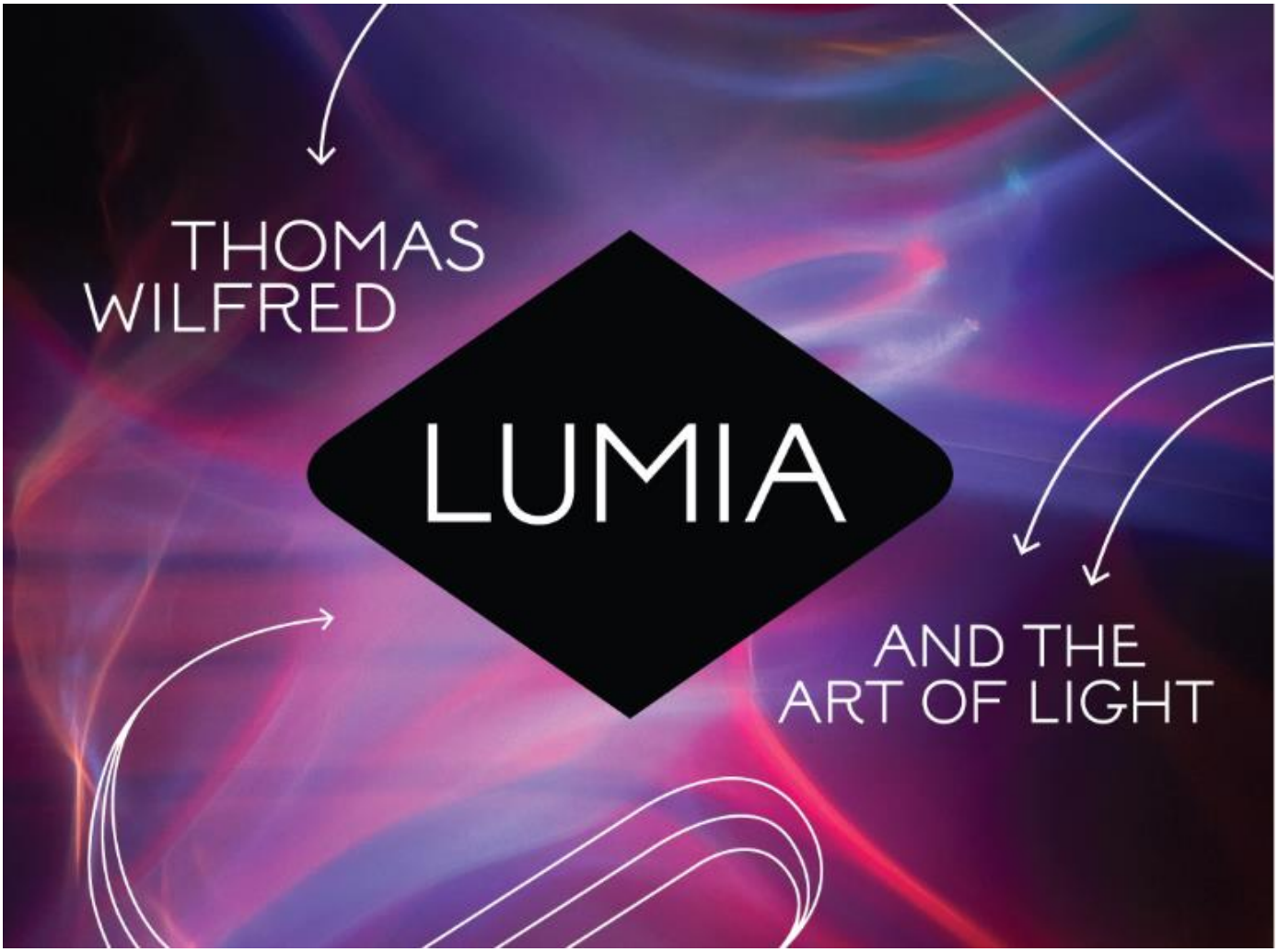

Study in Depth, Op. 152 (detail facsimile), 1959. Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C., Gift of Bristol-Myers Squibb by transfer from the National Museum of American History, Behring Center. Photograph courtesy Yale University Art Gallery

Light is part of the universe of flux and therefore motion is a necessary dimension.

