corse's technological applications in the studio. Corse narrates the entire film (which is about ten minutes in length), speaking with evident comprehension of the manner in which electromagnetic physics aids her works' completion. She explains her technological appropriation with a mixture of comprehension and misunderstanding: "The generator that I use is an [*sic*] electromagnetic radiation. It's a transverse wave

⁴⁰ Ace Gallery, Los Angeles (2012) "Mary Corse: Chronology."

⁴¹ Mary Corse (2013), interview with the author. Corse does not recall what the instruction entailed. According to Emeritus Professor Richard Thompson, who has been teaching physics at USC since 1970, her instruction would likely have involved theoretical physics with occasional practical demonstrations by the instructor. The course structure would not have been hands-on training in the construction of a Tesla coil, per se. Richard Thompson (2013), electronic mail to the author, 1 July.

phenomena [*sic*] consisting of electrical and magnetic intensity being propagated through space at the velocity of 3×10^{10} cm/s—the velocity of light.”⁴² She describes the system in somewhat general terms, referring to elements such as electrical components, high-frequency coils, and capacitors; she never explicitly refers to them as Tesla coils nor does she explain how the electromagnetic radiation illuminates the gas-filled tubes. While viewing the film, it is difficult to discern if Corse withholds an explanation out of apprehension of possible viewer miscomprehension or if she is simply uncomfortable using such highly technical language.⁴³

Rather than offer technical clarifications, *White Light* (the film) portrays her art objects as a type of Western science meets Eastern metaphysics. Much of the footage itself represents Corse at work in her studio, using a wide variety of tools (including power drills and soldering irons) and manipulating the high-tech or industrial materials (specifically, fluorescent tubes, Tesla coils, and Plexiglas); the soundtrack also delivers a subtext of her interest in Tibetan Buddhism.⁴⁴ For example, leading into Corse’s narration of the technology that she uses, a forward tracking shot depicts one of her light-emitting works and inserts the viewer into the camera’s place of forward movement. Sounds of

⁴² Mary Corse speaking about her art in Andy Eason (1969), *White Light*, motion picture. The velocity (or speed) of light is typically represented with: 3×10^8 m/s, traveling at this rate in empty space. Corse inserts the article “an” to modify electromagnetic radiation, which is either an example of misunderstanding (i.e., that radiation is a phenomenon and not a “thing”) or an instance in which she simply misspoke.

⁴³ My sense is that it is a little of both. After viewing the film and speaking with Corse on a number of occasions, it is clear to me that she did educate herself about the theories and practical steps necessary to build electromagnetic radiators and illuminate fluorescent tubing. At the same time, when I asked Corse directly about her technological appropriation in the 1960s, she declined to comment and referred me to the film. I do not believe she is ignorant of the technologies she uses, but just rather shy in attempting a highly technical explanation of the processes involved.

⁴⁴ Corse states that her heavy involvement in Tibetan Buddhism began in 1964. Ace Gallery, New York (ca. 1999), “Mary Corse: Chronology,” events ranging from birth in 1945 through 1999 (n.d.), in *Richard Bellamy Papers* (III.D.6), The Museum of Modern Art Archives, New York.

live electricity mixed with the notes of a whimsical, woodwind flute overdub this tracking shot, providing the viewer with the sense that technology and metaphysics are parallel threads in her oeuvre. She underscores technology's essential usefulness to her work, revealing that her high-tech interface makes the spiritual, perceptual experience possible: "You use technology to bring down the idea. The idea exists in that high, absolute, you know that place of all-potential, of where the ideas, of where anything, can be formed. So the technology, the technical end, that's the material end. That's what gives it form."⁴⁵ In Corse's words technology provides the material interface—a locus for viewers to experience and perceive an artist's conceptual and perceptual intentions, which aligns with her dual interest in theoretical physics and Tibetan Buddhism.

Some historians of science have argued that Buddhist practice and quantum mechanics are separate but parallel disciplines oriented toward answering the same set of human questions about the universe.⁴⁶ In fact, William Ames has shown that Buddhism's notions of emptiness and interconnectivity (and their relationship to consciousness) mirrors what physicist John Wheeler (coiner of the term "black hole") has termed our "participatory universe."⁴⁷ Essentially, quantum theory has proven that the path of small

⁴⁵ Andy Eason (1969), *White Light*, motion picture.

⁴⁶ In the "Introduction" to a collection of essays on the subject, B. Alan Wallace justifies such a study because, in his view, Buddhologists have historically placed Buddhism in the uneasy Western categories of religion or philosophy. Buddhism does not fit neatly into either—i.e., it is not a traditional religion as there is no Creator mythology and it fails to conform to European or American philosophical parameters. This divide stems from the fact that Buddhism arose in the East whereas the comparable systems are generally Western in origin. Wallace, ed., *Buddhism & Science Breaking New Ground* (New York: Columbia University Press, 2003). Also, John Powers, *Introduction to Tibetan Buddhism* (Ithaca, NY: Snow Lion Publications, 1995, rev. ed. 2007).

⁴⁷ The participatory universe is a theory based upon experimental findings at the atomic level. It has been shown that the observer wields influence over the experiment's outcome based on how the experiment is set up. A well-known example is the two-slit experiment, which demonstrates that light is *both* a particle and a wave. Light is first passed through observable slits onto a substrate, which records the photons and

particles can be traced to observer participation. This led physicists to theorize that our universe depends, in part, on the perceiver's involvement within it. In parallel, Buddhist teaching prescribes that the path toward enlightenment is achievable by the practitioner 1) acknowledging the interconnected nature of karma and rebirth, and 2) coming to understand the dissolution of subject/object oppositions via the total conception of emptiness.⁴⁸ By understanding that these truths offer a path toward liberating the mind from loss, longing, and suffering, Buddhist practitioners contend that consciousness is a projection of our perceiving mind (and, as such, we *create* our consciousness). Hence, both systems of thought emphasize the observer's role in her/his perceptual experience.

Corse has commented that “we live in an abstract perceptual multiverse,” which relates to both the Buddhist teachings of interconnectivity and infinite worlds as well as Wheeler's contention of the existence of a participatory universe.⁴⁹ While Corse has affirmed that each discipline did inform her practice during the 1960s, she has yet (to my knowledge) to recognize the parallels between these two systems of thought (i.e., Buddhism and theoretical physics). Regardless of her awareness of their disciplinary similarities, I find the overlap quite poignant. From the perspective of Corse simultaneously studying quantum physics and Buddhism, one might consider her oeuvre

detects the light pattern in the shape of the slits. However, if the detectors are removed, the photons are recorded as landing in seeming random fashion as if passing through a sieve and *not* through the slits. Hence, experiment design yields distinct results. Experiments such as this have routinely proven that the observer, or participant, is partially responsible for the experiment's outcome. William L. Ames, “Emptiness and Quantum Theory,” in *Buddhism & Science Breaking New Ground* (New York: Columbia University Press, 2003), 301.

⁴⁸ Powers, “Some Important Buddhist Doctrines,” in *Introduction to Tibetan Buddhism*, 63-80.

⁴⁹ “Multiverse” was first coined by American philosopher William James in 1895, but the term's usage for physics did not gain traction until much later (in the early twenty-first century). Speaking in 2012, Corse's usage of the term seems to reflect a sustained interest in the language of physics, though the contemporary meaning of multiverse would not have been available to her in the 1960s. Quotation from an interview of Corse by Chloe Wyma: “19 Questions for Light and Space Artist Mary Corse” (2012).

to be a reflection of these corresponding systems of thought. Her *White Light* series of light boxes led her to study physics in order to directly apply wireless electrical technology to her art. This in turn spurred her concern for understanding the relationship between theoretical physics and the nature of perceptual reality. Thus in many ways, her technological appropriation represents the path to further intellectual pursuits—both theoretical physics and Eastern metaphysics—but it also operates as a vehicle for viewer perceptual experiences.

Corse refers to these works strictly as paintings (more specifically, “light paintings”) because, in her words, “they’re flat.”⁵⁰ Indeed, recent interviews reveal a level of discomfort for Corse as she acknowledges the sculptural identity of these works, despite her overt attempts to produce works that are not bound to the wall and encourage circumambulation. Notwithstanding her reluctance to entertain a phenomenological reading of her art—as well as her strict assertion that she produces flat objects to be looked at—Corse occasionally acknowledges the spatiality of her works using more metaphysical language.⁵¹ For example, she admits that her technological endeavors rendered “free and free-floating” associations that encouraged viewers to walk around the works in 180 degrees. Inspiring mobility seems to have been a career-long concern for Corse, but it certainly crystalized at the moment she began incorporating novel industrial technologies into her pieces.

⁵⁰ Mary Corse (2011), Oral history interview by Rani Singh, 5.

⁵¹ It is not surprising that Corse grappled with the proper terminology to describe her objects and their functions, as the 1960s witnessed widespread hybridity and experimentation in art-making (not to mention the many artists and critics searching for suitable labels and terms for new media and methods of production).

One example from her series of light paintings, *Untitled (Space + Electric Light)*, 1968, uses four carefully placed Tesla coils, which are hidden behind the backing wall in proximity to the sculpture (fig. 2.7). The coils emit high-frequency energy that passes through the thin wall, invisibly powering the work's interior lights. Suspended from the ceiling by four monofilaments, the sculpture hovers in front of but does not touch the wall behind it (fig. 2.8). A white Plexiglas box measuring roughly forty-five inches square houses twenty-two groups of vertical rods. An outer, clear Plexiglas box encases the interior box containing the rods. (This side view reveals that the outer box is twice as deep and sheathes the inner box completely, with visible space in front of and behind the white box.) The interior white box holds sixty-six parallel vertical rods that, in groups of three, follow the pattern of two white fluorescent tubes each flanking a transparent spacer tube.⁵² As an object purposefully detached from the background of the wall, *Untitled (Space + Electric Light)* aligns with parallel interests in underscoring the physical structure of the work itself—similar to Stella's move toward creating large-scale dynamic canvas reliefs or the welded steel armature and canvas constructions by Lee Bontecou. Illuminated from within and “floating” in front of the wall, *Untitled (Space + Electric Light)* bridges the rational mechanics of technical hardware with the metaphysical sensibilities associated with Buddhist philosophy.

Winding Tesla Coils

⁵² Clark and Auping, *Phenomenal*, 55.

A direct encounter with this work reminds one why reproductions often fall short of an artwork's true impact (fig. 2.9).⁵³ I encountered *Untitled (Space + Electric Light)*, which, installed in a small, dark gallery at the Museum of Contemporary Art San Diego, pulsed rhythmically like a half-dead fluorescent bulb. The object's white lights flickered hypnotically, echoed by a low humming sound that is typical of high-frequency electricity. These visual and aural elements teem with high-tech aesthetics, conjuring faint references to an abandoned laboratory or a science experiment gone awry. The hum and flicker felt otherworldly and inhuman in their technological emphasis; at the same time, the rhythmic throbs kept time with my own bodily vibrations and the pulses seemed to rival the viewer's heartbeat. The experience had an unfurling looped quality—referencing the body's experience of time and perception, human technological innovation, the mad science film trope, popular science, etc.

Though the mechanics of *Untitled (Space + Electric Light)* are felt sensorially, the schematics of a Tesla coil's operation are perhaps less obvious to the layperson. Serbian-American physicist and inventor Nikola Tesla (1856-1943) holds many achievements attached to his name, although the Tesla coil certainly remains the most famous invention of them all.⁵⁴ Patented in 1891, Tesla's coil was an improvement upon a commonly used electronic transformer in the field, known as the Ruhmkorff coil. In the mid-nineteenth century, physicists used this standard transformer to produce electrostatic

⁵³ Figure 2.9 conveys the glow emitted by Corse's light boxes, however due to the high-frequency energy there are aural and phenomenological aspects that cannot be photographically represented.

⁵⁴ W. Bernard Carlson, *Tesla: Inventor of the Electrical Age* (Princeton, NJ: Princeton University Press, 2013), 120.

effects for their experiments.⁵⁵ The Ruhmkorff coil consists of two windings—a thick winding dubbed “the primary” and a fine winding known as “the secondary”; electrical current passes through this coil and causes relational effects used in the study of electricity.⁵⁶

Tesla expanded upon Heinrich Hertz’s 1886 experiments, wherein Hertz had demonstrated the potential for electromagnetic waves to move through space using the Ruhmkorff coil. Tesla updated the mechanical setup outlined by Hertz by substituting a high-frequency generator for the mechanical current interrupter. With this alteration, Tesla was able to experiment with about one hundred times the cycle frequency Hertz employed. (Today, cycles per second bear Hertz’s name.) Tesla also learned that an increase in frequency cycles in the alternator produced an immense amount of heat, which melted the protective insulation between the primary and the secondary. Further reworking the scheme, Tesla redesigned the iron core to be adjustable and opted for an “air gap” between the coils rather than insulation. These alterations allowed him to exploit the principle of resonance by adapting the coils in such a way that each boosted the other’s output.⁵⁷ The thrust of electrostatic discharge in each coil coincided with the other’s maximum current induction, causing each portion of the circuit to reinforce the other. These fluctuations produced incredibly powerful—as well as spectacularly

⁵⁵ Ibid., 121. The Ruhmkorff coil is named after Heinrich Ruhmkorff, the German instrument maker who commercialized the widely used induction coil, introduced by Nicholas Callan and others in 1836.

⁵⁶ Ibid. The secondary winding, as a much finer wire, allowed for many more turns than the primary winding. With more turns in the secondary, there was the potential for it to hold a significantly higher amount of voltage than the primary. High voltages in the secondary allowed for ionization in the air between the terminals, resulting in impressive displays of sparks between the terminals. Ibid.

⁵⁷ A ready illustration of resonance is pushing a child on a swing. Instinctively, we know that the greatest amplitude of the swing’s path can occur when force is applied at the peak of arc. If force is applied well before the arc, then the arc’s amplitude will not reach its maximum potential.

visible—effects of electrical discharge (see fig. 2.10). Tesla had devised a transformer that produced electrical current with voltage and frequency unmatched by any generator at the time.⁵⁸ Most significant, this high-frequency generator did not rely on wires for the transmission of electrical current. Instead, energy was transmitted through the ether.

Tesla's coil made him world famous in electrical engineering; his devices performed remarkable displays of electrical power at the 1893 World's Columbian Exposition in Chicago, turning him into a cultural icon very quickly.⁵⁹ Eventually, Tesla's commitment to the creation of a powerful high-frequency, high-voltage transmitter would necessitate his relocation to the American West. After concluding that, through its higher conductivity, thinner air could facilitate the wireless transmission of electricity across great distances, he abandoned his New York City laboratory for the wide-open spaces of Colorado Springs. Tesla built an oscillating transformer that could wirelessly transmit millions of volts, and conducted mysterious experiments in the American West for nearly nine months.⁶⁰ Indeed, Tesla's drive to develop an instrument capable of transmitting energy across great distances had reached an obsessive pitch. He returned to New York in 1900 and, after his rival Guglielmo Marconi successfully made the first transatlantic radio wave transmission in 1901, Tesla commenced construction on his most ambitious

⁵⁸ Carlson, *Tesla: Inventor of the Electrical Age*, 120-125.

⁵⁹ Nell Greenfieldboyce, "Web Cartoonist Raises \$1 million for Tesla Museum," *National Public Radio (NPR) website*, 24 August 2012, via URL: <http://www.npr.org/2012/08/24/159925435/web-cartoonist-raises-1-million-for-tesla-museum> (accessed 29 May 2013).

⁶⁰ Though Tesla kept scrupulous notes in his daily diary, the results of high long-distance energy transmission remain inconclusive. There were some reports that he did successfully transmit electromagnetic energy across several miles to illuminate vacuum tubes planted in the ground, though critics claim this could be a faculty of the conductive properties in the ground of Colorado Springs. See Carlson, *Tesla: Inventor of the Electrical Age*, 262. Also, Robert Uth and Margaret Cheney, *Tesla: Master of Lighting* (2000), content on the website culled from a documentary film of the same name produced by Public Broadcasting Service (PBS), available at URL: <http://www.pbs.org/tesla/index.html> (accessed 30 May 2013).

project: Wardencllyffe Tower (a magnifying transmitter).⁶¹ Despite Tesla's sustained work on long-distance electromagnetic power transmission and discoveries germane to early radio, his Wardencllyffe Tower on Long Island never yielded the achievements he sought; by 1916 Tesla declared bankruptcy.⁶² Most important for Mary Corse, however, was the manner in which the Tesla coil entered the realm of popular science and hobbyist applications. Tesla's invention of a high-frequency coil facilitated wireless illumination of vacuum tube lights, which Corse would study and adapt to fulfill her aesthetic needs in 1967.

As early as 1918, *Popular Science* magazine reported that an amateur hobbyist could construct a Tesla coil (also known as a resonance transmitter) at home.⁶³ By the 1930s this do-it-yourself tinkering had become quite affordable and straightforward. For example, in a concise 1934 article Kenneth Swezey instructs readers on how to construct a coil at home by providing simplified diagrams and, importantly, safety instructions for avoiding contact shocks.⁶⁴ Amateur Tesla coils are relatively simple to construct. A rudimentary search in the *Popular Science* online archives reveals that every few years or so the magazine would publish basic DIY instructions for building one at home. While straightforward to a particular audience, the instructions nonetheless presume the reader

⁶¹ Completed in 1903, Wardencllyffe Tower was intended to be a world-wide wireless system. The project never succeeded and, when facing bankruptcy in 1915, Tesla surrendered the deed of the tower over to his investor, Waldorf-Astoria, Inc. See Tesla Universe, "Timeline," URL: <http://www.teslauniverse.com/nikola-tesla-timeline-1899-tesla-begins-colorado-springs-experiments#goto-1915>.

⁶² Gardner Soule, "Mr. Tesla, who made work easier," *Popular Science*, 169, no. 1 (July 1956), 84.

⁶³ E.R. Thomas, "Electrical Wizardry at Home," *Popular Science*, 92, no. 1 (Jan. 1918): 155-156.

⁶⁴ Swezey says the parts for a DIY Tesla coil would cost around \$1.50, and should not exceed \$10.00, depending on the sophistication of equipment desired (note: those estimates are in 1934 dollars). Kenneth M. Swezey, "Simplified Tesla Coil Gives 200,000-volt Current for Many Dazzling Experiments," *Popular Science*, 125, no. 6 (Dec. 1934): 65-66, 115.

already possesses a particular level of technical familiarity. A 1954 *Popular Science* article, for example, gives step-by-step instructions with accompanying photographic illustrations, yet it uses language that implies the reader is a hobbyist already acquainted with the requisite materials.⁶⁵ Step 2 (of twelve steps total) is worth quoting in full: “For your winding machine, clamp a hand drill in a vise, parallel to the bench top, using blocks to give the jaws a firm grip on the drill. Bend up a piece of heavy sheet metal as shown (or fasten an upright piece to a block of wood). Chuck a No. 25 drill and drill a hole in the upright like this [referring to the accompanying illustration].”⁶⁶

Desiring to construct her own high-frequency generators, Corse pursued the requisite knowledge—including the theoretical underpinnings of what she would be building—by enrolling in a suitable course in Los Angeles. As mentioned above, this choice was an attempt to rid her light paintings of their unsightly wires. She recounts, “Then I realized, oh, [the light painting] seemed so connected there [with the wires]. It doesn’t really have its own self—again, looking for the objective truth. So I thought, ‘Gee, those wires,’ so I wanted to get rid of the wires, not knowing how difficult that would be.”⁶⁷ Corse remembers few details about what her physics instruction at USC entailed; however, she does recall how she applied the information to her art praxis.⁶⁸ Learning how to construct a high-frequency generator—or Tesla coil—Corse set about constructing her own coils and adapting the florescent light bulbs to function in the new

⁶⁵ Elbert Roberson, “How to Build a Tesla Coil,” *Popular Science*, 165, no. 2 (August 1954), 190-194.

⁶⁶ *Ibid.*, 192-194. The article also provides a detailed list of necessary electrical and hardware parts. Presumably, the electrical parts would need to be ordered from a specialty retailer, such as Edmund Scientific.

⁶⁷ Mary Corse (2011), Oral history interview by Rani Singh, 5.

⁶⁸ Mary Corse (2013), interview with the author.

schematic. She removed the electrodes of the long glass tubes and had each tube filled with gas (likely a gas or combination of gases from the noble family, due to their electrical stability).⁶⁹ The “noble gases” denote each of the colorless, odorless, and tasteless gases, which prior to the 1960s were believed to be chemically unreactive. These elements include helium, neon, argon, krypton, xenon, and radon.⁷⁰

Corse would have selected the gas or combination of gases due to the color of light that she wanted the artwork to emit. In fact, it is worth noting here that while these lights are often generically referred to as neon, neon in its pure form actually emits red light. As the light emitted in Corse’s light paintings is exclusively white, she likely had xenon or carbon dioxide pumped into the aforementioned tubes.⁷¹ Once the tubes were gas-filled, the gas could be ionized and, hence, illuminated, using a proximate high-frequency energy transmitter, such as a Tesla coil.⁷²

Technological Utility and Immateriality

This negotiation—a direct appropriation of technology matched by an equal emphasis on phenomenological engagement—exemplifies another permutation of the “technological sublime,” distinct from Larry Bell’s oeuvre. Whereas Bell directly

⁶⁹ Corse does not specify which gas or gases she used; my suggestion that it was from the noble family is purely conjecture. Mary Corse (2011), Oral history interview by Rani Singh, 5.

⁷⁰ "Noble gas, n. and adj.," OED Online, December 2014, Oxford University Press, at URL: <http://www.oed.com/view/Entry/236910?redirectedFrom=noble+gas> (accessed February 20, 2015).

⁷¹ In fact, there seems to be some disagreement amongst those currently writing on Corse as to how to approach listing the materials in her light paintings. In *Phenomenal*, Robin Clark labels *Untitled (Space + Electric Light)* as consisting of Plexiglas, neon, and high-frequency energy whereas Ace Gallery describes her works simply with: “Plexiglas lit with high-frequency generator.” Clark and Auping, *Phenomenal*, 55; Ace Gallery, “Mary Corse,” online at URL: http://www.acegallery.net/artwork.php?pageNum_ACE=143&Artist=19.

⁷² Corse explains that she had the electrodes removed from the glass tubes, and implies that she outsourced the task of pumping gas into the tubes. Mary Corse (2011), Oral history interview by Rani Singh, 5.

appropriated high-technology into his studio processes, the art objects that resulted from his appropriation of dielectrical coating provide a more ethereal surface, which downplays the high-technology involved in its making. Conversely, a work like *Untitled (Space + Electric Light)* stresses its technological innards just as much as—and perhaps even more so than—its immaterial aesthetic. While the experience of an iconic Bell cube from his Terminal series might yield an airier engagement with technology than *Untitled (Space + Electric Light)*, a direct correlation in labor requirements exists between the practices of Corse and Bell.

Indeed, there is affinity between both artists' commitment to the exacting requirements of their technological craft. While Bell's production costs undoubtedly superseded Corse's expenses, each approached his/her craft with an immense amount of technical preparation and, especially, labor-intensive actions. Bell's required a good deal of preparatory visual scrutiny (i.e., to detect dust and other blemishes beforehand) and painstaking surface cleaning before the machine was put to work. Corse, in parallel, spent prolonged periods of time constructing her Tesla coils—on average four to five hours of constantly winding the fine copper wire to form the secondary.⁷³ Interestingly, Corse admits the labor-intensive nature of coil-winding, as a meditative exercise, caused her to reflect on the experience of time (paralleling her studies in Tibetan Buddhism). While it took four and a half hours, she added in an interview, “it was like twenty minutes. [. . .] The measure, it made me think about time, and how it's so much in our [trails off].”⁷⁴

⁷³ Corse explains that if she stopped while winding the coil, the wire would become loose, pop away, and require that she start anew. Mary Corse (2011), Oral history interview by Rani Singh, 22.

⁷⁴ Mary Corse (2011), Oral history interview by Rani Singh, 22.

While the interviewer, Rani Singh, changed gears at the moment that Corse trailed off, the implication Corse makes is that temporal experience resides in the mind; perception, she implies, is inherently solipsistic.

This viewpoint parallels the phenomenological aims of other artists working with technological lighting schematics, such as Dan Flavin and, especially, fellow West Coast artists Bruce Nauman, James Turrell, and Doug Wheeler. Like these artists' iconic works, Corse's light paintings fundamentally underscore the perceptual relationships between light, color, and architectural space. The affinity between Flavin's and Corse's works lies, simply, in both artists highlighting the emitted fluorescent light as the pure medium in which they work. However, Flavin's sculptures resolutely display the object of illumination (i.e., the fluorescent bulb) freely without the mediated sheathing of white Plexiglas employed by Corse. There are also a fair number of examples of Flavin displaying the necessary power cords, and occasionally even the outlets (see fig. 2.11), which Corse adamantly eliminated.⁷⁵ That Corse sought and implemented a high-tech strategy to eliminate the functional appendages from her light paintings distinguishes her work from Flavin's oeuvre. Flavin's approach is decisively Duchampian (in the readymade sense) in that the lighting objects are chosen, purchased, arranged, and ultimately presented as homage to the utilitarian aspect of the technological sublime. Flavin presents the readymade objects overtly, bare and unadorned.

⁷⁵ Fig. 2.11 is an installation view of an early Flavin exhibition at Green Gallery, where the electrical cords follow an organized trail down the wall and along the floor toward, one can assume, the outlet and power source.

Arguably, a Flavin sculpture partly implores the viewer to consider the function and utilitarian value of lighting technologies in our culture—much more so than the cord-free schema of Corse’s light paintings. From this perspective, the functional aspects of a Flavin piece compete with the sublime experience of light within space. In other words, the form of the bulbs themselves in conjunction with their electrical riggings, communicate a particular visual context that departs from the straightforward emission of fluorescent light. The utilitarian display of a Flavin sculpture resonates more closely with the examples presented in the preceding chapter: Nam June Paik’s *McLuhan Caged* (fig. 1.25) or Claes Oldenburg’s *Giant Soft Fan* (fig. 1.26). Paik, for example, might relish the display of cords with his television installations, whereas Corse necessarily desired to present a single gestalt that was free of all visible cords and power sources. The perceptual involvement of light and sound undergirds the experience of one of Corse’s light paintings.

Comparatively, *Untitled (Space + Electric Light)* does not overtly reference the utilitarian aspects of lighting in the ways a Flavin sculpture does. Rather, the aural buzzing that matches the faint throbbing of the light powered by high-frequency energy results in a heightened awareness of the viewer’s temporal-spatial sensations. These phenomenological effects compel the participant into a type of hypnotic meditation upon corporeality, vision as a dominant sense, and our dependence on (and primal desire for) light. The minimalistic gestalt of *Untitled (Space + Electric Light)*—its all-over white field hovering in front of a wall and elusively powered, perhaps from within itself—arbitrates how the viewing participant evaluates the experience of electromagnetism and

light. In contrast to the more direct experience that Flavin's lighting pragmatics induce, Corse's light paintings initiate an examination, consideration, and analysis of the metaphysical qualities and power of light to captivate and hold a spectator's gaze. Through her elimination of the power delivery apparatuses and her sheathing of the lights within translucent Plexiglas, the all-over white illumination heightens the sublime sensation of light and diminishes our awareness of its utilitarian functionality.

Filmic Immersion and the Trope of Mad Science

As mentioned above, the aural-visual experience (i.e., the synchronized hum and flicker of the fluorescent lights) that Corse's light paintings produce also subtly suggest film culture. Robin Clark has described *Untitled (Space + Electric Light)* as "elegant and slightly menacing, evoking something of a mad scientist's experiment."⁷⁶ Though Corse adamantly eschewed the inclusion of cords in the display of her light paintings, other signifiers of film culture—such as, the experience of viewing motion pictures as well as the trope of the mad scientist—are faintly present in the experience of a work like *Untitled (Space + Electric Light)*. The viewer encounters the piece by entering the darkened, cinematic space. Once inside, s/he is greeted with the buzzing of electromagnetic energy and a slightly irregular pulsing light, which suggests the early Hollywood trope of mad science laboratories.

Coincidentally (as regards an analysis of Corse's technological appropriation), scientific activity in the laboratory came to be signified in film by another Tesla

⁷⁶ Clark and Auping, *Phenomenal*, 55. Indeed, my initial engagement with *Untitled (Space + Electric Light)* closely paralleled Clark's observation, which I read after viewing the work in 2011.

adaptation. Bernard Carlson recently explicated in a biography on Tesla that the inventor made an important discovery after his modifications that yielded the Tesla coil. Tesla found that an electrical spark would jump between two terminals of his oscillating transformer at the point where the terminal spheres were closest and then gradually climb up until the gap became too far for the electrons to spark. Later dubbed “Jacob’s Ladder” by modern experimenters, this phenomenon has no real scientific usefulness today, beyond demonstrating the behavior of electricity. In fact, its simplicity of design led to its common inclusion in early Hollywood science fiction films, perhaps most famously in the “It’s alive!” scene of the 1931 version of *Frankenstein* (fig. 2.12).⁷⁷ For science fiction films like *Frankenstein*, which were a staple in early Hollywood cinema, filmmakers employed live electricity in “mad scientist” scenes from the 1930s through the 1960s. By incorporating an apparatus such as Jacob’s Ladder, its aural and visible effects gave the impression that the scientist’s laboratory was operational and abuzz with activity. It is the combination of the sights and sounds of live electricity that contribute to this topos. Essentially, live electricity—i.e., live electricity climbing up and descending down the apparatus’s arms of Jacob’s Ladder with the prominent audio of electromagnetic electricity incorporated into the soundtrack—became a filmic signifier for “science occurs within this space.”

To be sure, the relationship between the experience of a work such as *Untitled (Space + Electric Light)* and the mad scientist trope is not necessarily overt. In Robin Clark’s view, it is more an evocation of a mad science laboratory—not a one-to-one

⁷⁷ Carlson, *Tesla: Inventor of the Electrical Age*, 126-127.

correlation between the apparatus of Jacob's Ladder and the aesthetic of one of Corse's light paintings.⁷⁸ I draw this correlation to illustrate that the "slightly menacing" scientific mood that *Untitled (Space + Electric Light)* elicits is based on an established cinematic signifier that, remarkably, directly involved another Tesla invention. Beyond the indirect quality of this thematic element, however, *Untitled (Space + Electric Light)* simply projects light at the viewing subject. With its flickering white light and audible hum viewed in a dark, intimate space, *Untitled (Space + Electric Light)* delivers analogous references to movie going as an experience.

Another point of reference for considering both Corse's light paintings and other California artists who work with projected light (including, Hap Tivey, James Turrell, Douglas Wheeler, and specific works by Bruce Nauman) is the way in which viewer participation parallels a trip to the movies. The connections between the perceptual pleasures of cinematic immersion and the medium's technological heritage are worth emphasizing. As an intensely lucrative and wildly successful trade in Southern California, the motion picture industry is arguably more synonymous with Los Angeles than surfing, palm trees, "cherry" cars, and high-technology combined. Hollywood is as much a geographical location as it is an economic and institutional behemoth in the region.⁷⁹ As Corse was winding Tesla coils and constructing her light paintings, some of her contemporaries were strategically using film, slides, video, and photographic

⁷⁸ Clark and Auping, *Phenomenal*, 55.

⁷⁹ See Richard Maltby and Ian Craven, *Hollywood Cinema: An Introduction* (Oxford, UK: Blackwell, 1995), 485, for a definition of Classical Hollywood. For an overview of film celebrity in American culture, see "Stardom," Ch. 2, in Jeanine Basinger, *American Cinema: one hundred years of filmmaking* (New York: Rizzoli, 1994), 74-109. For an economic view of Hollywood stardom, See Gerben Bakker, "Stars and stories: How films became branded products," in John Sedgwick and Michael Pokorny, *An Economic History of Film* (London and New York: Routledge, 2005), 48-85.

projections to rethink modes of representation and alter the experience of spatial relationships. The corollary between cinema and Corse's works is strictly metaphorical and not a direct appropriation of recording and projecting technologies (unlike, for instance, Nam June Paik's groundbreaking appropriation of the Sony Portapak in 1965 or Andy Warhol's experimentations with film in the early 1960s).⁸⁰ Perhaps a closer parallel to the experience of one of Corse's light paintings is the concurrent emergence of the structuralist film movement. In the mid-1960s, artists such as Michael Snow and Hollis Frampton began emphasizing basic elements of cinema (including the filmic medium, sound, camera position, etc.) and downplaying content in their art.⁸¹

Similar to the manner in which Snow's seminal *Wavelength* (1967) highlights perceptual shifts in light and sound through a glacially-paced zoom within a fixed camera position, the immersive experience of *Untitled (Space + Electric Light)*, for example, also emphasizes the metacognitive awareness of cinematic viewing. The flicker effect of a Corse light painting echoes the basic structure of the cinematic experience: that is, the perception of glimmered movements vis-à-vis projected light within a necessarily darkened viewing space. While a Corse light painting relies heavily on the cinematic context to establish its phenomenological effects, the artist's following series requires an entirely different method of participation. By removing the high-tech apparatus from her paintings and returning to the medium of acrylic paint, Corse devised a unique structure

⁸⁰ See Martha Rosler, "Video: Shedding the Utopian Moment," in Doug Hall and Sally Jo Fifer, eds., *Illuminating Video: An Essential Guide to Video Art* (New York: Aperture Foundation, 1990): 31-50, for discussion of Paik's influence. See Callie Angell, *Andy Warhol Screen Tests: The Films of Andy Warhol: Catalogue Raisonné* (New York: H.N. Abrams, 2006) for a comprehensive historical discussion of Warholian film.

⁸¹ Maria Pramaggiore and Tom Wallis, *Film: A Critical Introduction* (London: Laurence King, 2005), 264.

that compels a reorientation of the body through space while looking. The artist's strong affinity for the medium as well as a disregard for contemporary art trends provoked her return to painting in 1968.

"There Are No Specific Objects"

Mary Corse's engagement with high technology was extremely short-lived, though arguably it was crucial to her steadfast return to painting in 1968. Indeed, Corse herself views the development of her oeuvre as inherently teleological, maintaining that each step led to the next phase: the shaped canvases yielded the all-white columns, which led to her vitrine-esque works, which she eventually imbued with electromagnetically-powered lights.⁸² At base, Corse maintains that these developments and transitions signify a progression toward the ultimate realization that her work should "be about the paint."⁸³ Through its constrained seriality, all-over white palette, and minimalist geometric form, the body of her work ca. 1964-1968 exemplifies Judd's definition of "Specific Objects." The parallels between Corse's oeuvre and Judd's canonical essay are self-evident, as artists on both coasts actively explored the potential of industrial materials during this period. Even so, Corse adamantly eschews this connection today, claiming in hindsight: "[W]e discovered there really are no specific objects."⁸⁴

Corse's retrospective claim that Judd's essay bore no relevance to her oeuvre is understandable but also somewhat misguided. In 1968, Corse resumed painting,

⁸² Mary Corse (2013), interview with the author.

⁸³ Ibid.

⁸⁴ Mary Corse in conversation with Drew Hammond. Quote published in Mary Corse, Drew Hammond, Honey Luard, and Dorothy Feaver, *Mary Corse* (London: White Cube, 2011), 15.

abandoning her fervent and short-lived engagement with high technology. Her post-1968 art forms and Judd's well-known claims, in hindsight, share little affinity in light of Judd's views on painting's relevancy. The fact remains that Corse interfaced with high technology up until 1968, and thereafter found a unique application for a low technology in her painting. Her initial technological interface holds kinship with a host of 1960s artistic styles and modes on both coasts, including East Coast Minimalism.⁸⁵ And, her participation in the broader phenomenon of artists directly incorporating new technologies into their studios aligns her oeuvre, in part, with the shift Judd was articulating.

Even so, Corse's intentions for her return to painting bolster her interrogation of "Specific Objects" in a recent interview.⁸⁶ Her dedication to the medium resides in her preference for working with the material itself, but she also prefers how painting allows her to intuitively express her ultimate aim of "pure abstraction."⁸⁷ This move departed considerably from what Judd was heralding in 1965. He argued that, when compared to what the new three-dimensional forms (or, specific objects) offered, painting was simply outmoded. According to James Meyer, what Judd found most objectionable was the "tendency of both painting and sculpture to resolve into a pictorial scheme" that was in direct lineage from European art.⁸⁸ Judd's claims operated less as an absolutist "painting is dead"-type declaration, than as an open acknowledgement that 1960s art was

⁸⁵ Douglas Davis provides an excellent account of the wide range of technological appropriations by artists during the postwar period. See Douglas Davis, *Art and the Future: A History/Prophecy of the Collaboration between Science, Technology, and Art* (New York: Praeger, 1973).

⁸⁶ Mary Corse in conversation with Drew Hammond. Quote published in Corse, Hammond, et al., *Mary Corse*, 15.

⁸⁷ Yablonsky (2012), "Artifacts: Mary Corse," *The New York Times Style Magazine*.

⁸⁸ Meyer, *Minimalism: Art and Polemics in the Sixties*, 134.

undergoing an obvious paradigm shift.⁸⁹ Corse's return to painting would come to bear little resemblance to what became "high" Minimalism, however. Minimalism, its leading progenitor prescribed, was an entirely new medium—a hybrid of painting and sculpture—that, in Judd's view, resisted the circumscribed trappings of a rectangle hung upon the wall.

One can only assume that Corse's declaration that "there really are no specific objects" is an allusion to how heavily the "anti-movement movement" of Minimalism became mired in its problematic contradictions.⁹⁰ In particular, Robert Smithson, Rosalind Krauss, and Barbara Rose all noted early on that Judd's theories did not quite align with his praxis. Essentially, the critique of Judd's essay stemmed from the assertion that his predilection for industrial resources was somewhat arbitrary. They argued that his penchant for reflective materials (such as galvanized metal or Plexiglas) had the tendency to dissolve into a kind of illusionism—precisely the illusionism that he decried.⁹¹ Despite this critique of Judd's seminal essay, and Corse's insistence on the obsolescence of Judd's theories, corollaries nonetheless exist between these artists. In the same way that Judd's (often) shiny objects encouraged viewer awareness of her/his perceptual

⁸⁹ Meyer convincingly shows that Judd originally intended his watershed essay to be a report on the state of contemporary art in the mid-1960s rather than Minimalism's manifesto (as it came to be used).

⁹⁰ Judd emphasizes upfront that the "new three-dimensional work doesn't constitute a movement, school or style." However, today we recognize Minimalism as a widespread sensibility—Meyer terms it a debate and shifting signifier—that dominated American art practice during the 1960s. Meyer, *Minimalism: Art and Polemics in the Sixties*, 3.

⁹¹ Smithson contended that "what seems so solid and final in Judd's work is at the same time elusive and brittle" in University of Pennsylvania, and Samuel Adams Green (1969?), *7 sculptors [Anthony Caro, John Chamberlain, Donald Judd, Alexander Liberman, Tina Matkovic, David Smith, Anne Truitt]*, reprinted in Robert Smithson, and Jack D. Flam, ed., "Donald Judd," *Robert Smithson, the Collected Writings* (Berkeley: University of California Press, 1996): 4-6. Flam cites the catalogue's initial publication date as 1965. Rosalind Krauss contends illusion exists vis-à-vis his works' distinctive phenomenology in her early essay on Judd, "Allusion and Illusion in Donald Judd," *Artforum*, 4, no. 9 (May 1966), 26.

engagement through transparent or reflective surfaces, both Corse's vitrine-esque works and her subsequent high-frequency light boxes operate in line with Judd's philosophies of perception. Moreover, the technological applications that Corse employed comparably echo Judd's fondness for incorporating novel, industrial materials. And while Judd emphasized that the strongest contemporary art being produced in the 1960s was three-dimensional work akin to Corse's *Untitled (Space + Electric Light)*, her post-1968 work might have caused Judd to reconsider his rigidity toward painting. The paintings that Corse began producing in late 1960s and 1970s encourage a distinct mobile spectatorship by incorporating an industrial material that was designed for and applied to American transportation systems in the postwar period.

