

“In the Middle of Nowhere”

**Robert Irwin’s Experiments with the Art and Technology Program
at the Los Angeles County Museum of Art, 1968-1970**

By Amanda Dalla Villa Adams



*At that time, around 1968...I had already gotten rid of my studio and had essentially put myself out in the middle of nowhere. It was as if the whole floor of my activity had fallen out. So I thought what was really interesting about the prospect of 'A & T' was not just to go to some industrial firm and produce a one-off piece, as other artists in the program were doing, but rather to have a dialogue with people in different disciplines who had the same existential problem that I was encountering. —Robert Irwin, *Artforum*, 2012*



Like the Art & Technology (“A & T”) exhibition, held at the Los Angeles County Museum of Art (LACMA) in 1971, Robert Irwin’s artistic practice reached a point of failure at the end of the 1960s. Under the auspices of the short-lived Art and Technology program, organized by LACMA curator Maurice Tuchman, Irwin participated in a series of scientific experiments from 1968-1970 with artist James Turrell and NASA scientist Dr. Edward Wortz; a final project, however, never came to fruition (Fig. 1).¹ Although trained as an Abstract Expressionist painter in the 1950s, Irwin found, after the LACMA experiments in perception, parapsychology, Zen Buddhism, and habitability, that he was less interested in tangible outcomes.² Nevertheless, little cultural and art historical investigation has been devoted to the marked shift during the late 1960s and early 1970s in Irwin’s career when he moved from object-based works to installation-based environments.³ During that period, Irwin abruptly gave up his studio practice. I contend that this shift resulted from: Irwin’s experiments with Turrell and Wortz; the changing political, cultural, and social milieu of Los Angeles (L.A.); and the American suspicion of science and industry.⁴ Furthermore, I argue that these experiments in perception had a profound effect on Irwin’s

understanding of the role of the artist, subsequently leading him to exchange the studio for several years for scientific perception, experimentation, and philosophical investigation.

Since his first major retrospective in 1977 at the Whitney Museum of American Art, Irwin has been portrayed as firmly entrenched in Los Angeles “California-ness,” defined as a sensibility best understood by a West Coast audience.⁵ Frequently, he is paired with Turrell as the leading proponent of the “Light and Space Movement,” which began in 1964 with Irwin’s disc paintings, and Irwin has also been incorrectly labeled a “California Minimalist.”⁶ Despite his success, however, there is a dearth of sustained critical analysis concerning Irwin’s post-1970 practice.⁷ Phenomenology particularly and its link to “the fact that [the works] are to be *seen*,”⁸ became the dominant interpretive method for analyzing Irwin’s work and this has continued to the present day.⁹ For this reason, it is necessary to open up the critical dialogue surrounding Irwin’s complex—and at times contradictory—practice and thinking as developed in his writing, which must, however, be tempered by considering the work itself.¹⁰

By the mid-1960s, Irwin had problematized art as a term and a practice in order to overcome critic Clement Greenberg’s then-widely-accepted formalist definition of

Figure 1. (l-r) Robert Irwin and James Turrell in the Anechoic Chamber at UCLA, 1969. ©Malcolm Lubliner



modernist art. Irwin's new theories of art culminated in the essay "Notes Toward a Model" published in his Whitney retrospective catalogue in 1977.¹¹ As a painter, Irwin first worked out these ideas in the studio through a series of increasingly reductive two-dimensional pieces in an effort to "[break] the edge of the frame."¹² The loose, painterly brushstrokes and tactility of *Untitled* (1959) gave way to a pristine chrome yellow surface accented by straight neutral-colored lines in *Untitled* (1963-1964). That same year, for *Untitled* (ca 1964-66) (Fig. 3), Irwin spent long hours deliberating over the placement of individual dots onto a slightly curved canvas. With the intended goal of "apprehend[ing] sensually before the intellectual eye," each dot painting appears as a blank field of off-white color unless viewed under close inspection.¹³ Finally, Irwin substituted the canvas support

with convex acrylic plastic discs. Set off from the wall and illuminated from behind in four directions, each disc appears to hover in the air as some ethereal form. Eventually, these investigations into negating the frame culminated in the "A & T" experiments with Wortz and Turrell.

In the spring of 1968, Tuchman invited Irwin to participate in the Art & Technology program. Although initially skeptical about the efficacy for collaboration between scientists, engineers, and artists, Irwin committed to being one of the first participants to the project.¹⁴ Over the course of that following year, thirty-seven corporations partnered with seventy-six participants¹⁵—including artists James Lee Byars, Claes Oldenburg, and Andy Warhol, musician Karlheinz Stockhausen, and poet Jackson Mac Low—for three-month-long projects.¹⁶ After touring the Lockheed Aircraft Corporation

Figure 2, above. (l-r) Former LACMA curators Jane Livingston and Maurice Tuchman, and artists Robert Irwin and James Turrell examine a ganzfeld sphere at the Garrett Corporation, Los Angeles, 1969. ©Malcolm Lubliner

Figure 3, top right. First National Symposium on Habitability, Venice, CA, May 12, 1970. ©Malcolm Lubliner