--Thomas Wilfred, 1968

Here light is the artist's sole medium of expression.
He must mould it by optical means,
almost as a sculptor models clay.
He must add colour, and finally motion to his creation.
Motion, the time dimension, demands that he must be a choreographer in space

—Thomas Wilfred

Thomas Wilfred (1889 Denmark–1968 USA) pioneered an art of light he characterized as "radiant form in dark infinite space." A skilled mechanic and electrician, beginning in the 1920s he invented instruments that produce brilliantly colored displays, fusing modern art and pre-digital technology. He aligned his art with then-current concepts of the universe— space-time, flux, infinity, the speed of light—sparked by Albert Einstein's theories of relativity and concepts about optics. These complex ideas were popularized by the mass media---the *New York Times* ran seventy-seven stories on these topics in 1921 alone. Wilfred wrote about the formation of the cosmos and light as the basis for life.

Early in his career Wilfred performed on an organ-like instrument he called the "Clavilux." Projected silently, light constantly changes in palette and pattern, with forms emerging, shifting, and receding into darkness. These "recitals" mesmerized audiences throughout the United States and Europe and the performances were covered in *Vanity Fair*, the *New York Times*, and other popular publications; *Scientific American* did a full-length feature on Wilfred in 1930. Recognizing possibilities beyond these ephemeral performances, in 1928 he began building instruments for the home. He later designed projected murals for Broadway performances and the 1933 World's Fair in Chicago, and, by the late 1950s, Wilfred's lumia were owned by the Metropolitan Museum of Art, the Museum of Modern Art, and the Cleveland Museum of Art.

Contemporary artists recognized Wilfred as radically innovative. His lumia shared formal affinities with the early twentieth century avant-garde and continue to resonate with later artists, among them James Turrell, who acknowledge Wilfred's influence on their own thinking about light and art. Today lumia remain as transcendent as they were almost a century ago. Their luminous, undulating patterns conjure a space and time beyond everyday human experience.

Although Wilfred left specific instructions for their preservation to ensure lumia could be exhibited well into the future, the fragile nature of the earliest objects require that they be turned on and off according to a schedule. Videos of the works in the exhibition are available at youtube.com/yaleartgallery.

Lumia: Thomas Wilfred and the Art of Light was organized by Keely Orgeman, the Alice and Allan Kaplan Assistant Curator of American Paintings and Sculpture at the Yale University Art Gallery and was made possible by the Terra Foundation for American Art. Additional support was provided by Mary-Jo and John Amatruda, Jerald Dillon Fessenden, the David Bermant Foundation, the Art Gallery Exhibition and Publication Fund, and the Friends of American Arts at Yale Exhibition and Publication Funds.

The presentation at the Smithsonian American Art Museum is made possible through the generosity of:

Elizabeth Broun Curatorial Endowment
James F. Dicke Family Endowment
scan|design Foundation

Thomas Wilfred Sitting at the Clavilux Model E, about 1924. Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Unidentified artist
Poster advertisement for *The Art Pioneer Thomas Wilfred in a Clavilux Recital*
ca. 1926
red printing ink on paper
Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Four Clavilux Keyboard Notations
ca. 1922–30
white ink on black paper
Wilfred's scores were made with white ink on black paper so they would be legible in dark theaters. Wilfred was a proficient lutentist; his notation's format is based on tablature, which was developed for fretted instruments such as the guitar. During recitals, the artist read the numbers and markings from top to bottom and moved the Clavilux's sliders or turned its knobs accordingly.
Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Clavilux Performances
In 1919, Wilfred began building his first Clavilux, an instrument played like an organ that projected light onto a large screen. The keyboard controlled a system of pulleys and motors that moved lenses, color filters, and rotating lightbulbs to generate the composition. These elements blended light on the screen to produce what Wilfred considered the three major aspects of lumia: form, color, and motion. The earliest performances were given by the artist for live audiences in concert halls. In 1922 a reviewer of the first Clavilux recital wrote, "Seated at a keyboard, next to a battery of high-powered projectors, the color organist [Wilfred] plays from notation upon a white screen, gracefully majestic dances of fantastic luminous forms, rising from a sea of pure color, changing and extending as far as the eye can reach."

