OPTIC NERVE

PERCEPTUAL ART OF THE 1960s

JOE HOUSTON

INTRODUCTION BY DAVE HICKEY

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PERCEPTUAL ART OF THE 1960s

A new movement of perceptual abstraction, dubbed "Op Art" by members of the press who witnessed its eruption, came to international attention in the mid-1960s. The era of global social and technological change was the backdrop to this pioneering form of art that exploited the latest technology, innovated the concept of viewer participation, and introduced an emphasis on the immersive experience—ideas that contemporary art embraces forty years later. The principles of Op Art shifted the focus of pictorial art from narrative to the nature of vision, engaging the process of perception as both a tool and a subject in painting, sculpture, and installation.

This important book, published to accompany the first major exhibition of Op Art at an American museum in twenty-five years, examines the development of the movement, its cultural context, and its widespread impact on advertising, fashion, and filmmaking. Featuring 250 stunning works by such key figures as Josef Albers, Bridget Riley, Julio Le Parc, François Morellet, and Victor Vasarely, the global nature of the Op phenomenon is here reflected in works by artists from Italy, France, Britain, Switzerland, Poland, Germany, Hungary, Israel, Japan, Russia, Argentina, Venezuela, Brazil, Canada, and the United States. The spectacular images, which, as Dave Hickey writes, dramatize "the threshold at which our ability to interpret the world begins to degrade and disintergrate," accompany Joe Houston's lucid and rigorous study of their conception and reception.

Manifestos of some of the most significant artists' collectives associated with Op Art, biographies of over sixty artists, and an extensive bibliography complete this thorough and insightful examination of the revolutionary movement. The first comprehensive survey of Op Art to be published for more than thirty years, *Optic Nerve: Perceptual Art of the 1960s* offers a timely reappraisal of the highly influential Op movement, and a fascinating collection of images that bewilder and impress.

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American, born Japan, 1935
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1965
Acrylic on canvas
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Collection of Nancy and Dave Gill,
Columbus, Ohio
Courtesy of the Artist

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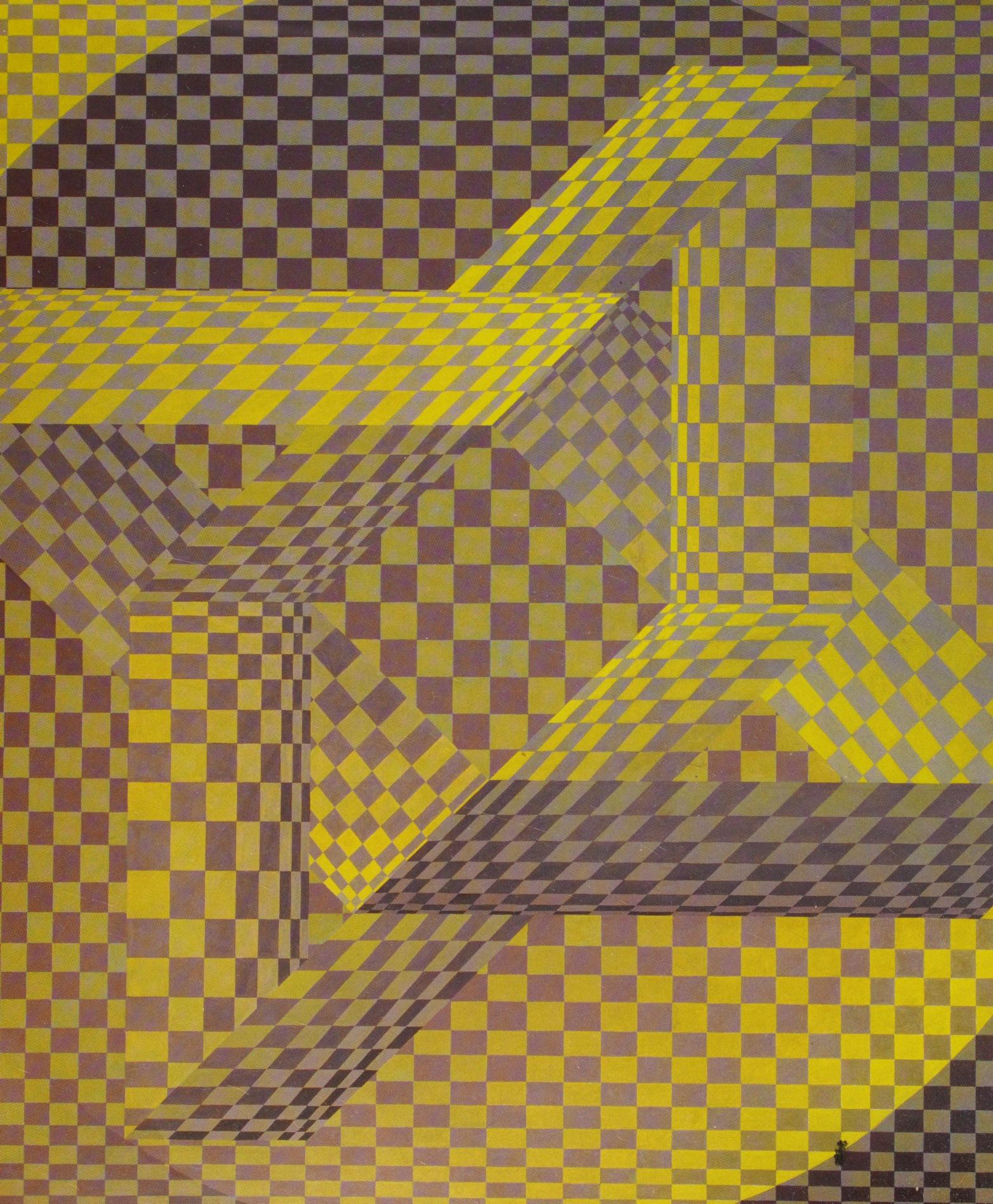
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FOREWORD