Figure 4, bottom right. First National Symposium on Habitability, Venice, CA, May 12, 1970. ©Malcolm Lubliner

and IBM facilities, Irwin signed a contract for an extended twelve-month, full-time residency at the Garrett Corporation, a Los Angeles-based aerospace company, to work with Wortz. Irwin then invited the younger Turrell to collaborate.¹⁷

Together the three planned a series of twelve experiments, all of which were intended to make the viewer aware that the:

experience is formed within... the viewer must assume the responsibility, they get into the experience, and they make the art...[we want] to bring [the viewer] an awareness of perception, of perceiving yourself perceiving, pressing the information against the senses—making the sense of reality a sense of the senses.¹⁸

Initially, the group planned to do this by building a multi-room environment for the museum exhibition (Fig. 2). The space would combine an anechoic chamber, a sound dampened, black room, with a ganzfeld.¹⁹ German for “total field” and closely tied to gestalt theory, a ganzfeld is an acoustically isolated room that produces a “homogenous perceptual environment” through randomly chosen visual stimuli. As originally outlined, participants would sit in a specially designed hydraulic chair. Following a brief isolation period, the chair would take the person from the anechoic chamber to a seamless, Plexiglass domed room to experience a completely white ganzfeld, then back to the anechoic chamber and finally by a tunnel directly outside; the whole experience would last twenty to forty minutes with five to ten minutes spent in each room.²⁰ Unfortunately, after Turrell left the project in 1969, the estimated \$25,000 experiment never happened.²¹ However, a series of initial tests were held in an anechoic chamber at the University of California Los Angeles (UCLA). For the test-group experiments, the men invited thirty to forty UCLA psychology students into the chamber, one at a time, where each sat for four-, seven-, or ten-minute intervals. Afterwards, participants were given a written questionnaire of sixteen questions about their experience of the room.

Irwin, Wortz, and Turrell also carried out experiments in an alpha chamber to achieve an alpha state, comprised of a series of alpha



rhythms, or measurable cycles of brain waves, that occur during meditation. In the chamber, the subject sat in a comfortable chair for thirty to forty minutes doing nothing in order to become “intensely aware but of nothing in particular...they were simply training themselves to achieve a special state of consciousness for a few minutes at a time.” Several hours after leaving the chamber, each participant experienced “definite, inexplicable sensations of anxiety, or a sense of mental dislocation or dissociation.” For the three men, these experiments, and their aftereffects in

the alpha chamber, closely related to Zen Buddhist meditation, which all three practiced twice a day under very strict instructions.²²

After Turrell’s resignation from the project, Wortz and Irwin continued to collaborate: the most important for Irwin was the First National Symposium on Habitability, held from May 11-14, 1970 in Venice, California (Fig. 3). For the symposium, Wortz and Irwin invited twenty-six speakers and panelists from leading universities, government agencies, and corporations across the United States and Canada to discuss



“the issue of habitability” and to determine the criteria for deciding the essential needs for humans to exist (on earth or in a spacecraft).²³ Assisted by artist Larry Bell and architect Frank Gehry, Irwin designed the space for the event (Fig. 4). Unlike a typical conference room, Irwin chose a large, studio-like space on Market Street, near the sea. Participants sat in the middle of the room, facing one another in low, bleacher-like seats made from corrugated cardboard. During the first day, Irwin used large cardboard cylinders to obstruct sound and light inside the room. He replaced the cylinders with a transparent tarp on the second day. On the final day of the symposium, Irwin removed the tarp, leaving an entire side of the room open to the outdoors.²⁴ Off the main room, Irwin created smaller environments that each presented a habitability challenge tied to scale, light, or atmosphere. For example, some rooms were

too small for the number of people involved in the activity, while other environments lacked proper lighting.

Culling directly from ideas discovered through the Art and Technology program, Irwin used the immersive environments to disrupt the participants’ perceptual understanding of space. Rather than interior or environmental design, Irwin’s alteration of the environment fell in line with the expanded field of art making, then concurrently being explored by many other artists.²⁵ The intentionally uncomfortable benches, bad acoustics, and awkward seating arrangements proved to be positive factors for Irwin because they directed the visitors’ attention onto the environment. Historian Donna Conwell has perceptively argued that with this symposium Irwin “created his first site-generated perceptual environment, several months before he produced a foundational Light and

Figure 5. Robert Irwin, *Scrim Piece*, Ace Gallery, Los Angeles, December 1-15, 1971, 35 x 35 x 17 ft. ©2016 Robert Irwin/Artists Rights Society (ARS), New York. Courtesy of Ace Gallery, Los Angeles.