Retreat From High Technology

In 1968, Mary Corse graduated with an MFA from Chouinard Art Institute. This year also marks the moment when her industrial engagement shifted to a more nuanced technological sublime. Her return to painting has endured for more than four decades since abandoning the high-frequency light boxes in the late 1960s. Corse unabashedly claims that this move was a push away from using high technology in her studio, instead desiring to engage with the more direct sensuality of her preferred and longstanding medium of painting.⁹² She also asserts this was her biggest breakthrough.⁹³ However, despite her abandonment of high-frequency energy for a return to painting, her keen interest in perception and lighting relationships persisted. She recalls that she began

⁹² Mary Corse (2013), interview with the author.

⁹³ Mary Corse (2011), Oral history interview by Rani Singh, 6.

searching for a material that would facilitate lighting effects occurring within the paint itself. Inspiration struck during an evening drive in 1968.

While driving in Los Angeles, Corse turned her attention to the demarcating lines painted directly onto the highway. Recognizing that the surrounding headlights and streetlights illuminated the lines through a type of reflection, she wondered about the possibility of experimenting with similar paint compounds in her own art-making.⁹⁴ This epiphany spurred further research into this technology's specific mechanics and availability; she contacted the California Department of Transportation to learn how their highway paint managed to reflect light so efficiently (fig. 2.13). Embedded in the highway paint, she learned, are millions of tiny glass spheres that capture, reflect, and refract light through a phenomenon dubbed "retroreflection." The microspheres, as Corse refers to them, range in diameter—typically between 180 and 850 microns. (For a scaled comparison, the diameter of a human hair measures roughly 100 microns). Manufactured industrially, the microspheres are produced in one of two ways. Either molten glass is "sprayed" as spherical droplets—in the same way water is sprayed from a hose—and then suspended and cooled. Or more typically, jagged, pulverized glass is passed through several stages of flame immersion in specially designed furnaces that smooth and shape the glass surface into spherical forms.⁹⁵

⁹⁴ Mary Corse (2013), interview with the author.

⁹⁵ Virginia Department of Transportation, "Ch. 2: Reflective Glass Beads," available at URL: http://www.virginiadot.org/business/resources/materials/mcs_study_guides/bu-mat-pavemarkch2.pdf, (accessed 28 February 2013).

This ingenious, “low technology” has been used extensively in highway markings since the 1940s.⁹⁶ Prior to World War II, American motorists by and large relied on streetlight illumination to navigate between the lines. Concern quickly grew over the frequency of wartime power blackouts resulting in increasingly unsafe roadways. Experimentation with radioactive materials and other reflective paints proved too costly for their extremely short lifespans. A federal push to replace pavement markings with glass-bead paint ensued because, though more costly than other reflective paints, glass-bead paint wears four to five times longer than its alternatives. Proper retroreflectivity in pavement markings requires precise glass-bead embedment for optimum functionality, which according to the Virginia Department of Transportation, is between 50 and 60 percent embedment. If the microspheres are embedded less than 50 percent in the paint’s surface, the longevity of the beads is compromised; greater than 60 percent embedment significantly decreases the efficacy of the beads’ retroreflectivity. Perhaps most obvious, complete embedment disallows retroreflection as the paint’s opacity blocks light from entering and refracting through the glass beads (fig. 2.14).⁹⁷

Corse procured microspheres from the same manufacturer that provides them to the California Department of Transportation.⁹⁸ Using the precision employed by highway departments, she began embedding the microspheres in the surfaces of her paintings. Working on canvases ranging from two feet square up to ten feet square, Corse remained

⁹⁶ As defined above, “low technology” refers to a basic or uncomplicated technology that enhances everyday life.

⁹⁷ Ibid.

⁹⁸ Mary Corse (2013), interview with the author.

committed to a minimalist (largely monochromatic) palette.⁹⁹ These works on canvas predominantly comprise schemes rendered in pure white acrylic and organized in simplified, geometric patterns; Corse employs medium gray acrylic strategically for pattern differentiation (fig. 2.15). In line with her Tesla coil works, she began titling this series “White Light,” underscoring her sustained interest in orchestrating the perceptual spectatorship of lighting relationships. Corse maintains that proper lighting is vital to a viewer’s engagement with her paintings and, optimally, they “should be lit far and low.”¹⁰⁰ Lighting configurations typically include a combination of natural and incandescent lighting, but Corse welcomes the impact of lighting fluctuations—foggy daylight, for example—on viewer experience.¹⁰¹

Viewer movement activates the paintings’ retinal effects, initiating a spectatorship orchestrated by moving the body through space. This activated viewing model does not resurrect the Greenbergian paradigm of the optical, which privileged “eyesight alone” in the reception of modern painting.¹⁰² Greenbergian dogma, of course, mandated that the viewer’s eye—and *no other* complementary sensation—be the *modus operandi* of High Modernism’s reception. Rather, mobile spectatorship dispenses with Greenberg’s now outmoded formalism that fetishized sight, and instead describes an embodied, movement-

⁹⁹ The majority of Corse’s oeuvre has been devoid of color altogether: executed in white or black. She has used the primary colors—red, blue, and yellow—in a select series of paintings executed during the 1990s and 2000s. She also has produced large-scale canvases in rectangular dimensions, though they typically conform to her preferred pattern of gridding (e.g., five squares by eight squares).

¹⁰⁰ Mary Corse (2011), Oral history interview by Rani Singh, 15.

¹⁰¹ Mary Corse (2013), interview with the author.

¹⁰² I make reference here to the comprehensive study of Greenberg’s controversial criticism undertaken by Caroline A. Jones. Jones both historicizes the critic’s theories against the socio-political context of mid-century America and exhaustively traces the philosophical underpinnings of his formalist position. See Caroline A. Jones, *Eyesight Alone: Clement Greenberg's Modernism and the Bureaucratization of the Senses* (Chicago: University of Chicago Press, 2005).

activated way of looking. This manner of looking not only underscores temporal movement and the body's shifting spatiality while perceiving, but also contends that a *metacognitive* awareness of this action occurs simultaneously.

This model of spectatorship occurred to me during my real-time engagement with a Corse microsphere painting, but I acknowledge my argument's reliance on the theories of vision put forth by Jonathan Crary. In "Modernizing Vision," Crary contends that the science of optics was reframed in the mid-nineteenth century to articulate the contingency of the observer's participation to optical experience. Whereas the former "camera obscura" model of fixed-point perspective understood perception to rely on inflexible divisions between subject and object, nineteenth-century modernization and its requirements of vision called for "[a] more mobile, usable, and productive observer [. . .] in both discourse and practice—to be adequate to new uses of the body and to be a vast proliferation of equally mobile and exchangeable signs and images."¹⁰³ The artists analyzed in this dissertation, in particular Corse, employ materials that distinctly require an observer's body to be in motion in order to instigate the optical effects of light triangulating from source to receiver.

Viewers's movements enact the optical effects of the microspheres, which manifests in fluctuations between what Corse describes as a sort of appearing and disappearing.¹⁰⁴ Movement directly toward and away from the painting offers marginal effects of shimmering silver. However, it is by walking back and forth (left to right

¹⁰³ Jonathan Crary, "Modernizing Vision," in Hal Foster, ed., *Discussions in Contemporary Culture, No. 2: Vision and Visuality* (Seattle: Bay Press, 1987), 43.

¹⁰⁴ Mary Corse (2011), Oral history interview by Rani Singh, 14.

repetitively) that the effect is enacted in more dramatic fashion. Retroreflection of environmental light passes through the surface microspheres and meets the viewer's eye as s/he mobilizes the body, producing spectacular effects that appear to exist within the paint itself (fig. 2.16). Akin to her high-frequency light boxes, photographic representations of Corse's paintings fail to deliver what one experiences in real-time engagement. The act of mobile spectatorship sparks glimmering shifts on the painting's surface. The effect goes from the perception of allover shimmery white, to distinct patterns coming into concretized shape, followed by a return to allover white. Indeed, a type of appearing and disappearing occurs in concert with the body's transambulation through space.

For the majority of Corse's career, the effect of her paintings' surface treatment has not been adequately conveyed in static photographic reproduction. As the experience necessitates bodily movement, photographs offer a singular (hence, limiting) perspective of what is actually observed. In a recently published catalogue for a solo exhibition of Corse's paintings, curator Drew Hammond and White Cube Gallery had the foresight to reproduce the same painting from two different perspectives (see figs. 2.17 and 2.18, for binary views). By using this type of binary representation, we can see how a subtle shift in bodily position yields two distinct appearances of the same painting.¹⁰⁵

Even if ignorant of Corse's inclusion of microspheres, a viewer can still acknowledge the reflective properties of the paintings. In a 1972 review, Joseph Masheck

¹⁰⁵ Corse, Hammond, et al., *Mary Corse*. Ace Gallery also provides the virtual experience of a singular perspective moving past an installation of Corse's paintings via an uploaded film. See Ace Gallery, "Mary Corse: Current Paintings," available on Vimeo (ca. May 2012) at URL: <http://vimeo.com/36453460> (accessed 26 March 2013).

called Corse's paintings "Puritan sin, for while they are entirely white they dazzle recklessly with a satiny sheen [...] [they are] sugar-coated, fairy-sparkled Robert Rymans. Rich art, fat art, dessert art, 'lobby' painting." He concludes, "I hope it is ironical."¹⁰⁶ To be sure, Masheck's backhanded compliment is reductive and somewhat gendered, yet nonetheless consistent with 1960s and 1970s narratives about female artists. Do Corse's interests in quantum mechanics and Buddhism aid in receiving her paintings as more than "sugar-coated" surfaces? Does her experimentation with an esoteric low technology somehow propel her oeuvre into a realm beyond outmoded formalism? I believe it does.

Though Corse adamantly refuses to discuss her methods in detail, one gets the sense that Corse has devised an exacting system to achieve such results. In light of the technical embedment requirements for proper retroreflectivity of the microspheres, one can generally surmise the steps involved in making her paintings. Corse likely paints the geometric patterns of stripes or grids first, as the microspheres would otherwise be covered (and, hence, useless) if the shaded patterns were not painted initially. Next, she probably works in small areas to apply the microspheres, as the drying time of acrylic is quite fast. I would speculate that Corse either applies a second coat of the under color as the microspheres are embedded, or she possibly applies the microspheres in a layer of transparent acrylic paint. Close scrutiny reveals the trace of Corse's method of application as well as areas lacking total physical coverage of her media.

¹⁰⁶ Joseph Masheck, "Mary Corse," *Artforum* (Summer 1972), 82. Masheck's review also echoes similar treatments he has given in his reviews of West Coast art during the postwar years.

The trace of her application technique appears and disappears as one walks past a painting; the light, refracted through the microspheres, reveals a pattern consistent with application by squeegee or rolling device. Corse hinted recently that her paintings require many steps and, as a result, comprise many layers:

Actually, [in] the paintings there are many layers, and sanding, and then finally, I have to lay them flat on the floor. I have this board with wheels. [...] So the painting's on the floor—and I have an assistant at this point, and we have ropes on the end—and I stand on [the] thing [...] and then I pour the beads on, and he rolls it and da-duh, and to get the brush strokes right and the beads it's a fiasco, but that's how it's done.¹⁰⁷

By admission, the microspheres are poured onto the wet substrate and rolled out by her assistant. This step presumably affords a regularized application while achieving the desired embedment depth of microspheres.

Corse points out that due to the required drying time for acrylic, the final step of a painting happens so quickly that she feels directly connected to her “early action painting roots.”¹⁰⁸ Not only does she work rapidly, akin to the expressionistic process that her forebears in the New York School adopted, she also mimics the Pollockian guise of placing the canvas on the floor and working above—or as Pollock maintained “in”—the painting. However, in contrast to the indexical quality of Pollock's corporeal drips or de Kooning's gestural brush strokes, the index of Corse's microspheres appear to be more mechanical in their presentation. An identifiable trace of her hand prevails, though the

¹⁰⁷ Mary Corse (2011), Oral history interview by Rani Singh, 7. Corse typically uses 120 sandpaper, and occasionally 220, for her sanding requirements.

¹⁰⁸ Ibid.

technical coolness of an instrument designed to smooth and normalize the surface mediates that touch (fig. 2.19).¹⁰⁹

I find the dualistic metaphor of organic trace arbitrated by systematic patterning and mechanized surface finishing appropriate and satisfying. The organic and mechanical dichotomy resonates with the automobile as an entity (where this chapter began). Automobiles can be viewed as mechanized extensions of the corpus itself, particularly from the perspective of a motorist experiencing an emotional connection to driving (i.e., road rage). And as illustrated from this chapter's outset, Reyner Banham maintains Los Angeles's freeways operate as a type of architectural ecology—a system that serves as both architectural space and engineered landscape. Corse literally incorporates a low technology developed for highway safety, but also envisions her painting as an endeavor to commune with the “abstract entity” or “the other side.”¹¹⁰ Conceptually, Corse's paintings, as well as her earlier high-tech works, emblemize the rhizomatic quality of Los Angeles's highway system expanding *ad infinitum*.¹¹¹ Her microsphere appropriation conflates a mechanical automobile navigating between mechanically applied pavement markings with the act of driving upon the organic, rhizomatic structure of the highway system. Here, the road serves both as a metaphor for the infinite as well as a real technological inspiration.

¹⁰⁹ This mechanical mediation is apparent in fig. 2.19, for example. The surface pattern reveals the paint and microspheres were applied in either vertical or horizontal layers, each confined to subtly delineated square of the grid pattern.

¹¹⁰ Mary Corse (2011), Oral history interview by Rani Singh, 15.

¹¹¹ Gilles Deleuze and Félix Guattari employed the concept of the rhizome in *A Thousand Plateaus*, using the “root-like structure” of the rhizome to oppose the arborescent model of vertical (unidirectional) intellectual thought based on dualities and binaries. Rhizomes imply no beginning or end and, when used as an intellectual model, suggests that entry can occur at any data point. See *A Thousand Plateaus: Capitalism and Schizophrenia* (Minneapolis: University of Minnesota Press, 1987).

Banham viewed the road in such nuanced terms, writing “the Santa Monica/San Diego intersection is a work of art, both as a pattern on the map, as a monument against the sky, and as a kinetic experience as one sweeps through it.”¹¹² To be sure, Corse is not the first artist or inventor to draw inspiration from the road. The landscape rushing by while driving unimpeded has the potential to stimulate free-form thinking and, sometimes, invention. Jack Kerouac’s novel is a classic example. *On the Road* became a defining benchmark for the 1950s Beat Generation.¹¹³ As important precursors to the social movements that defined the 1960s, the Beats privileged jazz, poetry, nonconformist behavior, and drug usage as vehicles for real-time experience and methods of resistance against the status quo. Similarly, artist Tony Smith famously likened the *experience* of a late-night drive on the unfinished New Jersey Turnpike to be equivalent—or perhaps even superlative to—the experience of any art object. Smith opined, “The road and much of the landscape was artificial, and yet it couldn’t be called a work of art. On the other hand, it did something for me that art had never done. At first I didn’t know what it was, but its effect was to liberate me from many of the views I had about art.”¹¹⁴ Smith’s contemporaries drew inspiration from this declaration, particularly for his attempt to articulate what Allan Kaprow was terming the open-ended, Zen-like “creation of a total art.”¹¹⁵

¹¹² Banham, *Los Angeles: The Architecture of Four Ecologies*, 89-90.

¹¹³ Jack Kerouac, *On the Road* (New York: Viking Press, 1957).

¹¹⁴ This well-known reminiscence by Smith helped usher in what came to be termed conceptual art. Published as “Talking with Tony Smith,” *Artforum*, 1, no. 4 (Dec. 1966): 18-19.

¹¹⁵ Kaprow articulated these ideas along with his critical framing of ‘environments’ and ‘happenings’ in the late 1950s and early 1960s. See especially “The Legacy of Jackson Pollock” (1958), “Notes on the Creation of a Total Art” (1958), and “Happenings in the New York Scene” (1961), all published in Jeff Kelley, ed., *Essays on the Blurring of Art and Life* (Berkeley: University of California Press, 1993).

Certainly less known to art narratives but worth recounting is the story of how Nobel prize-winning biochemist Kary Mullis conceived of one of the most important discoveries in molecular biology. While driving at night along the Pacific Coastal Highway in 1983, Mullis recalls the moments leading up to his thought experiment:

My girlfriend was asleep and I was functionally sober (or the road would have proven my undoing), but it was late at night and I was feeling weird. Strange things had happened to me on 128 before. Furtive old men in...what was that? A grey robe. In that field. I didn't see anything. Or lost time: [...] It was that kind of road, but tonight, in the middle of that stretch at mileage marker 46.58, the rest of my life was going to undergo a massive shift in just a few minutes.¹¹⁶

Mullis, it seems, had experienced a number of hallucinatory and time-bending phenomena while driving, but on this particular night, he explains, he could feel himself physically driving his car while his mind drifted into his laboratory. As he considered a nagging problem amongst geneticists at that time—how to amplify sequences of DNA beyond the current technology of copying small snippets—Mullis visualized a bracketing technique that would allow researchers to expand even the smallest DNA sample for insertion in a battery of tests. When he reached his destination, Mullis diagrammed his highway thought experiment, an invention known as the Polymerase Chain Reaction (PCR) for which he was awarded the Nobel Prize in 1993.

Like Mullis, Corse drew inspiration from night driving in California, though the solution to her problem (i.e., how to bring light into her paintings without harnessing electrical current) came from literally focusing on the highway's road markings. This notion of mobility aiding creativity—specifically the monotonous, hypnotic quality of

¹¹⁶ Quoted from Kary Mullis's recounting of his discovery of the Polymerase Chain Reaction (PCR) on his website, at URL: www.karymullis.com/pcr.shtml (accessed 7 July 2013).

vehicular movement—also corresponds to the movements required for perceptual engagement with her oeuvre (particularly her paintings). The experience of Corse’s paintings necessitates light triangulated from the light source, through the glass microspheres, and into the receiver’s visual system (that is, the retina and then transcribed to the cerebral cortex). Change governs this triangulation, with the more dynamic fluctuations in light (vis-à-vis movement of the light source or the receiver’s bodily position) correlating to more dramatic visual permutations.

The painting’s optical effect requires redirection of light spurred by either alteration to the light source (e.g., a cloud that suddenly shifts the room’s total light levels) or transambulation across the space itself. Visual scanning alone (while spatially static) does not yield equivalent results. Ace Gallery, Corse’s current representation, relate these perceptual effects to our broader conceptions of the natural of reality: “The continuous changes that occur in Corse’s paintings should remind the viewer that nothing stands still, that movement and transformation are inherent features of reality. And it is this reality that Corse’s paintings embody with both stark clarity and sensual solidity.”¹¹⁷ By contending that the hallmark of Corse’s oeuvre is experiential change, Ace Gallery (consciously or not) reemphasizes the artist’s longstanding interest in perception and the nature of reality. This, of course, links directly back to Corse’s education in physics during the early 1960s. After all, the discipline of physics explains, at base, the fundamental laws governing matter and energy, wherein matter can be an apple, light in particle form, or a painting and energy can take the form of electricity, a wave of light, or

¹¹⁷ Ace Gallery, New York. “Press release: Mary Corse, Survey 1964-1994,” (1995) in *Richard Bellamy Papers* (III.D.6), The Museum of Modern Art Archives, New York.

the body in motion. Like physics, the full perceptual experience of Corse's paintings require that light and corporeal movement through space act in concourse. Therefore from a symbolic perspective, one might also consider viewer engagement with a painting such as *White Light* (fig. 2.16) to be emblematic of a physics equation: what Corse terms "the minus apple."

Conclusions

Mary Corse helped expand painting's parameters through her appropriation of both high and low technology. She accomplished this via her literal expansion of the medium by seeking out the novel material of glass microspheres for her post-1968 works, but also through her unfaltering commitment to referring to her vitrine-esque works (fig. 2.3) and light boxes (fig. 2.7) as paintings. Corse herself has implied that the experience of her art ultimately hinges on time-based spectatorship. She uses plain language to prescribe how the experience of one of her paintings (e.g., fig. 2.18) should be enacted: "It has an inner band. Okay, it's a field of light, and this band you see down the middle appears and disappears as you move, or as the light changes. With time, it moves [...] From the side here, there's no line. It's inner, that band is inside."¹¹⁸ She views technological appropriation as a means to an end—with the end being a sublime, metaphysical awareness of how we perceive light.

However, the technological sublime of Corse's oeuvre does not solely hinge on the two-headed descriptor of technology (i.e., her interface with technology) and the

¹¹⁸ Mary Corse (2011), Oral history interview by Rani Singh, 20.

sublime (i.e., the sensorial immersion that her works instigate). Corse's art demands viewer movement in more extremes than her West Coast art contemporaries do. Examples from this dissertation—Larry Bell, Fred Eversley, Robert Irwin, Maria Nordman, Eric Orr, or James Turrell—all tended to create phenomenally immersive or reflective art; however, those sculptures or installations did not always benefit from transambulation in the manner that Corse's work necessitates it. In fact, some of the so-called Light and Space art implores spectators to stand rather motionless in order to allow their cerebral/perceptual faculties to engage.¹¹⁹ Corse's art, particularly her post-1968 paintings, requires a specific mobile spectatorship that differentiates her work from that of her contemporaries. In the words of Drew Hammond, Corse's oeuvre is "such an embodiment in two senses of [perception], both as a visible expression of perception, and as a process by which perception becomes tangible."¹²⁰

Fundamentally, Corse's art equally negotiates experimentation with new technologies while delivering unique optical experiences by channeling or emitting light toward a mobile subject. The innovation of her technological appropriations place her in a unique cast of Southern California artists who mined technology in order to generate

¹¹⁹ Jan Butterfield, the only scholar to publish a monographic study of the Light and Space movement, excluded Corse from her book on the grounds that she is a painter. Butterfield's reasoning is worth quoting in full: "Mary Corse is something of an enigma in terms of her relationship to Light and Space art. After careful consideration, I decided not to include her in the main body of this text, not because she is not a superb artist—because she is—but because she is primarily a painter rather than an artist concerned with room environments or site-specific installations. Working with glass microspheres, Corse creates paintings that are almost eerie in their intensity: inordinately bright, luminous canvases made by mixing crushed glass with acrylic paint, which she then smooths to a brilliant sheen. Powerful lights trained on her canvases create a glistening "pure whiteness," which fragments into halated spectrum colors as the viewer passes by. Corse is long overdue for a serious critical consideration, but this book is not the place for it." See Butterfield, *The Art of Light+Space*, 245.

¹²⁰ Drew Hammond, "The Realization of Perception: White Paintings by Mary Corse," in Corse, Hammond, et al., *Mary Corse*, 15. Hammond attributes this point to a discussion between Corse and himself in August 2011.

fresh experiences of the sublime. Southern California as locus for high-tech innovation spurred artistic interest in bringing such novel technologies into the studio; Corse was an active participant in this culture of experimentation that permeated West Coast art practices. The inimitable highways of Southern California also proved to be an indelible stimulus for her after she initially engaged with high technology. Like others working in the technological sublime during the 1960s and 1970s, her high- and low-tech paintings initiate metaphysical and empirical musings on the act of looking itself.

The following chapter reveals how artist Fred Eversley advanced an original casting method for a material that became popularly (and permanently) associated with 1960s Los Angeles art: polyester resin. Eversley's innovation—centrifugal casting—gave way to the sculptural lenses with which his oeuvre is best associated. And, like Corse, his plastic forms also require a distinct mobile spectatorship for their viewing. Whereas a Corse microsphere painting implores the viewer to prescriptively pace back and forth, an Eversley sculpture calls for aligning and crouching the body while looking through and beyond the plastic medium. Ultimately, I reveal how Eversley's inventive technique gave rise to such necessary optical adjustments.

CHAPTER 3

Spinning Plastic: Fred Eversley's Material Appropriation of Polyester Resin and Technical Innovation in Centrifugal Casting

Since the original and ultimate source of all energy on earth is that derived from the sun and since extensive utilization of solar energy seems the most likely long range solution to the energy crisis, my sculpture efforts are directly influenced by the concepts of this energy source, but are representative of the broad sense of energy. –Fred Eversley (1976)¹

And it is this, in fact, which makes it a miraculous substance: a miracle is always a sudden transformation of nature. Plastic remains impregnated throughout with this wonder: it is less a thing than the trace of a movement.
–Roland Barthes (1957)²

Perhaps more so than any other material or industrial process used by artists in Southern California, plastic embodies a pop sensibility. Plastics come in a spectrum of vibrant colors, endless curvilinear forms, and often have reflective, pristine surfaces. The potential for brilliant transparency and reflection conveyed via plastic also signifies qualities of superficiality and hedonism—somewhat unfortunate stereotypes of Los Angeles culture. Conceptually the term “plastic” denotes conditions of superficiality, but it also connects to a core feature of Pop art: consumerism (through its reference to the plasticity of goods and their packaging). Liquescent and sensuous, Fred Eversley’s sculptures certainly appear to be on par with other postwar sculptures produced for an eager, consuming American public (fig. 3.1). The high-keyed colors and decorative luster of Eversley’s plastic objects appeal to the deepest of consumer desires. As the

¹ Fred Eversley, “Statement of the Artist,” in *Frederick Eversley: [Catalog of the Exhibition] Santa Barbara Museum of Art, April 30 to May 30, 1976 [and] Oakland Museum, February to March, 1977* (Santa Barbara, CA: The Museum, 1976), n.p.

² Roland Barthes (1957), “Plastic,” in *Mythologies*, Annette Lavers, Trans. to English 1972 (New York: Hill and Wang, 1972), 97.

collaborating authors of the introductory essay for *Pacific Standard Time* put it, “In Los Angeles, pop would prove to be a peculiarly expansive category, one that embraced industrial finishes and abstract forms as well as the everyday objects and commercial design practices with which it was more commonly associated.”³ As a former engineer, Eversley’s art exemplifies a devotion to the medium of plastic (both unsaturated polyester resin and, eventually, laminated acrylic) but also demonstrates a reverence for the technological processes required in making his art. Although the coalescence of art and industrial technologies epitomizes the practice of many Southern California artists, Eversley’s technique developed out of an academic training and early career in electrical and aerospace engineering. In contrast with the path that many of his contemporaries followed—that is, to receive formal art training and adapt industrial materials and processes to one’s studio practice—Eversley honed his skills as a fine-art sculptor out of a scientific background. As such he represents an antipodal case study for art/technology in Southern California, primarily due to the fact that, as an artist who received no formal art training, his practice embodies a counter viewpoint to that of his contemporaries.

The plastic sculptures that would become the quintessential style of Fred Eversley’s oeuvre epitomize the union of art/technology with more specific LA art trends (such as the 1960s popularity of plastic media and Pop art in Los Angeles). There is a seeming natural correlation between Pop art and the superficiality of Los Angeles. Cécile Whiting links the two directly in her book, asking, “[D]id Pop art, owing to its affiliations

³ Rebecca Peabody, Andrew Perchuk, Glenn Phillips, and Rani Singh, “Shifting the Standard: Reappraising Art in Los Angeles,” in *Pacific Standard Time: Los Angeles Art 1945-1980* (Los Angeles: Getty Research Institute and the J. Paul Getty Museum, 2011), 3.

with popular culture, prove particularly adept at mimicking the shallow mindset considered emblematic of Los Angeles when it took up the city's popular motifs. . . [reflecting] the undisputed world capital of middlebrow purchase and pleasure back on itself?"⁴ While New York retained its hold on contemporary art hierarchies (and thus its grip on Pop), Whiting contends that Los Angeles—"the Pop city"—exists as both an environment and an art center that reflects the Pop art produced there (and vice versa).⁵

The "LA-ness" of Pop was also easily transferred onto the so-called LA Look for some writers, who read it as a curious conflation of Minimalism and Pop. With the streamlined, often geometric forms, the LA Look clearly aligned with Minimalism, yet its incorporation of high-keyed colors and commercial appeal also related to Pop art. To return to a quotation that introduced this dissertation, Peter Plagens contends, "Just as there was no New York School, there was no LA Look [. . .]—a semitechnological, industrially pretty art" that possessed "the aroma of Los Angeles in the sixties—newness, postcard sunset color, and intimates of aerospace profundity."⁶ Plagens conflates the "aerospace inspired" (i.e., Minimal) and the "postcard color" (i.e., Pop) features to define the LA Look, but he also implies that the West Coast style conceptually parallels the manner in which the New York School evolved. By using metaphor Plagens implies that the "LA Look," as a construct, mirrors the High Modernist idiom. Similar to the LA Look, Abstract Expressionism involved an informally affiliated group of artists who

⁴ Cécile Whiting, *Pop L.A.: Art and the City in the 1960s* (Berkeley: University of California Press, 2006), 3.

⁵ *Ibid.*, 9.

⁶ Peter Plagens, *Sunshine Muse: Contemporary Art on the West Coast* (New York: Praeger, 1974).

participated in a style lacking a manifesto or progenitor but came to be defined as a movement somewhat retrospectively. Thus, the LA Look parallels the New York School in its unstructured origins, but its focus on nonrepresentational forms also resonates with a sustained interest in postwar abstraction that continued well into the 1960s.

Rather than demonstrating a continuation of such abstract traditions, however, some contemporary writers viewed plastics as the obliterator of High Modernism and its gestural style. In *Plastics and New Art*, a 1969 exhibition that theorized the widespread aesthetic exploration of plastic, Stephen Prokopoff maintains that artistic experimentation with plastics was a direct outcome of the decline of Abstract Expressionism in the late 1950s.⁷ Prokopoff contends that not only was plastic appropriate for contemporary stylistic trends, but there was already an observable divide between each Coast's approach to the material. He adds that the East Coast tendencies aligned along the established axis of Minimalism (e.g., Robert Morris and Donald Judd) or with the "new organic fluidity" focused on material and texture (e.g., Eva Hesse). Comparatively, the West Coast not only witnessed "a more complex and technically explorative use" of plastics, in Prokopoff's view, but artists did so in "fantastic and often capricious forms indebted to Pop, Op, and especially indigenous Funky styles."⁸ Thus for some, plastic fittingly reflected LA's "middlebrow culture" back on itself—to return to Whiting's compelling phrasing.

⁷ Stephen S. Prokopoff, "Plastics and New Art," in University of Pennsylvania. *Plastics and New Art; An Exhibition Organized by the Institute of Contemporary Art of the University of Pennsylvania*, 15 Jan. to 25 Feb. 1969, in Collaboration with the Marion Koogler McNay Art Institute, San Antonio, Texas, March 16 to April 13, 1969 (1969), n.p. Eversley is notably excluded from this show, though a balance of East and West Coast, as well as Midwestern, artists is represented.

⁸ Ibid.

Beneath the shiny decadence of Eversley's art lies a foil to the Pop taste for sleekness and glitz: a multifaceted story of a technical-minded, bicoastal engineer who abandoned working on Kennedy's Space Race in favor of becoming a part of the nascent art scene in Los Angeles. Along with the other artists who became informally styled as "LA Glass and Plastic"—including Peter Alexander, Ron Davis, Craig Kauffman, Helen Pashgian, and De Wain Valentine—Eversley helped usher in the now longstanding association of industrial plastics with postwar Southern California art.⁹ What follows is a chronicle of the inception and rise of his art career, with technical description and analysis of his primary medium: polyester resin. I begin by foregrounding the relationship between the industrial infrastructure of plastics in Southern California and direct appropriation of those materials by artists. I examine Eversley's role in the interface of art and technology in Southern California, beginning in 1966, while examining the broader implications of artistic experimentation with polyester resin on the West Coast throughout the 1960s and 1970s. I demonstrate the range of experimentation by including the practices employed and forms produced by Eversley and his contemporaries (specifically Alexander, Pashgian, and Valentine).

Just What Is It That Makes California So Plastic, So Appealing?

With the War's conclusion and the advent of the Atomic Age, industrial demand on the West Coast specifically shifted from a model of aircraft and munitions production to one focused on broader militaristic requirements of the Cold War. Americans

⁹ Jan Butterfield, *The Art of Light+Space* (New York: Abbeville Press, 1993), 13.

witnessed the military's declassification of a host of wartime thermoplastics lead directly to their commercial availability.¹⁰ This widespread availability became especially concentrated in Southern California because the industrial infrastructure—i.e., the industries that manufactured aircraft as well as other essential military materials during the war—was not only established but also prepared for postwar production demands.¹¹ Specific Southern California industries devised ways to remain relevant in the economic boom of postwar America by continuing to partner with the military-industrial complex. The G.I. Bill helped to stimulate growth by placing workers in various trades, including the burgeoning plastics industry, left vacant following the war's conclusion.

Evidence of scientific interest and educational opportunities in plastics abound throughout scientific journals during the postwar years. From 1945 through the 1970s, for example, *Popular Science* frequently covered topics concerning specific developments in the plastic industry.¹² In many postwar issues of *Popular Science*, vocational training schools advertised a wide range of prospects for “veterans and non-veterans” alike. Specific opportunities in the plastics and aerospace industries picture Los Angeles as a glamorous locale in which to study a new trade. In the February 1948 issue, for example, Technical Crafts Corporation placed a two-page advertisement clearly aimed at cashing in on veterans who were eager to learn a trade using the sanctioned benefits of the GI Bill (enacted in 1944). In this particular ad, Technical Crafts Corporation weaves technical

¹⁰ Jeffrey Meikle, *American Plastic: A Cultural History* (New Brunswick, NJ: Rutgers University Press, 1995), 157.

¹¹ *Ibid.*, 195-198.

¹² By executing a keyword search (using the search term “plastic”) on the *Popular Science* archives website, the database produces a color-coded graph that ranges from the magazines inception in 1872 through 2009. As a search term, “plastic” is at maximum frequency from 1945 through the 1970s. See URL: <http://www.popsci.com/content/wordfrequency#plastic> (search executed on 9 September 2013).

prose with the lure of sunny Los Angeles. Out of the four vocations offered, two schools are exclusive to Los Angeles. One, the American Schools of Aircraft Instruments, invites the reader to “enjoy all that Southern California has to offer you (fig. 3.2).”¹³ Or choose plastics, the second LA school entices, proclaiming that plastics is a major growth industry and theirs is “the oldest and largest training school devoted entirely to plastics education (fig. 3.3).”¹⁴

Indeed, in the trade journal *Modern Plastics*, Robert Boskirk attested in 1947 that plastic manufacturing had become widespread to the degree that innumerable small companies had set up shop across the West Coast (sometimes in no more than a tent) to take part in the plastics revolution.¹⁵ With materials now declassified by the US military, entrepreneurs could access the widely available resources and use the benefit of Southern California’s fair weather for curing their concoctions outside. With regard to polyester resin, Boskirk confirmed that Californians had recognized that sunlight could be used as a catalyst for their purposes.¹⁶ Thus, plastic not only became a ready metaphor for some of the core, if pejorative, characteristics of Los Angeles and its residents, but the climate of Southern California functionally dovetailed with the material’s processing requirements and use value. As historian Jeffrey Meikle points out, fiberglass, a glass-reinforced plastic (GRP), transitioned from a material classified and used exclusively for aircraft

¹³ Advertisement by Technical Crafts Corporation for four of its trade schools, *Popular Science*, 152, no. 2 (February 1948), 15. Also available is training in diesel mechanics—with sites in New York, Memphis, and Los Angeles.

¹⁴ Advertisement by Technical Crafts Corporation for four of its trade schools, *Popular Science*, 152, no. 2 (February 1948), 14-15.

¹⁵ R.L. Van Boskirk, “The Plastiscope,” *Modern Plastics*, 25 (September 1947), 198.

¹⁶ *Ibid.*

manufacturing to a popular substance for a host of items associated with California (including surfboards, skateboards, dune buggies, and even sports cars).¹⁷

By the 1960s, the material ubiquity of plastic—as well as its conspicuousness as a West Coast industry—was firmly established in Americana. Its pervasiveness quickly spurred debates over its utopian and dystopian qualities. With the publication of Rachel Carson’s *Silent Spring* in 1962¹⁸—and the subsequent launch of environmental activism—Americans were becoming more aware of the consequences of these purported “chemical marvels.” A quip from the iconic 1967 film, *The Graduate*, provides a clichéd but nonetheless apropos example of how this ubiquity—and uncertainty—operated. Director Mike Nichols frames the film’s protagonist, Benjamin Braddock (played by Dustin Hoffman), as a disillusioned college graduate returning to his parents’ home in Pasadena, an unwilling participant in a party celebrating his graduation. The setting of the Braddock’s middle-class home and backyard pool—another Southern California staple—coupled with the artificiality of the guests’ dialogue reinforces Ben’s ennui. Uncertain about his future, Ben listens expressionless as a male guest, Mr. McGuire, offers him unsolicited advice: “I just want to say one word to you. Just one word. Plastics.”¹⁹ This quote, Meikle contends, “convulsed audiences” and became a much-repeated phrase that both “hit a nerve and entered communal memory.”²⁰

¹⁷ Meikle, 196. Meikle uses “Fiberglas” to refer to the material generically, though Fiberglas is a company trademark for a specific brand of fiberglass.

¹⁸ Rachel Carson, *Silent Spring* (Boston: Houghton Mifflin, 1962).

¹⁹ Mike Nichols, director, with Dustin Hoffman, Anne Bancroft, and Katherine Ross, *The Graduate*, motion picture (Hollywood, CA: Twentieth Century-Fox, 1967).

²⁰ Meikle, 3.

The cultural impact of this phrase has not only endured since its inception, but has been used glibly in conjunction with plastics art in California.²¹ Meikle emphasizes that what made the comment so unforgettable—and perhaps why it readily conjures references to plastic as an artistic medium—is the layered quality that the term “plastic” embodies. Meikle explains:

Some perceived a comment on the banality of business, others an attack on comfortable middle-class materialism. Still others, recalling plastic’s simulation of traditional materials, understood the scene as metaphoric commentary on the rhetoric of the Great Society. A few, catching an ominous note, entertained fleeting thoughts of science fiction nightmares, of technology run amok. And some merely relished the absurd elevation of the commonplace.²²

Whereas some writers have repeated the famous “plastic quip” as a type of signification and validation of Southern California as *the* postwar plastic hub, Meikle cautions that it actually demonstrated something far more insidious. The quip reminded audiences of their superficial postwar material culture, becoming something of an unwelcome mirror to a body politic that was growing increasingly fractured in the midst of war, activism, and demonstrations. At a time when Americans had begun to weigh various technological benefits against their dystopian costs, “the one word of plastics” could be taken anyway but lightly.

²¹ Hunter Drohojowska-Philp and Rebecca Anne Weller introduce their respective chapters on plastic aesthetics and Rani Singh concludes her introductory comments at an event at the Getty Center with the plastic quip. See Drohojowsk-Philp, *Rebels In Paradise*, 206; Rani Singh, Introductory comments, *Modern Art in LA, The Industrialized Gesture: A Conversation with Peter Alexander, Helen Pashgian, and De Wain Valentine* (Los Angeles: Getty Research Institute, 2010), DVD; and more recently, William Poundstone, “Just One Word: Plastics,” in *Blouin ArtInfo* at URL: <http://www.blouinartinfo.com/blog/los-angeles-county-museum-fire/just-one-word-plastics> (11 November 2013). In contrast, Rebecca Anne Weller cites Meikle’s thoughts on the “tired old joke” as a way of problematizing the overuse of this quotation in “Los Angeles Look(ing): Process, Perception, and Popular Culture in the Art of Larry Bell, Craig Kauffman, and John McCracken,” PhD diss., (University of Delaware, 2008), 54.

²² Meikle, 3.