The Keyboard Room in the Temple of Light
1926
facsimile of a drawing in ink on paper
Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

***Unit #86,* from the *Clavilux Junior (First Home Clavilux Model)* series**

1930

metal, glass, electrical and lighting elements, and an illustration-board screen in a wood cabinet

In 1928, Wilfred began building small instruments for home use that allowed the operator to manipulate the intensity and movement of light. The viewer could select one of a half-dozen or more "records," each painted with a different palette and representing a distinct composition. Rays from a light bulb inside the lower cabinet travel through a cone lined with reflective material and are projected on the screen (a piece of concave illustration board), which is protected by a glass pane. As the reflected light passes over this concave surface, it takes on the shape of a flame-like parabola.

Carol and Eugene Epstein Collection

Painted glass color records from *Unit #86,* from the *Clavilux Junior (First Home Clavilux Model)* series, Carol and Eugene Epstein Collection. Photograph courtesy Yale University Art Gallery

The Clavilux Silent Visual Carillon

1928

gouache and watercolor on paper, mounted on cardboard

By the late 1920s, having performed on the Clavilux in Canada, Europe, and the United States to great acclaim, Wilfred envisioned building a Clavilux-like instrument inside a tower that would project light onto curved screens installed on top of a skyscraper. The effect, he believed, would be a radiant, three-dimensional dome he called the *Clavilux Silent Visual Carillon.*

Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Drop for Overture

1928

gouache and ink on paper

Drop for Overture is the study for a lumia backdrop for *Americana*, a satirical revue for Broadway written and produced by J. P. McEvoy, who commissioned Wilfred to compose three "mobile settings" that could be projected during the performance. Wilfred designed *Drop for Overture* for the opening of one of the revue's acts. His contract described the setting as a "decorative mobile composition to be used on a specially painted drop curtain in front as a prelude to the performance."

Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Results of Questionaires [sic] Given to 200 Men and Women

ca. 1940

ink and colored crayon on paper

Wilfred opened his Art Institute of Light in rented space in midtown Manhattan in 1934, where he gave recitals, lumia demonstrations and, in at least one instance, passed out questionnaires to his audience. Frequent visitors included Museum of Modern Art director Alfred H. Barr Jr. and curator Dorothy Miller; painter Jackson Pollock; and *New York Times* art critic Edward Alden Jewell, who described one composition as "weaving, folding, unfolding, passionate, impassionate, parabolic, wheeling, quiescent dance." The institute closed abruptly in 1943, after the United States entered World War II.

Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Transverse Section of Ballroom in Hotel Sherman

1929

carbon reproduction of a drawing on paper

Wilfred decorated the ballroom of Chicago's Hotel Sherman with a panoramic light mural.

Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Counterpoint in Space, Op. 146

1956

metal, glass, electrical and lighting elements, and a frosted-glass screen in an oak cabinet

Duration: 44 hours, 31 minutes, 50 seconds

Counterpoint in Space is neither a recital Clavilux nor a home instrument but a later variation that he made for exhibitions and other permanent-display contexts. He described this work as consisting of "ascending forms moving outward as they rise" and "diagonally descending forms." Though by the mid-1950s this crisscrossing movement was not a novel effect in lumia, *Counterpoint in Space* produced an astounding 410 variations of form and color combinations and thus has a longer duration than earlier works. In the late 1950s, Wilfred considered it his "most important to date."

Metropolitan Museum of Art, New York, Gift of the artist

Dreaming of a permanent headquarters for lumia experimentation and performance, Wilfred made architectural renderings of a churchlike building he called the Temple of Light or Institute of Light.