Space installation for the Museum of Modern Art in New York.”²⁶

This merging of art and science into a “perceptual environment” as well as the influential “A & T” experiments helped to redefine Irwin’s thinking about the interplay between the two disciplines. In 1965, prior to conducting the LACMA experiments, Irwin denied any relationship between his artistic practice and science. However, by 1970 he readily acknowledged the correlation, claiming that, like a chemist testing a hypothesis, the artist tries out a “million yes-no decisions...the only difference is the character of the product.”²⁷ A 1972 interview with critic Jan



Butterfield also corroborates the importance of scientific inquiry on Irwin's practice: experiments with perceptual researchers concerning the construction of the eye, he noted, had led him to question the concept of the real and abandon painting altogether.²⁸ Furthermore, in a series of interviews from 1975 to 1976 with curator Frederick Wight, Irwin contended that he agreed to participate in the LACMA experiments because he was interested in marrying art with technology rather than merely the exchange of ideas. "What I thought was interesting," stated Irwin, "was the fact that at this point in time there was a lot of demand...for a cross-disciplining. Information seems to be proliferating and falling out of its original categories."²⁹

By 1971, science, technology, and art existed in a strange—if not strained—relationships when

LACMA finally exhibited "A & T."³⁰ Tuchman had initially planned the exhibition in 1966, at the apex of the science, technology, and art craze. In 1968 art historian Jack Burnham enthusiastically prescribed technology-infused art as the wave of the future in his influential book *Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of This Century*.³¹ But in 1971 critics deemed Tuchman's exhibition an overwhelming failure. Art historian Anne Collins Goodyear convincingly blames its flop on Americans' changing perception of technology from one of technophilia in 1957 to technophobia by 1971.³² Goodyear connects this shift in thinking with the escalating crisis and eventual failure of the Vietnam War.³³ Many of the patrons for the "A & T" experiments, including the RAND Corporation and the Jet Propulsion Laboratory, had close links to and significantly profited

Figure 6. Installation view of Robert Irwin, *Untitled* (1971), Walker Art Center, Minneapolis, 1971. ©2016 Robert Irwin/Artists Rights Society (ARS), New York. Eric Sutherland for Walker Art Center, Minneapolis.

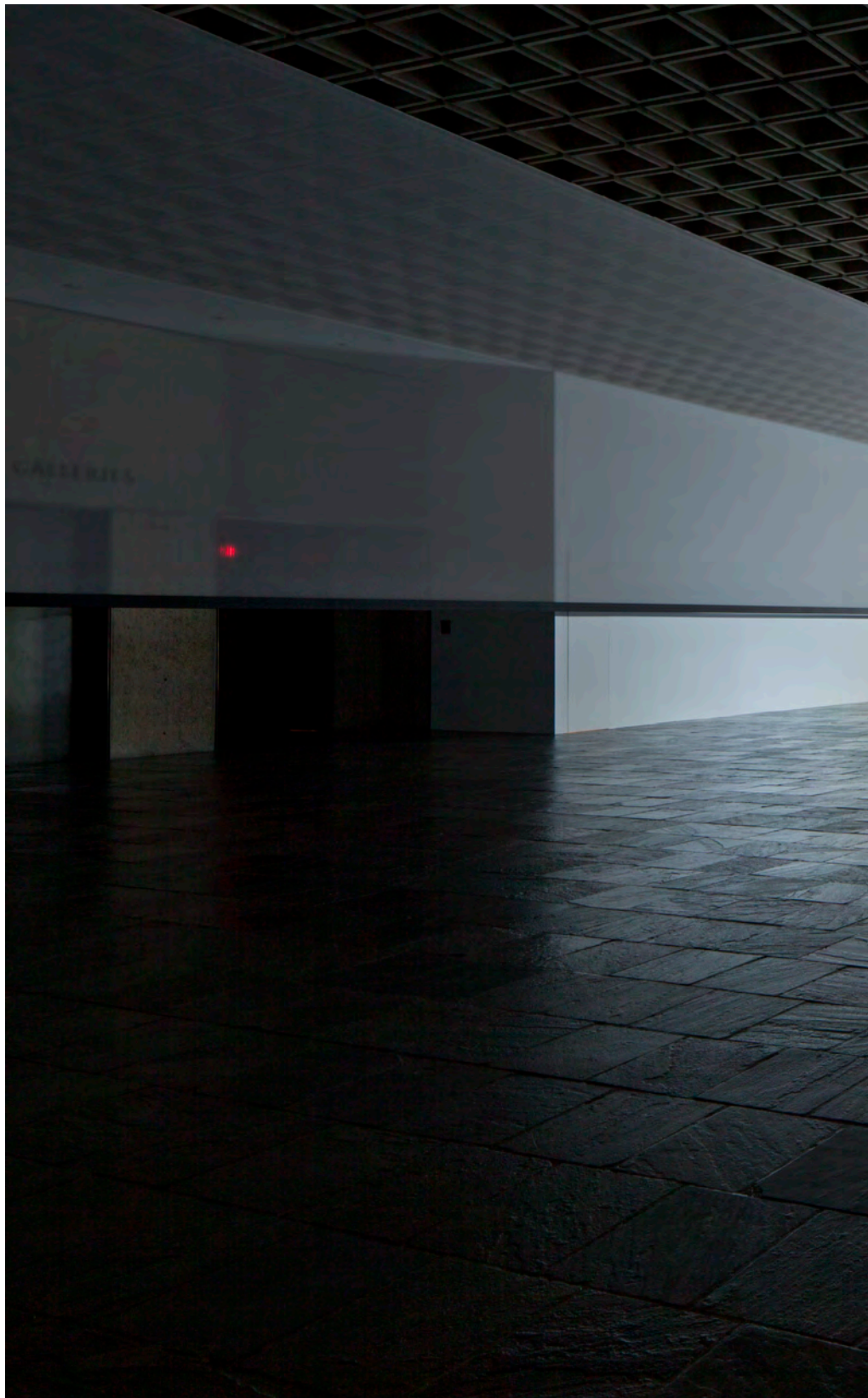
from the overseas conflict. While not a problem for Tuchman when the exhibition was initially planned in 1966, Goodyear claims that the government connection became problematic after public opinion of the Vietnam War turned following the Tet Offensive and My Lai Massacre of 1968, the American invasion of Cambodia in 1970, the Kent State shooting on May 4, 1970, and the leaked Pentagon Papers in 1971.