Set against the objectives of the American government during a tumultuous socio-political decade, Meikle's ideas on the cultural ramifications of plastics resonate with Eversley's entrance into the emerging LA art scene: both in the technical context of the material's availability in the market and in the biographical context of Eversley's early career as an engineer at Wyle Labs. The themes of *The Graduate* encompass several late-1960s American sociological conditions and psychological states—alienation, rebellion, and anti-conformism. Paul Simon had already penned “The Sound of Silence” in February 1964, responding directly to the disillusionment felt in the months following President Kennedy's assassination.²³ In many ways Ben Braddock's weariness over the pressures of making career decisions, his apathy towards his upper-middle-class rearing in Southern California, and, especially, his eventual indulgence in an adulterous affair, all relate to 1960s countercultural attitudes. In particular, Braddock's disenchantment and actions interrogate contemporary attitudes toward sexual mores and authoritarian systems, as well as affirms the youth movement's opposition to systems of authority and the ongoing war in Vietnam. The film's release in 1967 coincided with the US involvement in the Indochina conflict reaching its critical peak (prefiguring the Tet Offensive in January 1968). In my view, it is hardly coincidental that Mr. McGuire's quip struck a nerve as Americans were becoming skeptical of the true motivations for—and the level of corporate involvement in—the US occupation of Vietnam, Laos, and Cambodia.

²³ Paul Simon, webpage for “The Sound of Silence,” at URL: <http://www.paulsimon.com/us/music/paul-simon-songbook/sound-silence> (accessed 9 September 2013).

These themes broadly resonate with parallel countercultural conditions stirring in Southern California, particularly how the counterculture influenced experimental art practices and contributed to the nascent art scene in Venice Beach. It is precisely these intense socio-political forces that contributed to Eversley's arrival in Venice Beach in 1963 and his transition from engineer to artist during the mid-1960s. In many ways, *The Graduate* said aloud in 1967 what the country was already attributing to Southern California: that it is the apex of America's "plastic" society as well as a major site of social experimentation. Mr. McGuire's emphasis on the economic stability of plastics for the region speaks to the accessibility of plastic as a material, but also suggests further connections between it and the sunshine-drenched setting of Southern California. The future in plastics alludes to the perception of superficiality as the rule for social interactions in the region, the parallel (and profitable) industry of Hollywood with celluloid as its material mainstay, and especially the "anything goes" attitude that helped spur an art scene struggling to find an identity in the shadow of cerebral New York.

As introduced in this chapter's beginning, the stereotype of superficiality in Los Angeles resonates clearly with the logic of Pop art—a reasoning that has compelled scholars to question whether LA Pop trends are distinct from East Coast currents. In line with Cécile Whiting's contextualization of Los Angeles as "the Pop city," other scholars have posited that, similar to the LA Look, the so-called Light and Space movement also derived from a curious conflation of Pop and Minimalism (i.e., via Minimalism's reductive forms and Pop's tendency toward high-keyed colors). Peter Plagens conflated plastic and Los Angeles while assessing, "The patented 'look' [of Los Angeles art] was

elegance and simplicity, and the mythical material was plastic, including polyester resin, which has several attractions: permanence (indoors), an aura of difficulty and technical expertise, and a preciousness (when polished) rivaling bronze or marble.”²⁴ For Plagens, plastic is both mythically “LA” —he implies they are near synonyms—but plastic sculpting also represents a painstaking technique to master. Despite the technical aptitude required to execute fine-art sculpture in plastics, however, the medium began to take on “lowbrow” connotations. The material prevalence of plastic in LA art reflected the demands of local collectors. In the words of gallerist Irving Blum, “California taste [had] come to mean a kind of chromium taste, or a plasticized taste.”²⁵ By the end of the 1970s, it was becoming impossible to separate “plastic” from “LA-ness” and its use as a quintessential art material.

As the longstanding art material of several Southern California artists, polyester resin aligns with the region’s beach culture on a direct level. Its material ubiquity was a direct result of surfers using it to laminate their boards. For example, Los Angeles artist Peter Alexander recently recalled that he began experimenting with polyester resin in the mid-1960s after remembering the way it had been inadvertently cast when he left some resin sitting out in a Dixie cup after coating his surfboard. Foregoing his initial training in architecture, Alexander channeled this epiphany into launching an art career crafting tabletop polyester resin sculptures. Alexander’s first experiment, the aptly titled *Cloud*

²⁴ Plagens, *Sunshine Muse*, 120.

²⁵ Irving Blum (1977), Oral history interview by Paul Cummings, 31 May – 23 June, audio recording and transcript for Archives of American Art (Washington, DC: Smithsonian Institution).

Box from 1965, became something of an avatar for what came to be called the “LA Look” (fig. 3.4).²⁶

“LA Look” or “Finish Fetish”—both pithy designations that arose out of discernable visual commonalities in postwar art in Los Angeles—emerged during the art criticism of the early 1960s oriented toward categorizing LA art. In particular, Finish Fetish characterized what some called an obsession for many LA artists. The “obsession” characterized the creation of objects with pristine surfaces in compulsive terms; the tendency involved achieving immaculate exteriors while using intensely colorful, often translucent, and highly reflective materials. Perhaps with a tinge of disdain for trivial catchphrases, some critics preferred “LA Glass and Plastic,” which, rather generically, used the materials themselves as the categorical term. In her aforementioned study of California Light and Space (a slightly larger rubric that included not only the glass and plastic works that dominated the early 1960s but the subsequent development of immersive installations in the late 1960s), Jan Butterfield explains that, in hindsight, LA Glass and Plastic functioned as an important development in the entire Light and Space trajectory. She asserts that by the beginning of the 1970s it had become obvious that “the technical know-how behind [LA Glass and Plastic], derived from engineering and the aerospace industry, was put to use to produce works far more subtle, more resonant, and

²⁶ Alexander (2010), *Modern Art in LA, The Industrialized Gesture: A Conversation with Peter Alexander, Helen Pashgian, and De Wain Valentine*.

perceptually much richer than those of the preceding decade. The new work was also far more difficult; in many cases it seemed almost invisible.”²⁷

The “new work” to which Butterfield refers falls under the California tendency of producing immersive environments—with Robert Irwin’s iconic scrim experiments or a Ganzfeld environment by James Turrell as key examples of this tendency.²⁸ (I address these developments at length in the following chapter). Butterfield argues that the phenomenological spaces of an installation, such as one of Irwin’s early interventions, necessarily evolved from the materials and surface treatments of the LA Glass and Plastic objects. More than the materials, however, these trends sprang from parallels between the viewer’s relationship to materials and their translation into later experiences within immersive installations. In other words, spectator engagement with the physical presence of a glass or polyester resin sculpture decidedly spurred subsequent artistic experiments with shaping lighting schematics within architectural spaces themselves. The connections between the mobility initiated by the materiality of polyester resin and a perceptual environment is noteworthy, in that Eversley claims his works are kinetic—that is, they encourage viewer mobile spectatorship without relying on moving parts and gears.

Eversley’s oeuvre, in contrast to the pluralism associated with post-studio practices and immersive installations, has remained unfailingly sculptural. Beginning with his earliest experiments with polyester resin in 1967, he has developed a mastery of

²⁷ Butterfield, 14. Curiously, Butterfield excludes Eversley’s oeuvre entirely from this important first narrative of so-called Light and Space art.

²⁸ “Ganzfeld” is a portmanteau word that blends the German word “ganz,” which translates to whole or entire, and the English word “field.” The Ganzfeld is a psychology tool that controls sensory input, particularly the visual sense, in concurrence with particular psychological experiments. See Chapter 4 for further explanation of the Ganzfeld’s functions.

polyester and become a true innovator in his particular method of casting. Though he is best categorized as a sculptor of museum-scale objects, Eversley's career notably expanded to include a number of large-scale public art commissions in the United States and in Europe during the 1980s.²⁹ With professional goals set on pursuing engineering and possibly medical school, however, art could not have been further from Eversley's mind in the early 1960s.

An Engineer Turns to Art

In 1963, Fred Eversley moved to California from the East Coast, just a few months before the assassination of President John F. Kennedy in Dallas. At 21-years-old, Eversley was a freshly minted electrical engineer from Carnegie Mellon University who, with the assistance of the recently passed Equal Pay Act of 1963 and a fraternity connection, became the first black engineer at Wyle Laboratories in El Segundo.³⁰ Founded in 1949, Wyle Labs provides specialized engineering, scientific, and technical expertise to NASA, the Department of Defense, and commercial aerospace firms.³¹ Eversley recalls the two Big Science initiatives whose effects he felt intensely as he began work at Wyle: President Kennedy's declaration to be on the moon by the end of the decade and President Johnson's acceleration of the war in Vietnam. At the time, Eversley thought he was deferring medical school back East for six months; as it turns

²⁹ His success as a public art sculptor would yield impressive commissions for large-scale public art using materials more suitable for longevity in the outdoor elements.

³⁰ Fred Eversley (2011), Oral history interview by Naima Keith, 18 November, audio recording and transcript for Hammer Museum Oral History Project (Los Angeles: Getty Research Institute).

³¹ Wyle Laboratories, "About Wyle," on company website at URL: <http://www.wyle.com/AboutWyle/Pages/default.aspx> (accessed 5 September 2013).

out, he has maintained his California residency since that initial move.³² His involvement in the Venice art scene and eventual retirement from engineering was rooted in chance and, in part, the result of racial discrimination.

As Eversley explains, when he began work at Wyle Labs, he was determined to live by the beach because “I think the only place to live in Los Angeles is on the beach. I mean, the rest of Los Angeles I don’t have much use for. Never have and never will.”³³ His future roommate, Paul Strauss, was a friend from Pittsburgh who had landed a job at Hughes Aircraft Company (a large aerospace and defense contractor begun by Howard Hughes in 1932). After work each day, Eversley and Strauss split up to try to find a beachfront apartment in Manhattan Beach, their preferred location. After about one week of unsuccessful searching, a friendly technician at Wyle pulled Eversley aside and explained that Eversley’s race was the limiting factor, stating transparently, “Hey man, there’s no black people in Manhattan Beach. They won’t rent to you.”³⁴ Eversley and Strauss compromised by quickly settling in Inglewood and, eventually, moving to the multiracial, more bohemian (and consequently more open) Venice Beach community a few months later.³⁵ Once they settled in Venice, Eversley enjoyed an easy twelve-minute commute south along the coast to his work site in El Segundo.³⁶

Much more than a quick commute, however, living in Venice became providential for Eversley. Though he worked twelve-hour days and frequently traveled

³² Fred Eversley, interview with the author, Los Angeles (17 January 2013).

³³ Fred Eversley (2011), Oral history interview by Naima Keith.

³⁴ Ibid.

³⁵ Ibid.

³⁶ Fred Eversley (2013), interview with the author, Los Angeles.

both domestically and internationally for engineering consulting gigs, he lived by the dictum “work hard, play hard.” Consequently, he became immersed in the social circles of Venice.³⁷ He recalls that when he moved into Venice, the community of young artists (such as Larry Bell, Billy Al Bengston, Judy Chicago, and De Wain Valentine) was already established, and the scene comprised an intertwined milieu of artists, dealers, and a handful of collectors.³⁸ As many participants recollect from the early 1960s in Venice, the social aspects (in particular the parties) substantially drove the scene. In the words of Irving Blum, “There wasn’t much of a public, there really wasn’t.”³⁹ Artist Peter Alexander recently joked, “Not being in New York was a disadvantage from the point of view of commerce but an advantage in terms of having a good time.”⁴⁰ The art openings on La Cienega Boulevard in Venice as well as the parties after major openings at the Pasadena Museum of Art provided a shaping force for the scene. Although dealers such as Irving Blum at the Ferus Gallery were primarily concerned with selling art and advancing the careers of the artists they represented, the defining feature of the growing art community in Los Angeles hinged on parties and gatherings rather than high-brow intellectualism. Eversley remembers that some of the biggest parties included those at the homes of Thomas and Melinda Terbell (art historian Melinda’s first marriage before marrying psychologist Ed Wortz), Jim and Eugenia Butler, Stanley and Elyse Grinstein, and Barbara T. Smith.⁴¹

³⁷ Ibid.

³⁸ Fred Eversley (2011), Oral history interview by Naima Keith.

³⁹ Irving Blum (1977), Oral history interview by Paul Cummings.

⁴⁰ Peter Alexander (2010), *Modern Art in LA, The Industrialized Gesture: A Conversation with Peter Alexander, Helen Pashgian, and De Wain Valentine*.

⁴¹ Fred Eversley (2013), interview with the author, Los Angeles.

From 1963 until 1967, Eversley continued to delay graduate school, enjoying his new career as an engineer in California. While not on the West Coast, he recalls, “I was on a plane a lot.”⁴² Wyle sent Eversley to Washington, Paris, and a host of other international capitals consulting on industrial projects for their governments or commercial enterprise. Most of his work entailed US projects related to the Cold War and the Space Race. Eversley’s first assignment involved the investigation of corrosion on splice cases for intercontinental ballistic missiles. The majority of his work at Wyle entailed testing acoustical technological applications for NASA. Eversley states, “it was a unique period of time” characterized by an incredible amount of technical growth in the United States.⁴³ Outside of his demanding work hours at Wyle, Eversley found that socialization in his local beach community offered him a suitable work-life balance.

Through these forged connections in Venice—and because of his engineering and technical background—artist Charles Mattox invited Eversley to join the Aesthetic Research Center sometime in 1965 or 1966.⁴⁴ Mattox, an artist who had studied under Arshile Gorky and worked in the WPA during the 1930s, came to Los Angeles initially to build sets and design animation equipment for Hollywood. After the conclusion of World War II, Mattox settled in the Bay Area to teach at the University of California, Berkeley.

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Ibid. He is only able to approximate the date of 1965, and scant primary source evidence exists on the group’s history. Eversley does maintain that ARC was modeled after such organizations as EAT, so it is quite likely that ARC was formed sometime in 1966 in parallel with *9 Evenings*.

He returned to Los Angeles and became involved in the emerging Venice art scene during the 1960s as an artist of kinetic sculptures.⁴⁵

Initially, Mattox invited Eversley to serve as the primary consulting technologist in his Aesthetic Research Center (ARC) in the mid-1960s. According to Eversley, artists significantly outnumbered the engineers in the ARC; by organizing the group, Mattox envisioned that the collective could match artists with necessary resources for producing technologically advanced artworks.⁴⁶ The ARC, Eversley recalls, was generally modeled after similar experiments with art/science collaborations that were occurring simultaneously on the East Coast.⁴⁷ The most successful and notable of formalized industrial pairings between engineers and artists, of course, is Experiments in Art and Technology (EAT). Co-founded in 1966 in New York by engineers Billy Klüver and Fred Waldhauer with artists Robert Rauschenberg and Robert Whitman, EAT stemmed from earlier events that orchestrated art/technology pairings (with the final and most recognizable event being *9 Evenings* in the autumn of 1966).⁴⁸ In parallel, LACMA's "Art & Technology" was first brainstormed in 1966, followed by the founding of György Kepes's Center For Advanced Visual Studies at the Massachusetts Institute of Technology in 1967. Notably, NASA launched a lesser-known precursor to these

⁴⁵ Stephen Schwartz, "Obituary: Charles Mattox," *San Francisco Chronicle* (San Francisco, 24 April 1996). Eversley also confirms kinetic sculpture was Mattox's primary aesthetic.

⁴⁶ Fred Eversley (2011), Oral history interview by Naima Keith.

⁴⁷ Fred Eversley (2013), interview with the author, Los Angeles.

⁴⁸ Anne Collins Goodyear provides an excellent overview of these four key programs that peaked during the 1960s, including a chronicle of the establishment of EAT in 1966 and the organization's activities into the 1970s, in addition to other direct art-science collaborative efforts during these decades. See in particular her chapter on EAT: 'Chapter 4: Billy Klüver and the Foundation of Experiments in Art and Technology' in "The Relationship of Art to Science and Technology in the United States, 1957-1971: Five Case Studies," (PhD diss., University of Texas, Austin, 2002).

collaborative programs in 1962. The “Artist Cooperation Program”—an initiative that involved contemporary artists illustrating and representing NASA missions and projects—sought to bring artists into the scientific realm for the purpose of enhancing the Agency public relations efforts.⁴⁹

The Aesthetic Research Center, according to Eversley and others involved, was both independent of and inspired by EAT, crudely organized, and consequently short-lived.⁵⁰ Very limited information on the ARC’s purpose exists in the critical literature; with the exception of oral history interviews, almost no primary sources provide context for the ARC beyond mentioning its purpose. Two 1968 *Los Angeles Times* articles provide the most details on the group, though some of the facts presented are conflicting. The first—a March 1968 article by art critic Henry Seldis—provides a review of a group show of ARC artists, claiming that membership included about twenty artists who came together “last year” (1967).⁵¹ Seldis’s assertion of 1967 as an inception date for the ARC conflicts with Eversley’s claims that the ARC commenced ca. 1965-1966. Seldis chooses to highlight a handful of the twenty artists (Jesse Jacobs, Judy Gerowitz (Chicago), Lloyd Hamrol, Oliver Andres, De Wain Valentine, and Charles Mattox). Eversley’s name is not included, though Seldis omits several of the remaining twenty artists. Slightly more descriptive in its explanation of the ARC’s function is an April 1968 article “Experiment

⁴⁹ Ibid.

⁵⁰ Eversley was paired with artist Judy Gerowitz (now known as Judy Chicago). He states they never accomplished anything beyond meetings. Eversley also maintains that he never consulted with EAT, but he was aware of the organization’s premise and knew Klüver and Rauschenberg personally. Fred Eversley (2013), interview with the author, Los Angeles.

⁵¹ Henry J. Seldis, “Technology for Art’s Sake,” *Los Angeles Times* (10 March 1968): n16.

in Art,” which notes the ARC is “a group of about 40 leading sculptors.”⁵² Most telling, Charles Mattox’s 1996 obituary entirely omits mention of the center’s short existence.⁵³

Eversley maintains he was one of the few technologists involved in the ARC and, though they had semi-regular meetings, the group gradually fizzled out and meetings waned. When asked why he thought the organization disbanded, he reflected: “LA’s LA. I mean half the time people didn’t show up, you know, from the distances involved. It’s just a different vibe than New York.”⁵⁴ According to Eversley, LACMA curator Maurice Tuchman became interested in the collaborative model that ARC participants were practicing, and subsequently hatched the much more intensely structured Art and Technology program in 1966.⁵⁵ From this perspective ARC served more as a point of departure for the highly organized and well-funded Art and Technology program. Both Eversley and Mattox would eventually participate in Tuchman’s art/technology pairings (whose formal dates of artist participation range from 1967-1971).⁵⁶

⁵² “Experiment in art,” *Los Angeles Times* (25 April 1968): h9.

⁵³ Stephen Schwartz, “Obituary: Charles Mattox.”

⁵⁴ Fred Eversley (2011), Oral history interview by Naima Keith.

⁵⁵ In the catalogue for his most ambitious project at the Los Angeles County Museum of Art, curator Maurice Tuchman claims Art and Technology was first conceived in 1966.

⁵⁶ In a 2010 panel discussion at the Getty Institute, researcher Rani Singh states (with regard to Tuchman’s program, “The irony is none of you were included, but you’re doing it anyway.” See Rani Singh, et al., *The Industrialized Gesture: A Conversation with Peter Alexander, Helen Pashgian, and DeWain Valentine*.

⁵⁶ In 2011, Hunter Drohojowska-Philp argued, “A number of artists were interested in moving out of the confines of their studios and into the industrial environment. Chicago, Hamrol, Oliver Andrews, Eric Orr, DeWain [*sic*] Valentine, and others formed a cooperative called Aesthetic Research Center in 1966. All wanted to be involved in new technological discoveries.” In her footnote, she adds, seemingly inaccurately: “but none went on to be in Tuchman’s and LACMA art and technology.” Mattox is documented in the *Los Angeles Times* as participating, and Eversley maintains he participated as a technologist. See Drohojowska-Philp, *Rebels In Paradise*, 154.

In 1967, Eversley suffered serious injuries in an automobile accident, which left him on crutches for thirteen months due to a broken femur and hip joint.⁵⁷ Thoughtful introspection during this time urged his retirement from engineering and decision to become an artist. Eversley's connections through ARC and friendship with Mattox led to the senior artist inviting Eversley to share his studio for free in exchange for Eversley consulting as an engineer for the construction of Mattox's kinetic works.⁵⁸ Initially, Eversley envisioned himself pursuing photography—a medium that suited his current reliance on crutches. (He also had experience with photography, as he maintained a darkroom in his parents' home while growing up in Brooklyn). Eversley set up a darkroom in his apartment in Venice. An early tinkerer, he was the son of an engineer who modeled a sort of experimenter-hobbyist behavior to his son from an early age. Eversley grew up observing his father, Frederick W. Eversley, engage in this sort of experimental work, and when he was of age, the young artist claims he was given his own shop space to begin experimenting with a variety of materials. He recalls, "My parents had a large home, and I used to have an engineering shop and photography studio. I invented all kinds of things and used to tinker, make things. [I] didn't call it art—[but] had a lot of familiarity with materials and tools. I knew a lot about exotic materials."⁵⁹ The autodidactic qualities that Eversley had observed in his father were reborn as the budding artist began to establish his first studio in Venice alongside Mattox.

⁵⁷ Frederick Eversley (1976), *Frederick Eversley: [Catalog of the Exhibition]* Santa Barbara Museum of Art.

⁵⁸ Fred Eversley (2013), interview with the author, Los Angeles. Eversley shared studio space with Mattox for approximately 1.5 years.

⁵⁹ Fred Eversley (2011), Oral history interview by Naima Keith.

Perhaps due to his initial involvement with ARC, and his studio-mate's ongoing investigations into mechanical technologies for kinetic sculptures, Eversley's photographic work took a more pronounced technical turn. He began experimenting with embedding his photographs in plastics as well as incorporating lighting schematics.⁶⁰ He pursued intersections of photography and plastic for about six months, attempting to "encapsulate [his photographs] in plastic, cubes of plastic, and use those cubes to create three-dimensional sculptures."⁶¹ Along with other Los Angeles artists, Mattox had been experimenting with polyester resin since its availability on the market in the postwar years. "There were two outlets right in Ocean Park and Santa Monica that sold all the materials," Eversley recounts.⁶² Eventually, Eversley would go straight to the manufacturer for his materials.⁶³

Visits from friend and fellow artist John Altoon encouraged Eversley to leave out the photographs altogether. A rich culture of camaraderie existed amongst the artists who had studios in Venice, especially during the scene's formative years. Often artists would drop by for visits in order to offer helpful critique, or to lend a hand moving equipment or art. Altoon, according to Eversley, came to the Mattox-Eversley studio often to ask for help (particularly when Altoon's wife, Babs, was at work).⁶⁴ Eversley recounts: "John would always come upstairs to see what I was doing. He wasn't interested at all in what I

⁶⁰ Paul Richard, "The Space Museum's Latest Craft: It's Art, by Sculptor Frederick Eversley, an artist for the Spacefolks," *The Washington Post*, Washington, DC (8 Dec 1977): E1.

⁶¹ Fred Eversley (2011), Oral history interview by Naima Keith.

⁶² Ibid.

⁶³ Fred Eversley (2013), interview with the author, Los Angeles.

⁶⁴ After Altoon's untimely death in 1969 (at age 44 of cardiac arrest), Roberta "Babs" Thompson bequeathed the studio to Eversley. Eversley has maintained the space—a disused Laundromat renovated by Frank Gehry for Altoon—since 1969.

was [making]; he was interested in my experiments. It used to really annoy me.”⁶⁵

Eventually, Eversley realized that perhaps he should push the experimentation with polyester resin and leave the photography behind.

With this breakthrough in 1967, Eversley began casting his brightly colored abstractions from polyester resin. This path directly led to his originating a process for casting plastic. From his involvement in the ARC as a technologist, he was very much aware that others were using polyester resin, but what set his work apart from other artists working in plastics is that they poured their resin into static molds. In contrast, Eversley has produced the majority of his cast polyester pieces by spinning the liquid plastic centrifugally until it hardens. He maintains, “To the very best of my knowledge, I’m the only artist who creates shapes in such a manner.”⁶⁶ He started out small—experimenting with the material and polishing it into works that could be held in your hand. (For a scale example see fig. 3.5, which shows Eversley holding an unpolished polyester experiment from ca. 1968.) From an economic standpoint Eversley had the freedom to experiment in this manner for about a year and a half. He had a fair amount of money saved from his career at Wyle, and had amassed, in his words, “a tidy sum of money in the stock market.”⁶⁷ During the final years of the 1960s, Eversley’s injuries healed while he transitioned from an engineer who provided technological advice to Venice artists, to an artist who drew on his own high-tech experience and knowledge in order to produce his plastic sculptures.

⁶⁵ Fred Eversley (2011), Oral history interview by Naima Keith.

⁶⁶ Ibid.

⁶⁷ Frederick Eversley (1976), *Frederick Eversley: [Catalog of the Exhibition] Santa Barbara Museum of Art*. Eversley adds that he was “wiped out” in the stock market in 1969.

Polyester Resin – History, Definition, and Artistic Appropriation

As noted above, polyester resin played a major role in American postwar industrial applications and a range of exclusive organic polymers were made commercially available at the culmination of World War II. Artists responded to this availability by experimenting with the potential aesthetic applications of these high-tech plastics. However, plastics in general are much, much older. The term itself dates as far back as ancient Greece as the word *plastikos*— π λ α σ τ ι κ ο ς—connotes both a malleable substance as well as the capacity to be shaped or molded.⁶⁸ Modern plastics became available during the mid-nineteenth century, as manufacturers sought less expensive resources that could be fashioned to imitate luxury materials, such as ivory or tortoise shell. Alexander Parkes exhibited items made of cellulose nitrate, generally considered to be the first man-made plastic, at the International Exhibition of 1862 in London. Unfortunately, English industrialists did not see the commercial value of plastics, and consequently, Americans soon became the pioneers in the emergent industry.⁶⁹

An American mechanic named John Wesley Hyatt introduced celluloid, a compound of cellulose nitrate and camphor, in 1869, which became a widely used substitute for the ivory poached for billiards production. In 1907, industrial chemist Leo H. Baekeland invented Bakelite, the result of using heat and pressure as catalysts to

⁶⁸ Meikle, 4.

⁶⁹ Brian Parkyn, "Glass Fibre Reinforced Plastics," *Journal of the Royal Society of Arts*, 111, no. 5079 (Feb. 1963): 205.

combine phenol (a waste product of coal manufacturing) and formaldehyde.⁷⁰ Bakelite represents the first truly synthetic plastic made in a lab and its development initiated something of a paradigm shift. Rather than trying to make materials that purely imitated nature (as in substituting for the look of tortoise shell), Bakelite revealed the open-ended potential for plastics to improve human lives as never before.⁷¹

The plastics industry arose with the advent of Bakelite and was crystalized with the inception of its trade journal: first titled *Plastics* (1925), subsequently retitled *Plastics & Molded Products* (1927), and eventually setting upon the longstanding *Modern Plastics* (1934-2004).⁷² *Modern Plastics* touted in its first issue that it was a different sort of industrial magazine directed at outside audiences, aimed at documenting “at large the growth of the plastics industry.”⁷³ Leading up to World War II, the term plastic began to enter the general nomenclature, developing into a cultural phenomenon that, in the postwar period, became as idiomatic as the variety of chemical compounds comprising the plastics industry. As Robert Milby contends, “If the plastics industry and the many applications of its products could be described in one word, that word would be *adaptable*.”⁷⁴

During the first half of the twentieth century, the public viewed plastics in ambivalent terms. On the one hand, the plastics industry tried to separate itself from the connotation of being nothing more than a substitute for rare materials. As early as 1927,

⁷⁰ Susan Freinkel, *Plastic: A Toxic Love Story* (Boston: Houghton Mifflin Harcourt, 2011), 15-23.

⁷¹ Meikle, 5. Also Freinkel, 23.

⁷² *Ibid.*, 99-100.

⁷³ DEA Charlton and Charles A. Breskin, “*Modern Plastics* Statement of Policy,” *Modern Plastics* (Sept 1943), 22.

⁷⁴ Robert V. Milby, *Plastics Technology* (New York: McGraw-Hill, 1973), 7.

publicists were declaring a “Plastic Age” ripe with “miracle materials” that could make luxury goods much more accessible to consumers as well as life’s tools more hygienic, safe, and durable.⁷⁵ On the other hand, consumers had a healthy amount of skepticism regarding plastic goods. Objects made using unstable polymers or simply cast with shoddy attention to proper chemistry had resulted in terrible consumer experiences with the substance. In Susan Freinkel’s words, “plastic plates that melted in hot water, plastic toys that cracked on Christmas morning, [and] plastic raincoats that grew clammy and fell apart in the rain” prompted wariness.⁷⁶ Such outcomes rendered the unfortunate associations of shoddiness, cheapness, and imitation with the plastics industry. Consequently, “cheap” and “plastic” have remained irrevocably synonymous in American culture. According to some artists who employed cast plastic as their primary medium, this stigma caused certain dealers to receive their art with indifference or even disparagement.⁷⁷ Despite these negative associations, artists remained committed to exploiting the material applications of plastics.

Just prior to World War II, thermoplastics became available. Thermoplastics, by definition, contain a polymer structure that becomes pliable and returns to a solid state at specific temperatures. World War II drove the industry’s growth further, often in “top secret” fashion. Chemists employed esoteric materials and catalysts to achieve

⁷⁵ Meikle, 69-70.

⁷⁶ Freinkel, 33. *Modern Plastics* published an article attempting to alleviate concerns over “the button controversy”—i.e., consumer garments ruined over accidental attempts to dry-clean articles of clothing with polystyrene buttons. See “Buttons are Big Business,” in *Modern Plastics*, 25, no. 8 (April 1948): 91-97.

⁷⁷ For example, De Wain Valentine emphasizes this point in a recent panel discussion. See De Wain Valentine, panel discussion at The Getty Center, *Modern Art in LA, The Industrialized Gesture: A Conversation with Peter Alexander, Helen Pashgian, and De Wain Valentine*.

increasingly more sophisticated, durable materials to fill a range of defense needs—from the most mundane item in a GI’s hygiene kit to gasket fittings for the atomic bombs that decimated Hiroshima and Nagasaki. Such ubiquitous plastics as polyethylene, nylon, acrylic, and Styrofoam were first introduced during the war.⁷⁸ Growth did not hinge solely on wartime requirements, however. The narrative is much more complex because the pressures of overabundance in supply of raw materials drove enterprise to find new uses of both petrochemicals and their byproducts. Thus, military science eagerly found uses for the discovered polymers as chemists grew to understand polymerization of long-chained molecules, yet “the rise of large vertically integrated chemical companies whose influence spanned many industries” equally propelled the developments in chemistry.⁷⁹

Consumers reveled in these modern materials at their inception, which led to frenzied disturbances in shopping centers across America. In one notable example, DuPont’s “artificial silk” nylon stockings spurred fights and brawls between frustrated shoppers when supply failed to meet demand at the end of World War II.⁸⁰ The “Plastic Age” had donned by 1945, bringing materials with functionality that seemed to defy nature: “surfaces to which nothing would stick (Teflon), fabrics that could stop a bullet (Kevlar).”⁸¹ At the war’s conclusion, the demand that had been created for such novel materials found their way into the postwar American marketplace as viable substitutes for materials that had become scarce during wartime.

⁷⁸ Meikle, 1-2 and 82-83. Also, Freinkel, 6.

⁷⁹ Meikle, 82.

⁸⁰ Freinkel, 24.

⁸¹ Ibid.

By 1945, the petrochemical industry was trying desperately to demonstrate to the American public that it could and would provide the most modern of conveniences—for the home and beyond. Postwar consumerism drove rapid economic growth and social mobility, fueled by plastics and their ability to provide near limitless options for the manufacture of consumer goods.⁸² By the 1950s, plastics had infiltrated the postwar home and, as such, artistic representations of consumer products quickly became subject matter in works by the Independent Group in the mid-1950s and by American Pop artists in the late 1950s.⁸³ Direct artistic experimentation with these novel materials soon followed their inclusion as Pop subject matter. Postwar industry made a variety of plastics accessible and artists quickly engineered ways to exploit plastics in the studio. By the 1960s, artists were incorporating plastics into their artworks (either as the principle medium or as a component in a work).

In Southern California in particular, artists experimented with a variety of plastics, including thermoplastics (e.g., acrylics) and thermoset plastics (e.g., fiberglass). One of the most pervasively appropriated of the thermoset plastics was polyester resin. With its jewel-like qualities of transparency and potential to adopt myriad color additives, its attractiveness and sense of opulence, and its streamlined “aerospace-inspired” appearance, polyester resin became something of an exemplar of the LA Look. Its niche materiality and its relative availability encouraged its widespread popularity. Plagens

⁸² *Ibid.*, 7.

⁸³ The Independent Group (IG) is best described as a research collective of British painters, sculptors, architects, writers, and critics who met at the ICA, London from 1952-1955. The IG went through three phases, first centered on display and design, then science and technology, and finally art and popular culture. The IG is widely understood to be the precursor to the Pop art movement. See Hal Foster, “1956” in Foster, et al., *Art Since 1900: Modernism, Antimodernism, Postmodernism*, ed. 2 (New York: Thames & Hudson, 2011, 2004), 423-428.

emphasized that by the late 1960s, “the chemical smell of resin and a frozen drop at the nozzle of a 55-gallon drum were as familiar Beaux-Arts studio décor as splattered floors and turpentine.”⁸⁴

Plagens’s comment seems to exaggerate the popularity of polyester resin, but scores of artists truly did experiment with its potential during the 1960s. Often overlooked for his resin experimentation during the late 1960s and early 1970s, for example, Terry O’Shea (1941-2002) created a number of distinctive lozenge- and sphere-shaped sculptures (fig. 3.6).⁸⁵ A more obscure example, perhaps, is internationally recognized filmmaker Pat O’Neill (b. 1939), who experimented with laminating works with polyester, exhibiting as a visual artist from around 1964 through 1970.⁸⁶ Robert Bassler (b. 1935) also experimented with polyester resin during the late 1960s and 1970s, but pursued other art forms (and completely abandoned it after 1974). And known for his brightly colored monolithic planks, John McCracken (1934-2011) switched from initially spraying up to thirty coats of automotive lacquer onto his plywood sculptures to a more enhanced technique of pouring layers of tinted polyester resin onto his wooden planks.⁸⁷ In comparison, a focused number of artists—including Eversley, Peter Alexander (b.

⁸⁴ Plagens, *Sunshine Muse*, 120.

⁸⁵ Eversley highlighted O’Shea’s work during an interview with the author. Fred Eversley (2013), interview with the author, Los Angeles. See also David Pagel, “Review: ‘Serious Candy’ captures Terry O’Shea’s elusive nature,” in *Los Angeles Times* (2 August 2013), URL: <http://articles.latimes.com/2013/aug/02/entertainment/la-et-cm-art-review-terry-oshea-serious-candy-craig-krull-20130729>.

⁸⁶ In 1970, O’Neill abandoned studio practice to pursue a successful career in filmmaking. He is especially known for his innovation in special effects and his influential teaching at CalArts, whereby many of his students went on to work on the special effects in the original *Star Wars*. See Julie Lazar, Pat O’Neill, and Paul Arthur, *Pat O’Neill: Views from Lookout Mountain* (Santa Monica, CA: Santa Monica Museum of Art, 2004).

⁸⁷ Ken D. Allan, Lucy Bradnock, and Lisa Turvey, “For People Who Know the Difference: Defining the Pop Art Sixties,” in *Pacific Standard Time: Los Angeles Art 1945-1980*, 164.

1939), Helen Pashgian (b. 1934), and De Wain Valentine (b. 1936)—came to employ polyester resin as their primary medium from ca. 1966 through the mid-1970s. I detail the processes of these three artists below in order to provide a counterpoint to Eversley’s centrifugal innovation. (Eversley, notably, worked with polyester resin exclusively from 1967 to 1977 and continued to work with polyester, as well as acrylic, bronze, and other materials, from 1977 to the present.)⁸⁸

In an abstract of a paper (1948) delivered at the Society of the Plastics Industry, E.L. Kropa explains, “All known resins fall into four general classes: thermoplastic condensation materials, thermoplastic polymerization types of resins, thermosetting condensation resins, and thermosetting polymerization resins. Polyester resin fits into the fourth, hitherto neglected, class.”⁸⁹ Polyester resin is one of many thermoset plastics: compounds formed by a specific catalyst that, once added, initiates a chemical reaction that forms polymer chains and emits heat as a byproduct of the reactive event.⁹⁰

Thermoset plastics are not to be confused with thermoplastics—polymers that include polystyrene and nylon—which have loose polymer chains, are quite mutable with temperature changes and, as such, can be melted and recycled readily. For Eversley and other artists, the thermoset quality of polyester resin makes it desirable for its longevity, if handled properly. If mishandled, the material chips and scratches easily and is subject to damage from exposure to ultraviolet light. Small chips and scratches can be sanded

⁸⁸ Peter Alexander cast polyester resin from 1965-1972 and 2009-2012; Helen Pashgian seems to have experimented with polyester resin strictly from 1968 to 1969; De Wain Valentine used polyester resin as his primary medium from ca. 1966 to 1978.

⁸⁹ E.L. Kropa, “Polyester Resins,” abstract published in conjunction with “West Coast Conference S.P.I.” in *Modern Plastics*, 25, no. 9 (May 1948), 182.

⁹⁰ Milby, 16.

and polished out, which essentially involves wearing the material down to remove inclusions and restore the surface to its shiny brilliance.

Polyester resin first appeared with breakthroughs in chemistry during the nineteenth and early twentieth centuries that used volatile catalytic events to produce novel, heavy-duty coating agents. A Swiss chemist, Jons Jacob Berzelius, made the first polyester resin in 1847 (polyglyceryl tartrate), followed by Daniel Vorländer, a German chemist, producing the first unsaturated polyester resin (glycol maleate) in 1894. Subsequently, British chemist Watson Smith reacted phthalic anhydride with glycerol to create polyglyceryl phthalate in 1901. In 1913, these discoveries prompted the development of alkyd resins for use in the paint industry. Alkyd-based enamel paints grew in popularity as a reliable means of surface coating during the 1920s, though their low durability eventually led to the preeminence of latex-based paints for exterior surfaces. Widespread commercial use of polyester—amongst other thermoset plastics—occurred in 1942 with the pervasive use of glass reinforced plastic (GRP) in the manufacture of aircraft.⁹¹

According to British chemical engineer Brian Parkyn, aircraft manufacturers prized GRP for production of radomes (the structure protecting radar equipment) in the nose of the aircraft. He explains: “The reason for this is self evident, because a radome had to be strong, low in weight, but most important of all it had to be transparent to radar. It could not therefore be made of metal, and the size and complexity of the molding

⁹¹ J.A. Brydson, *Plastics Materials*, fourth ed. (London: Butterworth Scientific, 1982), 626-639. Also, Brian Parkyn, “Fiber Reinforced Plastics,” in S.T.I. Mossman and P.J.T. Morris, eds., *The Development of Plastics* (Cambridge, UK: The Royal Society of Chemistry, 1994): 105-114.

precluded the use of any other polymeric material available at the time.”⁹² As noted above, the structural integrity and lightweight quality of GRP encouraged its incorporation in the manufacture of a number of products common in Southern California, including boats, surfboards, and swimming pools. The prevalence of polyester resin directly relates to these regional ties.

“Polyester” describes the polymer chain that occurs as the esters become linked into a system of polymer chains. An ester is an organic compound, derived by replacing one or more of the hydrogen atoms of an acid with an alkyl, aryl, or similar group.⁹³ Caltech Professor Julia Kornfield recently explained the chemistry behind working with unsaturated polyester resin. The term “unsaturated,” according to Kornfield, signifies that the esters have the potential to form molecular linkages.⁹⁴ In its unsaturated form, the resin is liquid and comprised of the ester molecules (each with the potential to link and chemically change into the desired solid). The introduction of a catalyst initiates a process of stealing one electron from an ester compound. This, in turn, sets off a chain reaction wherein every ester bumps into a neighboring ester, stealing an adjacent electron in an attempt to stabilize itself. Each electron “theft” propels the unstable molecule to seek out a re-stabilizing electron and, in the process, binds the esters together. The catalyzing process puts the compound into “an unstable, excited state” as polymer chains are initiated throughout the system during a thermic reaction of electron stealing and

⁹² Parkyn (1994), “Fiber Reinforced Plastics,” 107.