The "Temple of Light" Imagined as a Cathedral, #1

ca. 1926

pencil on paper

Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

The "Temple of Light" Imagined as a Cathedral, #2

ca. 1926

pencil on paper

Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

The "Temple of Light" Imagined as an Art Deco Building

ca. 1926

pencil and ink on paper

Thomas Wilfred Papers, Manuscript16s and Archives, Yale University Library

Preliminary Sketch of an Institute of Light

ca. 1930

photographic print of a drawing

Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

***Unit #50, Elliptical Prelude and Chalice*, from the *First Table Model Clavilux (Luminar)* series**

1928

metal, fabric, glass, and electrical and lighting elements on maple table

Elliptical Prelude and Chalice functions as a piece of furniture until a switch is flipped to activate the mechanism. Inside the box, a bulb transmits light through two rotating discs, hand-painted by Wilfred in brilliant colors and abstract patterns. The light then travels through a set of dimpled, reflective cones—one under the table, the other inside the body of the lamp—and emerge through the top of the lampshade. The light is projected on the ceiling, which is filled with a vortex of rippling clouds that swirl around a central oculus to evoke the eye of a storm.

Yale University Art Gallery, Gift of Thomas C. Wilfred

Plotting Space and Time

Wilfred was drawn to Albert Einstein's research on how light moves in space. His fascination inspired him to apply a scientific precision to the design of his compositions. He made analytical drawings to illustrate his manuscripts and published articles on his works and the concepts behind them in the mid to late 1940s. He diagrammed the complex relationships among lumia's three primary elements---form, color, and motion---which could be combined in countless ways to make unique compositions in what he called the Eighth Major Fine Art.

Basic Structure of the Two Alternating Forms

ca. 1940–50

ink on paper

Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Entire Sequence of Nine Cycles Is 162 Spaces Long

ca. 1940–50

ink on paper

The top portion of this drawing examines two generic lumia forms, X and Y, and the amount of space each occupies on the screen over the duration of a "cycle"—here defined as the length of the form, plus the length of the flat plane of the screen. Forms X and Y are both eight cubic units long according to Wilfred's grid (which represents the screen) and orbit through ten additional units, including brief intervals of total darkness between cycles.

Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Imagination—the Esthetic Concept; Reality—the Physical Equipment

ca. 1940–50

ink on paper

As light forms traverse the screen in lumia instruments, they move through what Wilfred called the "first field," or the visible section of space. In the upper half of this drawing, Wilfred noted that his aim was to "perform [the composition] so convincingly spatial that the spectator imagines he is seeing it through a large window in the cabin of a magic space-liner." Seated in front of this imaginary window, the viewer may perceive only a fraction of a total form at any given moment, but at the same time be completely surrounded by and aware of the "second field"—the totality of the cosmos.

Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Drawing submitted as part of Thomas Wilfred's patent application for a Light Projection *Display*
1930
photographic facsimile of drawing
Thomas Wilfred received at least four U.S. patents, including USP 1908203, the design for a light projection display system. The award issued by the U.S. Patent Office on May 9, 1933, states that the main objective of the apparatus was "to enable the projection upon a suitable surface of effects simulating architectural and other forms, such as columns." Wilfred intended the device to create an optical illusion in which projected forms would appear three dimensional.
Photograph courtesy the U.S. Patent and Trademark Office, www.uspto.gov

Light Source and Diamond-Shaped Color Spectrum
ca. 1940–50
ink on paper
Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

Lumia Diagram
ca. 1940–50
ink on paper
Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

***Unit #167*, from the *Clavilux Home Instrument (First Home Lumia Instrument)* series**
1930
metal, glass, electrical and lighting elements, and frosted-glass screen in wood cabinet
Unit #167 is believed to be the only surviving object from the *Clavilux Home Instrument (First Home Lumia Instrument)* series.
The Cleveland Museum of Art, Gift of the artist

Abstract, Op. 91 (The Firebird)

1934

metal, glass, gel filters, electrical and lighting elements, and frosted-glass screen in wood cabinet

The Firebird is the only static work among the small-scale lumia. It features a shadowed form that suggests a bird, its triangular beak silhouetted against a spotlighted area of ultramarine blue. Arching diagonally downward from the beak, a gentle contour delineates the bird's body and feathers, which radiate vibrant red, orange, and yellow light. The palette echoes the color scheme of the original costume for the title character in Russian composer Igor Stravinsky's ballet. Wilfred might have seen *The Firebird*, which debuted in Paris in 1910, when he was studying art at the Sorbonne.