While Goodyear's assessment of the botched LACMA exhibition is fitting, it does not fully explain the shift in Irwin's career away from painting toward technology, the exploration of perception, and environmental

art making. Additional contextual reasons should be considered. For example, the Los Angeles art community became increasingly politicized opposing the financial support of large-scale corporations. In addition, the L.A. art scene was redistributed during the 1960s, as conceptual artists replaced the earlier Ferus Gallery artists. Although Irwin declined to participate in some of the artist-led activist events of the mid-1960s, his intimate connection with the Ferus Gallery and L.A. art world places him squarely within the debates circulating around American foreign policy. Similarly, like the later artists, Irwin's work displays the shift from object-based to conceptual-oriented practice indicative of post-studio work.³⁴ Thus, by considering Goodyear's assessment of technological perception within the larger political, scientific, and social crisis of the period, it is likely that Irwin exchanged studio practice for scientific research as a response to his milieu. Irwin's post-studio art-making and interest in scientific perception closely follows the rise and fall of the political, cultural, and economic instability associated with the sixties in general and L.A. in particular.

The so-called "long sixties" according to cultural theorist Fredric Jameson, began with the wave of Third World decolonization, launched by the Battle of Algiers in 1957. Jameson marks its closing in 1973 with the cessation of the draft, withdrawal of American troops from Vietnam, and the onset of a worldwide

Figure 7. Installation view of Robert Irwin, *Scrim Veil-Black Rectangle-Natural Light*, 1977 (June 27-Sept 1, 2013). Whitney Museum of American Art, New York. Robert Irwin (b. 1928). *Scrim Veil-Black Rectangle-Natural Light* (1977). Cloth, metal and wood. Overall: 144 x 1368 x 49 in. Whitney Museum of American Art. ©2016 Robert Irwin/Artists Rights Society (ARS), New York. Photograph by Sheldon C. Collins.





economic crisis.³⁵ Similarly, the space race between the United States and the Soviet Union parallels this political timeline, providing another pair of bookends to mark the sixties: the Soviet's launch of Sputnik on October 4, 1957, and the cancellation of the Apollo program in 1972.³⁶ During the sixties, science and politics, frequently overlapped, working in tandem to shift American perception of technology.³⁷

However, at the height of the science and technology craze, museums and artists made much of the potential for combining the two with art. As Goodyear explains:

The 1960s represented a cultural crossroads between philosophies of artmaking developed in pre-World War II Europe—when scientific breakthroughs seemed to offer proof of the interrelatedness of all aspects of life and new modes of seeing, the understanding of which could avert future conflict.³⁸

A series of events testify to this widely held belief of a beneficial symbiotic relationship between the two disciplines. Spurred by classes with composer John Cage, Allan Kaprow's early happenings of the late 1950s and those of his peers helped initiate this trend by combining new forms of technology and found media. Other collaboration ensued, such as Experiments in Art and Technology (E.A.T.) founded by engineer Billy Klüver in 1966, famous for its inaugural event *9 Evenings* (1966), which combined engineers, musicians, artists, dancers, and other performers.³⁹ Institutional-led initiatives followed, including the Center for Advanced Visual Studies (CAVS), founded in 1967 at the Massachusetts Institute of Technology (MIT). The museums lagged behind but by 1968 they had embarked on a series of seminal exhibitions devoted to the pairing, including: "The Machine as Seen at the End of the Machine Age" (1968) at the Museum of Modern Art, "Some

More Beginnings" (1968) at the Brooklyn Museum of Art, "Cybernetic Serendipity" (1969) at the Corcoran Gallery of Art, "Software Information Technology" (1970) at the Jewish Museum, and "Explorations" (1970) at the Smithsonian.⁴⁰