⁹³ “Ester, n.”, *OED Online* (September 2013) Oxford University Press.
<http://www.oed.com/view/Entry/64572?redirectedFrom=ester> (accessed October 31, 2013).

⁹⁴ See Julia Kornfield’s recorded explanation in Tom Learner, Rachel Rivenc, and Emma Richardson, *From Start to Finish: De Wain Valentine’s Gray Column* (Los Angeles: The Getty Conservation Institute, 2011), DVD.

molecular binding. Not only does the process cause the polymer chains to become longer, it also results in the chains linking up with each other, creating an extremely complex, cross-linked material.⁹⁵

This process is so-named “thermosetting,” because the polymerization event emits an enormous amount of energy-produced heat. The process requires that the user be aware of the environmental conditions (both temperature and humidity) as well as the volume of the form being cast, because the process is unforgiving of haphazard techniques. The amount of catalyst required depends strictly on precise measurements of such factors. An unbalanced ratio of catalyst to resin yields suboptimal curing (visible bubbles, inclusions, or worse-case: cracking). For example, too much catalyst relative to the environmental conditions accelerates the curing process and renders the material unable to be poured. Conversely, too little catalyst will result in a quasi-solid cast sculpture—tacky and unusable.

A further complication: the greater the volume of resin employed results in exponentially higher amounts of heat emitted, which in turn also accelerates the curing process. In order to avoid waste of materials and process time—particularly if an artist is attempting to cast a monumental sculpture—the conditions relative to resin volume and catalytic amount should be calculated ahead of time. Eversley recently explained the meticulous considerations required for a successful casting: “It’s a very tricky material, so you have to be just right on for a given mass, for a given shape, for a given air temperature, for a given humidity. And it’s a lot of trial and error that over the years you

⁹⁵ Milby, “Chapter 4: Polyester and Alkyd Resins,” in *Plastics Technology*, 59-75. Also, Brydson, 628-630.

sort of gain. To that clear liquid [unsaturated polyester resin] you can add color—either transparent color or opaque color.”⁹⁶ As a result, this painstaking process compelled artists to notate precise environmental conditions (akin to a scientific log) for reference in future production events.

Beyond assessing the relative environmental conditions before initiating the catalytic event, extreme precautions are also taken in protecting the body from the toxicity of polyester resin. In its unsaturated form, the resin is especially viscous and sticky. Users often protect their hands from direct contact because the removal of resin from the skin is arduous and can prove injurious. Absorption of small amounts of the resin through the epidermis could be potentially toxic to some individuals. Gloves are advisable, though not imperative. A critical concern is appropriate ventilation when manipulating the material in either physical state (liquid or solid). The fumes emitted by polyester resin are especially noxious, which requires proper environmental ventilation coupled with a respirator worn over the nose and mouth. Respirators are worn during every stage—from introducing the catalyst, to pouring the resin for casting, to the final stages of sanding and polishing (that is, when the abraded particulates could be detrimentally inhaled).

Even with the use of proper ventilation, some artists abandoned working with polyester strictly due to the recognizable toxic effects on their bodies. For example, Peter Alexander recently recounted that during his most intensive period using polyester resin during the late 1960s, he was consuming an immense amount of vodka every night. He

⁹⁶ Fred Eversley (2011), Oral history interview by Naima Keith.

began to realize the vodka effected a kind of corrective to the resin's underlying toxic effects. In 1971, he became fed up with the toxicity and ceased using polyester resin altogether; he maintains he also stopped consuming alcohol when he abandoned the material entirely.⁹⁷ In 1995, Alexander reflected that polyester resin not only began to have ill effects for him personally but was also mired in a type of aesthetic dead end:

Well, the resins were a product of the time. I was given permission to [produce these] by the context from which these came, to make objects that showed no touch. That's the most significant aspect of it. [. . .] I think the reason why I stopped doing them was because they became much too inhibited for me. I couldn't touch the material. I couldn't stand the smell anymore. The toxicity had an effect. The distance that they provided no longer satisfied.⁹⁸

While Alexander certainly grew weary with polyester resin, not all artists have viewed the material in such negative terms. Those who have continued to work with it have taken the proper precautions to prevent the sensitivity that Alexander experienced. Some artists have also strategically employed assistants to prevent burnout on using the material independently. In fact, Eversley has employed assistants for polishing and other logistical needs on occasion since ca. 1969.⁹⁹

Safety precautions aside, polyester resin was not developed to be used the way artists came to employ it. Their innovation with the material—both with its chemistry and

⁹⁷ Peter Alexander (1995), Oral history interview by Paul Karlstrom, 1995 December 13 – May 8, 1996, audio recording and transcript for Archives of American Art (Washington, DC: Archives of American Art). In the interview, Alexander stresses to Karlstrom that while he did drink alcohol regularly, he never had consumed vodka until his resin period. He also emphasized that he never consumed the amount of alcohol that he found himself drinking during his polyester resin period.

⁹⁸ Peter Alexander (1995), Oral history interview by Paul Karlstrom. It is worth noting that Alexander first trained as an architect (under Richard Neutra) before becoming a visual artist. His polyester resin sculptures, by his own admission, relate to his architectural foundations. He also stresses in the interview, “[The polyester resin sculptures] were distant in a relative term, they were engaging, but yet they were distant. The distance was a product of how much you want to reveal and at that time what I wanted to reveal, evidently, was what I revealed, which was distant. I mean they were all self-portraits. But I was very much influenced by my architectural training. I mean, that was inseparable because of the way one thinks.”

⁹⁹ Fred Eversley, phone conversation with the author (6 November 2013).

casting techniques—is especially intriguing. When polyester resin became widely available for commercial use in the postwar period, the first group to use it pervasively was surfers. Just following the war, the composition of polyester resin made it most functional as an epoxy or sealing agent as its composition made it suitable for pouring or coating in very thin layers. In the immediate postwar years, *Modern Plastics* suggested that polyester could potentially be used “as a casting resin, but producing these resins for casting seems harder than for laminates.”¹⁰⁰ Small (trinket-sized) casts could be made without danger of cracking; however, the chemistry required for significant volumes was technically challenging.

By 1965, Southern California artists began to acknowledge its potential for large-scale casting (providing that the environmental conditions were highly controlled). Eversley’s innovative casting technique is quite distinct from other Southern California artists working with polyester resin. Most artists devise their own approach to casting the resin in static molds by adapting the process to their respective vessels—either personally constructed or ordered from a manufacturer. Depending on the mold’s size, artists often prepare the container with a sealant that allows the sculpture to be easily removed. Once cured in the static mold, the artists who employ this technique (including Peter Alexander, Helen Pashgian, and De Wain Valentine) remove the resin object and proceed to finish its surface using increasingly finer sandpaper and polishing grits.

As noted above, Alexander’s first experiments with polyester resin grew out of his usage of the material for coating surfboards. His sculptures appear to involve straight

¹⁰⁰ Van Boskirk (1947), “The Plastiscope,” 198.

pours of the resin into geometric molds (typically a cube, wedge, or pyramid—see fig. 3.7, for example) or long tubes designed for exhibition that entailed propping them against the wall. He recently reflected that they were like “containers of silence” that related to the experience of “being underwater.”¹⁰¹ Pashgian has detailed the layering process of creating her iconic spheres (e.g., fig. 3.8), which resemble a mystic’s gazing ball in scale and shape. Pashgian necessarily built the spheres up from the inside out in three successive steps. First, she would begin by casting the initial sphere using transparent polyester resin in a mold that she fabricated and sealed herself (about the size of a head of lettuce). Once it fully cured, she would remove the sphere from the mold and sand the surface to as symmetrical of a spherical shape as possible. Next, Pashgian would use a cylindrical support to brace the sphere while pouring thin layers of colored polyester resin to coat the sphere. (Pashgian would often cover half of the sphere and let it cure, and then flip the sphere to coat the opposite hemisphere in a separately tinted resin.) Once the second coats cured, Pashgian again evenly sanded the sphere before initiating the final coat of clear polyester resin. To finish, Pashgian proceeded to sand and polish the exterior layer to brilliance after the third coat cured. In similar fashion to the historic technique of building up glazes in oil painting, these steps helped create a visual complexity by injecting layers of color within the sculpture’s interior.

Like Pashgian, Valentine also devised his unique take on casting polyester resin in static molds (however, Valentine’s ingenuity shined through in his development of the chemical processes required to cast monumental sculptures). As part of *Pacific Standard*

¹⁰¹ Peter Alexander, speaking about the resins in an audio clip on his website, URL: http://www.peteralexander.com/pa/?page_id=152&nggpage=2 (accessed 31 October 2013).

Time, the Getty Conservation Institute (GCI) chronicled Valentine's foray into scientific innovation. In the publication, *From Start to Finish*, the GCI details how Valentine's ambition and exceptional talents led to his work in developing the chemical formula necessary to cast contiguous, monumental resin sculptures, such as *Gray Column*, 1976-77 (fig. 3.9).¹⁰² At that time, polyester resin cured at a rate that would not allow large pours. Artists either fabricated the resin in accumulating steps or used small single-cast molds to accommodate the material's limitations. Valentine recalls, "Some artists were able to make larger pieces by slowly building up layers of polyester, but that never worked for me."¹⁰³

The limiting factors for casting a work like *Gray Column* or *Red Concave Circle* (fig. 3.10) using the 1960s standard formula were the exothermic reaction and the volume. Too large of a volume would result in the resin curing in the barrel from which the artist was pouring. By introducing a catalyst into a pour of that magnitude (on average Valentine used ten fluid barrels of unsaturated polyester resin), the reaction would produce so much heat and pressure against the walls of the mold that the material could shatter the mold or simply force itself out into the space. Such a risk of failure proved both cost-prohibitive as well as physically dangerous. To combat this dilemma, Valentine experimented to find the proper ratio between resin and catalyst—relative to temperature—and kept meticulous notes of his measurements. Working with people in the industry (namely a representative from Pittsburgh Plate Glass and the local outfit,

¹⁰² See Tom Learner, et al., *From Start to Finish: De Wain Valentine's Gray Column*. By using *Gray Column* as a case study, *From Start to Finish* foregrounds the importance of understanding the chemical and material science for the long-term conservation of works comprising industrial materials.

¹⁰³ *Ibid.*, 8.

Hastings Plastics), Valentine determined the proper formula to facilitate his monumental pours.¹⁰⁴ However, despite his scientific preparation, Valentine's large-scale pours remained dangerous. He explains:

Each one took about eighteen hours to pour. It took an hour to mix the pigment and catalyst into the resin inside each barrel, and then an hour to force the resin out of each barrel through a filter and into the mold. It was really challenging and dangerous to make these big pieces. I usually had them curing by the back door in the studio in Venice with a forklift positioned right behind them, read to push them out into the alley if they started to overheat and burn. With all the pressure pushing out on the sides of the mold, there were cracking and snapping sounds the whole time—like pine logs burning in a fireplace!¹⁰⁵

Valentine's ambition for scale is admirable; it also provides better context for why he has executed a fixed number of monumental pours during his career.¹⁰⁶

In contrast to the static-pour techniques employed by Alexander, Pashgian, and Valentine, Eversley improvised a novel technique that uses centrifugal force rather than solid molds to shape the curing polyester resin. By combining his technical background with an autodidactic approach to working with the material, Eversley fabricated polyester sculptures that are distinct in both their level of transparency and uniqueness in shape. Before arriving at the concept of centrifugal casting, he spent a few years experimenting with the material in static casts. During these initial years, Eversley learned from his investigations by keeping accurate notes and developing a sort of color theory for the

¹⁰⁴ In fact, Hastings Plastics (currently operating as Santa Monica Plastics) went on to market Valentine's formula as "Valentine MasKast Resin" in 1966 and printed a handbook titled *Spectacular De Wain Valentine Mass Casting Resin for the Modern Artist* in 1970. A copy of this short publication is in the collection of the Getty Research Institute.

¹⁰⁵ De Wain Valentine, quoted in Learner, et al., *From Start to Finish*, 9.

¹⁰⁶ Indeed, *Gray Column* is the most monumental polyester resin sculpture executed by Valentine. During the course of the *Pacific Standard Time* initiative, Valentine informed the GCI that he produced three eight-foot diameter discs, but had no idea where they were. Valentine had produced a significantly greater number of six-foot diameter discs. GCI director Tom Learner tracked *Red Concave Circle* down to a Bank of America collection, where it was on display in Wichita, Kansas.

material. Trials with color layering during this early period helped Eversley to understand which optical effects could be achieved.¹⁰⁷ His earliest experiments towards this end involved static casting of small, rectangular forms, such as *Untitled*, 1967 (fig. 3.11). Subsequent series included the casting of conical shapes that, after the curing period, Eversley shaped by using a bandsaw and sanding and polishing finishes (fig. 3.12). Depending on the amount of color additive used—as well as thickness, layering, and combination of colors—he achieved a wide range of optical results due to the ways in which light behaved when reflecting off of and refracting through the resin. These first few experimental years mark an evolution from Eversley learning about polyester resin to his command of the material. Eversley also made his first sale during this time to LA collector Diana Zlotnik, after she made a studio visit to see Mattox’s new work.¹⁰⁸

After two years of experimenting with polyester, Eversley arrived at the idea of using centrifugal force on the vertical axis to shape the plastic. The centrifuge first entered commercial application in 1864 when Antonin Prandtl of Munich revolutionized the dairy industry by developing a dairy centrifuge to separate cream from milk. According to medical logistician Robert Dondelinger, a centrifuge operates according to Isaac Newton’s First Law (or the Law of Inertia), which states that in the absence of a net force, a body at rest remains at rest or a body in motion maintains that motion at a constant speed in a straight line.¹⁰⁹ Also at play is the principle of sedimentation, which

¹⁰⁷ Fred Eversley, “Early Work: Rectangles,” from his website at URL: <http://fredeversley.com/artworks/early/rectangles#1> (accessed 30 October 2013).

¹⁰⁸ The sale led to Eversley’s inclusion in his second exhibition at Limited Editions Gallery on La Cienega Boulevard in Venice, California. Fred Eversley (2011), Oral history interview by Naima Keith.

¹⁰⁹ Robert M. Dondelinger, “Centrifuges: Take a Spin,” *Biomedical Instrumentation and Technology*, 44, no. 4 (1 July 2010): 309-312.

states that particles in a solution will separate when particular forces act upon them (i.e., gravity or centrifugal force). A centrifuge sets a given material in rotation around a fixed axis, thereby applying its force perpendicular to the axis of rotation. Many industries benefit from this technology, including nuclear, sugar refining, medical blood banking, and biomedical research. In fact, as Dondelinger points out, even “the common automatic washer uses this principle of physics to express water from clothes during the spin-dry portion of the operating cycle.”¹¹⁰ The US Military, NASA, and other private research entities conducted centripetal acceleration tests on human subjects using colossal centrifuges (fig. 3.13). Researchers staged experiments with these so-called human centrifuges designed to test “G-force” tolerances first for pilots and, eventually, in preparation for human space travel.¹¹¹

Regardless of industrial application, all centrifuges comprise three essential parts: the electric motor, the motor-drive electronics, and the rotor (that is, the chamber or component that rotates on the axis). Spinning rates have grown alongside technological innovation. For example, in 1927 the fastest centrifuge in the world touted 15,000 rpm (relatively slow compared to current standards).¹¹² Today these rates vary according to industrial application, ranging from low-speed (up to 10,000 rpm), to high-speed

¹¹⁰ Ibid., 309.

¹¹¹ Herbert O. Johansen, “Navy Doctor’s Ride World’s Fastest Merry-Go-Round,” *Popular Science*, 161, no. 1 (July 1952): 86-89.

¹¹² “Science Gains New Ground in Many Fields of Research,” *Popular Science*, 111, no. 4 (October 1927), 36. Also, “Jet Age Whirligig,” *Life*, 33, no. 1 (7 July 1952): 56-58.

(between 10,000 and 30,000 rpm), to ultracentrifuge (between 40,000 and 150,000 rpm).¹¹³ Eversley employs a low-speed centrifuge to produce his plastic parabolic discs.

By applying centrifugal force while casting polyester resin, Eversley developed a layering technique that involved pouring distinct tints of polyester in successive stages. He expanded upon this innovated technique to cast small forms comprising three discrete color combinations (such as violet, amber, blue—see fig. 3.14). Eversley initially used a potter's wheel (ca. 1969) borrowed from De Wain Valentine's wife, Darlene, to test the centrifugal process.¹¹⁴ Eversley attached a cylindrical reservoir to the modified potter's wheel in order to contain the liquid polyester resin during the thermoset process. As the wheel spins (on average at a rate of 40 rpm), Eversley would then pour the pre-tinted and catalyzed resin into the reservoir. The variable speeds of the potter's wheel also allowed him to experiment with the effects that different spinning rates had on curing times.

The centrifugal force shapes the polyester by pushing the material away from the turntable's vortex and thrusting it toward the walls of the reservoir. Eversley typically maintains the turntable's speed as the resin cures, yielding cast forms in curvilinear shapes that are thicker toward the edges. Eversley explains that removing the cured resin from the reservoir rarely presents a challenge because shrinkage naturally occurs as the material thermosets and emits heat.¹¹⁵ After removing the sculpture, he typically does what he calls a "post-cure" (i.e., he sets the sculpture out for a fixed duration of time in

¹¹³ All ultracentrifuges incorporate a refrigeration component to prevent material deterioration due to heat produced by air friction.

¹¹⁴ Fred Eversley (2013), phone conversation with the author.

¹¹⁵ He has occasionally used vacuum cups to remove casts that otherwise were too difficult to remove by hand when they did not shrink.

order to ensure it is fully cured).¹¹⁶ Finally, Eversley finishes each sculpture akin to other LA artists working with polyester resin by undertaking several stages of sanding and polishing. Like other polyester sculptors, Eversley devoted a significant amount of time to finishing a sculpture—as much or more time than that spent during casting alone.

This attention to sanding and polishing earned the group the undesirable (if somewhat accurate) label “Finish Fetish.” Pashgian recently explained in an oral history interview why she and others cringed at the term: “Finish Fetish is a vaguely pathological term. It sounds as though these artists are a little sick, which isn’t very flattering, and it has nothing to do with the art.”¹¹⁷ In a panel discussion at the Getty Institute one month later, Pashgian qualified her statement, admitting that the pristine quality of the sculptures was indeed a guiding force: “Because if there’s a scratch on the surface, that’s all you see. So, the point is to be able to interact with the piece, to see into it, see through it. That’s why we deal with the finish: to facilitate that engagement.”¹¹⁸

Part of the Finish Fetish label relates to the laborious polishing of the object for final exhibition, but it also speaks to the obsessive promotion of cleanliness while fabricating the material. Just as Larry Bell maintained sterile working conditions to prevent dust, hair, and other inclusions from ruining the vacuum-deposition on his glass plates, the plastics artists also promoted such immaculate studio conditions. Eversley points out that when casting he always wore white, which helped him readily see if dirt or

¹¹⁶ Fred Eversley (2013), phone conversation with the author.

¹¹⁷ Helen Pashgian, *Modern Art in Los Angeles: Oral history interview with Helen Pashgian* by Emma Richardson, Catherine Taft, and Rani Singh (8 April 2010), DVD and transcript.

¹¹⁸ Peter Alexander (2010), *Modern Art in LA, The Industrialized Gesture: A Conversation with Peter Alexander, Helen Pashgian, and De Wain Valentine*.

particulates were on his person. He also covered his head entirely and wore goggles to prevent shedding hairs from entering the resin. These precautions also offered protection from the material's toxicity, as discussed above.¹¹⁹

Similar to his peers, Eversley assumed many obsessive provisions in order to produce visually striking objects that were completely free of blemishes. However, despite the keen attention to surface finish in his sculptures, Eversley agrees with Pashgian that Finish Fetish is objectionable as a label. Citing Larry Bell and Robert Irwin as his main artistic influences, he desired to produce objects that underscored viewer perception to instigate a kinetic art without using moving parts.¹²⁰ In comparison to the distinct mobile spectatorship in the phenomenal experience of a Mary Corse microsphere painting, the required mobility of an Eversley lens aligns more closely with the act of circumambulating—and especially looking through—one of Bell's iconic cubes. Whereas the viewer necessarily walks back and forth in front of a work by Corse, an Eversley cast polyester parabola requires that the viewer position her/his body to gaze through the sculpture. Since an Eversley parabola functions in the same manner as a lens, the viewing placement for the intended optical effect is both static and precise. Depending on the installed height of the sculpture, the viewer may need to crouch or adjust the body in order to look directly through the transparent parabolic disc. And, like a Bell cube, the viewer may also desire to circumambulate an Eversley sculpture in order to assess such formal characteristics as scale, translucency, and surface quality.

¹¹⁹ Fred Eversley (2013), phone conversation with the author.

¹²⁰ His interest in non-mechanical kinetic art relates to the work of his first studio-mate, Mattox. Fred Eversley (2013), interview with the author, Los Angeles.

Mastering Polyester Resin and Innovating the Centrifugal Casting Technique

As outlined above, Eversley's earliest experiments with plastic involved static casting techniques that were in line with the poured casting methods utilized by Alexander, Pashgian, and Valentine. As in the historical challenges of sculpting with casts, the mold presents production limitations with regard to the approximation of the polyester's final form. In order to achieve the desired final form—which for these artists often entailed geometric symmetry and material brilliance—each artist manipulates the object extensively in the sanding and finishing stages. Beyond this historical challenge of casting, polyester specifically demands attention to its material and chemical idiosyncrasies. In its cured state polyester resin is quite brittle, requiring careful handling if one wants to preserve its flawless materiality. And with respect to its characteristic of being a thermoset plastic, its chemical volatility overshadows the process with one further stress-inducing variable—the possibility of destroying the mold while casting.

For example, as Valentine poured large amounts of polyester to cast his monumental works, the pressure of the thermosetting plastic had the potential to explode out of the cast. Thus, the calculations of environmental conditions in order to forestall potential explosions (particularly in Valentine's case) remained imperative for both safety and successful casting. In Valentine's words, "I had to do really precise measurements, like a prescription. I used a gram scale to weigh out the catalyst, recorded the temperature, and kept meticulous notes in my diary of everything—my bible! I'd then let

Ed [with Pittsburgh Plate Glass] know how it went [. . .]. Eventually we came up with a product that worked.”¹²¹

Valentine’s allusion to “coming up with a product” refers to his collaboration with Hastings Plastics and PPG to determine the proper ratio of resin to catalyst for casting monumentally. This innovation led to Valentine MasKast Resin: a suitable formula for his large-scale casts that came to bear his name through trademark.¹²² His trademarked resin—for which he received royalties—was marketed and sold by Hastings Plastics. Knowing Valentine designed it for the purpose of executing monumental pours, Eversley hypothesizes that Valentine and PPG included plasticizers as a necessary chemical ingredient in Valentine MasKast Resin. Plasticizers prevent the curing resin from cracking during the intensive thermoset process because they allow the resin to retain a pliability and tensile strength that otherwise would not be possible. At the molecular level, plasticizers “act as spacers between the polymer molecules” but also offer additional bonding structures which can alleviate the issue of brittleness.¹²³ However, the incorporation of any additive to polyester resin alters the final physical characteristics; two consequences of using plasticizers exist. Whereas plasticizers provide a material softness that averts cracking, they also have the potential to affect the resin’s transparency as well as its equilibrium.

¹²¹ De Wain Valentine quoted in Tom Learner, et al., *From Start to Finish*, 9.

¹²² Valentine does not provide specific details about the formula. Valentine’s trademark on a formula recalls French artist Yves Klein’s patenting of his signature blue color in 1960, which he named International Klein Blue (IKB).

¹²³ Brydson, 121-122.

Many additives exist for the production of polyester resin form, though a 1969 United Nations report on the plastics industry cites plasticizers and stabilizers as the most common.¹²⁴ Manufacturers add flame-retardant agents to building materials and anti-static agents to phonograph records for practical purposes. Both industry and artists include color additives to adjust the material for aesthetic reasons. With regard to transparency, plasticizers can potentially cloud the resin (depending on the combination and volume of plasticizer incorporated). Perhaps this explains why Martin Friedman referred to Valentine's polyester as "hazy hued resins" in a 1969 essay.¹²⁵ Take, for example, Valentine's 1968 large-scale cast *Slab* (fig. 3.15). Upon first glance, the lavender tint of the resin appears to be the additive contributing to the sculpture's lack of transparency. However, scrutiny of the edges and, in particular, the top of the work reveals that translucency rather than transparency occurs in the uncolored resin. Seeing how the light diffuses through these haloed areas of *Slab* demonstrates the physical qualities of polyester resin when employing a formula necessary for monumental casting.

In terms of the inertia of polyester resin (i.e., whether the catalyzed resin remains in the desired solid state), plasticizers can prevent the resin from fully curing. Valentine has admitted that his sculptures often develop what he terms a "grow-out"—areas where the solid surface of a finished sculpture exhibits bumps, ridges, or sometimes resembles the pattern of an orange peel.¹²⁶ Valentine explained recently that when he first realized

¹²⁴ Masashi Honda and Mitsuru Kakimi, *Studies in the Development of Plastics Industries* (New York: United Nations, 1969), 49-50.

¹²⁵ Martin Friedman, "14 Sculptors: The Industrial Edge," in Walker Art Center, *14 Sculptors, the Industrial Edge: Peter Alexander [and Others]*, May 29-June 21, 1969 (Minneapolis: 1969), 30.

¹²⁶ De Wain Valentine, quoted in Tom Learner, et al., *From Start to Finish*, 9.

this was happening to his work, he became upset. However, he came to recognize that Valentine MasKast Resin, due to its slower curing time, would necessarily require intermittent maintenance, including re-sanding and re-polishing a sculpture's surface in order to restore it to his artistic intention. Valentine suggests that this phenomenon is a quality of polyester resin in general—akin to how glass slowly flows and succumbs to gravity over many decades by curving toward the ground.¹²⁷ This point is well taken, as organic and industrial materials alike have specific degradation and decomposition rates that are relative to environmental conditions. The spontaneous appearance of surface abnormalities in Valentine's sculptures, in contrast to the absence of this phenomenon in Eversley's sculptures, may signal the consequence of necessarily including plasticizers in monumental casting.¹²⁸

My point here is not to cast a value judgment on the so-called “haziness” of some of Valentine's sculptures, nor do I find the manifestation of the so-called “grow-outs” to be especially problematic when assessing Valentine's oeuvre. In fact, there are several examples of Valentine's sculptures (dating to ca. 1968-1970) that do not appear to contain any resin cloudiness at all (see fig. 3.16, for example).¹²⁹ In terms of ambition and innovation in the chemistry required to achieve his artistic vision, the GCI has correctly highlighted Valentine's groundbreaking work during the 1960s. However, I contend that in parallel with Valentine's innovation in polyester resin formulae, Eversley also attained

¹²⁷ Ibid.

¹²⁸ Fred Eversley (2013), phone conversation with the author.

¹²⁹ Fig. 3.16 depicts examples of large-scale sculptures by Valentine that are fully transparent, exhibited recently in Athens, Georgia. The show, entitled *De Wain Valentine: Human Scale* (September 8, 2012 – January 27, 2013), was co-curated by Paul Manoguerra and Lynn Boland and mounted at the Georgia Museum of Art. The exhibition was not accompanied by a catalogue publication.

an expert level of understanding of polyester resin's chemical processes.¹³⁰ Eversley and Valentine, as well as several other Southern California artists detailed above (including Peter Alexander, Doug Edge, Helen Pashgian, and Terry O'Shea), embraced the idea of experimenting with and finding new techniques for casting polyester resin.

From this perspective, Hastings Plastics arguably operated as a collaborator (and perhaps even an initiator) of this "plastic sensibility" that emerged in the Los Angeles art scene. Norry Hastings—the owner of Hastings Plastics—enthusiastically sponsored exhibitions and became heavily involved in these artists' technical requirements for working with polyester resin. As noted above, Hastings published a manual/catalogue in conjunction with the commercial release of Valentine MasKast Resin.¹³¹ Hastings Plastics also sponsored "The Last Plastics Show" (1972), a group exhibition mounted at CalArts that included Eversley among the twenty-four artists and was co-curated by Judy Chicago, Doug Edge, and De Wain Valentine.¹³²

In light of the technical expertise required to cast successful polyester sculptures, artists' studios came to mirror experimental laboratories. As they grew more familiar with the chemical processes, the artists themselves paralleled chemical engineers. For the first few years of working with polyester resin (ca. 1967-1970), Eversley also procured

¹³⁰ Eversley has yet to be recognized extensively for his contributions in this regard.

¹³¹ See n. 102.

¹³² California Institute of the Arts, and Hastings Plastics Company, *The Last Plastics Show: [Exhibition] March 14-April 15, California Institute of the Arts, Valencia, California* (Valencia, CA): s.n., 1972. Presumably, "The Last Plastics Show" riffed on the 1971 motion picture, "The Last Picture Show" (nominated for eight Academy Awards), directed by Peter Bogdanovich, with Timothy Bottoms, Jeff Bridges, and Cybill Shepherd.

his plastic from Hastings.¹³³ Not only did Eversley quickly develop a deep understanding of the technical attributes of unsaturated polyester resin, but his innovation of the centrifugal casting technique enabled him to cast crystal-clear parabolic discs. He recalls, “I remembered way back in physics lab or something like that in high school that you could create parabolic surfaces by spinning liquids about a vertical axis. And I did some experiments with that, and indeed I could.”¹³⁴ This example, recently photographed in his studio (fig. 3.17), approximates the dimensions he first worked in (ca. 24 inches in diameter and 10 inches in depth). After his first experiments with the borrowed wheel, he began seeking out larger turntables in order to fabricate bigger centrifuges.

Over the years, Eversley has accumulated a variety of turntables and reservoirs for centrifugal casting (figs. 3.18 - 3.19). His decision to attempt a large-scale cast in the early 1970s led to a search for a solution to spinning large volumes. In 1971, he received a commission from the owners of Lenox Square Mall in Atlanta to do a three-color large-scale disc approximately eight feet in diameter (fig. 3.20). Not only did Eversley need to build or find a turntable that could accommodate a reservoir at that diameter, but he also realized he needed one that was heavy-duty enough to support substantial weights of plastic. He initially went to industrial auctions but decided to take a look at a scrapyard in Monrovia, California (a city in the San Gabriel Valley of Los Angeles County). He discovered two large, rust-covered turntable conveyors that appeared to be too deteriorated to salvage. While Eversley examined the machines, an elderly man who

¹³³ Eventually, however, Eversley began ordering directly from the manufacturer. Fred Eversley (2013), interview with the author, Los Angeles.

¹³⁴ Fred Eversley (2011), Oral history interview by Naima Keith.

worked at the scrapyards approached Eversley and they began to discuss the condition of the conveyors. The man explained that he had worked at the scrapyards for decades and knew these turntables well; he told the artist that they were originally used by the US Department of Defense for munitions production during World War II. While they appeared ruined on the outside, the interiors were solid brass and untouched by rust. With a little bit of effort, the man added, he was absolutely certain that Eversley could restore them for his casting purposes. Eversley agreed, paying the scrap metal rate for each dilapidated turntable (about \$100 total, he recalls).¹³⁵

Each turntable conveyor was approximately four feet in diameter, which required industrial transport as well as a setting equipped with the tools necessary for their restoration; Eversley also intended to retrofit each turntable to accommodate the scale of the commissioned sculpture. The artist reached out to Stanley Grinstein (1927-2014), a Los Angeles art patron and co-founder of Gemini G.E.L. (a high-tech art print firm in Los Angeles), who also happened to own trucks, forklifts, and industrial spaces.¹³⁶ The Grinsteins were fixtures in the Los Angeles art scene by the 1970s. Shortly after Grinstein and his wife, Elyse, married in 1953, they began to interact within the growing art community. Over the years, their home, as well as the Gemini workshop, had become legendary sites for contemporary art networking.¹³⁷ Grinstein sent out a truck to retrieve the machines from Monrovia for Eversley, and transported them back to the Grinstein

¹³⁵ Fred Eversley (2013), interview with the author, Los Angeles.

¹³⁶ Many artists benefited from the kindness of Stanley Grinstein. De Wain Valentine has noted that he had Grinstein's forklifts on-hand when he was executing monumental pours in the event of a thermal emergency.

¹³⁷ Getty Research Institute, *Modern art in Los Angeles: 40+ years with Gemini G.E.L., A Conversation with Andrew Perchuk, Sidney Felsen, Stanley Grinstein, John Baldessari, and Ed Ruscha*, transcript and DVD (Los Angeles: Getty Research Institute and the J. Paul Getty Museum, 2011).

factory in Venice. There, Grinstein also allowed Eversley to use his factory as the site for restoring and retrofitting the machines.

Over the course of two months, Eversley put in long days taking the machines apart, cleaning and restoring the mechanized components, rebuilding them to working order, as well as constructing and attaching the large-scale reservoirs for casting. He modified them to run at higher speeds than their previous design (the first around 40 rpm and the second up to 100 rpm). Once they had been restored, Grinstein also helped transport the turntables to Eversley's studio on Abbot Kinney Boulevard in Venice Beach. Eversley quickly set to work adapting his centrifugal process for large-scale casting of his parabolic discs.¹³⁸

Eversley's centrifugal technique facilitates the production of sculptures that are both stunning as candy-colored totems and function quite precisely as optical lenses (i.e., a viewing device designed to focus or diverge light). For example, a portrait of the artist gazing through one of his sculptures reveals both the precision of his centrifugally cast parabolic lenses as well as the optical effects they produce (see fig. 3.21). The artist's elbows are visible just beyond the bottom right and left edges of the parabolic disc. Once we register the scale of his elbows against the parallax view of his face, torso, and arms through the lens, the optical effect becomes more discernable. At the center of this parabolic disc is a symmetrical circle of negative space (though there is an illusion that the oculus might be a flat plane of transparent resin). This sculpture functions like a fish-eye lens with an oculus through which Eversley meets the photographer's gaze. The

¹³⁸ Fred Eversley (2013), phone conversation with the author.

oculus frames Eversley's face, while the lens distorts the proportion of his torso and arms. Somewhat akin to a funhouse mirror's distortion of proportion, this photograph delivers a playful representation of the artist. Unlike a funhouse mirror's uneven surface, however, there is no distortion of form. The artist's body remains intact as light penetrates the lens, revealing a perfect shift in scale with no linear irregularities. This accuracy attests to Eversley's technical exactitude in using centrifugal casting to create parabolic discs that function as optical lenses without aberrations.

Eversley did not select the parabolic form arbitrarily. The artist is worth quoting at length regarding his impetus to create sculptures that take the form of parabolas:

The parabola is the only perfect lens shape. Most lenses, like the lens on that camera, have spherical surfaces. And spherical surfaces introduce what's called aberrations—they bend the light to different points of focus, but not the same point of focus. And glass has both spherical aberration, which is caused by the shape itself, and it also has chromic aberration, where each color is bent to a different focal point. So a good glass lens has several elements in it, and the reason for the several elements is each element is trying to correct the inaccuracies that the first element puts in. And you add up enough pieces and get an expensive enough lens that has fairly low aberration and [is] fairly sharp. The only kind of lens that doesn't have aberration is a parabolic lens. A parabola bends all light to a single focal point regardless of its wavelength. So it makes the ideal lens. [. . .] A parabola has a property of focusing all energies, not only light, but all energies, heat, microwave, radio wave, sound to the exact same single focal point. And I purposefully used the parabola because what I'm trying to do is concentrate all energy to a single focal point.¹³⁹

This quote not only demonstrates the guiding premise of Eversley's work (that is, to create works in which the viewer uses his sculptures as a precise medium for light and space), but it especially speaks to his technological erudition. When asked how important the function of his parabolic forms were to his oeuvre, he stressed that he was most

¹³⁹ Fred Eversley (2011), Oral history interview by Naima Keith.

interested in allowing viewers to have their own perceptual encounters by engaging in corporeal-kinetic patterns.

Beginning in 1968, Eversley directed his earliest experiments with polyester toward the production of colorful, transparent forms that would encourage mobility for engagement with his works. Once he mastered his unique process of centrifugal casting, he claims he became intellectually curious about the geometric properties and functions of paraboloidal discs. He explains this evolution in an artist statement from 1978:

The transparent pieces employed the inherent image and energy concentrating properties of the concave paraboloidal shape in order to act as giant multi-hued fish eye lenses which capture an image within themselves [of] all of the surroundings. Since the external shape of this series was simple in comparison with all of the internal optical and color effects, the spectator was immediately drawn into studying the internal and imaging phenomena and their interaction with himself [/herself] and the environment. Thus this series of work continued my previous involvement with the use of internal geometric and optical effects to create kinetic imagery and interaction.¹⁴⁰

In many ways, this open-ended sense of play and sensorial experience seems to be the cornerstone of Eversley's longstanding work with parabolic discs. Even so, he also takes delight in the utilitarian use-value of his sculptures. For example, Eversley shared an anecdote about a collector, a practicing psychiatrist, who purchased one of his parabolic discs in the past. Rather than install Eversley's parabolic lens sculpture at his home, however, the psychiatrist elected to install it in his office where he treats his Hollywood patients. More than just a decorative object, Eversley has suggested that the collector offered it to his patients for therapeutic gazing (perhaps incorporating it into a free

¹⁴⁰ Frederick Eversley, *Frederick Eversley*, Palm Springs Desert Museum, October 24 to December 10 (Venice, CA: Eversley, 1978), n.p.

association assessment).¹⁴¹ In an effort to uncover repressed memories or emotions, the doctor may have devised a modified free-association schema and asked patients to focus upon Eversley's sculpture while free-associating during psychoanalytic therapy.¹⁴²

The notion of his sculptures operating as a type of physics-meets-metaphysics interface is, in my view, a satisfying way to consider Eversley's work. Much of what embodies Eversley's oeuvre is the way in which the representative quality and optical use-value of his sculptures arrive at a sort of equivalence. At base, all of Eversley's sculptural forms are abstractions, though they also symbolically function as representations of energy transmission. In form, his sculptures either represent a mathematical approximation of energy flow (i.e., the way in which parabolas and arcs are mathematical representations of equations) or tools used for the transmission of energy (such as the manner in which lenses focus light or parabolic discs receive waves). These specific conceptual and formal intersections are the hallmark of how viewers experience his work.

Since the mid-1970s, Eversley's artist statements have reflected his awareness of this conceptual and formal resonance. For nearly forty years, Eversley has recurrently included a quotation excerpted from William Blake's *Marriage of Heaven and Hell*

¹⁴¹ In Eversley's words, the doctor used it as "a meditation piece." Fred Eversley (2013), phone conversation with the author.

¹⁴² Developed by Sigmund Freud, free association is a practice in psychoanalysis that involves a patient sharing thoughts and random words or phrases freely as they come to mind without fear of the need to be coherent or socially appropriate. Free association allows the psychiatric practitioner to evaluate the shared information for specific issues of transference, projection, and resistance in the patient. See Konrad Schnabel and Jens B. Asendorpf, "Free Associations as a Measure of Stable Implicit Attitudes," *European Journal of Personality*, 27 (2013): 39-50.

(1793) in his published artist statements. The following quotation appears both in a 1976 and a 1978 catalogue, and it is included on the current home page of Eversley's website:

Man has no Body distinct from his Soul; for that called Body is a portion of Soul discern'd by the five Senses, the chief inlets of Soul in this age. Energy is the only life and is from the Body; and the reason is the bound or outward circumference of Energy. Energy is Eternal Delight. –William Blake, 1793, *The Marriage of Heaven and Hell*. I emphatically concur, Frederick Eversley¹⁴³

Indeed, Blake's visionary words appropriately describe the metaphysical sensations associated with the perception of energy. Beyond this literal reading, however, Blake also seems to ascribe experiences of joy or pleasure involved in such practices, while also conflating the concepts of matter and energy. By using the metaphor of the body and the soul fusing, Blake offers a poetic dichotomy for what theoretical physics literally describes: the laws of matter and energy. From this perspective, Eversley's use of this quotation as a paradigm for his work proves quite fitting.