The Columbus Museum of Art is pleased to present *Optic Nerve: Perceptual Art of the 1960s.* This book, and the exhibition it accompanies, offer the first survey of Op Art by an American institution in more than twenty-five years. Revisiting the international phenomenon and evaluating and redefining the movement, both the book and the exhibition contribute to a more comprehensive understanding of Op Art and its relationship with the culture, thought, and design of the 1960s. We here provide a long-due historical overview and critical reassessment of the movement, whose use of color, form, line, and pattern have contributed significantly to the history of non-objective painting. We also seek to highlight the visual splendor and optically engaging qualities of an art that is still under-recognized.

Developing in the 1960s, during an era of technological, political, and social uncertainty—a time that in many ways pre-figured our own—Op Art seems interestingly prescient and relevant. However, with its interest in color, movement, and the psychology and physiology of perception, Op Art can trace its roots back to the Impressionists, Constructivists, Suprematists, and Futurists. By building on their innovations, Op Art is a testament to the influence and legacy of these movements. It exploded during the turbulent cultural climate of the 1960s and reflected the decade through its intense abstraction. *Optic Nerve: Perceptual Art of the 1960s* presents an opportunity to experience a precursor to the art of our time. The Op Art movement pioneered the integration of technology into art, innovated the concept of viewer participation, and introduced an emphasis on immersive experience—ideas that contemporary art now embraces and incorporates. Through these relationships, *Optic Nerve: Perceptual Art of the 1960s* provides thought-provoking links between movements and interesting bridges from the past to the present.