Tuchman's exhibition was the first science-art-and-technology event planned for the West Coast. According to the young and optimistic curator, "futuristic" L.A. with its "advanced technology" offered a more appropriate geographical venue than the earlier shows on the East Coast.⁴¹ However, as technology-based corporations, many of whom were sponsors for the Art and Technology exhibition, profited from the increased wartime market, the reception by Tuchman, the participants, and the L.A. community at large quickly changed from optimism to a sense of crisis and disapproval. This shift was deeply felt in the L.A. artistic community. Many L.A. artists, closely connected with the Ferus Gallery, formed the Artists' Protest Committee (APC) in 1965 and organized a series of anti-war demonstrations.⁴² Although he was a founding member of the Ferus Gallery, Irwin declined to participate when the APC installed *The Artists' Tower of Protest (Peace Tower)* (1966).⁴³ Shortly after the *Peace Tower* installation, the thriving L.A. art scene encountered several major setbacks: the Ferus Gallery and Rolf Nelson Gallery closed in 1966, followed a year later by the move of both Virginia Dwan's L.A. gallery and *Artforum* to New York. This transition allowed for an influx of new trends such as conceptual art, as well as other artists, including John Baldessari and Ed Ruscha, and the formation of new galleries. By the late sixties, a changing Los Angeles art scene had subsumed the earlier, small community of pioneering artists who had stubbornly proved that art could flourish outside of a "ponderously established international art center such as New York."⁴⁴

By that time, Irwin had already exchanged his urban home for a peripatetic existence to "begin again" leaving him "in the middle of nowhere" with "nothing to do, a delicious state of attention where your perception is allowed to wander and indulge without the demands to function."⁴⁵ Later, he aptly described this period in dramatic terms: as he put it, "the whole floor of my activity had fallen out."⁴⁶ Traveling cross-country from 1970 to 1977, Irwin gave lectures, made ephemeral art in the desert, studied philosophy, and exhibited ephemeral installations.

These installations, following his collaborations with Wortz and Turrell, help shed light on the immediate post-1970 impact of the "A & T" experiments, thereby providing insight to the shift in Irwin's career from an object-based to installation-based praxis. In 1972, Irwin created a perceptual environment at the ACE gallery in L.A. (Fig. 5); he realized a similar project at the Pace Gallery in New York the following year. In each, Irwin installed a thin piece of semi-translucent scrim in the room. Often dividing the space in two, the transparent sheet appeared opaque when viewed from the same direction as the light source, as seen in the Pace environment, but seemed to disappear when the fabric hung between the viewer and light source. In the installation at the Walker Art Center in 1972, the scrim subtly allows the background to peek through (Fig. 6). With these installations, Irwin stated,

What I do now is come unprepared, no material, no presuppositions, the less I think I know the better. What I try to do is deal directly with the situation at hand. Not to change the environment to an 'ideal' in some wholesale way but to begin using those givens that are already unique to the situation...For example, an empty room is not empty except of that abstraction for content.⁴⁷

Like the empty anechoic chamber, the empty room became a space to be filled by the viewer's perceptual experience. Thus, with these environments, Irwin drew from his earlier collaborations with Turrell and Wortz in the anechoic chamber and from their shared Buddhist practice.

With these environments, Irwin drew from his earlier collaborations with Turrell and Wortz in the anechoic chamber and in relation to their shared Buddhist practice.

Irwin's stated goals for these minimally altered environments extended outside the empty, interior room. In *String Drawing—Filtered Light* (1976) at the Venice Biennale, Irwin used one piece of string to demark an "eighteen-foot-square section of the public pathway" between the U.S. and Italian pavilions.⁴⁸ With the marked-off section, Irwin sought to bring attention to the shadows cast by the surrounding trees onto the ground; few visitors to the Biennale even noticed the ethereal work. Irwin sought to highlight light itself as the material in order to make the viewer aware of his or her surroundings in a way that mimicked the effect produced by a ganzfeld.

These investigations into interior and exterior environmental transformations culminated in Irwin's installation *Scrim Veil—Black Rectangle—Natural Light* (1977) (Fig. 7) at the Whitney Museum of American Art. There, Irwin installed a large sheet of translucent, gray scrim in an empty room in order to "explore consciousness and things that impede our experience with the phenomenal world."⁴⁹ Unlike the immediately preceding works, the scrim at the Whitney did not hang from floor to ceiling; visitors could walk underneath the sheet, accessing each side of the space. Therefore the viewer through his or her experience of the environment became an integral part for completing the work. A seminal work in Irwin's career, this altered environment firmly cemented his induction into the New York art world, even though he had

been exhibiting at the Pace Gallery since 1966.

With these site-altering installations, Irwin drew directly from his LACMA experiences. In an "A & T" memo dated 1969, Irwin, Turrell, and Wortz wrote out their intended goals:

Make certain the viewer is aware that the experience is formed within, that he forms the experience, gives it substance... The viewer must assume the responsibility, they get into the experience, and they make the art... [we intend] to bring you to an awareness of perception, of perceiving yourself perceiving, pressing the information against the senses—making the sense of a reality a sense of the senses.⁵⁰

For his own individual practice, Irwin first began to realize these goals by constructing and transforming a rented space for the "First National Symposium on Habitability." He then transferred the viewer's experience "perceiving yourself perceiving" onto empty gallery rooms or seemingly-empty plots of earth marked only by translucent veils or pieces of string in order to bring attention to light, perception, and the viewer's consciousness. Time spent in the anechoic chamber, in structured meditation, staring at a ganzfeld, or exploring the relationship between light, sound, and color pushed Irwin to reconsider space itself as a container for visual perception and its aftereffects.