In a glowing review of a solo exhibition that surveyed the artist's work from 1968 through 1976, art critic Henry Seldis underscored this mind/body balance in Eversley's oeuvre. Our awareness of our perceptual faculties as we experience Eversley's artwork, Seldis argues, compels "us to turn inward while looking out."¹⁴⁴ Seldis adds, "It is the energy these works project that allows us to accept their true elegance which never descends into slickness. [. . .] There is a metaphysical as well as physical aspect to these

¹⁴³ Frederick Eversley (1976), *Frederick Eversley: [Catalog of the Exhibition] Santa Barbara Museum of Art*; Frederick Eversley (1978), *Frederick Eversley*, Palm Springs Desert Museum. He also continues to post this quotation on his website. See *Fred Eversley*, at URL: <http://fredeversley.com/> (accessed 8 July 2013).

¹⁴⁴ Henry J. Seldis, "Art: Optical Magic Turns Us Inward As We Look Out," *Los Angeles Times* (23 May 1976), 76.

recent sculptures.”¹⁴⁵ As in Blake’s dichotomy quoted above, Seldis highlights how the viewer’s meta-awareness of these phenomena plays a key role in the works’ *raison d’être*.¹⁴⁶

This Blakean balance can also be read as emblematic of the technological sublime. On the one hand, viewers may delight exclusively in the opulence of his sculpture—the aesthetic joy that resides in their spectacular translucency, reflection, and high-keyed colors. On the other hand, Eversley’s mode of production has a multi-faceted relationship with technology (for instance, directly, representationally, symbolically, and conceptually). As a trained engineer with strong proclivities toward technological experimentation and problem solving, his appropriation of polyester resin functions as a direct conduit between the industrial and art worlds. Representationally, they operate as fitting avatars for California aerospace culture; there is an aerodynamic quality in many of the shapes that Eversley chooses for his artworks (for example, fig. 3.22 or 3.23). In fact, Eversley’s first public art piece, *Parabolic Flight* (fig. 3.24), was commissioned and installed at the Miami International Airport in 1980.¹⁴⁷

Beyond their apparent referential qualities to flight or the aerospace industry, Eversley’s sculptures also symbolize mathematical abstractions of energy flows. In the words of Seldis: “Stringent mathematical calculations as well as the artist’s very crucial

¹⁴⁵ Ibid.

¹⁴⁶ Though LA artists, including Eversley, generally shared a common concern with orchestrating perceptual encounters for viewers, there is no evidence that their concerns were supported by theoretical readings. Whereas many artists working on the East Coast were known to be studying and discussing Merleau-Ponty’s *Phenomenology of Perception*, the only LA artist who incorporated philosophical study into his practice was Robert Irwin.

¹⁴⁷ Fred Eversley, “Commissions,” from his website at URL: <http://fredeversley.com/artworks/early/rectangles#1> (accessed 30 October 2013).

concern with the concept of energy inform his sculptures and help to explain his utterly disciplined yet endlessly imaginative treatment of the sensuous, synthetic materials in which he has chosen to work.”¹⁴⁸ More than their symbolic references to the streamlined forms of aircraft machines or their affinity with mathematical representations of energy, Eversley’s sculptures reveal the type of technical approach and problem-solving you might expect from a trained engineer. For example, not only did *Parabolic Flight* appropriately abstract the concept of flying for its commission at an airport, but it also demonstrated a direct inspiration from kinetic engineering technologies.

Eversley modeled the sculpture using the Savonius Rotor windmill design, which entails the mounting of twin-parabolic forms onto a circular turntable that powers an electrical generator. The Savonius rotor windmill is a vertical axis wind turbine propelled by wind drag force filling and pushing the windmill’s buckets.¹⁴⁹ Thus, as wind power pushes against the forms and causes them to rotate on their vertical axis, the generator receives its electrical power and delivers electricity to peripheral neon lamps. There is a direct correlation between the strength of the prevailing wind, the rate of rotation, and illumination of the lamps. Hence, the amount of electricity generated depends on how fast the wind propels the rotation. In Eversley’s words, *Parabolic Flight*, in theory, “acts as a kinetic visual anemometer.”¹⁵⁰ Unfortunately, due to airport security concerns, the sculpture would not be allowed to rotate as originally designed.

¹⁴⁸ Seldis (1976), “Art: Optical Magic Turns Us Inward As We Look Out,” 76.

¹⁴⁹ João Vicente Akwa, Horácio Antonio Vielmo, and Adriane Prisco Petry, “A review on the performance of Savonius wind turbines,” *Renewable and Sustainable Energy Reviews*, 16, no. 5 (1 June 2012): 3054-3064.

¹⁵⁰ Fred Eversley, from an interview with Peggy Loar published on his website, available at URL: <http://fredeversley.com/about/essays/peggy-loar>. An anemometer is an instrument for measuring the force

Had *Parabolic Flight* been allowed to operate kinetically by harnessing wind power, it would represent both formal and conceptual features of flight. With regard to its formal aspects, Eversley's iconic abstract geometric shape—the parabola—is presented twice in nearly identical fashion. From the standpoint of the conceptual, *Parabolic Flight* in motion resonates with the commissioning institution and the way in which jet airliners propel wind through their engines to remain aloft. Moreover, the title itself also signifies a specific microgravity experiment wherein an aircraft climbs and dives in sharp parabolic arcs. These so-called “parabolic flight” campaigns allow researchers to carry out experimentation otherwise designed for the gravity circumstances of outer space. The parabolic flight experience allows participants analogous sensations of weightlessness by mimicking low-gravity conditions.¹⁵¹

Beyond these characteristics, Eversley maintains that the thematic principle running across his oeuvre is energy. He emphasizes, “My sculpture is all about energy—in the very broadest sense of the word, and the very narrow sense of the word. My pieces are parabolas, which is the perfect concentrator of all forms of energy, including light energy.”¹⁵² Symbolically, parabolas represent an instrument for transmitting or augmenting energy flows, but Eversley's production technique requires energy beyond that of his contemporaries. The manipulation of polyester resin results in events—including instances of static casting—wherein an energy-driven chemical reaction takes

of wind. "Anemometer, n.," *OED Online*, March 2015, Oxford University Press, URL: <http://www.oed.com/view/Entry/7395?redirectedFrom=anemometer> (accessed April 09, 2015).

¹⁵¹ Paul Gerke Hofmeister and Jürgen Blum, “Parabolic Flights @ Home: An Unmanned Air Vehicle for Short-Duration Low-Gravity Experiments,” *Science and Technology*, 23, no. 2 (1 Feb 2011): 191-197.

¹⁵² Fred Eversley, quoted in interview by Marilyn Holstein, “Meet the Master of the Lens,” *SoHo Life* (November 2012), 16.

place. Whereas a byproduct of the polyester resin's curing exothermic reaction is energy in the form of heat, Eversley's production technique simultaneously employs centrifugal force in tandem with exothermic energy. Eversley's innovation with the centrifugal technique distinguishes his oeuvre from those Southern California artists who cast polyester resin using more traditional approaches in that it combines chemical energy and centrifugal energy outputs.

Conclusions

Toward the end of the 1970s, Eversley had obtained a good amount of success, having participated in more than fifty group exhibitions across the globe as well as securing numerous solo exhibitions in major US cities (including New York, Chicago, Detroit, Kansas City, and several California cities, including San Francisco).¹⁵³ The end of this decade also marks Eversley's expansion into working with acrylic rather than strictly with polyester resin. In 1977, Eversley became the Smithsonian Institution's first artist in residence, specifically with an appointment to work in the National Air and Space Museum. With a nine-month stipend of \$15,000 (approximately \$56,000 in today's dollars), and an additional \$5,000 provided for materials, Eversley began what would develop into a three-year tenure at the Museum.¹⁵⁴ *The Washington Post* published an article in December 1977 announcing Eversley's appointment, wherein museum affiliate

¹⁵³ Eversley secured a solo exhibition at the Whitney Museum of American Art in 1970, using a childhood friendship with curator Marcia Tucker as his contact. Fred Eversley (2011), Oral history interview by Naima Keith. For a detailed list of the artist's exhibitions, see Frederick Eversley, and Peter Frank, *Fred Eversley: Four Decades: 1970-2010* (Santa Monica, CA: William Turner Gallery, 2011).

¹⁵⁴ Paul Richard, "The Space Museum's Latest Craft: It's Art, by Sculptor Frederick Eversley, an artist for the Spacefolks," *The Washington Post*, Washington, DC (8 Dec 1977): E1.

Jim Dean emphasized Eversley's technological background as an important criterion for the artist's selection. Dean added that while no one knew precisely what Eversley would produce, "that's not the point. We want [Eversley's] presence in the building. We want him to talk to people, to do his work, and consider flight and space craft. We want him to consider what they have done to man [*sic*]." ¹⁵⁵

Eversley was given accommodations to live in the historic Barney House in Washington, DC. With the knowledge that he would be working with noxious polyester resin (and consequently required well-ventilated or open-air spaces to do so), he was informed that he could use all components of the Smithsonian's Paul E. Garber Preservation, Restoration, and Storage Facility in Suitland, Maryland as his studio. ¹⁵⁶ He was promised access to all of the site's workshops—facilities where historic aeronautical collections are restored—including the tools and equipment housed there. According to Eversley, however, things did not turn out as he was originally promised.

When he arrived at Garber Facility, he was introduced to the facility's director (in Eversley's words, "an ex-Air Force Colonel who was known to be a racist"). ¹⁵⁷ The artist contends that if he asked permission to use a particular tool or material, the director would provide various excuses, using diplomatic language, of how the tool or material was off-limits for artistic use. Eversley observed, "It became obvious to everyone that he

¹⁵⁵ Ibid.

¹⁵⁶ Nicknamed "Silver Hill," the facility comprised 32 hangar-sized buildings designed to house the collections of the Smithsonian Institution (especially aircraft in the collection of the National Air and Space Museum). From the outside, the facility is quite unassuming—a series of windowless, corrugated metal buildings. See the Smithsonian Institution webpage, "Paul E. Garber Facility," describing the site's purpose at URL: <http://airandspace.si.edu/about/history/paul-e-garber.cfm> (accessed 30 October 2013).

¹⁵⁷ Fred Eversley (2013), interview with the author, Los Angeles.

didn't want me there.”¹⁵⁸ For nearly a year, Eversley maintains he was prevented from making new work because of this “red tape.”¹⁵⁹

Eversley eventually requested an alternative location to work and museum affiliates found a space for him in the basement of the Air and Space Museum.¹⁶⁰ Unfortunately, another impediment arose. It became apparent to museum staff that the ventilation system could not accommodate his work with polyester resin, as the fumes would be directed from his new studio into the general ducting system of the Museum. Discouraged by this second set-back, an emergency meeting was called wherein Eversley recounts that Michael Collins, the Museum's director, asked him directly, “Can't you use precast plastic?”¹⁶¹ Mostly out of frustration over the succession of obstacles that he had encountered, Eversley agreed to the Museum's offer to provide him with \$10,000 worth of acrylic plastic. And though Eversley would return to working in polyester resin once he completed his Smithsonian appointment, this series of hindrances actually came to yield a dynamic series of acrylic sculptures that he otherwise may not have envisioned in the first place.

Working with precast acrylic prevented Eversley from applying his centrifugal casting technique while in residence at the Smithsonian. However, his decision to use the material alleviated all concerns over the introduction of toxins to the institution's environment. Eversley also discovered further benefits to working with acrylic. From a

¹⁵⁸ Ibid.

¹⁵⁹ Ibid.

¹⁶⁰ In fact, Eversley maintains that some friends advised him to sue the Museum for non-performance (i.e., breach of contract), and he made his intentions known to the General Consul for the Smithsonian Institution. Ibid.

¹⁶¹ Ibid. This quotation is as recalled by Fred Eversley from the emergency meeting held to determine what would be done about the apparent mismanagement of his studio's ventilation requirements.

material perspective, acrylic fares far better in the elements than polyester resin. For example, a work such as *Red Arch* from 1979 (fig. 3.25) had a physical robustness that would allow for installation outdoors. This discovery led directly to Eversley incorporating acrylic into large-scale commissions, such as *Futurista*, 1984 (fig. 3.26), which weds painted steel and transparent acrylic in its material composition.

Although Eversley may have perceived his unfair treatment to be the result of his race or ethnicity, it is also plausible that the treatment he received was more complex than racial bias. Since about 1965, the art world had witnessed a barrage of Art and Technology programs that had come to make the theme feel clichéd. Simply, the director's uncooperative attitude toward the artist—namely Eversley's claims that the institution did not provide the tools and resources promised to him—might have been bound up in the sensibility that artists and engineers have little in common. If this were the case, it correlates directly to similar complaints from artists and engineers participating in LACMA's A&T program.¹⁶² Regardless of the true impediments to Eversley's initial productivity at the Smithsonian Institution, this uncomfortable incident provides a necessary reminder of the sociological matrix in which Eversley was working. In my view, it underscores the importance of evaluating his art on its own terms—free of the potentially muddy frameworks of race and ethnicity.

¹⁶² Indeed, many artists reported that the engineers or technologists projected unwelcome or otherwise condescending attitudes toward their presences in their assigned collaborative firms in industry. Some engineers, particularly those who responded to John Chamberlain's requests at Rand Corporation, also vocalized their antagonism toward the dichotomous pairings. See John Chamberlain Folder, Los Angeles County Museum of Art, Archives, Modern Art Department, Art and Technology records (Los Angeles: 1970).

At the end of his tenure at the National Air and Space Museum in 1980, Eversley fully committed to maintaining a bicoastal status as an artist. He continued to keep his studio in Venice, California and purchased a building in Manhattan for the purpose of maintaining his East Coast connections. He admits, “I do most of my physical work in Venice Beach, California, but I still have a private studio in SoHo. My SoHo building provides me with a wonderful show place for reaching national and international audiences.”¹⁶³ Since 1980, Eversley has continued to produce centrifugally cast polyester sculptures, as well as work further with precast acrylic and other materials suitable for outdoor display in public spaces. Much of Eversley’s prolific production over the last thirty years has entailed commissions for large-scale public artworks, such as *Parabolic Flight*.

With over forty-five years working as an artist and with “about 200 exhibitions in 16 countries, 22 public commissions, and 35 public collections,” Eversley attributes his success to maintaining his presence in New York.¹⁶⁴ Despite having studios on both coasts, Eversley considers himself a California artist not only because he has kept residence there the longest but especially because Venice is where his career originated. Eversley recently emphasized the direct role racial biases played in his career: “The racism I encountered in LA is almost directly responsible for my becoming an artist. By

¹⁶³ Fred Eversley (2012), quoted in interview by Marilyn Holstein, “Meet the Master of the Lens,” 17.

¹⁶⁴ Ibid.

accident I moved in and met my neighbors — artists, poets, etc. I ended up walking into the scene. Maybe I would have gone out and hung out and maybe I wouldn't have.”¹⁶⁵

Like Bell and Corse, Eversley pursued a successful career defined by a steadfast commitment to innovating within a specific technical process and expanding the aesthetic use of industrial materials. In comparison, the following chapter considers the application of psychological technologies to art beginning in the late 1960s. By analyzing a range of projects that sought to relocate the studio while using new modes of production, I would like to consider cognitive psychology as an applied science that operated as an aesthetic vehicle in immersive environments.

¹⁶⁵ Fred Eversley (2013), phone conversation with the author. Eversley refers to the fact that he initially wanted to live in the Manhattan Beach community.

CHAPTER 4

Post-studio Sublime: Southern California Art and Technology After *Earthrise*

Back then I didn't know it was "Light and Space"! But I knew right away that it was the direction that the artists were going. And it ended up that I showed all of them. It was an amazing time really. –Hal Glicksman (2008)¹

To me, the whole relationship to the spectator is secondary because ... in other words, I am them. If I can think this sort of thing, if I can be involved in these kinds of ideas, then so can they. In other words I'm not that unique. I don't step way out of my time. If it's a question for me then I feel it's probably a question of the time. I'm sure there's someone else that worries about it too and therefore there's somebody else who's going to consider it. –Robert Irwin (n.d.)²

The accomplishment of human space travel seems inextricably intertwined with Southern California. During the 1960s, the number of government and privatized firms oriented toward optimizing the American space program reached a critical mass, solidifying Southern California's achievement of "industrial preeminence," to borrow Allen Scott's characterization.³ In a more metaphorical sense, the American West has perpetually represented a locus of expansive terrain and, hence, site of necessary exploration. That the American space program was threaded through Southern California is but an extension of that strong desire to continually explore, document, and comprehend uncharted territory. The nineteenth-century concept of Manifest Destiny had morphed into President Kennedy's call for lunar exploration by the early 1960s, tying the region's

¹ Hal Glicksman, "Hal Glicksman Interviewed by Rebecca McGrew," (Santa Monica, CA: Hal Glicksman's home, 4 December 2008). Quoted in Rebecca McGrew, Glenn Phillips, Marie B. Shurkus, and Thomas E. Crow, *It Happened at Pomona: Art at the Edge of Los Angeles 1969-1973* (Claremont, CA: Pomona College Museum of Art, 2011), 112.

² Robert Irwin, quoted in notes from an unpublished interview with Barbara Rose, in *Barbara Rose papers, 1940-1993, Box 1* (Los Angeles: Getty Research Institute).

³ Allen John Scott, *Technopolis: High-Technology Industry and Regional Development in Southern California* (Berkeley: University of California Press, 1993), 4.

contributions toward aerospace excellence to the figurative connotations of western expansion.

The legacy of the space race reached its crescendo in 1968. The Apollo 8 mission capped off the year by becoming the first crewed spacecraft to complete a lunar orbit. By achieving a sufficiently distanced perspective, Frank Borman, James Lovell, and William Anders became the first humans to observe Earth as a distinct entity (fig. 4.1). Anders captured the definitive moment in *Earthrise* (figs. 4.2 – 4.3), altering humankind’s relational conceptions of space, time, and placement in the universe.⁴ *Earthrise* depicts a view of the planet from space, instigating an indexical relationship with the traveling astronauts that signaled their junction at this crucial point of the expedition. This image not only initiated a dramatic shift in how the people of Earth understood our relative existence within the fundamental conceptions of light and space, but it also served as a model *par excellence* of the technological bound to the sublime. As Robin Kelsey explains, “Only photographs [like *Earthrise*] taken by humans could signify our bodily arrival, our actual presence, at the extraterrestrial vantage that had underwritten the scientific imagination.”⁵ Similar to the ways in which the public eagerly consumed sublime representations of the American West during the nineteenth and early twentieth

⁴ In fact, the moment wherein Anders made *Earthrise* was a collaborative effort and also a matter of chance. The audio recording of the astronauts’ voices as Anders first spied the “Earthrise” was a result of the spacecraft being nose down toward the lunar surface and Commander Borman “rolling” the craft during orbit. Anders apparently saw the stunning view of Earth, called out to Lovell for color film, and used a Hasselblad still camera fitted with a telephoto lens to make the iconic photograph. Though *Earthrise* technically was captured with the camera turned 90 degrees from the horizon, the iconic image was presented with a lunar horizon (fig. 4.1) for the masses. See NASA, “Earthrise: The 45th Anniversary” (20 Dec. 2013), at URL: <http://www.youtube.com/watch?v=dE-vOscpiNc#t=100>.

⁵ Robin Kelsey, “Reverse Shot: Earthrise and Blue Marble in the American Imagination,” in El Hadi Jazairy and Melissa Vaughn, eds., *Scales of the Earth* (Cambridge, MA: Harvard University Graduate School of Design, 2011), 12.

centuries, outer space had become the new frontier of exploratory documentation. This sublime imagery was increasingly delivered in photographic, radiographic, and televisual forms and was framed in the contexts of patriotism and national supremacy.

Contemporary art practices echoed the cultural reverberations produced by this icon of the sublime. Artist Nancy Holt recalled that the lunar missions possessed a gravitas in American visual culture and paralleled the beginnings of post-studio art production for many artists. Her recollection is worth quoting in full:

The moon shot in '69 was important, because it was the first time that we saw the earth as a finite entity. Earth Art, of course, had already begun before the moon shot but the big sculptures, Bob's *Spiral Jetty* and Michael Heizer's *Double Negative* weren't done until *after* the moon shot. The nation was *ready* for something. I remember Bob and I went to see the moon shot on television at Chuck Ross's studio and Joan Jonas was there, they were together then. And there was all this ho-hum business, there was this *attitude* like, "Oh, it's nothing." But there was a *thrill* to it. And I thought it was so weird that everyone was putting it down. And I remember that *The New York Times* called Bob about what his thoughts were about the moon shot. And he said, "Well, it's just a *huge* 'Nonsite.' They fly up to the moon, they collect some rocks, they fly them back and display them." It was fascinating, because it was *exactly that*. It was a very expensive "Nonsite." It's a trip out to the fringes to get whatever you get. Take some photographs and use a map, you know, bring it back.⁶

Holt's and Smithson's reactions to *Earthrise* suggest a central paradigm for contextualizing post-studio intersections of art/technology. Holt indicates that *Earthrise* necessarily influenced the large-scale earthworks that followed, with Smithson and Heizer spearheading the movement as its leading practitioners. Wittingly or not, Smithson's quip relating lunar exploration to his own geological "Site/Nonsite" projects performed two correlations. That *The New York Times* approached Smithson for

⁶ Nancy Holt, quoted from an interview that took place between 1993 and 1999, in Amy Newman, *Challenging Art: Artforum, 1962-1974* (New York: Soho Press, 2000), 251 [emphasis is Holt's].

comment speaks to this blurring of art, science, and technology in American visual culture by the late 1960s. By labeling the mission (ostensibly referring to the mission of the first lunar landing, Apollo 11) a “huge Nonsite,” Smithson emphasizes that this paradigmatic moment had altered conceptualizations of time, space, scale, and perspective.

Earthrise quickly entered the visual culture as an iconic image, fusing the technological achievement of NASA’s lunar orbit with the sublime image of Earth engulfed in the vastness of space. Beginning in 1957, the achievements of the Space Race helped accelerate speculation of what our planet looked like from beyond the atmospheric threshold. Between 1959 and 1966, both American and Russian satellites produced crude grayscale images depicting fragments of the Earth. In 1966, futurist and *Whole Earth Catalog* creator, Stewart Brand, began a grassroots campaign demanding that NASA make any images of the planet as a total entity available. Using rhetoric aimed at countercultural attitudes, Brand produced and distributed buttons that posed the question: “Why haven’t we seen a photograph of the whole Earth yet?”⁷ NASA responded by sharing the first full-color representations of the whole Earth in 1967, captured first by the Department of Defense Gravity (DODGE) satellite and then by the Applications Technology Satellite (ATS). Yet, the publication of *Earthrise* in 1968 provided the eyewitness testimony that the mechanically produced imagery lacked. As the Apollo 8 craft and crew traveled around the lunar surface and caught a glimpse of their life-

⁷ Carole Cadwalladr, “Stewart Brand’s Whole Earth Catalog, the book that changed the world,” *The Guardian* (London, 4 May 2013), at URL: <http://www.theguardian.com/books/2013/may/05/stewart-brand-whole-earth-catalog> (accessed 14 September 2014). Also, Kelsey, 12.

sustaining home, *Earthrise* simultaneously signified both point of origin and ultimate destination. In the words of Lovell, the making of *Earthrise* communicated its signification as “a grand oasis in the vastness of space.”⁸

In the weeks following the mission, *LIFE* magazine published a special issue dedicated to the events of 1968 and included one of the Apollo 8 photographs on the cover (fig. 4.4). Five months later, the United States Postal Service honored the flight’s widespread impact by issuing a postage stamp depicting *Earthrise*. That same year, Brand placed *Earthrise* on the cover of the second issue of the *Whole Earth Catalog* (fig. 4.5).⁹ As *Earthrise* entered the common culture, the number of Art and Technology exhibitions increased significantly. In fact, the phenomenon reached outright codification with the founding of the art-and-science journal *Leonardo* in 1968.¹⁰ Moreover, an increasing amount of political demonstrations, including the student revolts in France, reverberated across the globe and produced a cultural climate that both resisted hierarchies and embraced experimentation. To echo Holt’s and Smithson’s

⁸ Lovell is quoted in NASA, “Earthrise: The 45th Anniversary,” written and narrated by Andrew Chaikan for Lunar Reconnaissance Orbiter and The Lunar and Planetary Institute, video (<https://www.youtube.com/watch?v=dE-vOscpiNc>, accessed 16 May 2014).

⁹ The inaugural publication of *Whole Earth Catalog* (*WEC*) in Fall 1968 used a photograph of the earth captured by NASA’s ATS-III satellite on November 10, 1967. The *WEC* functioned, in the words of Brand, “as an evaluation and access device. With it, the user should know better what is worth getting and where and how to do the getting.” While the *WEC* is now out of print, Brand maintains a comprehensive website dedicated to the communicating the historical and cultural significance of this groundbreaking publication. See “Whole Earth Catalog: Access to Tools and Ideas” at URL: <http://www.wholeearth.com/index.php> (accessed 14 September 2014).

¹⁰ Kinetic artist and astronautical pioneer Frank Malina founded *Leonardo* in 1968 in Paris. According to the journal’s website, Malina sought to create an “international channel of communication between artists, with emphasis on the writings of artists who use science and developing technologies in their work.” *Leonardo* remains at the forefront of providing a forum for the application of contemporary art and science. See *Leonardo* online, “Publications: Leonardo Journal,” at URL: <http://www.leonardo.info/leoinfo.html> (accessed 13 November 2013).

acknowledgment, “the moon shot” helped ignite new attitudes toward space exploration and paralleled an emerging art paradigm.

What follows is an examination of examples of this post-studio trajectory in Southern California, organized around the central shaping figure of Hal Glicksman and his curatorial role in a number of case studies. First, I foreground the case studies by presenting an overview of post-studio practice and the rise of immersive environments (two overlapping, yet distinct modes). Next, I introduce Glicksman and his early role in developing a locus for post-studio experimentation. Among the curators and critics who were the most keenly aware of this decisive shift—including John Coplans, Peter Plagens, and Maurice Tuchman, among others—Glicksman led the way by curating or arranging a number of post-studio explorations of art/technology in Southern California. Through his technical knowledge and keen interest in providing a place for artists to experiment beyond their studio, Glicksman facilitated post-studio engagement for both well-known and lesser-known artists alike (including Lloyd Hamrol, Michael Asher, and Tom Eatherton). I present James Turrell and Robert Irwin as two of the earliest figures to merge art and technology in post-studio practice: Turrell as an experimenter with projected light in alternative spaces and Irwin borrowing from a mixed bag of industrial materials (i.e., cast acrylic, auto-finishing enamels, and theatrical scrim) to realize his experiments in optical perception. I also highlight their collaboration with industrial psychologist Ed Wortz for LACMA’s canonical Art & Technology program, which Glicksman helped organize. Finally, in the works of Maria Nordman and Eric Orr, I examine how some artists experimented with the impact of extreme psychological

situations on the viewing subject by developing diverse, immersive situations for participants. My examination of Nordman and Orr focuses on Glicksman's presentation of two key immersive situations during his tenure as Gallery Director at the University of California, Irvine (1972–1975).

Of the Southern California artists who incorporated industrial technologies in the studio, several continued in the more direct, industrial-craftsman model (paralleling the practices of Bell, Corse, and Eversley, among others). For the case studies examined below, the material aspects of each constructed environment retained artisanal consideration through craft, though the artists typically did not design these works to be permanent. The technology borrowed in each case study reflects both a literal appropriation (such as industrial lighting schematics) as well as a theoretical engagement with technologies and applications of science (specifically, cognitive psychology). I reveal how phenomenological sensations became a primary medium for many Southern California artists experimenting with new technologies. Ultimately, I suggest that the application of psychological theories manifests as yet another appropriated technology in the post-studio sphere.

Post-studio Permutations in American Art and Technology

In 1968, John Baldessari (b. 1931) initiated his now famous post-studio course at California Institute of the Arts (CalArts). Wanting to devise interactions between his students and himself that would initiate a “class situation” as opposed to “people daubing away at canvases or chipping away at stone,” Baldessari structured class meetings

unconventionally.¹¹ He employed heavy use of slide discussion, arranged lectures by visiting artists, and offered newly acquired catalogues from his art travels. He also initiated chance-based cultural field trips determined by throwing a dart at a map hung in the classroom. The purpose, Baldessari explained, was “to try to do art where we were.”¹²

Art historian Thomas Crow critiques what he claims Baldessari’s course actually accomplished, asserting, “Though [Baldessari’s] newly christened ‘post-studio’ regimen still encouraged students to range widely around the city and its environs in search of inspiration, the teacher-student dynamic resembled less the ‘revolutionary cell’ recalled by David Salle than a counselor organizing field trips, skits, and craft projects for his charges at a high-powered summer camp.”¹³ Whether or not the class meetings achieved the expected outcomes associated with avant-garde tactics, Baldessari’s pedagogical interventions expose a critical restructuring of the appearance, location, and forms that art production had begun to take in the United States as well as across Europe.

Baldessari openly admits that he cannot take credit for coining the term “post-studio.” It appears that he borrowed it from a sensibility that was already on the scene by 1968. In a 1992 oral history, Baldessari confessed to his interviewer, Christopher Knight, that he may have borrowed the term from Carl Andre, who described himself as the first post-studio artist during the late 1960s. As an artist who mined industrial materials and

¹¹ John Baldessari (1992), quoted from an Oral history interview by Christopher Knight (Apr. 4-5), Archives of American Art, Smithsonian Institution. Available at URL: <http://www.aaa.si.edu/collections/interviews/oral-history-interviewjohn-baldessari-11806>.

¹² Ibid.

¹³ Thomas Crow, “The Art of the Fugitive,” in Lisa Gabrielle Mark and Paul Schimmel, *Under the Big Black Sun: California Art, 1974-1981* (Los Angeles: Museum of Contemporary Art, 2011), 47. Salle quote from catalogue on Baldessari in *Pure Beauty*, LACMA, 2009, 144.

constructed his sculptures *in situ*, Andre's art production did not require a studio in the traditional sense.¹⁴

Baldessari's innovative course at CalArts, and Andre's wedding of the term to industrial art fabrication, speaks to a much larger shift at that historical moment: the dematerialization of the art object. In their landmark 1968 essay, "The Dematerialization of Art," Lucy Lippard and John Chandler connected this "conceptual turn" to a growing emphasis on artistic process and a general relocation of the sites of art production.¹⁵

Lippard and Chandler assert,

As more and more work is designed in the studio but executed elsewhere by professional craftsmen, as the object becomes merely the end product, a number of artists are losing interest in the physical evolution of the work of art. The studio is again becoming a study. Such a trend appears to be provoking a profound dematerialization of art, especially of art as object, and if it continues to prevail, it may result in the object's becoming wholly obsolete.¹⁶

Post-studio practices encompassed an array of tactics, materials, and terms of aesthetic content employed by artists in the late 1960s and 1970s, and were not strictly dematerialized in their scope. According to Lippard, the tactics of dematerialization took

¹⁴ Andre claims others referred to him as a post-studio artist. In correspondence with Caroline Jones, Andre admits that his dispensing with the studio might have, in retrospect, sprung from necessity as he "could never afford one." Andre quoted from a postcard to Caroline Jones (4 April 1990), published in *Machine in the Studio* (1998), 150. Scott Burton termed Andre a self-described post-studio artist in a seminal exhibition at Kunsthalle Bern. Burton, "Introduction," Harald Szeemann, ed., *When Attitudes Become Form: Works, Concepts, Processes, Situations, Information: an Exhibition Sponsored by Philip Morris Europe, Kunsthalle Bern, 22.3.-27.4.1969* (Bern: Kunsthalle Bern, 1969).

¹⁵ Lucy R. Lippard and John Chandler, "The Dematerialization of Art," *Art International*, 12, no. 2 (Feb. 1968): 31-36. The argument presented here was developed into the full-length book, *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). *Six Years* compiles primary source documents into a seminal early study of conceptualism, and pictures the network and information-driven nature of art during its inception. See Ann Goldstein and Anne Rorimer, eds., *Reconsidering the Object of Art: 1965-1975* (Los Angeles: Museum of Contemporary Art, 1995) for a study of this moment with critical distance.

¹⁶ Lucy R. Lippard and John Chandler, "The Dematerialization of Art," *Art International*, 12, no. 2 (Feb. 1968), 31.

many forms of the non-visual or the visually deemphasized, manifesting in idea-based or action-based modes. Referring to Lippard and Chandler's argument, Andrea Tarsia explains that, rather than operating as a strict material versus immaterial dichotomy, "dematerialization" downplays or transforms physicality as opposed to strictly producing a "result."¹⁷ Lippard stressed that conceptually-based art forms offered suitable vehicles for unraveling the hierarchical power structures of New York.¹⁸ Photography, systems and seriality, immersive environments oriented toward enabling a perceptual experience, and language itself all became vehicles of conceptualism.¹⁹ Specifically, Donna Conwell and Glenn Phillips argue that dematerialized investigations in Los Angeles took the form of "architectural interventions or spatial modifications designed to induce powerful perceptual effects in the viewer," which coalesced with the contemporaneous institutionalization of art/technology.²⁰ In essence, dematerialization was "in the air" in Southern California as the *site* of art production and exhibition became increasingly more blurred.

For the West Coast artists who engaged art/technology practices while expanding into post-studio modes, a cohesive aesthetic often comprised their art forms. Generally, they were oriented toward the psychological implications of perceptual or bodily

¹⁷ Andrea Tarsia, "Time and the Immaterial," in Clive Phillpot and Andrea Tarsia, *Live in Your Head: Concept and Experiment in Britain 1965-75* (London: Whitechapel Art Gallery, 2000), 17.

¹⁸ Lippard, "Escape Attempts," in *Six Years*, xvii. Lippard quotes herself from a discussion with Ursula Meyer in 1969.

¹⁹ "Dematerialization" themed exhibitions were a dominant trend on the East Coast, including such noteworthy shows as *9 at Leo Castelli* (1968), *January 1-31, 1969* curated by Seth Siegelaub in an empty office space, and *Anti-Illusion* (1969) curated by Marcia Tucker and James Monte for the Whitney Museum of American Art. See "1968" and 1969" in Lippard, *Six Years*, 35-133.

²⁰ Donna Conwell and Glenn Phillips, "Duration Piece: Rethinking Sculpture in Los Angeles," *Pacific Standard Time: Los Angeles Art 1945-1980* (Los Angeles: Getty Research Institute and the J. Paul Getty Museum, 2011), 200.

encounters with light and space. The post-studio practices that channeled cutting-edge technologies (that is, research conducted to understand the cognitive isolation experienced by astronauts) and psychological theories became central to phenomenal installations. Here, the technology is not necessarily tangible, though lights and machines were certainly employed to facilitate such phenomenal environments. The scientific context for applying perceptual psychology to aesthetic environments remains a central theme for this chapter, while tracking this trend's transition from studio-based production to a post-studio model.

The tradition of the studio as private space—and, more generally, the artistic drive to make objects—began to dissolve during the late 1960s in American art practices. The “nonstudio” space, Caroline Jones explains, “is a kind of theoretical positioning within a newly valued discourse of postmodernism, indicating that the studio will be denied sole importance as the site of creation or meaning.”²¹ The post-studio model does not imply that artists gave up their studio spaces wholesale (although some did). By positioning the nonstudio paradigm as a discursive construct rather than as a literal category for analysis (i.e., asking whether the object is produced in or out of a studio), the methods of Bell, Corse, and Eversley can be read as possessing attitudes associated with the post-studio model. While Bell, Corse, and Eversley adapted their discrete technologies to their individual spaces of art production, their reconfiguration of the studio as a type of ad-hoc factory or laboratory attached a contingency to their practice that resists the totality of studio as principal site.

²¹ Caroline Jones, *Machine in the Studio: Constructing the Postwar American Artist* (Chicago: University of Chicago Press, 1996), 271.

For Jones, Robert Smithson represents the progenitor of the post-studio construct, whereby his critical writings and art overtly rejected the ways in which the studio had become a figurative prison for the artist.²² Whereas the late nineteenth-century *plein-air* painters sought out direct contact with the frenetic spaces of industrialized France, the Cubists returned forcefully to the isolation of the studio and channeled Cézanne's influence in a dead-end "studio-based formalism" (to borrow Smithson's term).²³ Jones cautions that Smithson maintained physical spaces, which he described as "studio"—ostensibly, she adds, "until his death."²⁴ While artists did openly embrace artistic modes and projects that fell outside the traditions of the studio, post-studio came to signify an artistic posture beyond the literal designation of practices occurring outside of these private spaces.

Many, but not all, of the case studies examined below constitute installation art. The rise of installation art—and its categorization as a distinct art "medium" in which the participant enters—emerged alongside the development of post-studio tendency. While the postwar practice of describing an aesthetically-conceived space as a total work of art began with Allan Kaprow's coinage of "Environment" in 1958, it took several decades

²² Robert Smithson participated in A&T by touring and proposing projects for Kaiser Steel and American Cement in 1969, although his proposals were not realized. Smithson submitted two proposals in 1969: *For Kaiser Steel* (which resembles his work with non-sites) and *Portland Cement Sites, A Dearchitected Project* (which appears to be a hybrid of his earthworks and architectural interventions). See Tuchman, *A Report on the Art and Technology Program*, 320-321. The projects sought to incorporate the materials manufactured by each corporation.

²³ Jones is quoting Smithson from interviews as well as his writings. See, for example, Smithson, "Fragments of a Conversation," William C. Lipke, ed., (Feb. 1969) or Smithson, "Frederick Law Olmsted and the Dialectical Landscape," *Artforum* (Feb. 1973), both in Smithson, and Jack D. Flam, *Robert Smithson: The Collected Writings* (Berkeley: University of California Press, 1996).

²⁴ Jones, *Machine in the Studio*, 271.

for “installation art” to enter the lexicon in a more concrete fashion.²⁵ As a term, “installation art” was not employed during the 1960s and 1970s, though the aesthetic mode was in use by the mid-1960s.²⁶ Art historian Claire Bishop maintains installation art “came of age” between 1965 and 1975 due to the sharpening of the philosophies undergirding subjectivity and spectatorship.²⁷ Initially, theorists valued art environments for their opposition to “passive or detached” modes of contemplating a work of art (via immobile gazing or disengaged circumambulation).²⁸ What makes installation art fundamentally experiential, in Bishop’s view, is the fact that activated and decentered participation varies from subject to subject.²⁹

Installation art as a phenomenon of the last five decades comprises a range of tactics, intentions, and artistic points-of-view. With regards to a regional aesthetics of these modes, the East and West Coasts each embraced this new medium of “environments”—particularly in post-minimal permutations of the late 1960s—in

²⁵ Kaprow coined “Environment” to describe his large, immersive spaces comprised of a range of media. In her important monograph on the subject, independent scholar Julie Reiss outlines the gradual ways in which installation art entered the art nomenclature. See Julie H. Reiss, *From Margin to Center: The Spaces of Installation Art* (Cambridge: MIT Press, 2000), xi.

²⁶ The artwork’s mode and vehicle (namely the practice of conceiving of and executing site-specific installations as a medium) prefigured the scholarly account and its establishment in the historiography by several decades. Reiss explains that critics first used Kaprow’s “Environment” during the 1960s and 1970s to describe this nascent trend, followed by “Installation art” gradually entering the lexicon during the 1980s and 1990s. Reiss points out that beginning in 1978 and during the 1980s, *The Art Index* identified the term “Installation” while advising researchers to “see Environment (Art).” Reiss, *From Margin to Center*, xii.

²⁷ Claire Bishop, *Installation Art: A Critical History* (London: Routledge, 2005), 13. Heightened immediacy and decenteredness were best articulated, according to Bishop, by Roland Barthes, Michel Foucault, Jacques Lacan, and Jacques Derrida.

²⁸ Bishop, 11.