Yale University Art Gallery, Gift of Thomas C. Wilfred

Tranquil Study, Op. 92

1935

metal, glass, gel filters, electrical and lighting elements, and frosted-glass screen in wood cabinet

Duration: 5 minutes, 15 seconds

Streaks of white light morph across the screen in *Tranquil Study*, which begins with a celestial apparition—a comet or faint aurora—crossing a low horizon above a purplish-blue sea. The white forms entering the screen from the upper-right corner create the illusion of an outward trajectory and eventually disappear on the left behind a "distant promontory," as Wilfred called it in a letter to a prospective buyer. The "narrative" composition, which has a distinct beginning and end, stands in stark contrast to the repeated but variable patterns in his later works.

Yale University Art Gallery, Gift of Thomas C. Wilfred

Nocturne, Op. 148

1958

metal, glass, electrical and lighting elements, and frosted-glass screen in oak cabinet

Duration: 5 years, 359 days, 19 hours, 20 minutes, 48 seconds

Nocturne moves at an unusually slow tempo. The length of the composition—almost six years—exponentially exceeds that of Wilfred's earlier works, which have running times measured in days. The horizontal composition sometimes evokes a seascape with a shifting horizon line that separates water and sky, and at other times, a view from the window of an airplane overlooking an endless expanse of clouds.

Carol and Eugene Epstein Collection

Vertical Sequence, Op. 136

1940

metal, glass, electrical and lighting elements, and frosted-glass screen in oak cabinet

Duration: 37 hours, 28 minutes, 47 seconds

In *Vertical Sequence* Wilfred initiated a more complex formal vocabulary that he often used in subsequent models. Reflected light on the screen coalesces into voluminous masses that give the composition a heightened illusion of depth. Angular forms project insistently forward, while vaporous clouds drift like smoke in and out of the visual field.

Carol and Eugene Epstein Collection

Multidimensional, Op. 79

1932

metal, glass, electrical and lighting elements, and frosted-glass screen in painted wood cabinet

Duration: 20 minutes

Multidimensional may be the earliest example of an instrument with a "recorded" composition, one whose movements, palette, and duration are entirely predetermined by the artist. It is distinguished by its unusual aesthetic. Inside the cabinet, light passes through transparent objects that retain their basic shapes and give a sense of their physical presence on the screen. The translucency of these materials produces prismatic effects: for example, the iridescent scales on a snakelike tube are produced by a clear glass cord embedded in the mechanical apparatus.

Carol and Eugene Epstein Collection

Visual Counterpoint, Op. 140

1950

metal, glass, electrical and lighting elements, and frosted-glass screen in metal cabinet

Duration: 11 hours, 7 minutes, 30 seconds

Visual Counterpoint emphasizes the interplay between lateral and vertical rhythmic movement, much like the way music combines melodies. The simple alternating motion gives the composition a precise structure. *Visual Counterpoint* was featured in the landmark *15 Americans* exhibition at the Museum of Modern Art in New York in 1952, where it was installed along with *Multidimensional, Op. 79* and three other lumia works. The exhibition also showcased paintings by Mark Rothko and Clyfford Still, as well as Jackson Pollock, who reportedly had attended lumia recitals at the Art Institute of Light in the 1930s.

Carol and Eugene Epstein Collection

Lumia Suite, Op. 158

1963–64

projectors, reflector unit, electrical and lighting elements, and projection screen

Duration: approx. 9 years, 127 days, 18 hours

Lumia Suite is Wilfred's best-known project—"as close to perfection as I can get," the artist wrote at the time. The Museum of Modern Art in New York, which offered Wilfred more support than any other institution, commissioned *Lumia Suite* in 1963 and kept it on almost continuous view for sixteen years. Despite its popularity, its need for maintenance led to its disassembly in 1980. In anticipation of the present exhibition, *Lumia Suite* has been restored to its original spellbinding effect.

Lumia Suite is organized around three sequential movements of form—vertical, horizontal, and elliptical. In the third movement, a descending arc slowly transforms the horizontal sequence into a central whorl of expanding and interlacing ellipses that sweep around a nucleus of intense changes. Viewers witness this "central whorl" repeatedly, but it almost never reappears in exactly the same colors or shapes.