Spurred by the crisis of a changing L.A. art scene, the Vietnam War, the political and scientific uncertainty of the decade, and the scientific influence of the "A & T" experiments, Irwin exchanged his studio for a post-studio, object-less practice predicated on the altered environment. A comparison of Irwin's two-dimensional paintings from the late 1950s and 1960s alongside his later altered perceptual environments from the 1970s, beginning with the space used for the First National Symposium on Habitability, reveals a

stark difference. Post-1970, Irwin attempted to disrupt the viewers' perception in order to bring about a new, heightened sense of awareness. With this shift and the "A & T" experiments in mind, it becomes apparent that Irwin's participation in the LACMA program and subsequent scientific projects had a notable impact on his career after 1970. Following his collaboration with Wortz and Turrell, the divide between the disciplines of art and science blurred to the point of indistinction. Art became a theoretical inquiry that necessitated experimentation and testing rather than a materialist practice. By combining these disciplines, Irwin's career shifted from purely art historical and theoretical inquiry to one filtered through philosophy and science as he attempted to examine "our state of consciousness and the shape of our perception."⁵¹

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Endnotes

1. Originally Tuchman planned the “A & T” exhibition as an ongoing series of experiments that would become a permanent program at LACMA. After the initial flop, the program was discontinued in 1971. In December of 2013, LACMA announced the introduction of a revamped Art + Technology Lab, which would “provide grants and lab space to artists who want to experiment with new technologies” by partnering with technology industries like Google and SpaceX. Michael Govan, LACMA’s chief executive, cited Tuchman’s program as the inspiration for the new endeavor. Andrea Chang, “LACMA announces Art + Technology Lab, with support from Google, SpaceX,” *Los Angeles Times* (10 December, 2013), <http://articles.latimes.com/2013/dec/10/business/la-fi-tn-lacma-art-technology-lab-google-20131210> (accessed April 25, 2014).

2. Irwin, of course, shared this sentiment with many artists. See Lucy Lippard, *Six Years: The Dematerialization of the Art Object from 1966 to 1972* (Oakland, CA: University of California Press, 1997).

3. Some have hinted at the importance of this period on Irwin’s career. Critic and biographer Lawrence Weschler does concede that by the late 1960s Irwin, “was increasingly absorbed in outside pursuits, activities whose imperatives in turn filtered back into his studio activity. It will be important to understand his involvement in some of these other pursuits if we are to comprehend the decisive move he was about to make as he entered the seventies.” Weschler’s focus however is on biographical rather than art historical analysis. See Lawrence Weschler, *Seeing is Forgetting the Name of the Thing One Sees: Over Thirty Years of Conversations with Robert Irwin* (Berkeley; Los Angeles, CA: University of California Press, 2008), 121.

4. See, for example, Max Kozloff, “The Multi-million Dollar Art Boondoggle,” *Artforum* 10, no. 2 (October 1971): 72.

5. “California-ness” is Irwin’s own term for his practice. Since he received little, and mostly negative, critical attention from the New York critics until 1977, Irwin decided that his work was better suited for a West Coast audience and sensibility. Robert Irwin and Barbara Isenberg, “Conversation with Robert Irwin,” in Isenberg’s *State of the Arts: California Artists Talk about Their Work*, 353-354 (New York, NY: Harper Collins, 2000), 353.

6. Beginning in the 1970s, critic Edward Levine tried to correct the misconception that Irwin was a minimalist: he claimed others had incorrectly focused on Irwin’s end product rather than his working process.

Decades later, art historian Rosalind Krauss inserted Irwin into the minimalist timeline under the heading “California Sublime.” Others, however, have taken umbrage with this assessment. Former curator Howard Fox calls Krauss’ strategy “suspect.” He goes further, stating that Krauss’ “California Sublime,” is “less a provincial offshoot of contemporaneous East Coast art than a venturesome assertion of a different aspiration.” Likewise, the introductory text written by editors Rebecca Peabody, Andrew Perchuk, Glenn Philips, and Rani Singh for the exhibition catalogue *Pacific Standard Time: Los Angeles Art 1945-1980* criticizes Irwin’s art historical placement “as uncomfortably squeezed into the equally antagonistic domains of color-field painting and minimalism.” See Rebecca Peabody, Andrew Perchuk, Glenn Philips, and Rani Singh, eds., *Pacific Standard Time: Los Angeles Art 1945-1980* (Los Angeles, CA: The Getty Research Institute, 2011), 1, 191; Edward Levine, “Robert Irwin’s Recent Work,” *Artforum* 16, no. 4 (December 1977), 26; Rosalind Krauss, “Overcoming the Limits of Matter: On Revising Minimalism,” in John Elderfeld, ed., *American Art of the 1960s* (New York, NY: Museum of Modern Art, 1991), 133, 140; and Catherine Grenier, ed., et al. *Los Angeles, 1955-1985: Birth of an Art capital* (Paris: Éditions du Centre Pompidou, 2006), 37.

7. The recent retrospective, Robert Irwin: *All the Rules Will Change* (2016), mounted by the Hirshhorn Museum and Sculpture Garden, sought to ameliorate Irwin’s position within postwar-contemporary art. However, the exhibition reconsidered Irwin’s practice from 1958 to 1970.