²⁹ Activated spectatorship, Bishop demonstrates, not only implied that the participant completed the piece with her/his presence, but consequently became a natural vehicle for politically engaged artworks. Bishop argues that poststructuralist theory reveals the decentered function of installation art. As psychoanalytic theory claimed that the subject is undeniably fragmented and idiosyncratic—which subsequently led theorists to articulate new perspectives on feminism and postcolonial theory—installation art was understood to require the first-hand experience of that uniquely “decentered self.” Bishop, 13.

distinctive “looks,” respectively. Despite their methodological parallels, the art/technology investigations on the West Coast emphasized the technological sublime and perceptual explorations beyond those of their East Coast contemporaries. Peter Plagens phrased it well in 1974:

Near the end of the decade, the LA Look began to realize its metaphysical (the great white light of Zen, the quiet peak of a good trip, or simple serenity) and scientific (sensory deprivation, inundation, Ganzfelds, and anechoic chambers) implications: what had started as a milieu of mass-production methods, plastic, sunshine, and affluence, attained the velocity of an esthetic philosophy. The seminal figure is Robert Irwin [. . .].³⁰

Experimentation with art and technology had reached a tipping point in America and Europe by the end of the 1960s; in Los Angeles, art/technology had morphed into the realm of the metaphysical and intangible by 1968.

Another frame of reference for considering the rise of LA post-studio practice, is the presence of artist Marcel Duchamp (1887–1968). Many members of the LA vanguard maintain that Duchamp’s visits proved catalytic for the direction their work took during the 1960s. Walter and Louise Arensberg first introduced LA curator Walter Hopps to Duchamp at their Hollywood home (ca. 1948). Hopps later reflected that this blossoming friendship and exposure to the Arensberg’s substantial collection encouraged his decision to pursue a career in art. As noted in this Introduction, Hopps proved seminal to the LA art scene, co-founding one of the leading contemporary spaces—the Ferus Gallery—in

³⁰ Peter Plagens, *Sunshine Muse: Contemporary Art on the West Coast* (New York: Praeger, 1974), 129-130.

1957. The connection between Hopps and the artist resulted in Duchamp's first retrospective at the Pasadena Art Museum in 1963 (curated by Hopps).³¹

Duchamp and the Arensbergs served as fundamental conduits for aesthetic, methodological, and intellectual pursuits that took hold in 1960s Los Angeles. Not only had Duchamp proven to be an important philosophical axis on which experimental art pivoted in Los Angeles, two of his works spoke to the industrial aesthetic that pervaded LA art. As a mechanical perspectival tableau that compresses viewer depth of field to enact its optical effects, *Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage . . .* (*Given: 1. The Waterfall, 2. The Illuminating Gas . . .*), 1946–1966, parallels the viewer perception that installations by Nordman or Turrell developed.³² And *The Bride Stripped Bare by Her Bachelors, Even (The Large Glass)*, 1915–1923—designed for viewers to look *through* while studying its symbolic pictorial elements—correlates forcefully to the phenomenal objects produced by, for example, Larry Bell or Fred Eversley.

Finally, an analysis of post-studio practices through the lens of Southern California art/technology calls for examination of the curatorial interventions of Hal Glicksman. Knowing the profound interest that Glicksman took in such technologically engaged projects, A&T curator Maurice Tuchman brought Glicksman on board to assist as an outside curator in 1969—the same year Glicksman began curating post-studio

³¹ Moreover, the “Duchamp Festival” staged by the University of California Irvine in 1971 attests to the artist's ongoing West Coast influence.

³² Penelope Haralambidou offers an exhaustive, technical examination of *Given* in terms of its Cartesian perspectivalism and use of architectural perspective. See “The Blossoming of Perspective: An Architectural Analysis of Given,” in *Marcel Duchamp and the Architecture of Desire* (Dorchester, UK: Henry Ling, 2013).

projects in Pomona.³³ Glicksman was born in Beverly Hills, California in 1937, graduating from Beverly Hills High School in 1955. He studied art history at the University of California, Los Angeles at both the undergraduate (B.A., 1959) and graduate levels (1960 – 1962), before beginning work as Preparator-Registrar at the Stanford University Museum of Art in 1962.³⁴

Following his graduate studies, Glicksman held preparator roles at Stanford University (1962 – 1963) and the Pasadena Art Museum (1963 – 1969). His résumé grew to include the design and installation of exhibitions on an international stage, with his oversight of US presentations at the Eighth Sao Paulo Bienal in Brazil in 1965 and the Fifth Biennale de Paris in 1967.³⁵ Perhaps due to the highly technical nature of designing and installing exhibitions, Glicksman channeled his interests and talents into developing a new program focused on creating experimental environments. Although the appointment—described in the following section—lasted just one year at Pomona College, Glicksman left an indelible mark on the trajectory of post-studio technology practices in Southern California.

³³ Glicksman was officially employed at the Pasadena Museum of Art when he was brought on the project. From 1967–1971, Tuchman, Glicksman, and LACMA Associate Curator Jane Livingston, among others, coordinated direct exchanges and collaborations between artists and technologists.

³⁴ The museum is now the Iris and B. Gerald Cantor Center for Visual Arts at Stanford University.

³⁵ He also spent two years on the East Coast—teaching (George Washington University) and curating (Corcoran Gallery of Art) in Washington, DC from 1970-1972—before returning to California. See Hal Glicksman, *Curriculum Vitae* (1955-present), at URL: <http://percept.home.cyberverse.com/percept/halresume.html>.

Hal Glicksman—Curating the Post-studio Sublime in Claremont, California

Hal Glicksman's legacy as a chief facilitator of the so-called Light and Space movement on the West Coast began with his appointment at Pomona College in 1969. The art department's new chair, Mowry Baden, hired Glicksman with no real curatorial training (save his hands-on experience as a preparator) to direct the college's small, yet innovative museum of art. Glicksman came to Pomona College from the Pasadena Art Museum, where he had worked under Walter Hopps as an Exhibition Designer-Preparator for six years. According to Glicksman, Hopps entreated his assistance far beyond the functional duties of a preparator, often requiring that Glicksman work quickly to get shows installed within exceedingly narrow timeframes.

Glicksman interacted significantly with the artists during installation, including lending them tools and constructing spaces as needed; he understood the technical aspects of installation and artists trusted his expertise. For example, when installing James Turrell's first exhibition in Pasadena in 1967, Turrell asked Glicksman for a soldering iron and then a "VTVM" (a vacuum tube voltage meter that records electrical measurements). Glicksman was able to answer positively to all of Turrell's requests save, "Do you have an oscilloscope?" When Glicksman replied that he did not own an oscilloscope, Turrell quipped, "When you're in this long enough, you'll have one of those, too."³⁶

This amusing exchange attests to Glicksman's strong technical proclivities as well as his trouble-shooting capabilities, which heavily influenced Baden's selection of

³⁶ Hal Glicksman (2008), quoted from an interview with Rebecca McGrew, Santa Monica (December 4) reprinted in McGrew, et al., *It Happened at Pomona*, 100.

Glicksman to helm the Gladys K. Montgomery Art Center at Pomona College. Thomas Crow maintains that Glicksman's experiences as a preparator at the Pasadena Museum of Art instilled "a heightened awareness of the gallery as a physical apparatus. At a time when the idea of site-specific sculpture was gaining dominance, he set out commissioning sympathetic artists to take over the gallery in a series of comprehensive installations."³⁷ Not only did Glicksman possess the technical experience to facilitate post-studio process, he also desired to contribute to the emergent discourse. Glicksman maintains he participated in all Art and Technology events in the area, including all interdisciplinary events held at California Institute of Technology (Caltech).³⁸

Glicksman's role at Pomona paralleled the inception of immersive environments as well as the dematerialization of the art object, but also helped to crystalize a more focused interest in phenomenal environments in Southern California. Glicksman recalls, "My principle the whole time I was doing exhibitions was to show artists who needed something that I could do for them—that the art wouldn't exist without the opportunity and without the technical expertise that I could give to it. I didn't see any justification for the existence of curators just to be arbiters of taste."³⁹ Thus, Glicksman held the title of curator at Pomona, though his role is best characterized as a facilitator-collaborator as he offered a space for experimentation and provided technical assistance to artists as opposed to pre-selecting art works to be exhibited alongside other compatible pieces.

³⁷ Thomas Crow, "Disappearing Act: Art in and out of Pomona," in McGrew, et al., *It Happened at Pomona* (2011), 44.

³⁸ Hal Glicksman (2014), phone interview with the author, 27 May. According to Glicksman, his involvement contributed to Tuchman inviting Glicksman to join the A&T curatorial staff.

³⁹ Glicksman (2008), "Hal Glicksman Interviewed by Rebecca McGrew," 112.

Although Glicksman directed the museum for just one academic year (September 1969 to June 1970), he initiated a groundbreaking program during that brief tenure.⁴⁰ With a unique idea of how he might best facilitate true artistic experimentation, Glicksman made an ad-hoc space available to artists-in-residence. He termed the program the “Artist’s Gallery,” arriving at the idea from a studio visit that he paid to artist Lloyd Hamrol (b. 1937). After earning a graduate degree in art from UCLA in 1963, Hamrol began making minimalist sculpture and, along with Judy Chicago and Fred Eversley, became involved in the Aesthetic Research Center in ca. 1966. According to Hamrol, he and Glicksman lived on the same street in Pasadena at that time: Colorado Boulevard.⁴¹

During a studio visit, Glicksman learned that a major frustration for Hamrol was a lack of institutional support for site-specific experimentation. Hamrol desired to produce site-responsive works but found that institutions typically were unwilling to allow artists extended periods of time to be in the space where their ideas might germinate organically. Glicksman responded by providing the exhibition gallery itself to serve as a studio-residency for selected artists for six weeks. He invited artists based on his local network of art workers, not relying on a formal selection process. He explains:

Artists knew me as someone who was interested in the processes and technology of creating art and showing it properly. I was able to see the correlation of the materials and the aesthetic goals of the work. The artists that I showed were friends, and there did not seem to be any conflict of interest because there was no

⁴⁰ Glicksman departed at the end of the academic year to join Walter Hopps as associate director of the Corcoran Gallery in Washington, DC. Helene Winer continued Glicksman’s curatorial innovation, succeeding him as director the Museum in 1970. Winer was an Angeleno, having grown up in Los Angeles and studied art history at the University of Southern California. Baden enticed her back to Los Angeles from her post as assistant director of Whitechapel Art Gallery in London. Winer was forced out of her post by a conservative college administration in 1973. Winer (2008), “Helene Winer Interviewed by Rebecca McGrew,” in *It Happened at Pomona* (2011): 165-175.

⁴¹ Hamrol (2010), Oral history interview with Glenn Phillips, 4-5.

special prestige or advantage to showing at Pomona College at the time. The artists expected that only other artists and art students would make the trek to Claremont to see their work. They wanted to show because otherwise the work would not be created, or even conceived.⁴²

The lack of pretentiousness that surrounded the art shown at Pomona College possibly contributed to the underground success and positive local press that the Artist's Gallery enjoyed. Without the pressures of art market economies and art criticism, artists found that true experimentation with materials, technologies, and, especially, the manipulation of viewer perception within space occurred more fluidly.

In a glowing review of Glicksman's innovative Artist's Gallery, art critic William Wilson asserted that the program was progressive in the ways it addressed new expectations and desires for both artist and audience. Wilson praised Glicksman's new project at Pomona for the collaborative exchanges that it fostered between artists who were interested in creating so-called "environmental art." Wilson suggests that these developments in immersive art practices fulfilled two distinct needs: they rely on the coordination of like-minded curators and also open new avenues of aesthetic production. Wilson concluded his argument by asserting, "Many artists feel constricted by the normal dimensions and effect of traditional art objects and techniques. Their need for expansiveness is virtually Baroque in its character. [. . .] It is a need for places to discover our feelings, total and integrated in a world that demands we divide and suppress our natural togetherness."⁴³ Without appending a label to this movement or noting the site-

⁴² Hal Glicksman (2008), "Hal Glicksman Interviewed by Rebecca McGrew, 100.

⁴³ William Wilson, "A Milestone in Modernism at Pomona College," *Los Angeles Times* (10 May 1970), C42.

specific impulse of Glicksman's initiative, Wilson acknowledges the growing desire for aesthetic "places" rather than "objects."

Glicksman initially intended the space to be used as a type of studio, though the invited artists began to produce immersive environments worthy of exhibition. Hamrol was the first invited artist, followed by Ron Cooper (December 12 – 20 1969), Michael Asher (February 13—March 8, 1970), and Tom Eatherton (May 1 – 27, 1970).⁴⁴ Hamrol realized *Situational Construction for Pomona College*, 1969 (fig. 4.6).⁴⁵ He created the installation by using basic, low-tech materials: electrical lights and colored gels, balloons, lead wire, water, and plastic. With the assistance of his (then) wife, Judy Chicago, Hamrol installed theatrical gels over floodlights mounted on the ceiling. The warm, uneven light projected through tightly packed white balloons, creating the illusion of an orange-hued sky nearing twilight. Between the balloons Hamrol draped 1/4-inch lead wires that fell irregularly into roughly three inches of water held in a shallow black polyethylene liner on the room's floor (fig. 4.7).

Situational Construction—an installation viewed through a small window—provided what Glicksman called the effect of "a sunset burning through the clouds."⁴⁶ The light coupled with the balloon forms gave the illusion of dusk filtering through clouds and the wires conveyed the notion that frozen trickles of rain dripped soundlessly

⁴⁴ Additionally, Glicksman organized concurrent exhibitions and events at Pomona, including an outdoor performance of pyrotechnics by Judy (Gerowitz) Chicago, a small gallery devoted to Robert Irwin, and the first exhibitions of Lewis Baltz and Michael Brewster, respectively. Glicksman also mounted the thematic shows "Movie Palace Modern," "Three Master Photographers," and "Chicano Graffiti."

⁴⁵ Glicksman invited Robert Irwin to exhibit one of his now iconic discs concurrent with Hamrol's residency. Glicksman (2008), "Hal Glicksman Interviewed by Rebecca McGrew," *It Happened at Pomona*, 101.

⁴⁶ Glicksman (2008), "Hal Glicksman Interviewed by Rebecca McGrew," *It Happened at Pomona*, 102.

into the pooled water on the ground. The balloons/clouds and rivulets of wire/rain reflected into the depthless floor. Hamrol recalls, “It went from being a room with given and known dimensions to a room with some unknown dimension in the vertical axis.”⁴⁷ Although Hamrol’s overarching goal was to create a perceptual environment, Glicksman recalls that Hamrol’s underlying premise arose out of a painterly tradition.⁴⁸

Not only did Hamrol distance the viewer from total immersion by installing an aperture through which to view the space, but the work itself reads as an abstracted landscape painting replete with the romantic sensibility of the idyll. Hamrol plays with painting’s adage of providing a “window to the world.” Gazing through the rectangular aperture (fig. 4.8), which resembles a picture frame, results in strange readings of the three-dimensional, abstracted landscape comprised of industrial materials.⁴⁹ There is a horizon line, and the reflection of water and warm hues of the balloon-filtering light provides the viewer with an uncanny sense of the whimsical sunset. While Hamrol does not provide the viewer with an immersive environment that can be entered in the manner that the works discussed below do, *Situational Construction* resonates with the viewing structure of Duchamp’s *Étant donnés*, 1946–1966 (which, according to the Philadelphia Museum of Art, was made available for viewing in 1969).⁵⁰ Both works ask the viewer to look through an aperture and investigate the constructed tableau, while underscoring an

⁴⁷ Lloyd Hamrol (2010), quoted from an interview with Glenn Phillips (15 June), *It Happened at Pomona*, 5. *Situational Construction for Pomona College* was recreated for the 2011 exhibition, *It Happened at Pomona*.

⁴⁸ Hal Glicksman (2014), phone interview with the author, 27 May.

⁴⁹ *Situational Construction* was recreated in 2011 for the *Pacific Standard Time* exhibition at Pomona College.

⁵⁰ Philadelphia Museum of Art, “Collections: *Étant donnés: 1° la chute d'eau, 2° le gaz d'éclairage . . .* (Given: 1. *The Waterfall*, 2. *The Illuminating Gas . . .*), Philadelphia Museum of Art website, at URL: <http://www.philamuseum.org/collections/permanent/65633.html> (accessed 8 April 2015).

uncertainty over the scale, dimension, and spatial relationships of the objects just beyond that threshold.

What speaks to the experimental quality of Glicksman's organized residencies is that Hamrol generated his idea for *Situational Construction* while being physically present in the space itself. Hamrol recently recalled, "I didn't have this piece in mind [until I spent time in the Artist's Gallery]." ⁵¹ Thus, Hamrol responded to the site by merging his desire to create a tranquil tableau with the incorporation of unorthodox materials. Hamrol employed the materials mindfully, pairing simplicity and repetition of form with the ethereal—yet somehow tangible—quality of the light. By privileging formal harmony and placing light as the dominant perceptual medium, he demonstrates an overall vision that seems to highlight the aesthetics of landscape and nature while diffusing the technology employed in production. He toys with viewer perception by staging an installation that intentionally employs a framed aperture as its viewing apparatus. The aperture withholds total awareness of scale, dimension, and panoptic immersion, though viewer perception of light and space remains the hallmark of this post-studio work.

Whereas Hamrol did not engage cognitive psychology as a crucial theory in the way that other so-called Light and Space practitioners would, Michael Asher (1943 – 2012), who followed Hamrol in the Artist's Gallery, valued perceptual concerns differently than this emergent group. During Asher's initial visit to the exhibition space, he devised an installation that used a separate part of the building (distinct from the

⁵¹ Hamrol (2010), Oral history interview with Glenn Phillips, 5.

Artist's Gallery). However, after taking up residency on campus, he changed his mind and instead planned a work that connected the gallery space, the lobby, and the main entrance from the street.⁵² His untitled installation (figs. 4.9 – 4.10) proved to be a direct response to the site, an early example of his signature style of “situational aesthetics.”⁵³ Like Daniel Buren, Hans Haacke, and others, Asher's aesthetic interventions typically involved adjustments to the architectural space that underscore the ties between the site's architecture and its relationship to the institution as a place of commerce and/or authority.

Just prior to Asher accepting Glicksman's invitation at Pomona, Asher executed an installation for his first solo show at the La Jolla Museum of Art in 1969 in which, according to the museum, “the object was conspicuously absent.”⁵⁴ In La Jolla, Asher created a “white out” experience by modifying the architecture and the spatial acoustics (fig. 4.11 – 4.12). The entire room was painted bright white, the floor was carpeted white, and the floor and the ceiling were sound dampened. Asher built sound adjusting equipment into the architecture: an audio oscillator, an amplifier, and a speaker generating a low-frequency tone.⁵⁵ The emission of the low-frequency sound waves, in conjunction with the dampening effect of the floor and ceiling, produced what Marie

⁵² Michael Asher with Benjamin H.D. Buchloh, reprinted from *Writings 1973–1983 on Works 1969–1979*, in McGrew, et al., *It Happened at Pomona*, 118.

⁵³ This move distanced him from the phenomenological camp and increasingly aligned his style with the conceptual art practice of Institutional Critique. Victor Burgin, “Situational Aesthetics,” *Studio International* 178 (October 1969): 118-121.

⁵⁴ “Exhibition Chronology, 1969-1996” in *Blurring the Boundaries: Installation Art, 1969-1996* (San Diego, CA: Museum of Contemporary Art, San Diego, 1997), 81. In the early 1970s the museum became the La Jolla Museum of Contemporary Art and, in 1990, officially changed its name to the San Diego Museum of Contemporary Art.

⁵⁵ Clark, “Introduction,” *Phenomenal*, 48.

Shurkus has termed “a dead zone in the center of the gallery.”⁵⁶ Visitors experienced sound as the primary aesthetic component in the gallery, produced by the well-hidden technical equipment. According to curator Larry Urrutia, the haptic sensation of feeling the vibrations overshadowed the experience of actually hearing the sounds themselves.⁵⁷ At Pomona, Asher continued his manipulations of a room’s soundscapes by intervening in the existing architecture (although he completely divested his practice of additional audio equipment). Instead, Asher reconfigured the walls to channel interior and exterior sounds between the gallery and the main entrance (fig. 4.13).

Asher’s installation at Pomona was sectioned into two triangular spaces—one chamber significantly larger than the other—with impinging, low ceilings. A narrow passage joined the two chambers, allowing the transmission of natural light and sound. Additionally, Asher blended a low-illumination artificial light source into the work flushed up to the portico ceiling: a seventy-five watt light diffused by clear and blue-tinted Plexiglas and other layers of fiberglass; the exterior street lights and moonlight also defined the installation during nighttime interactions. He included an entry/exit to the offices south of the installation, which was for the most part unobtrusive as its faint outline was barely visible when closed (fig. 4.14). Views of the installation at various times of the day illustrate the ways in which the passage channeled and shaped the light, while also highlighting the emptiness of the space (fig. 4.15).⁵⁸

⁵⁶ Marie B. Shurkus, “Michael Asher: Familiar Passages and Other Visibilities,” in McGrew, et al., *It Happened at Pomona*, 115.

⁵⁷ Larry Urrutia, “Michael Asher: Untitled (White Room),” in Davies, et al., *Blurring the Boundaries*, 82.

⁵⁸ Hal Glicksman, *Hal Glicksman papers (1927-2010): exhibition files Pomona College*, Box 13.

Rather than dampening the sound, as in the installation at La Jolla, Asher reformed the architectural space at Pomona to produce an acoustical conduit between the exterior and interior of the building. Mowry Baden recalls that he, Asher, and Glicksman were in the installation's interior triangular space and Asher pulled out a low-range air velometer for tracking air currents. With the delivery and return of the ventilation system turned off, Asher activated the device—also known as a titanium tetrachloride smoker (T.T. Smoker)—which produced a cloud of white smoke.⁵⁹ Baden, Glicksman, and Asher observed the smoke follow the wall at chest height, turn the corner, follow the opposing wall into the adjacent room, go around the two walls in opposite space, and exit out of the doorway outside.

Ecstatic with what he saw, Asher cried “It’s working!”⁶⁰ The next time Baden was in the space, he heard the sound of a train across campus become more enhanced as it moved.⁶¹ With a basic understanding of natural ventilation and air currents (relative to barometric pressure and temperature), Asher amplified the acoustics of the exterior environment and brought those sounds into the space in a focused manner. Moreover, Asher’s choice to remove the doors altogether introduced not only external soundscapes into the space, but also left participants’ experiences open to current weather conditions. (It is worth noting that the amenable climate of Southern California facilitated this aspect

⁵⁹ Since the smoke produced is not hot, it does not rise. Architects and engineers use this device to find drafts and trace air currents in spaces.

⁶⁰ Baden recalled Asher’s reaction in: Mowry Baden (2008), “Mowry Baden interviewed by Rebecca McGrew, Part I” at Baden’s studio in British Columbia (12 August), transcript in *Pacific Standard Time Oral Histories* (Los Angeles: The Getty Research Institute, 2012), 2-3.

⁶¹ *Ibid.*

in a pragmatic way.) Asher recounted in 2011 that after he had worked out the triangular chambers of the installation, he began to wonder about the necessity of the doors:

Since I was looking at everything that preexisted, I finally wondered about the doors. Why do I have to use the doors? Because in fact, all the elements that I wanted to use in the work were coming through the passageway anyway, why not have basically a work which truly merges to the out of doors, and yet is defined by the indoors? So I took them off...As a matter of fact, I really liked the idea of accessibility day and night because I was interested in how the air was changing, the sounds were changing, and the light was changing. And if one really wanted to follow it, like I wanted to follow it, they would come back at night to see what shifts were taking place in those three elements.⁶²

By eliminating the doors, Asher blended the experience of the space with external and internal light, sound, and climate conditions—an overt interrogation into the architecture’s functionality and purpose. Sharkus concludes, “Thus, in contrast to the Light and Space environments of his Southern California contemporaries, Asher’s work connected perceptual experiences of the specific locations with the actual social discourses flowing through those contexts.”⁶³ With the Pomona installation, Asher questions our subjective relationship to the specific space as well as with any spatial environment. Does architecture function solely to shield us from the elements? Or, can we engage with space in new, meaningful ways by blending the external and internal in a phenomenological experience?

In a neutral review of Asher’s installation at Pomona—“Space Used in Unusual Art Exhibit”—the reviewer quotes Glicksman in regards to the dichotomy of interior and exterior space. Glicksman explained, “Careful balancing of these factors enables one to

⁶² Asher in conversation with Marie Shurkus, quoted in Shurkus, “Michael Asher: Familiar Passages and Other Visibilities,” 116.

⁶³ *Ibid.*, 114.

be aware of such things as the din of passing cars, when one expects it to be quiet, or the fleeting shadows of the daylight reflected off many surfaces. Emerging from the inner chamber, the outside world of grass and trees is framed in the doorway, and seen as if for the first time.”⁶⁴ With the safety of Pomona’s quiet campus, the installation remained open twenty-four hours a day for the duration of the show, and students used the space as a late-night hangout.⁶⁵

Whereas Asher responded to the site with the intent of highlighting the temporospatial experience of the gallery’s architecture set against the outside environment, Tom Eatherton’s experimentation with creating situations of light and space stems from the tradition of painting. Eatherton maintains that he considers his installation work to be a type of painting that surrounds the viewer—a painting you view from the inside out. From around 1958 and into the early 1960s, Eatherton was firmly rooted in Abstract Expressionism. His style reflected a structural sensibility, painting, for example, rigidly gridded abstracts injected with an understated painterly flair. In a continuation of this mode, he produced a series in 1966 in which he masked geometric designs directly onto unprimed, unbleached muslin.⁶⁶ (Eatherton pursued this concept with such works as *Point Set I* and *Point Set II* [figs. 4.16 – 4.17]). When Eatherton carried a painting from this series home and propped it up in his breakfast nook, epiphany struck; he noticed the

⁶⁴ Hal Glicksman, quoted in “Space Used In Unusual Art Exhibit,” *Progress-Bulletin*, Claremont (15 February 1970).

⁶⁵ Glicksman (2008), “Hal Glicksman Interviewed by Rebecca McGrew,” 104. The component of twenty-four-hour accessibility also prefigures Asher’s early investment in the development of Institutional Critique, in that it interrogates the typical functions of the gallery by undermining its standard hours of operation.

⁶⁶ Tom Eatherton (2010), “Tom Eatherton interviewed by David Pagel” at Tom Eatherton’s studio, Santa Monica, California (June 4), transcript in *Pacific Standard Time Oral Histories* (Los Angeles: The Getty Research Institute, 2012), n.p.

optical qualities that occurred when the sun shone through the unpainted muslin.

Eatherton recalls, “I was looking at that light coming through those points, and I thought, ‘That’s it. I can make those pieces. I can get inside them. If I bring the light in, that’s it, that’s the information.’”⁶⁷ The following day Eatherton began experimenting with this idea, which eventually yielded *Home*, 1967—his first piece in which light served as the primary aesthetic element and encompassed the viewer completely (fig. 4.18). He exhibited *Home* at his studio in Ocean Park, California, which became not only his breakthrough piece in terms of phenomenal installation but also served as a prototypical work for the development of his post-studio practice at Pomona.⁶⁸

Home projected light through photographic backdrop paper (though small lines on the paper became visible when bright light filtered through it). As a result, *Home* incorporated substantially low lighting to prevent what Eatherton believed to be a distracting inclusion in the material. With each subsequent installation, he gleaned new information and used the opportunities to refine his vision. Eatherton experimented with varying the footprint of the space, the material used to filter the backing lights, and the color of the projected light itself. He tested the materials, including shower curtain plastic and highly reflective Mylar, for their ability to stretch over a large armature.⁶⁹ The scale of these installations ranged from rather small rooms—which he felt might instigate

⁶⁷ Eatherton (2010), “Tom Eatherton interviewed by David Pagel.”

⁶⁸ Hal Glicksman, “Thomas Eatherton,” biography published on Glicksman’s online exhibition space “Percept,” at URL: <http://percept.home.cyberverse.com/eatherton/index.html> (accessed 11 April 2014).

⁶⁹ Mylar is a polyester resin that takes the form of (often transparent) plastic sheets that are heat resistant.

feelings of claustrophobia in participants—to significantly larger spaces (typically sixteen feet long, by eight feet high, by five feet wide).⁷⁰

After Eatherton exhibited three phenomenal environments in his studio, *Home* (1967), *Float* (1968), and *Arc* (1969), Glicksman invited Eatherton to use the Artist's Gallery for residency in May 1970. Glicksman recalls, "I felt confident that he could do a large, complicated piece. But when he got to Pomona, he actually had no idea how to do it. He knew what he wanted, and he communicated it to me, but I had to solve all the technical problems. That was fine, that was my job."⁷¹ They collaborated to produce Eatherton's most ambitiously scaled installation, *Rise*, (figs. 4.19 – 4.20), which employed a more complicated technical structure than the studio-based works.

First, they constructed a framework that encircled a secondary, interior framework (figs. 4.21 – 4.22). Stretched over the interior armature—and creating the physical space in which the viewer enters—was white nylon pulled taught; the exterior armature held a stretch of plastic. The visual effect of the blue-grey lighting is achieved by a double-diffusion: first through the translucent plastic, followed by a denser dispersal produced by the white nylon cloth. Eatherton explains that air pressure between the cloth surface and the secondary plastic surface created "a big balloon, a big tube that goes all the way around that curve. Nobody can see that."⁷² The color choice, he adds, is "congenial" for him, but the light level also provides the intended meditative experience.⁷³

⁷⁰ Eatherton explains that the dimensions of the installations were always dependent on his ability to dismantle the framework into movable pieces that could be moved out of his studio and reassembled in the exhibition space. Eatherton (2010), "Tom Eatherton interviewed by David Pagel."

⁷¹ Glicksman (2008), "Hal Glicksman Interviewed by Rebecca McGrew," 112.

⁷² Eatherton (2010), "Tom Eatherton interviewed by David Pagel."

⁷³ *Ibid.*

Eatherton maintains his installations stem from his roots in abstract painting, but that he was especially interested in setting up an encompassing space that filled the viewer's total visual field (including peripheral vision). He explains,

While Lightspaces are physically three-dimensional (and hence are often called sculptures) they are conceptually extensions of painting. Painters in this century have become increasingly concerned with the limitations of painting either to affirm and restate them, or to transcend them. For me the opportunity to work with light itself was like a portal to the future or to a timeless place.⁷⁴

This comment illustrates Eatherton's firm belief that his phenomenal installations operate as actual three-dimensional extensions of painting's two-dimensionality—as a way of placing the viewer within the traditional sphere of painting.⁷⁵ Although Eatherton does not overtly comment on the ways in which his installations intersect with the discursive contexts of Judd's "Specific Objects," his language suggests his art is a hybridization of painting and sculpture.⁷⁶

With thirty years between Eatherton's statement above and my personal experience of the work at its 2011 reinstallation at Pomona for the *Pacific Standard Time* exhibitions, I admit that construing *Rise* as an immersive "light painting" did not register overtly. Certainly, the formal structure in which Eatherton segments the fields of light in his installations—i.e., the black "traced" edges of the dimensional planes in *Home* and the presentation of two monumental curvilinear fields in *Rise* (fig. 4.23)—does correlate the walls of light with the rectilinear presentation of paintings. But whereas Mary Corse

⁷⁴ Tom Eatherton (after 1981), "Rise: artist statement," published on Glicksman's online exhibition space "Percept," at URL: <http://percept.home.cyberverse.com/percept/statement.html> (accessed 11 April 2014).

⁷⁵ Perhaps a corollary would be Monet's iconic *Water Lilies*, mural-scale paintings produced at the end of his life. The experience of *Water Lilies* can be framed as proto-installation works as they were displayed by Musée de l'Orangerie in a specially designed oval room in 1927, shortly after the artist's death.

⁷⁶ For an overview of Judd's "Specific Objects," see "Chapter 2" above. For an overview of Merleau-Ponty's *The Phenomenology of Perception*, see "Chapter 1" above.

literally intervenes in painting's institution by imbuing paint with light-channeling spheres, the experience of *Rise* feels quite distant from the experience of a painting. The relationship is solely conceptual. While the tradition of painting expects the viewer to maintain the subject/object relationship, *Rise* removes "object" from the equation and replaces it with total subjective immersion.

Similar to the phenomenal exchange experienced in the art/technology objects produced by this dissertation's first three case studies, the mobile spectatorship of *Rise* highlights the experience of embodied vision by attuning the subject to the metacognitive awareness of perception in time.⁷⁷ However, the paths of this mobility depart from these case studies in an important way. Unlike the circumambulation or body repositioning required to gaze around or through a sculpture by Larry Bell or Fred Eversley, and unlike the transambulation that necessarily activates the retroreflection of Mary Corse's paintings, *Rise* inverts the subject/object relationship of mobile spectatorship entirely. Instead, the subjective experience of *Rise*, in line with other fully immersive installations, is dependent on less prescriptive movements: including walking across and through, spinning, and turning one's head in 360 degrees.

Entering *Rise* through the narrow hallway signals an entrance into a space of significance, not unlike entering a cathedral through its main portal. Not only does this liminal space signify bodily transition into the anticipated spatial environment, but the darkness of the hallway also dampens (and even slightly disorients) vision in preparation for the illumination at its threshold. Crossing that interchange yields an identifiable

⁷⁷ See my preliminary remarks above on mobile spectatorship in this dissertation's "Introduction."

moment of the sublime—a “wow” moment—when the light is eagerly welcomed and consumed. A feeling of reverence for the experience persists, through the trance-inducing effect of the dim, encompassing, blue light. One finds oneself annoyed by excessive noises, aligning the space with a place in which prayer or mediation occurs. The experience has a hypnotizing aspect, causing one to lose concrete sense of temporality. The transfixed gaze, coupled with the subjective awareness of one’s thoughts, perceptions, and breath, come to the fore. Eatherton summarizes, “It’s moving. I mean I wasn’t trying to trick anybody. But an old girlfriend of mine took her six-year-old son to *Rise*, and he reached down to feel the floor he was standing on to see if it was there.”⁷⁸

Glicksman concluded his tenure as Director and Pomona’s exhibition season with two shows: Lewis Baltz (May 1–June 1, 1970) and Robert Irwin (October 20, 1969–June 6, 1970). Helene Winer continued the post-studio programming at Pomona begun by Glicksman, as Glicksman accepted a position in Washington, DC as the Associate Director of the Corcoran Gallery of Art. With a curatorial point of view focused on conceptualism and performance art, Winer helped to launch the careers of key LA conceptual artists at Pomona including John Baldessari, Chris Burden (b. 1946), and Allen Rupersburg (b. 1944), among others.⁷⁹ After Glicksman’s departure for the East

⁷⁸ Eatherton (2010), “Tom Eatherton interviewed by David Pagel,” n.p.

⁷⁹ She curated a number of groundbreaking conceptual art exhibitions and performance pieces from 1970 until her 1972 dismissal from Pomona, due to a controversy over a commissioned performance by Wolfgang Stoerchle (1944 – 1976). On March 13, 1972, Stoerchle performed an untitled piece completely nude during which he drank beer and urinated on a rug placed on the gallery floor. This piece proved too provocative for the school’s administration, and Winer was immediately relieved of her directorial duties. Winer’s termination in conjunction with the controversy of exhibiting advanced art spurred the studio art faculty to resign in solidarity, including artist James Turrell. Turrell recounts, “the faculty all resigned! *En masse* to support her.” Turrell (2009) interviewed by Rebecca McGrew, in *It Happened at Pomona*, 305.

Coast, he and Baden continued their professional kinship via correspondence; in one particular letter, Baden reflected on the impact of Glicksman's post-studio space:

I have been thinking of late that your gallery program at Pomona was a most tactful acknowledgment of some obvious truths that need facing. I'm really glad I saw you and the artists do that. Except for the aspect of impermanence, the whole program lay in that long tradition of artist and institutional patron....The only way I can see to tighten it up is in ownership. And [it] seems to me Bob Smithson said something to that effect over Walter's [coffee shop in Claremont] grease one noon. His sequence went something like this: 1) Artist makes a proposal for a specific site. 2) Artist finds a patron who must assume ownership of the site and pay for the work. 3) Because it is owned by someone it obtains instant longevity. Longevity is really a matter of memory. To have any substantial memory the work must, however brief, be public....Like Taliesin, Soleri's Scottsdale and best of all, Watts Towers and Merzbau.⁸⁰

Thus, Baden suggests Glicksman's post-studio program operated as a liminal site for exchange between artist and audience, in the same way that works (such as the Watts Tower) functioned as icons of public art. Though Baden openly champions the experimental nature of Glicksman's program, he implies that permanence or materiality would possibly have elevated the Artist's Gallery to the renown of the Watts Towers. Yet the relative obscurity is precisely what made Glicksman's curatorial style and experimental program attractive to the local art milieu. By serving as a public space that merged studio and gallery, the Artist's Gallery allowed lesser-known artists to hone individual explorations of art/technology and space while gaining local exposure.

Winer wrote briefly for the *Los Angeles Times*, before moving to New York where she went on to direct Artist's Space and co-found Metro Pictures with Janelle Reiring.

⁸⁰ His comment reveals a bias that art exists as a material product rather than a process or a dematerialized experience. Baden in an undated letter to Glicksman on Pomona College letterhead, in *Hal Glicksman papers (1927-2010): exhibition files Pomona College*, Box 13, M2009.M.5.

Examining the Ganzfeld—James Turrell and Robert Irwin

Post-studio practices in Southern California often channeled cutting-edge psychological theory and technologies—data, for example, collected by NASA to prepare astronauts for the cognitive isolation of space exploration. An exemplar of the interface between art and cognitive psychology arrived on the heels of the Apollo 8 mission in the form of a collaborative project—between an industrial psychologist and two contemporary artists—made possible by LACMA’s A&T program. Hal Glicksman began assisting Maurice Tuchman and the A&T curatorial team (fig. 4.24) in parallel with Glicksman’s implementation of the Artist’s Gallery at Pomona College (ca. 1969). The sensibilities of A&T echoed those of the Artist’s Gallery—both programs held interdisciplinary collaboration and artistic process outside of the studio as their principal concerns. Through Glicksman’s own interest, the Artist’s Gallery incorporated technology into its aesthetic profile; A&T held collaborations between artists and engineers as its guiding premise.

Between its initial planning in 1967 and its culmination with an exhibition and catalogue in 1971, A&T at LACMA became a platform for post-studio experiments by pairing artists with prominent technology corporations. Of the fifty artists who wished to collaborate with high-tech industry, twenty-three collaborations were successfully realized.⁸¹ Of these twenty-three, nearly all realized proposals that entailed the artists entreating respective corporations to allow them to use cutting-edge technologies on-site (i.e., as a type of artist-in-residence) or involved them requesting donations of high-tech

⁸¹ Tuchman, et al., *Report*, 21.

materials or assistance with fabrication of their designs from the company. In contrast, the A&T project that paired artists Robert Irwin and James Turrell with physiological psychologist Ed Wortz produced no material products (save the collaboration's documentary notes and conference proceedings). Irwin, Turrell, and Wortz's partnership led to the implementation of human perception experiments at Garrett Aerospace Corporation.

Prior to their first meeting, Irwin and Turrell were independently producing art works that activated subjective awareness of perception. Irwin's pedigree emerged out of his training as an abstract expressionist painter, beginning his career with traditional fine art training at Chouinard Art Institute during the 1950s. During the early 1960s, he confronted what he self-consciously termed his "superficiality" and transitioned to producing canvases that highlighted optical perception. Examples of these investigations include his production of a simplified field of color with streamlined horizontal stripes (fig. 4.25) and, thereafter, meticulously applied translucent dots reminiscent of Seurat's pointillist process (figs. 4.26 – 4.27).

By 1967, Irwin's increasing frustration with the edge of the canvas spurred his disc-shaped forms that sought to eliminate viewer perception of the rectilinear edge of a traditional canvas (fig. 4.28). He mounted convex aluminum discs using a hidden armature attached to the back of each object and incorporated strategic lighting schemes to blur or cancel out the object's edges. He coated the discs with a gossamer layer of spray paint designed to work in conjunction with the carefully placed spotlights. Together the object's shape, surface treatment, lighting design, and wall mounting all deliver the

illusion that the painting/disc hovers in space near the backing wall. As such, the perceptual experience fluctuates between a relative uncertainty about the painting's materiality and dimensions, and the desire to get closer to the object to confirm its physical solidity and structural mounting. Irwin's interest in achieving this flux between assurance and ambiguity over the physicality of objects and his concerted effort to produce what he terms "situations," propelled his practice into creating installations of light and space.⁸² His involvement in A&T would prove crucial to this eventual development.