Museum of Modern Art, New York, Mrs. Simon Guggenheim Fund

Study in Depth, Op. 152

1959

projector, reflector units, electrical and lighting elements, and projection screen

142 days, 2 hours, 10 minutes

Study in Depth was commissioned for the lobby of the Clairol company's New York headquarters. It is the only surviving example of Wilfred's limited output of commercial work. A press release from Clairol stated that the "light mobile" installation "dramatizes the interplay of light and color in the development of hair tints for women." Illuminated, irregular forms float across its cinema-size screen in a horizontal, back-and-forth procession, followed by a sequence that stretches backward into space, and, finally, a rapid vertical ascension. These trajectories establish a cyclical tripartite structure, but in each cycle colors and shapes mix in an array of combinations. The balance of predictability and flux offers an experience that Wilfred compared to "the watching of clouds."

Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C., Gift of Bristol-Myers Squibb by transfer from the National Museum of American History, Behring Center, 2004

Sequential Development of Three Form Groups

1948

colored pencil, ink, and colored ink on paper

Wilfred's drawing *Sequential Development of Three Form Groups* illustrates the spatio-temporal concepts behind such curving and orbiting forms. The diagram maps each "form-group" as it changes direction, indicated by lines with arrows in corresponding colors of red, green, or blue.

Museum of Modern Art, New York

Study for *Lumia Suite, Op. 158*

1964

pencil on blueprint

Museum of Modern Art, New York, Gift of Earl Reiback

Spacetime Study, Op. 153

1960

metal, glass, electrical and lighting elements, and frosted-glass screen in painted wood cabinet

Duration: 14 days, 14 hours, 33 minutes

In *Spacetime Study* some forms rise in a continuous upward stream while others expand diagonally and horizontally, pushing against the boundaries of the screen. Three-dimensional in effect, *Spacetime Study* verges on the illusion of a fourth dimension, in which perceived volumetric forms morph over time and seem to orbit around the viewer.

Joslyn Art Museum, Omaha, Neb., Gift of Mr. and Mrs. D. H. Voltz, 1962

Luccata, Op. 162

1967–68

metal, glass, electrical and lighting elements, and frosted-glass screen in hinged wood cabinet

Duration: indefinite playing time

Luccata was Wilfred's last lumia work. In a final attempt to render infinity intelligible, he created a composition that plays indefinitely without repeating exact combinations of form and color. The form sequences read as technicolor grass with blades that suddenly materialize, sway, and dissolve into the nebulous constellations of light. *Luccata*'s large format and inclusion of semi-representational imagery suggest a conceptual return to the keyboard-controlled Clavilux performances of the 1920s and 1930s.

Carol and Eugene Epstein Collection

Untitled, Op. 161

1965

metal, glass, electrical and lighting elements, and a frosted-glass screen in oak cabinet

Duration: 1 year, 315 days, 12 hours

Inside the cabinet of *Op. 161*, three internal sets of aluminum reflectors—two of which are positioned at the same height but turn at slightly different speeds—concentrate light at the center of the composition. While the use of coupled reflectors represented an innovation, the work also employs a hand-painted color record like those found in the domestic models of the late 1920s and 1930s. An amalgam of old and new, *Op. 161* may nonetheless be unfinished; it was left in Wilfred's studio after his death. Movie director Terrence Malick saw something evocative of cosmic creation and human afterlife here and featured footage of its glimmering light in his 2011 film *The Tree of Life*.

Carol and Eugene Epstein Collection

Thomas Wilfred Sitting at the Clavilux Model E, about 1924. Thomas Wilfred Papers, Manuscripts and Archives, Yale University Library

"A New Substitute for Scenery and a New Kind of Concert," *Vanity Fair* (May 1925): 67. Beinecke Library, Yale University

Memorial Medal for Thomas Wilfred (1889–1968)

Joseph Kiselewski American, 1901–1986

Medallic Art Company, American, founded 1903

1968

bronze

Yale University Art Gallery, Transfer from the Yale University Library, Numismatic Collection, 2001