8. Michael Compton, *Larry Bell, Robert Irwin, Doug Wheeler* (London, UK: Tate Gallery, 1970), 8, 25.

9. Since the 1980s, the phenomenological thread in Irwin’s work has been extended to include associations with spiritualism, Zen philosophies, metaphysics, and mysticism. Even the press release for the aforementioned exhibition *Robert Irwin: All the Rules Will Change* at the Hirshhorn Museum of American Art emphasizes a connection between Irwin’s work and phenomenology. See Howard Singerman, (Review of Art in Los Angeles: Seventeen Artists in the Sixties at the Los Angeles County Museum of Art), *Artforum* 20, no.7 (March 1982): 75-77; Roberta Smith, “Ineffable Emptiness, From Dawn to Dusk,” *The New York Times*, July 25, 2013, http://www.nytimes.com/2013/07/26/arts/design/robert-irwins-light-and-space-work-returns-to-the-whitney.html?_r=0&pagewanted=print (accessed Feb. 1, 2014); Nancy Princenthal, “Dia: Beacon: The Imperturbable,” *Art in America* 91, no. 7 (July 2003): 62-72; and Lance

Esplund, “Lit: Three Artists Sculpting with Light,” *Modern Painters* 13, no. 1 (Spring 2000): 108-111.

10. Although an eclectic array of philosophical tenets highly influenced Irwin’s theories about artmaking, they frequently appear misquoted in his essays. Scholars have noted that Irwin’s writing, which “seeks to materialize the experience of thinking as a lived, contingent practice,” should be taken as a “conversation” rather than “communication.” See Robert Irwin and Matthew Simms, ed., *Notes Toward a Conditional Art* (Los Angeles, CA: J. Paul Getty Museum, 2011), 10-11.

11. Robert Irwin, *Robert Irwin* (New York, NY: Whitney Museum of American Art, 1977).

12. Robert Irwin, “Robert Irwin with Marianne Stockebrand: A Dialogue,” *Chinati Foundation Newsletter* 6 (December 2001): 20.

13. Robert Irwin, *Robert Irwin* (Chicago, IL: Museum of Contemporary Art, Chicago, IL, 1975), 4.

14. Robert Irwin, 1928 -, Modern Art Department Art and Technology Records, Los Angeles County Museum of Art Balch Art Research Library, MOD.001.001

15. Goodyear points out that although seventy-six people participated in the project, only sixteen collaborations were realized. Likewise, only twenty-three participants actually collaborated with industrial sponsors. Anne Collins Goodyear, “From Technophilia to Technophobia: The Impact of the Vietnam War on the Reception of ‘Art and Technology,’” *Leonardo* 41, no. 2 (2008): 171.

16. Maurice Tuchman, *Art & Technology: A Report on the Art & Technology Program of the Los Angeles County Museum of Art, 1967-1971* (Los Angeles, CA: Los Angeles County Museum of Art, 1971), 10.

17. Peabody, et al., *Pacific Standard Time*, 218.

18. Peabody, et al., *Pacific Standard Time*, 218.

19. Beginning in the 1930s, experimental psychology conducted studies on telepathy in the ganzfeld. See Philip John Tyson, Dai Jones, and Jonathan Elcock, *Psychology in Social Context: Issues and Debates* (Malden, MA; Oxford, UK: BPS Blackwell, 2011), 199-200.

20. Peabody, et al., *Pacific Standard Time*, 220.

21. It is unclear why Turrell left the project. When later asked, Turrell downplayed any “A & T” importance to his practice entirely. Former LACMA curator Jane Livingston suggests several reasons: 1) both Irwin and Turrell became disinterested in the project after discovering that the feasibly would not work for a large exhibition of many spectators; and 2) differences in collaborative style, ambition, and ego, especially between the artists. Robert Irwin, 1928 -, Modern Art Department Art and Technology Records,

Los Angeles County Museum of Art Balch Art Research Library, MOD.001.001

22. Wortz formulated the list of instructions for meditation, which began by outlining the subject's body posture: seated comfortably but erect in a lotus positions, hands in lap, palms facing up with thumbs pressed together, and eyes closed. Wortz outlined a different type of meditation for four individual weeks: the first week focused on counting breaths; during the second week the subject tried to "see the inhalations and exhalations" of their breaths; the third week was reserved for hearing the breath and breathing as quietly as possible; and the subject was invited during the fourth week to "try to increase the level of illumination of the room" in an attempt to see through his or her closed eyelids. Wortz lists other meditative strategies that should be observed daily, namely that the subject should have "no thought," "meditate in a group," and use "koan(s)" and "tantric(s)" to enhance the "psychophysiological experiences." Robert Irwin, 1928 -, Modern Art Department Art and Technology Records, Los Angeles County Museum of Art Balch Art Research Library, MOD.001.001

23. Edward Wortz, "Habitable Environments," *Choke* (1976): 20.

24. Robert Irwin, 1928 -, Modern Art Department Art and Technology Records, Los Angeles County Museum of Art Balch Art Research Library, MOD.001.001

25. See, for example, Rosalind Krauss, *Passages in Modern Sculpture* (New York, NY: Viking Press, 1977).

26. Peabody, et al., *Pacific Standard Time*, 223.

27. Lawrence Weschler, *Seeing is Forgetting the Name of the Thing One Sees: A Life of Contemporary Artist Robert Irwin* (Berkeley; Los Angeles, CA: University of California Press, 1982), 133.