Like Irwin, Turrell also held a deep-seated interest in conveying perceptual situations, although Turrell's early interest in light as a primary medium distinguishes his work from that of Irwin. Born in 1943, Turrell was raised in Pasadena and, as his family was Quaker, his grandmother instructed him at a young age to enter their meeting house and "greet the light."⁸³ During a boyhood visit to MoMA in New York, Turrell was exposed to a Clavilux by artist Thomas Wilfred (1889 – 1968), which Turrell maintains served as a touchstone for the development of his art practice (fig. 4.29).⁸⁴ The Clavilux is a mechanical invention of Wilfred's (the first model dates to 1919), which can "play" one individually created "opus" at a time. With a viewing screen much like a television,

⁸² Sally Yard, "Deep Time," in Russell Ferguson, ed., *Robert Irwin*, exh cat (New York: Rizzoli International Publications and The Museum of Contemporary Art, Los Angeles, 1993), 54. Also, Lawrence Weschler, *Seeing is Forgetting the Name of the Thing One Sees: a life of Contemporary Artist Robert Irwin* (Berkeley and London: University of California press, 1982), 41-42.

⁸³ Calvin Tomkins, "Flying into the Light," *The New Yorker*, 78, no. 42 (13 Jan. 2003), 64.

⁸⁴ Turrell (1986) from a conversation with Craig Adcock in November, in Adcock, *James Turrell: The Art of Light and Space* (Berkeley: University of California Press, 1990), 79. Thomas Wilfred experimented during the early twentieth-century with light projections, creating instruments that could be operated to "play color." He termed the ability to play color *lumia* and called the instrument a Clavilux after the Latin for "light played by key." See Donna M. Stein, *Thomas Wilfred: Lumia, A Retrospective Exhibition* (Washington: The Corcoran Gallery of Art, 1971). Also, "Thomas Wilfred: Lumia," Museum of Modern Art Press Release, No. 89A (10 August 1971).

colors of light swirl slowly in an ethereal, smoke-like pattern; the performance is hallucinatory and the light appears three-dimensional.⁸⁵

Turrell began his undergraduate studies at Pomona College in 1961, where he focused on perceptual psychology and mathematics. From 1965 to 1966, Turrell studied art at the graduate level at the University of California, Irvine. Classmates described him as “serene and calm,” which contrasted sharply with the politically charged angst many students felt toward the escalating conflict in Vietnam. In fact, Turrell was not only registered as a conscientious objector, but he was arrested in 1966 during an FBI sting operation and spent about a year in jail for counseling potential draftees on strategies for avoiding war service.⁸⁶

Turrell’s first series (1966) drew on an idea spurred in the classroom during a slide lecture, and involved experimentation with the high-intensity projection of light using an electrical gas discharge lamp (specifically a xenon arc lamp). Turrell generally refers to these works as “Projection Pieces,” and specifically to those that bridge a room’s corner as “cross-corner projections.”⁸⁷ In *Afrum (White)*, 1966 (fig. 2.5)—the first work from the series—Turrell represents the illusion of a white cubic form by projecting an intensely bright light and incorporating the room’s corner as a bisecting line. This isometric projection draws on the classic Necker cube (see fig. 1.11), a form that relies on

⁸⁵ Inside the cabinet, a rolling bar spins to oscillate a prismatic, hand-painted glass disc, projecting the light patterns upward and onto the viewing screen.

⁸⁶ Tomkins (2003), “Flying into the Light,” 68.

⁸⁷ See “James Turrell: Artworks” on his website available at URL: <http://jamesturrell.com/artworks/by-type/> (accessed 9 June 2014).

the Gestalt psychology theory of multistability and uses the ninety-degree angle of the adjacent walls to produce the illusion of a three-dimensional shape.⁸⁸

By focusing on the gestalt a vacillation unfolds. Through the desire to perceive the simplest (most familiar) gestalt, a tension results in whether one views a material form or a negative space. The phenomenon fluctuates between the appearance of a cut-out window receding into the space beyond the wall and the appearance of a material cube hovering in space just in front of the corner. Turrell's projection pieces rely significantly on the technological apparatus—a xenon projector—and three technical aspects: 1) smooth, unimpeded backing walls, 2) continuous projection of high-intensity light, and 3) exceedingly sharp edges of the projected shape. Developed in Germany in 1940, xenon arc lamps provide high-intensity lighting for cinematic projection. A xenon arc lamp uses gas discharge, wherein electricity is passed through ionized xenon gas at high pressure. The illuminated xenon produces a penetrating white light, with a color temperature close to sunlight.⁸⁹ Thus, Turrell's early interests also made him a clear candidate for LACMA's A&T program.

In early 1969, Turrell, Irwin, and Wortz held their initial meetings at Garrett Corporation, an aerospace-oriented contractor that often worked with NASA. Within the first few discussions, the trio realized their common interests made their grouping apt.⁹⁰

⁸⁸ See above in Chapter 1 for a thorough discussion of multistability.

⁸⁹ See OSRAM, "Historical Overview," *XBO@--theater lamps: Technology and application* (Munich: Hellabrunner Strasse, 2008). The xenon lamp replaced the carbon arc lamp previously used in early cinema.

⁹⁰ Prior to meeting Wortz, Irwin communicated some reservations that he had about the A&T program; Irwin believed that the museum's desire for the artist/corporate pairings to yield exhibitable objects to be exploitative of the artists. After some deliberation, his skepticism about corporate involvement was

Glicksman recently explained: “Ed was sort of a guru in the art world. Even though he didn’t teach, he had long conversations with many artists.”⁹¹ Over the course of the nine-month collaboration, the trio rotated between meeting at Garrett, Dr. Wortz’s residence, each of the artist’s studios, and UCLA before planning and, eventually, conducting psychological experiments on volunteers as well as themselves.

With his academic background in psychology, Turrell principally designed a number of the Garrett investigations for A&T; the twelve experiments were based on their collective interest in synesthesia and a desire to isolate each of the five senses for deeper study.⁹² The tests incorporated Ganzfeld spheres (fig. 4.30) and more in-depth usage of a sensory deprivation chamber to test participants’ reactions to losing contact with select senses (fig. 4.31).⁹³ Ganzfeld— or “entire field”—is an instrument used in psychological experiments to control the visual sensory input of subjects; time spent in the undifferentiated light of a Ganzfeld produces the optical effect of light becoming a material entity. The team also built upon the structure of an anechoic chamber—a space that deadens sound and reproduces the aural conditions of outer space—in their experimental model. Through soundproofing and absolute darkening, experimenters can further test the effects of human sensory deprivation in a modified anechoic chamber.⁹⁴

eventually assuaged and he agreed to a preliminary meeting with potential collaborators. Tuchman, et al., *Report*, 21.

⁹¹ Glicksman (2014), phone interview with the author, 27 May.

⁹² Though their most intensive investigations entailed experimentation with the anechoic chamber, other proposed experiments include using a strobe or low light levels to test retinal levels, as well as auditory intersensory relational (such as the relational quality of taste and pitch). See Tuchman, et al., 133-136.

⁹³ Tuchman, et al., 128. Also, Los Angeles County Museum of Art, Archives, Modern Art Department, Art and Technology records, Box 3.

⁹⁴ In other configurations that employ a water-filled tank in which the subject floats, the participant experiences suspension to minimize awareness of planetary rotation. Once inside a sensory deprivation

With all external stimuli eliminated, participants often report a heightened awareness of bodily sounds and movements. Garrett Corporation used such experimental environments to determine what the human threshold for similar psycho-physiological conditions entailed in the hostile environment of outer space and how the data collected informed the execution of the Apollo and Gemini programs.⁹⁵

Wortz had been an employee of Garrett since 1962, having received a PhD in Experimental Psychology from the University of Texas. His perceptual research in the Garrett Life Sciences Department contributed toward the development of life-support systems for space exploration. At the time of their preliminary A&T meetings in 1968 (fig. 4.32), Wortz was working at length on the psychological tolerances and perceptual implications of physical exertion during a lunar walk.⁹⁶ NASA had just implemented the first human-flight mission of the Apollo program in 1968, which was building toward the much-anticipated first attempt at a lunar landing in July 1969.

By placing themselves and participants in an anechoic chamber on the University of California, Los Angeles (UCLA) campus, the trio maintained copious lab notes detailing the outcomes of each subject's reactions to being "sensory deprived." Experiment instructions for the anechoic chamber that detailed participatory actions were straightforward, outlining repetitive cognitive and physiological tasks designed to spark

tank, users have no visual indicators, all audible sounds are deadened, and the chamber's structure downplays the effects of gravity. Irwin, Turrell, and Wortz employed an adapted anechoic chamber.

⁹⁵ The Apollo program ran from 1961-1972, which included the first spacecraft carrying humans around another celestial body (Apollo 8 and *Earthrise*) as well as six successful lunar landings (Apollo 11, 12, 14, 15, 16, and 17). The Apollo 13 was necessarily aborted near the Moon when critical systems failed in flight. The Gemini program involved ten human spaceflight missions (1965-1966), designed to gather data concurrently with Apollo in support of the ultimate goal of achieving a lunar landing.

⁹⁶ Tuchman, et al., 128. Also, LACMA, Art and Technology records, Box 3.

phenomenological experiences within prefigured time periods (often 10 – 15 minutes in length). Examples of such activities include counting inhalations and exhalations, “seeing breaths,” and meditation practice designed to free the mind of thoughts.⁹⁷

Descriptions and justifications for the project highlighted their aims of defining and codifying perceptual experience: e.g., “All art is experience, yet all experience is not art,” and “We are dealing with the limits of an experience—not for instance with the limits of painting. We have chosen that experience out of the realm of experience to be defined as ‘art,’ [. . .] Perhaps this is all ‘art’ means—the Frame of Mind.”⁹⁸ Attesting to the project’s interdisciplinary aims, the artists underscored, “This project, we believe, is an extension of our work, just as our work is an extension of some mainstream of modern art. A problem may arise with this project in the minds of the art community who may regard it as ‘non-art’—as theatrical, or more scientific than artistic [. . .] we believe in it as art, and yet recognize the possibility of a redefinition needed.”⁹⁹ From the point of view of Irwin and Turrell, the post-studio re-siting of their art transpired within the participants’ perceptual experiences as well as within their data-gathering process.

During the experiment, participants reported an intensified awareness of bodily sensations, including being in a “dream-like” area of consciousness or experiencing visual and auditory hallucinations. Some also fell asleep.¹⁰⁰ The effects that the anechoic chamber produced immediately *after* leaving also intrigued the artists; the chamber

⁹⁷ Tuchman, et al., 138.

⁹⁸ Robert Irwin, James Turrell, and Dr. Ed Wortz (1969), statement and proposal for Project Art and Technology, reprinted in Tuchman, et al., 131-133.

⁹⁹ *Ibid.*, 131.

¹⁰⁰ Tuchman, et al., 136. Also, LACMA, Art and Technology records, Box 3.

elicited a sort of amplified sensorial state of being. Irwin recently reflected that upon exiting, aspects of the surrounding environment appeared visibly altered. He mused:

Houses are there, trees are there, so on and so forth. But it's absolutely totally different because you're processing it more so through what you've done. Not only have you changed your sense dependence, but also your relationship to these: certain ones are now heightened, and the other ones [have] been dumbed down so that you're actually building the thing out of a different set of information.¹⁰¹

In other words, the anechoic chamber had the potential to function like a site of sensorial “resetting” that, once re-tuned, provided volunteers with authentic and original perceptual engagement with their proximate environment.

As noted above, the art/science collaboration at Garrett paralleled Wortz's research initiative for NASA, which sought to develop intelligence and life-support systems for spaceflight. Spurred by the cohesive alliance already forged, Wortz invited Irwin and Turrell, along with other colleagues, to discuss a parallel initiative set forth by NASA.¹⁰² These discussions led to the First National Symposium on Habitability—a three-day event comprised of academic talks organized around both theories and logistics of human habitability (fig. 4.33).¹⁰³ Though the presenters ranged in disciplinary backgrounds—architecture, urban planning, psychiatry, and systems engineering—they were all asked to respond to two questions in their respective talks: “What factors

¹⁰¹ Irwin (2011), “Oral History with Robert Irwin,” (15 March), *PST Oral Histories*, Getty Research Institute, Los Angeles, audio recording and transcript.

¹⁰² Turrell terminated his involvement with this initiative when he stopped collaborating on LACMA's A&T project in August 1969.

¹⁰³ The conference grew out of the interchange between Irwin, Turrell, and Wortz project. See typed notes by Livingston titled “Irwin and Turrell” (but scratched through) in Robert Irwin folder, LACMA, Art and Technology records, Box 3. A synopsis of the event was published in the A&T catalogue. See Tuchman, et al., 140-143. Wortz published a comprehensive report on the event for Garrett in 1970.

influence the perception of life quality and what sets of conditions are necessary for well-being and satisfaction?”¹⁰⁴

As a complete departure from traditional symposia meeting sites, the event proceedings were entirely held in Irwin’s recently acquired studio in Venice, California. Conceived as a type of environment, Irwin removed a wall, painted the remaining walls white, and installed cardboard tubes designed to prevent external sounds and light from entering the space. Thus the environment mimicked the immersive conditions of traveling inside a habitability capsule (i.e., a spacecraft). Over the course of the three days, Irwin gradually intervened in these enclosing measures to allow more of the outside environment to permeate the space, causing him to reflect: “Lighting may be the most versatile tool for environmental change.”¹⁰⁵

The room’s configuration of furniture, attendees, and presenters also proved unorthodox. To underscore the conceptual underpinnings of the symposium, the seating was purposefully uncomfortable; geometric, low profile benches without backs and scattered throw pillows offered some attendees respite from sitting directly on the studio floor. The speakers sat in chairs elevated on a short riser in the middle of the space, with the audience encircling the centrally placed riser in various postures of lounging. The transformation of Irwin’s studio into a site that conceptually represented the symposium’s themes may be viewed retrospectively as his first piece of “installation art,” although his interest in an environment’s perceptual effects was already firmly established. Before he

¹⁰⁴ Edward Wortz, ed., *First National Symposium on Habitability* (Los Angeles: Garrett AiResearch, 1970), 1.

¹⁰⁵ “Notes on Habitability,” 1970, *Robert Irwin Papers, 1970-2004*, Getty Research Institute, Los Angeles, Research Library accession no. 940081.

abandoned painting altogether, Irwin held strong opinions about the perceptual effects that a viewing space had on his paintings and, as such, was insistent on controlling all aspects of their installation.¹⁰⁶

According to Irwin, his Garrett and Habitability collaborations “changed his life,” focusing his interests toward a more pregnant form of post-studio practice, though he continued to make objects for a short time.¹⁰⁷ He now viewed materiality in art as a type of fetter: he termed this the “bias” of the pictorial scenario that a viewer must “look *at*” something. He executed transparent acrylic columns (fig. 4.34), but also experimented with shaping space—for example, by taking a stark white room and rounding off the corners. Critics termed his transparent sculpture paradoxical, because of the ways in which these works appeared to contradict his ethos (that is, objects about nonobjecthood are contradictory).¹⁰⁸ Distancing himself from sculpture, Irwin began experimenting with lighting scrims made of muslin in his Venice studio in 1969.¹⁰⁹

Following his first documented scrim piece in his Venice studio, Irwin executed his first museum work incorporating scrim at the Museum of Modern Art (MoMA) in 1970. “The Room at MoMA,” as Lawrence Weschler refers to it, involved curator

¹⁰⁶ It was precisely the exercise of meticulously attending to the space as a whole—removing potentially distracting elements that would impede the perceptual experience (of his paintings, that is)—that initially led Irwin to wonder if he could execute an “art of the incidental, the peripheral, the transitory.” Weschler, 111.

¹⁰⁷ Ibid.

¹⁰⁸ In fact, he disallowed photographs to be made of his art (specifically between the years 1957 and 1969). As a result, few works from this period exist in documentary form (i.e., represented in installation photographs). Weschler, 112-113. See ix, in Weschler, for further explanation of Irwin’s refusal to allow photographic documentation of his work. Not many people knew of the columns, nor did he market them. Butterfield, 21-22, for a discussion of Irwin’s transition to transparent sculpture.

¹⁰⁹ Part of his transition into producing installations of light and space involved his making countless treks into the desert in order to think and to *look*. Yard, “Deep Time,” 63.

Jennifer Licht inviting Irwin to transform a vacant room on the museum's third floor.¹¹⁰

Licht sought institutional permission for Irwin to utilize the space, and, though she was denied permission, she invited Irwin anyway.¹¹¹

Irwin described the room as “clumsy” with “fat” walls—the “kind of walls you’d find in a basement, bowed as if by too much weight.”¹¹² After spending some time in the awkward room, he responded with *Fractured Light—Partial Scrim Ceiling—Eye-Level Wire*, stretching a translucent white scrim overhead and parallel to the ceiling halfway across the room (fig. 1.34). The scrim diffused the overhead bay of lights by hanging below them, leaving the adjacent bay of lights exposed. Irwin addressed the room’s awkward shape by stretching a single piano wire at eye level parallel to the longest wall.¹¹³ The juxtaposition of diffused and non-diffused bays rendered a near tangibility of light, seemingly draped from the scrim’s edge like a transparent curtain. Without a wall label, *Fractured Light* exuded an anonymity or arbitrariness that could be encountered by a passerby. As Weschler interpreted it, “Ironically, the more sophisticated one was, it seemed the less chance one had of ‘getting it.’”¹¹⁴

¹¹⁰ Jennifer Licht had just curated the well-received exhibition, *Spaces* (December 30, 1969—March 1, 1970), at MoMA.

¹¹¹ Weschler, 150. *Robert Irwin* [MoMA Exh. #943, October 24, 1970]. Licht received confirmation that the room (adjacent to the Brancusi installation) would remain empty for the duration. Without formal support from the Museum, Irwin covered his travel expenses and received no compensation for the execution of the work. Since the room was scheduled to remain vacant, the museum painters, electricians, and carpenters objected to Irwin using the room due to their own union interests. Irwin paid off the union himself and worked outside of gallery hours to complete the piece. Though MoMA maintains this work existed by giving it an official exhibition archival number, no ephemeral publications were produced at the time. See MoMA webpage, “Exhibition History List,” URL: http://www.moma.org/learn/resources/archives/archives_exhibition_history_list#1970 (accessed 22 May 2014).

¹¹² Weschler, 150.

¹¹³ *Ibid.*, 152. Also, Butterfield, 23 and Irwin, “Notes Toward a Model,” 32-33. Before seeing the space, Irwin’s initial idea was to produce an acrylic column.

¹¹⁴ Weschler, 153.

As a post-studio response to the space *in situ*, *Fractured Light* reveals how Irwin's A&T involvement honed his oeuvre going forward. While Turrell discontinued his institutional affiliation with the LACMA project prematurely (August 1969), his abrupt termination did not signal the end of his explorations in perception and art/technology.¹¹⁵ Besides Turrell's magnum opus—*Roden Crater* (begun 1972)—his experiments in light and space at the Mendota Hotel (fig. 4.35) represent some of his most ambitious interdisciplinary investigations.¹¹⁶ Turrell had been renting a dilapidated building, the former Mendota Hotel in Ocean Park, since 1966 with the intent of eventually turning it into an experimental studio. Bracketing his time spent in jail and his A&T participation, the artist slowly converted the hotel into a series of “light studios.” The transformation entailed eliminating external light sources by sealing rooms on the ground floor and preparing the interior walls, making them neutral in color and perfectly smooth.¹¹⁷

Eventually, Turrell started cutting apertures in an outer room of the hotel in order to study light patterns from the exterior environment (fig. 4.36). Known as *Mendota Stoppages*, Turrell scored a light performance for select viewers that combined his light projections with the synchronized opening and closing of the apertures. Organized in a series of nine stages presented during the summer evenings of 1969 and 1970, each

¹¹⁵ Tuchman, et al., 139-140. Turrell provided cryptic reasoning for his departure, implying Irwin's ambition or vanity might have played a role (though he never lays this out in explicit terms).

¹¹⁶ James Turrell and Turrell Art Foundation, “Roden Crater: Introduction,” *James Turrell* website, at URL: jamesturrell.com/roden-crater/roden-crater/introduction/ (accessed 22 May 2014). Roden Crater is a “naked-eye” observatory built by transforming a natural cinder volcano in Arizona over the last four decades.

¹¹⁷ Perhaps most interesting, Turrell does not refer to this series as a work of art on his website. See Patrick Beveridge, “Color Perception and the Art of James Turrell,” *Leonardo*, 33, no. 4 (2000), 306-307.

section built upon the effects of the previous stage and culminated with immersion in total darkness. The performance reduced viewers' visual systems to a heightened sensitivity to extremely low light levels.

Viewers acknowledged the more dramatic effects. For example, during the fifth stage, Turrell adjusted a sliding door between the adjacent room and the performance studio to reveal a diagonal line of light, whose source was a fluorescent light in a store across the street. However, the ultimate perceptual effect went unnoticed by participants. Relying on the knowledge taken from his early conversations with Irwin and Wertz, Turrell began the final stage using the smallest possible apertures. He concluded *Mendota Stoppages* by closing the remaining apertures and plunging the room into absolute darkness. This gradual immersion into a hyper-perceptual state prevented the observers from realizing that darkness had engulfed them. As Patrick Beveridge explains, the visual systems of those participants continued to fire “because the idioretinal light is also phenomenally located in front of our eyes and thus could easily be mistaken for perceptions of quantal fluctuations in a room that is not completely light-free.”¹¹⁸ Thus, Turrell's *Mendota Stoppages*, in line with the A&T experiments, functioned as a laboratory for cognitive perception. Though Turrell reserved the space initially to perform studio work, his reappropriation of the space pushes it into the realm of the post-studio. The hotel became *the site* for the experience of the work—a decided blurring of studio, installation, performance, and the scientific application of cognitive psychology.

¹¹⁸ Beveridge, 307. Idioretinal pertains to the phenomenon in which the retina detects light sensations intrinsically rather than from an external source.

As in the case of Irwin's participation in the Habitability Symposium, the studio had come to bear new meaning far beyond "workspace."

Similar in design to the cognitive and retinal structures governing the *Mendota Stoppages*, Turrell went on to create another series known as "Space Division Constructions." A Space Division combines a large, horizontal aperture cut into the wall with diffused lighting in the room beyond the viewing space. The aperture "appears to be a flat painting or an LED screen but it is a light-emitting opening to a seeming infinite, light filled room beyond."¹¹⁹ Firsthand experience of *Illtar*, 1976 (fig. 4.37), at the Solomon R. Guggenheim Museum's recent exhibition of the artist's oeuvre, revealed Turrell's intended optical effects. After entering a dimly lit gallery space, the viewer's focus is quickly turned to a large gray rectangle hovering on the opposite wall (much like a cinema screen). Flanking the gray field are two low-level spotlights that direct light on either side of the field, but do not illuminate the space in dramatic fashion.

The experience leading up to looking feels decidedly cinematic; the low lighting suggests that the show will begin momentarily. During my own experience, the handful of anonymous participants seemed confused about the work's intention. Some uttered, "I don't get it." Others asked in confusion, "What is this supposed to do?" Knowing that Turrell had designed a perceptual situation that required persistence in looking, I chose to combat the aural distractions from those talking by plugging my ears with my index fingers. I stared with conviction, preventing myself from blinking and softening my focus

¹¹⁹ James Turrell and Turrell Art Foundation, "Artworks By Type: Space Division Constructions," *James Turrell* website, at URL: <http://jamesturrell.com/artworks/by-type/#type-space-division> (accessed 22 May 2014).

to allow my eyes to glaze over. Through unimpeded looking (and selective auto-soundproofing), my steady gaze was rewarded with Turrell's intended perceptual effect. After about twenty seconds, my visual perception switched from viewing the gray rectangular field to viewing an undifferentiated field of neutral gray—as if a gray blanket had instantaneously filled my entire visual field. The effect was jarring, and momentary, as my visual system quickly reset and I was once again in the dimly lit room staring intently at the gray rectangle. I chased these momentary “lapses” of vision to the “gray-out” field for approximately fifteen minutes, noticing that each subsequent lapse grew incrementally longer in duration.

The *Mendota Stoppages* represent a direct bridge between the experiments Turrell designed for Garrett and the form that his oeuvre assumed; Turrell's Space Division Constructions reveal his sustained interest in designing cognitive perceptual situations. In 1970, Turrell offered some insight into his feelings about the Garrett collaboration, concluding that the experiments revealed each participant's individualized, conditional response. In other words, the results were exceptionally hard to quantify and, as in my own attempt to account for my experience of *Iltar*, each experience proved subjective. While reflecting on his A&T involvement, Turrell emphasized overlaps in spirituality and science:

Our culture is going through a strange time—looking at Eastern thought—their work with meditation, their sense of the body and mind and soul. We're approaching it through psychology. We're very physical. When we want to go into the universe, we can't look at a rock, like the Japanese. We have to actually go to the moon. We're so literal. We totally ignore the Eastern way. There are actually meditative sciences, or sciences of the soul. We have devices, sensors, alpha conditioning machines. The machines are just manifested thought. Technology isn't anything outside us We just go about it very clumsily and

very wastefully. Because we have to actually *make* all these devices, we have to *go* to the moon, we can't see the cosmos in a rock, and we can't meditate without having this thing strapped on us.¹²⁰

This quotation reveals certain ideas that Turrell was ruminating upon when he left the project. He seems to call for injecting introspection and spirituality into scientific study, but he also delivers a veiled critique of corporate science with respect to LACMA's affiliation (i.e., the source of the project's financing). "We're wasteful," he chides. Rather than be economical with our science and technology, he emphasizes, we spend egregiously in order to beat the Russians to the moon.¹²¹

Perhaps these sentiments prompted Turrell to abandon A&T entirely; or, perhaps it was a personality conflict. Buried within archived notes from the A&T project (typed by curator Jane Livingston), Irwin criticizes Turrell's final presence at an A&T meeting: a preliminary meeting at Garrett to discuss the Habitability Conference. Livingston writes, "According to Irwin, he and Turrell 'corrupted the meeting. They started out trying to define the word "habitability." NASA's projections of what this meant seemed incredibly limited to us. Our definition of habitability completely altered the premise they were assuming. We broadened the term.'"¹²² Turrell abdicated after this meeting.

Turrell continued to generate projects that plumbed scientific and perceptual investigations of light, but he did so in a self-directed approach to project design. While producing his "Space Division series" and more sophisticated projection pieces, such as

¹²⁰ Tuchman, et al., 140.

¹²¹ Ibid.

¹²² See "Livingston notes," p. 29, in Irwin folder, LACMA, Art and Technology records, Box 3. It is unclear if Irwin refers to himself or to Wortz with "he." Regardless, Irwin's use of the phrase "corrupted the meeting" implies that an awkward tension may have resulted from their intensive focus on the meaning of habitability.

the “Wedgework series” (fig. 4.38), he was also flying his personal aircraft over the Painted Desert in Northern Arizona in search of a suitable location for a monumental post-studio artwork in a natural setting. After a seven-month search, he selected Roden Crater—an extinct volcano cinder cone in the desert outside Flagstaff—and arranged to purchase it and the surrounding acreage in 1977. Conceived as a site-specific artwork that would facilitate a “naked-eye observatory” engagement with the surrounding environment, Turrell has worked diligently toward completing the site over the last four decades. Like Irwin, the knowledge gained from the Garrett collaboration was imprinted on Roden Crater and continued to influence and inform future Turrell projects.

Glicksman claims that dialogue between the artists and Wortz remained “crucial to how Irwin and Turrell thought about perception in art.”¹²³ However, while Turrell and Irwin incorporated their knowledge of cognitive psychology into future projects, their aesthetic paths proved utterly distinctive. Turrell continued to generate works that employed high-tech light projection while also experimenting with the potential of naked-eye observatories in his Skyspaces series. In comparison, Irwin preferred to produce exceedingly minimalist installations characterized by absence—vacant rooms, hallways, or spaces with scrim-filtered sunlight that appeared to have never received the sophisticated intervention of an artist. And while their collaboration at Garrett Corporation yielded no physical product for the A&T exhibition in 1971, theirs was lauded as the most successful and received a fifteen-page précis devoted to their project

¹²³ Glicksman (2014), phone interview with the author, 27 May.

in the catalogue.¹²⁴ As LACMA brought A&T to a close in 1971, Glicksman was serving in an East Coast post at the Corcoran Gallery. The following year, Glicksman returned to the West Coast permanently to continue his curatorial involvement with installation and post-studio art.

Post-studio Performativity in Art and Technology—Eric Orr and Maria Nordman

In the summer of 1972, Hal Glicksman returned to California to teach and direct the gallery at UC Irvine (1972—1975). Glicksman’s curatorial focus resumed the interests he had pursued at Pomona: “Light and Space” and post-studio projects in the gallery and around the grounds of Irvine’s campus, while expanding to include video and performance-based works.¹²⁵ In an interview given at the time of the opening exhibition, Glicksman explicitly outlined his agenda:

I got to do a show with Robert Irwin, Jim Turrell, and Doug Wheeler who are just about the first on the West Coast to build the gallery into the work of art or to integrate the object so much with its surroundings that it became one thing. I decided that’s what I wanted to do. And that other art is really sort of generally uncomfortable in galleries or it’s trying to make some comment about its forced situation.¹²⁶

During his tenure at Irvine, Glicksman showed familiar “Light and Space” artists, including Tom Eatherton, Larry Bell, and Bruce Nauman. Other well-known conceptual and performance artists that Glicksman placed in the exhibition schedule were Vito

¹²⁴ Tuchman, et al., 129-143. Irwin apparently exhibited one of his acrylic columns as a “parallel activity” to his collaboration with Wortz and Turrell. See Irwin folder, LACMA, Art and Technology records, Box 3.

¹²⁵ See Hal Glicksman, *Curriculum Vitae* (1955-present), at URL: <http://percept.home.cyberverse.com/percept/halresume.html>.

¹²⁶ Hal Glicksman, in interview with Newton, “The Room That Eric Built,” *New University*, 5, no. 7, University of California, Irvine (20 October, 1972), p. 8.

Acconci, Eleanor Antin, Allan Ruppersberg, and Barbara Smith. In fact, Glicksman also tried, unsuccessfully, to facilitate the installation of an early Turrell Skyspace—a naked-eye observatory comprised of a proportioned chamber with an unmediated aperture cut in the chamber’s ceiling—on the Irvine campus.¹²⁷ The plans entailed placing a room in the ground, with an aperture that would allow viewers to observe shifts in sunlight (and, thus, subtle changes in the sky’s appearance) over a sustained period. Unfortunately, as administrator Paul Knopf explained in a letter addressed to Glicksman, the project could not move forward as the proposed site was located on land set aside for The Irvine Company for grazing purposes.¹²⁸

Glicksman used his first summer on the West Coast preparing the gallery and assisting with the construction of the first work he would show as gallery director at Irvine. He opened the exhibition season with an intense perceptual environment by artist Eric Orr (1938-1998) titled *Zero Mass* (fig. 4.39). The Village Art Gallery at UC Irvine exhibited *Zero Mass* from October 3 to 29, 1972, which, according to a press release, represents one of a series of experiments on the perception of light, sound, and haptic sensations that Orr was exploring in 1972. *Zero Mass* involves a space wherein the viewer observes “light emanat[ing] evenly from the wall surfaces dissolving the physical limits of the wall and suspending the viewer in what appears to be a misty infinity of

¹²⁷ The aperture can be round, ovular, or square and is opened directly to the sky. From June 1974 – May 1975, Turrell was a Guggenheim Fellow and, per his fellowship’s award letter, would “devote himself to creative work with solar light in interior spaces.” Stephen L. Schlesinger, letter certifying Turrell’s fellowship award from the John Simon Guggenheim Memorial Foundation (20 May 1974), in Hal Glicksman, *Hal Glicksman papers (1927-2010): exhibition files Pomona College*, Box 9.

¹²⁸ Paul H. Knopf, memorandum to Hal Glicksman (29 August 1974), in Hal Glicksman, *Hal Glicksman papers (1927-2010): exhibition files Pomona College*, Box 9.

space.”¹²⁹ The space employs light-filtering paper to create the environment’s structural confines, allowing an extremely low level of light from gelled light fixtures beyond the plywood armature to permeate the space. Thin strips of wood (a few inches thick and tapered toward the ends) comprise the curved framework (fig. 4.40) with plywood supporting the frame of the doorway. The entire wood armature is attached to the ceiling at twelve points with strings, which have turnbuckles to adjust for tension and hoist the walls to the proper level on the floor. Photographer’s paper is employed for all of the light-mediating surfaces, which is stapled on the frame.¹³⁰ The set-up resembles Tom Eatherton’s *Rise* described above, although the incredibly low light levels of *Zero Mass* deliver an entirely different visual and psychological experience.

In October 2011, I experienced *Zero Mass* while it was on view at the Museum of Contemporary Art, San Diego for the *Pacific Standard Time* initiative. Walking from the sun-drenched space of a gallery overlooking the Pacific Ocean in La Jolla into *Zero Mass* proved psychologically disorienting. I entered what appeared to be a hallway plunged in utter darkness and heard a group of teenagers, rough-housing ahead of me, who seemed to be trying to scare one another. To avoid barreling into another person, I reached out instinctively and touched the wall. (My unease with this disorientation stemmed partially from my knowledge that viewers have suffered injuries—and consequently filed lawsuits—from falls sustained in a Turrell Ganzfeld in the early 1980s.)¹³¹ In amazement,

¹²⁹ Irvine Gallery, press release for Eric Orr *Zero Mass*, to University Relations Office, University of California, Irvine (26 September 1972) in Hal Glicksman, *Hal Glicksman papers (1927-2010): UCI exhibition files*, Box 8.

¹³⁰ *Ibid.*

¹³¹ Grace Glueck, “Whitney Sued Over 1980 ‘Light Show,’” *New York Times* (4 May 1982).

I felt a pliable, heavy-weighted paper that gave a little with the pressure of my fingers. At the threshold of the hallway and the main space of *Zero Mass*, I noticed two figures at the opposite end of the hazy room. The dimensions of the space (approximately 22 x 44 x 12 feet) were impossible to discern in the low light, and I felt my breath catch in response to not knowing where I was in relation to my environment. Slowly I walked with hands outstretched in front of me, fearful that I might inadvertently trip or bump into something. After approximately twenty steps, I pivoted and began to gaze back toward the entrance. As my eyes adjusted to the cave-like conditions, I observed subtle color shifts within the fog: tones of dark gray, to lighter gray, eventually arriving at white. Two figures entered through the entrance—black silhouettes that appeared to float through space. The ground and ceiling were dissolved into a contiguous field of misty white.

Zero Mass compels the viewer to observe her perceptual faculties sensing slowly though time. The perceptual effect occurs as vision adjusts from low sensitivity to heightened sensitivity—or, from day vision to night vision—and you see yourself seeing. Like Eatherton's *Rise*, *Zero Mass* instigates an internalized spectatorship, through a languid stillness brought about by patient gazing. The manner of looking occurs in a transition between light receptors in the visual system itself. Art critic, scholar, and a frequent collaborator of Orr's, Thomas McEvilley (1938–2013) explains the optical shift in physiological terms: "The transition from rod to cone vision gradually unfolds; floods of afterimage color wash over the vision and gradually decrease like waves. After about

12 minutes one is ready to see, but in a different way.”¹³² Thus, as the visual system adjusts to the extreme low levels of light in *Zero Mass*, the participant perceives that the space is increasing in illumination without the usual increase in one’s detection of details. The perceptual effect renders the sensation that you are in a fog or a cloud, with others or objects appearing grainy or fuzzy gray.

In an interview with Glicksman, a UC Irvine journalist praised the work: “The Eric Orr exhibit is one of the few here at Irvine that’s been a real experience rather than just an empty room to walk around in looking at the walls and other dead objects.”¹³³ An interesting component of the exhibition of *Zero Mass* at UC Irvine involved the Gallery recording participant responses. Glicksman arranged for a photographer to stand just outside the exit to document viewers’ reactions as they emerged from the experience of Orr’s environment (fig. 4.41). Some visitors exit into the Southern California daylight, shielding their eyes from the intensity of the sun; others appear to react more bodily to the dramatic perceptual shift by doubling over.

Orr had been working with perceptual, environmental, and performance-based art since 1966. Orr was born in Peking, China in 1939 and grew up in Kentucky, attending the New School for Social Research, UC Berkeley, and the University of Cincinnati to study history and the humanities. Before relocating to Los Angeles in 1965, Orr performed civil rights work in Mississippi for a period. He settled in Venice Beach where he befriended other local artists, including Larry Bell and Judy Chicago, who would

¹³² Thomas McEvelley, “Negative Presences in Secret Spaces: The Art of Eric Orr,” *Artforum* (Summer 1982): 58-66.

¹³³ Newton (name provided), in an interview with Hal Glicksman, “The Room That Eric Built,” *New University*, 5, no. 7, University of California, Irvine (20 October, 1972), 8.

become future collaborators of his. Some of Orr's solo projects entailed scientific experimentation that did not necessarily result in the production of a physical artwork, such as building a precision optical device to demonstrate the wave functions of light. Orr also produced works that investigated the perception of sound waves in perceivable volumes. *Sound in the Shape of a Pear*, 1970, and *Sound Tunnel*, 1970-71, relied on high-tech acoustical equipment focusing sound waves at a participant in a pitch-black space.¹³⁴ Thus, *Zero Mass* presents a continuation of Orr's interest in creating a perceptual experience for the participant, though it accomplishes this task with humbler materials.

According to Glicksman, "*Zero Mass* is the simplest light-space in construction and in principle, but has ample reason to be considered the most profound. After its first showing at Irvine, it was purchased by Dr. Giuseppe Panza di Biumo, and shown in numerous museums."¹³⁵ The son of a Milanese wine merchant, Giuseppe Panza (1923-2010) earned a law degree but never practiced. Panza began to assemble an art collection in the 1950s, becoming a preeminent collector of American minimalist, conceptual, and Light and Space art during the 1960s and 1970s. Panza amassed a serious collection during those decades, and the Panza Estate in Varese, Italy showcases site-specific works by Dan Flavin, Robert Irwin, James Turrell, and Maria Nordman, among others. In the early 1990s, the Guggenheim Museum acquired approximately 350 works from this

¹³⁴ Hal Glicksman, "Draft for Press Release," *Hal Glicksman papers (1927-2010): UCI exhibition files*, Box 8. Also, "Sound Tunnel Opens to Give Art World New Dimension," *Westlake Post*, Los Angeles (12 March 1970).

¹³⁵ Hal Glicksman, *Exhibitions and Publications*, at URL: <http://percept.home.cyberverse.com/percept/exhibitions.html> (accessed 9 July 2014).

significant collection and has established an initiative to ensure its long-term preservation and exhibition.¹³⁶

Panza became acquainted with Maria Nordman through her growing reputation as a so-called Light and Space artist, despite her strong objection to her work receiving any affiliation with the movement.¹³⁷ It is clear that Panza knew of Nordman's work by 1973, initiating a long-term artist/patron relationship. Already aware of Glicksman's curatorial program at UC Irvine and a frequent traveler to Southern California, Panza viewed Nordman's *Saddleback Mountain* in 1973 (fig. 4.42).¹³⁸ Nordman's showing at UC Irvine in 1973 definitively set her career in motion.

Born in Görlitz, Germany in 1943, Nordman earned a BFA and MA at the University of California, Los Angeles (1961–1967). She spent 1968 at the Max Planck Institute in Stuttgart, Germany researching “coherent light models” in a collaborative

¹³⁶ Giuseppe Panza, *La Collezione Panza: Villa Menafoglio Litta Panza, Varese, Palazzo Ducale, Gubbio, Palazzo Ducale, Sassuolo, Palazzo della Gran Guardia, Verona, MOCA, Los Angeles, Reina Sofia, Madrid, Guggenheim Bilbao* (Milano: Skira, 2002). In 2010, the Panza Collection Initiative was established with the support of a major grant from the Andrew W. Mellon Foundation.

¹³⁷ For an excellent introduction to the development of Nordman's oeuvre and her objection to being grouped with “Light and Space,” see Butterfield, 96-116. As curator Michael Auping has argued, “[I]f Nordman is not a part of the Light and Space movement, then one could argue that there is no Light and Space movement, as her relatively small but intense body of work is the epitome of what could be called a choreography of light and space.” Auping, “Stealth Architecture: The Rooms of Light and Space,” in Clark, et al., *Phenomenal*, 89.

¹³⁸ In correspondence with Panza, Nordman writes, “It was a pleasure to meet you and your wife at Irvine.” This implies that 1973 was their first meeting. Nordman, Santa Monica, California, letter to Giuseppe Panza, Milan, Italy (15 December 1973) in “Maria Nordman” file, *Giuseppe Panza papers, 1956-1990*, series IIA.137 (Los Angeles, CA: The Getty Foundation). It is possible that curator Germano Celant introduced them ca. 1967 – 1968, when Nordman traveled to Milan to “see what it was really like with no slides.” Nordman mentions her travels to Milan in a panel discussion honoring Panza. Nordman, performance/monologue during the panel “Conversations: In honor of Giuseppe Panza,” *Art Basel Conversations* (20 June 2010), video available at URL: <https://www.youtube.com/watch?v=DYFUoN3L7UI> (accessed 14 May 2013).

setting.¹³⁹ Physics describes coherent light as an intense beam in which the waves travel in tight parallel synchronicity, never crossing one another. For example, “the action of a laser is to emit light of very narrow bandwidth and considerable intensity—what is called coherent light.”¹⁴⁰ After a year in Germany studying coherence, Nordman returned to Santa Monica where she spent two years constructing light environments in her studio (1014 Pico Boulevard) that few people in the art world saw. (Nordman is exceedingly private about her work, making scholarship on her oeuvre a challenge.) She also worked as Editorial Assistant to architect Richard Neutra from 1970 – 1971.

In 1971, Nordman presented her first major studio work that many in the art world were able to experience due to word of mouth circulating around Los Angeles.¹⁴¹ Nordman’s research into the physical properties of light and her contact with architecture through Neutra are equally evident in the evolution of her oeuvre during the 1970s. In addition to physics and the construction of space, Nordman theorized her work through the lens of what she terms the “chance participant” as well as the personal experience of the city. Importantly, Nordman refers to her environments as “places” rather than “spaces” because, according to Jan Butterfield, “a space, she feels, is empty.”¹⁴²

Saddleback Mountain was a perceptual environment that employed a hallway coupled with an entrance leading into a darkened room and a sixteen-by-eleven-foot mirror installed between the hallway and the interior space. The angled mirror reflected

¹³⁹ Nordman, “Biography,” (ca. 1973) in Hal Glicksman, *Hal Glicksman papers (1927-2010): UCI exhibition files*, Box 8.

¹⁴⁰ “Coherent, adj. and n.: d. Various spec. senses in Physics.” OED Online. December 2014. Oxford University Press. <http://www.oed.com/view/Entry/35935> (accessed January 3, 2015).

¹⁴¹ Nordman, “Biography,” in Glicksman, Box 8. Also, Butterfield, 97.

¹⁴² Butterfield, 100.

Saddleback Mountain through the door and behind the viewer. The delineation of the reflected beam produced a clear line that divided the space into two halves: one light and one dark. In Nordman’s words, she altered “an existing room with a concurrent entry made for the person, the light, the sound. Entering at ground level with 51-foot entrance beginning 22 inches wide, opening to 5 feet with a floor to ceiling mirror (second image of entry) dividing the room in two. Diagonal light touching a dark room.”¹⁴³

Consideration for “the person” (the artist’s term) is paramount in Nordman’s art—the subject is whom she speaks and writes about unremittingly. Her works provide places for reverie and meditation—a place where “clock time stops and internal time begins.”¹⁴⁴

In conjunction with the exhibition of *Saddleback Mountain*, Nordman also offered what I characterize a “lecture performance.” For this component, Nordman delivered a monologue, which was followed by a discussion session with UC Irvine students. Her performance provides notable insight into her philosophies with respect to the function of a space and how experience is both convivial and deeply introspective. In an undated video recorded by Hal Glicksman, Nordman begins the session with a monologue in which she first describes broad concepts of geological time. Next, she delivers an account of an unknown community and the ways in which the “persons” interact within this mythic place. This community does not use traditional numerical or temporal representations (such as systems of time or calendars); rather, they organize themselves

¹⁴³ Nordman, in Barbara Haskell and Hal Glicksman, *Maria Nordman: Saddleback Mountain* (Irvine: University of California, 1973), n.p.

¹⁴⁴ Butterfield, 100.

in small villages with patriarchal rule, and the flora and fauna are bountiful enough to afford them a sort of utopian existence. Nordman elucidates affectedly:

We don't make incredible stone edifices that are beyond our size, which may not allow sound and may not allow outside sounds to endure it. Also, we like the idea of movement. We don't settle in places. We don't feel it necessary to put something down that will be an impediment to future people. In other words, someday there will be absolutely no trace of our habitats. What we build will go down naturally with the rain and the sun, like everything else.¹⁴⁵

She goes on to describe their rituals of worship and language, how their days are filled with archaic hunter/gatherer roles, and how orthogenesis is their model of evolution.¹⁴⁶

Nordman's emphasis on a type of nomadic experience of space—through movement—and the ephemeral nature of shaping space (either through architecture or her own spatial interventions) reveals how she conceptualizes the experience of her art. She implies that *Saddleback Mountain* is intensely personal and one's experience of it is distinct from all others, defying precise linguistic description. She also hints generally at the concept of "deep time" with her inclusion of orthogenesis and the temporary nature of architecture.¹⁴⁷ After approximately fifteen minutes of monologue, Nordman invites the members of the audience who "have seen the place, which was constructed downstairs" to join her on the floor seated in circle formation. Select people join her, and she proceeds to hand out blank sheets of paper. She instructs, "Ok, I'd like for you to think about

¹⁴⁵ Nordman, "Maria Nordman," Hal Glicksman, *Hal Glicksman papers (1927-2010): multimedia recordings* (Los Angeles: Getty Research Institute), n.d., V17, 2009.M.5.

¹⁴⁶ Orthogenesis is based on the premise that evolutionary change progresses in a straight teleology, wherein successive generations develop from mutations within the closed gene pool and not as a product of natural selection. "Orthogenesis, n.," *OED Online* March 2015 Oxford University Press, <http://www.oed.com/view/Entry/132814?redirectedFrom=orthogenesis> (accessed April 10, 2015).

¹⁴⁷ Deep time is a way of thinking about time on a geologic or cosmologic scale—time in the far distant past or future. See "deep time, n." *OED Online*, December 2014, Oxford University Press, <http://www.oed.com/view/Entry/264316?redirectedFrom=deep+time> (accessed January 5, 2015).

[inaudible] the feeling of writing down beautiful words.”¹⁴⁸ The participants direct questions at Nordman, such as “How many words?” She answers, “It shouldn’t be a sentence; it should be four separate words.” Minutes pass. Then Nordman collects the papers and begins reading the submitted responses without inflection or emotion. “Space, illusions, dimension, nothingness, aura, axis, choose, cornea, trees, space, light, time, down, hollow, eyes, adjust, past, sad, cry, mist, together, we answer our convergence, channel, crazy, discontinuous, vacuum, boundless, ambiguous, location, light, it was a pleasant class, atmosphere, non-dimensional space.”¹⁴⁹ From there, she launches into a final performative epilogue, emphasizing the inadequacy of adjectives used when describing “that place” (*Saddleback Mountain*) because of the personal associations that each subject brings to a conceptualization of descriptive language.

To conclude she opens the floor for questions, whereby the students probe her for an explanation of her intentions with producing *Saddleback Mountain*; she continues to deflect. Appearing frustrated, one man declares:

Is there any other way to talk about it? You’re going to have to talk about it in some sort of personal terms. And I’d like to know what others experienced. That was when I initially walked in the room—I didn’t know it was a room. I could see a wall, when I turned the corner, but something was wrong with my eyes, so I could see the wall left and I could see the wall right, and it wasn’t until I walked halfway down to that wall, that I realized there was a room to the left. It was really a shocking experience. Did anyone else experience that? You? [Looks off camera and nods at someone.] I’m wondering if that’s an indication that your retina is not functioning properly?¹⁵⁰

¹⁴⁸ Ibid., about midway through the recording.

¹⁴⁹ Ibid.

¹⁵⁰ Unidentified man, in *ibid.*

Nordman answers with metaphor: “Yeah, like when you get a cup of coffee. What are all the motivations for that? It may not be as simple as you’re hungry, there may be something more, too.” And when another audience member attempts to connect her “performance lecture” on habitability to the experience of *Saddleback Mountain*, Nordman replies paradoxically, “Well, isn’t living awareness of self in the room? Doesn’t that make it a living space? If you’re not aware of yourself in the room, your consciousness is not there. Are you dead at that point? It’s a dead place. It’s a living place.”¹⁵¹ Thus, Nordman links the functionality of a space to the individualized psychic interpretation of a particular person. From this perspective, her places operate as both perceptual and conceptual sites.

Nordman was aware of perceptual psychology and how that type of investigation factored into creating environments, though she did not collaborate formally in the way that Irwin and Turrell did. Recently, Glicksman explained that her awareness of phenomenology did factor into how she constructed the viewer’s experience of her work but she also wanted to distance herself from the Light and Space camp. According to Glicksman, Nordman’s aims involved creating an “absolutely pure light-space” in order “to reach ordinary people.”¹⁵² In a 1974 letter to Panza, Nordman endeavored to explain her desire for a democratic art. She argues:

On paper [my works] exist completely or defined ideas in process, but when actualized they also contain unpredictable elements because of the participant’s role in constructing the experience. Chance has a different potential with an idea when it is compared to a conception of it, and when it is constructed in real time

¹⁵¹ Nordman, in *ibid.*

¹⁵² Glicksman (2014), phone interview with the author, 27 May.

and space by being there. I like the idea that a person can contact a piece without preconception.¹⁵³

Saddleback Mountain and subsequent works by Nordman represent post-studio practice due to the fact that, similar to Asher or Irwin, the intervention entails a direct response to the site. She explained her process to Glicksman and curator Barbara Haskell: “I usually will tend to sit still with a place for a while before I decide. [. . .] When I came out to Irvine to draw up the floor plan—I just walked around a lot. After a while the buildings seemed to recede and I began to see new animals, plants, the unspoiled parts of the landscape and the Saddleback Mountain.”¹⁵⁴ Her decision to include the view of the mountain—by bridging the exterior with the experience of the interior—constitutes a site-specific action (similar to Michael Asher) and relocates the studio to the immediacy of the site.

Zero Mass and *Saddleback Mountain* represent two of the most accomplished perceptual environments curated by Glicksman at UC, Irvine. Both Orr and Nordman developed a post-studio practice grounded in phenomenology, though one preparatory aspect relates to the tradition of studio drafting: both artists produce blueprints for their environments. Similar to Eatherton and Asher, the construction and troubleshooting of a Nordman or an Orr installation occurs at the exhibiting site, thereby blurring their systems of production toward a post-studio positioning. Nordman always spends time with the “place” in order to allow the creative impulse to conceptualize while in the moment at the location. Moreover, her installations operate as conceptual sites of

¹⁵³ Nordman, letter to Giuseppe Panza, Milan, Italy, mailed from West Germany (6 May 1974) in “Maria Nordman” file, *Giuseppe Panza papers, 1956-1990*.

¹⁵⁴ Nordman, in Haskell and Glicksman, n.p.

experience with a performative/participatory bent. Many of Orr's environments and performances, including *Zero Mass*, are not always site-responsive in the way that Nordman's works manifest.¹⁵⁵ *Zero Mass*, for example, was initially conceptualized as a smaller environment constructed for Orr's studio, and was adapted to its longer "cigar shape" for exhibition at Irvine.¹⁵⁶ In contrast to Nordman, Orr drew inspiration for his art process by spending long periods of time meditating at ancient sites, such as the Great Pyramid of Khufu in Giza, Egypt. For Orr, the mystery and ritual associated with ancient monuments conjured the very emotions he sought to elicit in his perceptual environments. Weaving hazy environments with ancient concepts of mysticism and alchemy, Orr explored how viewer perception within dimly lit immersive environments could conjure emotional responses echoing the feelings of an archaic place.¹⁵⁷ The post-studio process for Orr entailed moving and thinking amongst sites without the intention of producing a site-responsive work *in situ*, as Nordman did.

Conclusions

Writing in 1976 artist and critic Brian O'Doherty (b. 1928) asserted, "We have now reached a point where we see the *space* first."¹⁵⁸ Indeed, frameworks for considering art production during the 1960s witnessed a transition from a strident focus on individual objects in a given exhibition space, to the consideration of some objects within the space

¹⁵⁵ Orr has produced works that overtly relate to a site, such as *Just a Dance*, 1969, a performance in which Orr hired construction workers to build a wall, after which another person was hired to paint the wall's shadow, followed by the dismantling of the wall and the shadow's representation remaining.

¹⁵⁶ Glicksman (1972), in interview with Newton, "The Room That Eric Built," 8.

¹⁵⁷ Glicksman, "Draft for Press Release."

¹⁵⁸ Brian O'Doherty, *Inside the White Cube: The Ideology of the Gallery Space* (Santa Monica: Lapis Press, 1986, 1976), 14. Emphasis O'Doherty.

relationally, and finally, to the jettisoning of the gallery object in favor of the experience of the space itself. In Southern California, proximate industries, particularly the research of cognitive psychologists for the aerospace industry, had an influence on the post-studio practices oriented toward replicating Ganzfeld environments.

According to Glicksman, the theoretical interest in perception and the aesthetic resonances of the so-called Light and Space movement proved to be distinctive to Southern California. He explains, “Light and Space emerged out of a discrete dialogue between artists on the West Coast and, to a degree, with some artists working on the East Coast and in Europe.”¹⁵⁹ From the early environments exhibited at Pomona, to the sensory deprivation experiments conducted by Irwin and Turrell, to the mature light and space installations of Orr and Nordman, these post-studio artworks are driven by a desire to comprehend or instigate experiences of subjective perception.

Experiments conducted for NASA by psychologists such as Wortz contributed greatly to our scientific understanding that perception is both an innate, but also a highly constructed process. Perception depends heavily on our ability to selectively focus on essential data while excluding nonessential stimuli. While perception is guided by vision as a privileged sense, it also remains indebted to the other senses and, especially, to their instantaneous and ongoing communication with the central nervous system. Art historian Jonathan Crary explains that this construction aligns with the perceptual tasks set before us. Whether we are observing theater or driving, Crary reminds us that “we are in a dimension of contemporary experience that requires that we effectively cancel out or

¹⁵⁹ Glicksman (2014), phone interview with the author, 27 May.

exclude from consciousness much of our immediate environment.”¹⁶⁰ Our navigation around surfaces and objects depends both on the physiological conditions of our bodies and the relative visual, aural, and perspectival circumstances.

Perception is thus relational—a cognitive management of our five senses in relation to material objects and immaterial space. O’Doherty linked the perspectival logic of space exploration—and its significance to vision—to the irrevocable shift in how we consider space, broadly construed. He writes, “But history, the view from the departing spacecraft, is different. As the scale changes, layers of time are superimposed and through them we project perspectives with which to recover and correct the past.”¹⁶¹ Space travel aptly illustrates the ways in which the language of quantum mechanics and the experience of space-time converge (that is, time is made physical to the observer as s/he perceives the shifts in scale produced by the gradual, yet continuous modifications in subjective distance). In other words, the data points of observation for a traveler speeding toward the edges of our solar system represent a material timeline. By visualizing these observational points in a rudimentary thought experiment, time is measured through relational subjectivity of a human being to the scale of the Earth. The visual index of the Earth completely encompassing the visual field, to the perspective of *Earthrise*, to the perspective of Earth resembling a distant star, blur the experience of time into a cognitive conception of distance and space. In the terms of a physicist, this time-space relativity

¹⁶⁰ Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture* (Cambridge, Mass: MIT Press, 1999), 1.

¹⁶¹ Brian O’Doherty, “Notes on the Gallery Space,” *Inside the White Cube: The Ideology of the Gallery Space* (Santa Monica: Lapis Press, 1986, 1976), 13. “Notes on the Gallery Space” was the first of three articles published in *Artforum* in 1976, which together comprise this canonical essay.

represents the fourth dimension.¹⁶² The 1968 publication of *Earthrise* gave visual testimony to these newly emerging paradigms of scale, time, and distance.

In 1971, *The Last Whole Earth Catalog* looked back on the ramifications of this 1968 icon, maintaining, “*Earthrise* established our planetary facthood and beauty and rareness [. . .] and began to bend human consciousness.”¹⁶³ The incorporation of *Earthrise* into our common culture ignited a reevaluation of the phenomenological experience of light and space while challenging the *a priori* conception of terrestrial scale and the sublime expanse of the universe. Ultimately, this shift paralleled the dematerialization of the art object, which helped establish a Cartesian repositioning of the locations where art is produced and experienced.

¹⁶² The fourth dimension implies the existence of a dimension beyond length, area, and volume (space) in which time is postulated to be measurable in linear dimensions (distance).

¹⁶³ *The Last Whole Earth Catalog* (Menlo Park, CA: Whole Earth Catalog, 1971), verso of front cover.

CONCLUSION

Reflections on Dilapidation and Obsolescence

Without intending to present a teleological narrative, the chronological approach in this dissertation inevitably follows an arc: from the earliest, free-form influences of jazz music and the Beats in 1957, to the zenith of high-tech Los Angeles art during the 1960s, to the leveling of an art community that—for a brief period—had rivaled the movers and shakers of New York. This story of art and technology in Southern California also loosely parallels the trajectory of the Space Race: from Americans' initial apprehensions, to their patriotic enthusiasm, to a temporary *détente*. The anxiety felt over the launch of Sputnik coincided with the founding of the Ferus Gallery in 1957. Attitudes shifted as the US responded by vigorously developing their human spaceflight programs—the Mercury Project in 1959 followed by the Gemini and Apollo programs in 1961. The establishment of these projects prefigured Larry Bell's early technological appropriation of vacuum-coating in 1963, the later integration of Tesla coils by Mary Corse in her light paintings, and Fred Eversley's transition from engineer to plastics artist (both in 1967). The Space Race peaked in December 1968 with NASA's publication of *Earthrise* followed by the American lunar landing in July 1969; Hal Glicksman's facilitation of art/technology post-studio experiments coincided with the climax of the late Apollo missions. In 1972, President Richard Nixon and Premier Alexei Kosygin negotiated a *détente*, producing a temporary "thaw" in the Cold War and putting steps

into place for the first joint US-Russian space mission on July 17, 1975.¹ By the mid-1970s, the ennui experienced over “where to go next” in space exploration was echoed in the growing disdain felt in the art world for that “tired” topic of Art and Technology.²

I introduced this dissertation by framing the complex relationship between the art world and technological industries during the 1960s and 1970s. The onset of Big Science marked a significant paradigm shift in experiment implementation whose outcomes generated a technological pervasiveness in the common culture. This shift was palpably felt in the emergence of art/technology experiments in the US during the 1960s, and became less visible during the 1970s. As artists appropriated the new materials and processes that Big Science initially helped to forge, their artworks underscored viewer perception while expanding audience conceptions about art mediums. However, amid suspicions over the ties between Maurice Tuchman’s “Art and Technology” program and militaristic industries, activist groups, such as the Artists’ Protest Committee, vehemently rejected aesthetic collaborations between artists and corporations. While some Southern California artists, such as Bell or Eversley, continued to incorporate technologies in their studios throughout the 1970s, they consciously distanced themselves from corporate and government entities in a posture of political neutrality.

With respect to curating, Glicksman continued to support art/technology efforts through the end of the decade. He left UC Irvine to helm the Otis Art Institute Gallery in Los Angeles from June 1975 to January 1982. At Otis he developed a much broader

¹ NASA History Program Office, “Overview,” *National Aeronautics and Space Administration* website, URL: <http://history.nasa.gov/astp/overview.html> (9 December 2014).

² Plagens maintains Art and Technology was “a little tired” by the mid-1970s. Plagens, *Sunshine Muse*, 162.

approach to the themes and artistic styles than those he presented at Irvine; he continued to organize Light and Space exhibitions while interspersing conceptual and performance art programming into the agenda. From 1981 to 1982, Glicksman created and directed an alternative art space dedicated to “Light and Space,” sponsored by a private collector. Over the course of one year, the gallery—Percept—exhibited three separate shows of Tom Eatherton’s work, including *Rise*. By August 1982, Glicksman had transitioned into book publishing with the closing of the short-lived gallery. From there, his career followed a more technical path: developing early computer databases for brain research, overseeing an early slide digitization initiative, and teaching computer art—all at California State University, Long Beach.³

Glicksman’s reduction in organizing exhibitions of immersive environments corresponds to the waning of public enthusiasm for the Art and Technology theme that was matched by an overall weariness with 1970s current events. Scholar Bruce Schulman explains that this cultural malaise permeated the decade for a number of reasons, including discontentment over the failure of 1960s liberal reform, “stagflation” (i.e., high rates of inflation coupled with economic stagnation), cynicism in the wake of the Watergate scandal, and the accretion of depressing political incidents (including gasoline shortages, the Iran hostage crisis, and the defeat in Vietnam).⁴ As Peter Plagens phrased it in 1981:

³ Hal Glicksman, *Resume*, at URL: <http://percept.home.cyberverse.com/percept/halresume.html> (accessed 9 July 2014).

⁴ Bruce Schulman, *The Seventies: The Great Shift in American Culture, Society, and Politics* (New York: Free Press, 2001), 8-14 and 217.

In the sixties, [Los Angeles] became big enough, industrialized enough, and ugly enough to be a breeding ground for contemporary art with a bite, and several artists began to feel that, in order to make significant contemporary art, it was necessary to throw off the yoke of Abstract Expressionism [. . .]. That it unraveled in the seventies is not so sad: *everything* leveled in that decade, upon which we now look back as on ten years of erased tape.⁵

Toward the end of the 1970s, the “last gasp” of art/technology was more of a distancing from the formal, hybridized concept—Art and Technology—than a total rejection of artists appropriating new technologies. Even so, Percept’s inability to remain open in the city that begat Light and Space suggests a growing consensus that the theme itself was obsolete.

Dilapidation and obsolescence represent two framing concepts for reflecting on the demise of art/technology. By the early 1980s, the theme of Art and Technology as had reached obsolescence, evidenced, for example, by the plummet in art/technology-themed exhibitions. (The short-lived lifespan of Glicksman’s Percept also hints that attitudes toward outmoded art themes could have an effect on a commercial gallery.) In the wake of such sensibilities, are there consistent ways in which to grapple with art/technology works that fall into disrepair or are no longer wanted or valued? Moreover, is it equally predictable that, once a few decades pass, we will look upon the “vintage” art/technology phenomenon with renewed gusto? (The success of the *Pacific Standard Time* initiative suggests this is the case.) Lastly, did the actual technical or mechanical failings of art/technology works contribute to the ways in which Art and Technology as a theme fell into disfavor?

⁵ Peter Plagens, "Art in Los Angeles: Seventeen Artists in the Sixties," *Art Journal*, 41, no. 4 (Winter 1981), 375.

To be sure, maintenance and conservation necessarily play a role in every collecting art program. For example, De Wain Valentine’s polyester “grow-outs”—discussed in Chapter 3—require occasional re-sanding and buffing. Outlined in Chapter 1, the glass surfaces of Larry Bell’s cubes demand careful scrutiny in order to keep the surface free of dust, grime, and blemishes. Beyond the vigilant conservation of materials, art/technology works that comprise mechanical parts demand ongoing maintenance for optimal functionality; dilapidation is a persistent challenge. When considering Bell’s aesthetic process, the maintenance of his vacuum deposition machines remains crucial to upholding a desirable level of productivity. Bell necessarily maintains a high standard of care for the machines in his studio. From the standpoint of ensuring accessibility and intended functionality of art, artworks that contain mechanical parts also require a greater level of routine upkeep than artworks that consist of more traditional materials. To address such maintenance challenges, exhibiting institutions routinely set hours of operation for artworks that are resource-intensive or include complex mechanical parts.

For example, Larry Bell’s *The Improbable Flow* (1983) is a large-scale installation that incorporates asynchronous pulsing lights and a curtain of water viewed through a large window in a wall; the slightly faster stroboscopic lights produce the illusion that the water rises upward toward the ceiling rather than dripping downward with gravity. When installed for exhibition, the stroboscopic lights failed occasionally and, for this reason, the exhibiting institution—ARCO Center for Visual Art—was faced

with establishing times of operation: 11am – 3pm Mondays through Saturdays.⁶ Suzanne Muchnic summed this up well, terming *The Improbable Flow* “interesting” as it “tackles an unfamiliar and intriguing technical feat,” while cautioning that it was “less successful” in its “faltering state.”⁷ An uncooperative machine that is routinely in disrepair projects the sensibility that technology can be cumbersome or cantankerous—that is, too much trouble for art. When ungainly, technology signifies more of a contraption and less of a suitable apparatus.

Whereas dilapidation connotes a state of partial ruin, obsolescence describes a condition in which an entity suffers uselessness despite its potential functionality or applicability. However, attempting to delineate the obsolete within art is a slippery task. Obsolescence exists in a range of values: it is a qualitative state by which a technology or cultural phenomenon is perceived to be no longer useful or desirable. Consumerism depends on the “planned obsolescence” of technologies, wherein engineers manufacture obsolescence with slight improvements to working models. The Apple Corporation, as an obvious example, exploits this market tactic strategically, releasing newer versions of its iPhone© every year or so. As the newest phone is made available—and unless a consumer’s current device has simply failed—personal attitudes toward the relative disparity between new and older technologies will govern if a model is deemed obsolete.

While the phenomenon of planned obsolescence can be observed through its infiltration in our modern lives and our relationships with consumerism, its expression in

⁶ ARCO Center for Visual Art was a not-for-profit gallery established in Los Angeles in 1976 by the Atlantic Richfield Company. ARCO closed in 1984. Suzanne Muchnic (1983), “Larry Bell Gets Into Flow of Things,” *LA Times*, G1.

⁷ *Ibid.*

art feels more tenuous. In the fall of 2001, *October* editor George Baker sent questionnaires to contemporary artists with the purpose of compiling responses to the practical and conceptual uses of obsolescence. After defining “the obsolescent” as art representing “the outmoded, the nonsynchronous, discarded forms, [and] marginal mediums,” Baker posed a number of questions on its aesthetic implications.⁸ He wondered how the obsolescent manifests in art practice, if it is mobilized primarily as a critical vehicle, if it serves a constructive purpose, and if it offers the artist a site of resistance. The majority of artists answered with short critical essays filled with anecdotes, philosophical musings, and extended metaphor; some included images with their replies. For example, in addition to his essay response, Gerard Byrne contributed two photographic representations to illustrate examples of sociopolitical and media obsolescence: 1) a “Euro converter” machine and 2) stacks of used *National Geographic* magazines in Chapters Bookstore, Dublin.⁹

Of the textual observations returned to Baker, recurring themes in the artists’ responses entailed the relationship of obsolescence to time, fashion, context, and loss. Christian Philipp Müller related the obsolescent to art history by questioning the necessary distance between an outmoded artistic style—such as Institutional Critique—and its eventual recovery for aesthetic recycling. Zoe Leonard shared remarks on the connections between obsolescence and nostalgia, describing the sadness she felt when she realized her New York neighborhood on the Lower East Side was undergoing redevelopment: chic boutiques and bars replaced her more familiar bodegas and specialty

⁸ George Baker, ed., “Artist Questionnaire: 21 Responses,” *October*, 100 (Spring, 2002), 6.

⁹ *Ibid.*, 20-21.

shops. For Leonard, obsolescence proved deeply personal and relied on context, producing feelings of longing for that which was being erased. Pierre Huyghe connected the phenomenon to individualized valuations over time: “That which is obsolete seems tied to duration. It is actually a question of distance. We must invent singular distances, gaps for observing the dynamics that cross such a space. Obsolescence is a frame, an instrumentalization of the gaze. [. . .] Its reception is inevitably very different.”¹⁰ Thus for Huyghe, obsolescence denotes a framed position relative to the observer. As in the tangible timeline of space travel discussed in Chapter 4—that is, the awareness of time relative to an observer’s sense of scale and perspective—the assessments of obsolescence also rely on context.

How does one establish the practical obsolescence of an artwork? Specifically, who evaluates an object’s demise when it comes into disrepair? What about an object’s accidental demolition and, if destroyed, who decides its fate? This question arose with the destruction of Fred Eversley’s *Untitled*, ca. 1970, in the 1995 bombing of the Alfred P. Murrah Federal Building in Oklahoma City by Timothy McVeigh and Terry Nichols. Installed in the ninth-floor elevator lobby of the building (fig. 5.1), the bomb blast initially appeared to have annihilated *Untitled*. However, about five months into search and recovery efforts, the sculpture was discovered in identifiable pieces, having been

¹⁰ Ibid., 34.

propelled through the exterior window with the blast and deposited on the outdoor plaza (fig. 5.2).¹¹

When Eversley learned that the demolished piece would be installed in its ruined condition in the Oklahoma City National Memorial and Museum (dedicated 2001), he countered with the possibility of either an attempt at restoration of the sculpture or a commission for a comparable piece to be exhibited alongside the destroyed piece. Eversley explains, “Although it’s amazing it survived, a big battle ensued about whether or not to restore it.”¹² Eversley objected to the destroyed sculpture being exhibited “as is.” In the end, an agreement was not reached and the Memorial Foundation elected to present *Untitled* in its ruined condition. From the viewpoint of Eversley, *Untitled* had suffered irrevocable damage, rendering it lifeless, not exhibitable, and therefore not in keeping with its intention as an aesthetic, optical instrument. With respect to the Museum’s purpose—to present “a tribute that in no way diminishes the tragedy, but rather offers an inspiring contrast between the brutality of the evil and the tenderness of the response”—Eversley’s destroyed sculpture viscerally pictures the outcome of a polyester resin disc exploding through a window and falling nine stories to its demise.¹³ *Untitled* assumes an altered existence through its ruined condition, while communicating the message of resilience in the face of terrorism, and honoring those who perished. In this particular case, the Oklahoma City Memorial Foundation chose to override the aesthetic concerns

¹¹ U.S. General Services Administration, “An Oklahoma Tribute: Art Collection from the Alfred P. Murrah Federal Building, Oklahoma City,” Fine Arts Program Library (undated), PDF download at URL: <http://www.gsa.gov/portal/content/103725> (accessed 19 November 2013).

¹² Fred Eversley, phone conversation with the author (6 November 2013).

¹³ Oklahoma City National Memorial, “Memorial Foundation,” at URL: <http://www.oklahomacitynationalmemorial.org/secondary.php?section=10&catid=118> (accessed 19 November 2013).

of the artist in favor of the Museum's objectives. Both Eversley and the Foundation agreed that *Untitled* was obsolete in its destroyed condition, although the Museum elected to repurpose its ruined fragments to live on in a new symbolic function.

I share one final example to illustrate the ramifications of dilapidation and obsolescence occurring jointly: a collaborative public artwork by Larry Bell and Eric Orr, *Solar Fountain* (1976-1982, dismantled 1997). As colleagues who regularly visited each other's studios, Bell and Orr began discussions in 1976 with the intention of producing a large-scale artwork that combined each of their primary aesthetic concerns. According to Bell, their instincts were to design a high-tech fountain that defied categorization of typical public fountains, while blending the appropriated technology of Bell's mineral-coated glass and Orr's aesthetic concerns with the metaphysical symbolism of gold. The artists envisioned that *Solar Fountain* would be permanently installed for civic engagement in a public space, but they had no particular space in mind upon the work's conception.¹⁴

The execution of *Solar Fountain* required lengthy artist collaborations (1976-1978), long-term research, consultation with local engineers, and in-depth funding and political negotiations. These design components culminated in a sculptural vessel comprised of highly-reflective glass standing 10 feet tall with a base diameter of 37 feet; housed within the vessel was a mechanical apparatus that generated fog to produce the optical, temporospatial effects (figs. 5.3 – 5.4). The design called for Bell to coat the glass panels with titanium, which can be controlled in its metallurgical deposition to

¹⁴ Larry Bell (1980), Oral history interview by Michele D. DeAngelus, 95-98.

appear as a reflective gold. Orr knew a scientist-engineer who developed an industrial apparatus for protecting citrus fruit from frost damage, which “produced a very fine water mist or fog that would cover the field when a frost was imminent.”¹⁵ After extensive research and consultation with their science contact, the machine was adapted to the design for *Solar Fountain*. As the fountain emits moisture, the natural light refracts through the moving fog and the gold-tinted glass substrate. Before its completion, Bell explained, “We call it a solar fountain because it uses more sunlight than water. [. . .] As the sun is high enough in the sky to see inside the vessel, the panels will reflect into the fog, appearing as gold bars. The heat in these reflective bars will cause the moisture to evaporate and move, by natural convection, from the hot side to the cold side, where it will recondense.”¹⁶

In order to raise funds to produce *Solar Fountain*—including undertaking renovations on an industrial studio to produce the complex sculpture—the artists produced saleable works on paper and glass related to the project as well as a short promotional film demonstrating the temporospatial aspects in a scaled model.¹⁷ Finding a buyer for *Solar Fountain* proved exceedingly challenging, though Bell admits the film contributed to its time-based visualization and, consequently, eventual sale to the Denver County Cultural Council. In 1982, *Solar Fountain* was completed and installed in downtown Denver next to the Denver Performing Arts Complex. Despite claims made in

¹⁵ Bell, “Bell-Orr solar fountain,” *Domus*, 581 (April 1978), 52.

¹⁶ *Ibid.*

¹⁷ According to Bell, they produced the film themselves ca. 1977. See Bell (1980) Oral history interview, 107. Bell’s son, Oliver Bell, has made the film available on Vimeo at URL: <http://vimeo.com/12958639>.

the film that the apparatus is “industrially rated for low maintenance;”¹⁸ the artwork suffered dilapidation. According to Bell, the mechanical components of *Solar Fountain* fell into disrepair, the victim of vandals repeatedly throwing objects into the vessel that disrupted the functionality of the fog-producing apparatus. By 1997, the Cultural Council elected to dismantle and remove the challenging public artwork. Bell maintains that he does not know *Solar Fountain*’s ultimate fate, whether its components were repurposed or sent to a landfill.¹⁹

When listening to Larry Bell’s recent reflections on the dilapidation, obsolescence, and final demise of *Solar Fountain*, I detect utter frustration coupled with weariness over the matter. It must feel exasperating to labor for years on a large-scale, complex public artwork, promote it relentlessly, and finally find a buyer with whom you are satisfied, only to observe its expiration as a result of the actions of unsympathetic vandals. Unfortunately, vandalism is but one of the challenges that plagues the good intentions of public art: public reception, conservation issues, budgetary limitations, and zoning constraints also often position these works in precarious circumstances. Without *Solar Fountain*’s dilapidation by vandalism, its obsolescence would, in all likelihood, have occurred in time anyway. In the words of John Hallmark Neff, “In the absence of shared beliefs and even common interests, it should not be surprising that so much of the

¹⁸ Ibid.

¹⁹ Larry Bell (2012) interview with the author (26 October).

well-intentioned art acquired for public spaces has failed—failed as art and as art for a civic site.”²⁰

This dissertation has considered the implications of studio and post-studio art/technology appropriations, arguing that a culture of experimentation and the high-tech environment in Los Angeles contributed to artists’ extensive preoccupations with this phenomenon. While the public conspicuousness of Art and Technology decreased significantly by the early 1980s, in practice artists never ceased appropriating new technologies. Video devices, computers, and various digital technologies all found their way into artists’ studios. The obsolescence of Art and Technology has now reached “vintage” status in many art circles. In the past five years in particular, a renewed scholarly interest has sought to recount these untold art/technology narratives—e.g., portions of *Pacific Standard Time (PST)* put forth by the Getty Foundation—and to revitalize similar programs from the 1960s—e.g., the reinstatement of the A&T program at the Los Angeles County Museum of Art, known as the “Art + Technology Lab.”²¹

Begun in 2002, the Getty Foundation implemented *PST* to bring more than 60 cultural institutions—from Berkeley to San Diego—together for the purpose of “recover[ing] the historical record of art in Southern California.”²² With grant support from the Getty Foundation, institutions across Southern California produced exhibitions,

²⁰ John Hallmark Neff, “Daring to Dream,” in W.J.T. Mitchell, ed., *Art and the Public Sphere* (Chicago: University of Chicago Press, 1990), 6, republished from *Critical Inquiry*, 16 (Summer 1990).

²¹ LACMA explains: “Inspired by the spirit of LACMA’s original Art and Technology program (1967-1971), which paired artists with technology companies in Southern California, the Art + Technology Lab at LACMA supports artist experiments with emerging technology. The Lab provides grants, in-kind support, and facilities at the museum to develop prototype projects.” See LACMA, “Art + Technology,” *LACMA* (website), at URL: <http://www.lacma.org/lab> (accessed 3 March 2014).

²² The Getty Foundation, “Pacific Standard Time: Background,” *The Getty website*, URL: <http://www.getty.edu/pacificstandardtime/> (accessed 10 March 2015).

events, and publications that document the postwar emergence and relevance of Los Angeles as an art center. Currently, the Getty is organizing another arm of the *PST* initiative: *Pacific Standard Time: LA/LA*, which will examine the role of Latin America in the art of Los Angeles and the networked relationships between “LA/LA” and the rest of the world.

Similar in sentiment to *PST*'s focus on an historical recovery of Southern California art, the Art + Technology Lab (the Lab) drew inspiration from LACMA's original A&T program (1967–1971), which matched artists with Southern California technology companies during the late 1960s. Today, the Lab encourages aesthetic experimentation with new technology through “grants, in-kind support, and facilities at the museum to develop prototype projects.”²³ The Lab's inaugural year ran from the spring of 2014 to the spring of 2015, after having published its first call for proposals in December 2013. Since receiving their awards, artists Taeyoon Choi, E Roon Kang, John Craig Freeman, Annina Rüst, Rachel Sussman, and Tavares Strachan have been at work researching and carrying out their proposed projects. The current awardees' art/technology interests range from robotics and data visualization, to nonstandard measurements of time, to rocket propulsion using alternative fuels. According to LACMA's website, the program will continue for a second iteration due to the successes of the first year.²⁴

²³ Los Angeles County Museum of Art, “Art + Technology Lab,” *LACMA website*, URL: <http://www.lacma.org/lab>.

²⁴ *Ibid.* The Lab just concluded its second call for proposals and will announce the awardees in April 2015.

Since the first wave of *PST* events in 2011, the initiative has galvanized scholarly interest in the art of Southern California. As a revival of a key art/technology program, the Lab also demonstrates an invigorated attention to LACMA's role in the art of postwar Southern California as well as a parallel concern for fostering the art/technology model. Fifty years of critical distance provides a deeper appreciation for the arc of this history. From this vantage, we can bring into focus the role of parallel narratives on the development of Art and Technology in Southern California: the influence of the counterculture and the arc of Big Science as a source of artistic inspiration. (The declassification of germane Big Science ventures also enables such instances of reevaluation.) Moreover, a growing scholarly interest in technical art history as a viable methodology reinforces the goals set forth in this dissertation. By understanding artists' technical choices and the chronologies associated with technological innovation, these methods help to situate and complicate these modes of appropriation in relation to other more established histories. Like *PST* and the Lab, this study contributes to the expanding discourse of Art and Technology in Southern California during the 1960s and 1970s.

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