28. Jan Butterfield, "The State of the Real: Robert Irwin Discusses the Activities of an Extended Consciousness: Part 1," *Arts Magazine* 46, no. 8 (Summer 1972), 48-49.

29. Irwin and Simms, *Notes Toward a Conditional Art*, 102.

30. The exhibition had traveled to Osaka, Japan one year earlier where it was exhibited in the American Pavilion at the Expo of 1970. See William Wilson, "L.A." 'Art, Technology' Prepares for Japan Expo," *Los*

Angeles Times, 28 August 1969, E1.

31. Initially trained as an artist, Burnham, envisioned a convergence between structuralism, the emergence of Information Technology, experimental art practices, and the introduction of conceptual art. Burnham negated the distinction between art and non-art, and instead advocated a form of artmaking that mimicked the two-way communication processes of information technology. See Edward A. Shanken, "The House that Jack Built: Jack Burnham's Concept of 'Software' as a Metaphor for Art," in Roy Ascott, ed. *Reframing Consciousness*, 156-160 (Portland, OR: Intellect Books, 1999), 156; and Jack Burnham, *Dissolve into Comprehension: Writings and Interviews, 1964-2004* (Cambridge, MA: The MIT Press, 2015).

32. Goodyear, "From Technophilia to Technophobia." Additionally, art historian Pamela Lee has investigated this shift in the sixties from technophilia to technophobia. Looking at Aristotelian *techne*, she redefines the term as the relationship between art and technology rather, instead of the more agreed upon translation of technology or tool. She maintains that this new relationship between art and technology is not neutral. Furthermore, she contends that art of the 1960s begins with a suspicion of technology. See her introductory discussion in Pamela Lee, *On Time in the Art of the 1960s* (Cambridge, MA: The MIT Press, 2004).

33. Goodyear, "From Technophilia to Technophobia," 169.

34. See Daniel Buren, "The Function of the Studio," *October* 10 (Autumn 1979): 51-58, originally published in 1971 as "Fonction de l'Atelier." Although neither Buren or Irwin use the term "post-studio," the term has been later applied to work that is realized at the final exhibition site. See Caroline Jones, *Machine in the Studio: Constructing the Postwar American Artist* (Chicago, IL: University of Chicago Press, 1996). Jones attempts to formulate a definition and history of the term "post-studio" by looking at specific practices from the sixties and seventies.

35. Fredric Jameson, "Periodizing the 60s," *Social Text* No. 9/10, The 60s Without Apology (Spring-Summer, 1984): 180, 204-205.

36. Samuel Willard Crompton, *Sputnik! Explorer 1: The Race to Conquer Space* (New York, NY: Infobase Publishing, 2007).

37. Of course, there were many other factors beyond the space race and the Vietnam War. For example, see Rachel Carson, *Silent Spring* (1962) (Boston, MA: Houghton Mifflin, 2002).

38. Anne Collins Goodyear, "Gyorgy Kepes, Billy Klüver, and American Art of the 1960s: Defining Attitudes Toward Science and Technology," *Science in Context* 17, no. 4 (December 2004): 613-614.

39. See Catherine Morris, et al., *9 Evenings Reconsidered: Art, Theatre, and Engineering, 1966* (Cambridge, MA: The MIT Press, 2006) for a description of the inaugural event and brief history of E.A.T.

40. I am thinking of museum exhibitions that highlighted new forms of technology as the central factor rather than exhibitions that explored perception within artistic media.

41. Tuchman, *Art & Technology*, 9.

42. Francis Frascina, *Art, Politics, and Dissent: Aspects of the Art Left in Sixties America* (Manchester, UK; New York, NY: Manchester University Press, 1999), 20-21, 26-29.

43. It is unclear if Irwin participated in any of the APC protests or if he was present at the group's first meeting at then-L.A.-based Dwan Gallery in 1965. Peabody, et al., *Pacific Standard Time*, 172.

44. John Coplans, et al., *Los Angeles Six* (Vancouver: Vancouver Art Gallery, 1968), 7.

45. Robert Irwin, *Robert Irwin* (New York, NY: Whitney Museum of American Art, 1977), 23.

46. Robert Irwin, "Robert Irwin," *Artforum* (September 2012): 405.

47. Irwin, *Robert Irwin*, 11.

48. Robert Irwin, *Robert Irwin: Primaries and Secondaries* (San Diego, CA: Museum of Contemporary Art San Diego; New York, NY: D.A.P./Distributed Art Publishers, 2008), 31.

49. Edward Levine, "Robert Irwin's Recent Work," *Artforum* 16, no. 4 (December 1977): 26.

50. Robert Irwin, 1928 -, Modern Art Department Art and Technology Records, Los Angeles County Museum of Art Balch Art Research Library, MOD.001.001

51. Butterfield, "The State of the Real," 48.

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