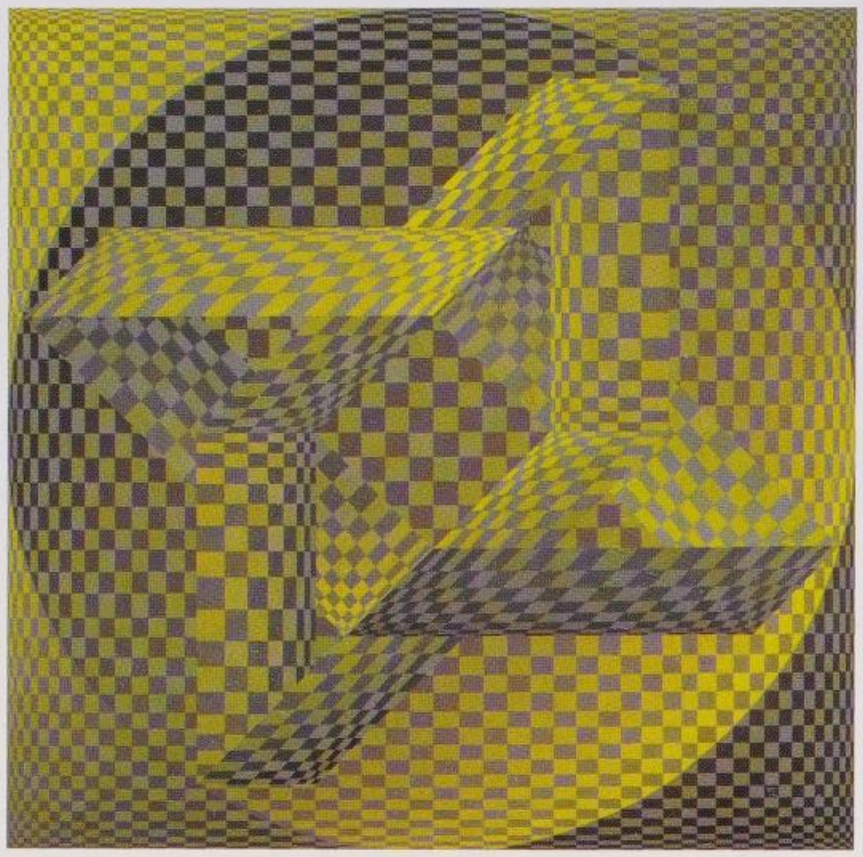
This endeavor contributes to the expansion of the canon of art history, bringing together works by artists from around the world, from Italy, France, Switzerland, Germany, Britain, Hungary, Poland, Israel, former Yugoslavia, Japan, Russia, Canada, Brazil, Venezuela, and Argentina. In keeping with the mission of the museum, to provide "great experiences with great art for everyone," Op Art stresses the individual sensory experiences and psychological responses of each viewer, enabling everyone to have a unique reaction to the works featured in *Optic Nerve: Perceptual Art of the 1960s.* It presents a wonderful chance to learn about work that engages and amazes us all.

Projects of this size, complexity, and scope require the cooperation of many individuals and institutions, as well as a dedicated effort on the part of our staff. Within the Columbus Museum of Art, we are especially thankful to Joe Houston, Associate Curator of Contemporary Art, for conceiving the show, imagining its potential, and bringing it to fruition. We thank Catherine Evans, Chief Curator, for overseeing the project; as well as Nancy Duncan Porter, Deputy Director of Institutional Advancement; Norma Sexton, Director of Development; Kerri Mollard; and Melissa

Fig. 2
Ben Cunningham
American, 1904–1975
Equivocation
1964
Synthetic polymer paint on composition board
26 x 26 in. (66 x 66 cm)
The Museum of Modern Art, New York, New York: Larry Aldrich Foundation Fund.
106.1965

Digital Image © The Museum of Modern Art/Licensed by SCALA/Art Resource, New York

(Detail on p. 6)



Ferguson, Director of Marketing, for championing the exhibition. In addition, we acknowledge Melinda Knapp, Chief Registrar and Exhibitions Manager, and Jennifer Seeds, Associate Registrar, for their expert coordination and management of the pieces on loan. We acknowledge the efforts of Cindy Meyers Foley and the Education Department staff. Thanks also to Barbara Sweney, for collecting ephemera of the era. Greg Jones, Exhibition Designer and Production Manager, and David Holm and Darren O'Connor, Preparators, deserve recognition for their artistry and care in helping to design and install the show, and for their creativity in coping with the unusual and challenging size and shape of some of the works.

With continuing gratitude, we acknowledge the Mrs. Richard M. Ross Publications Fund of Columbus Museum of Art.

Many from beyond the museum's family contributed to the success of the exhibition as well. We extend our gratitude to Getulio Alviani; Blanton Museum of Art, The University of Texas at Austin; Charles Foley Gallery; Dayton Art Institute, Ohio; Nancy and Dave Gill; Hirshhorn Museum and Sculpture Garden; Miami University Art Museum, Ohio; The Museum of Modern Art, New York; National Gallery of Art, Washington, D.C.; George Nauyok and Joseph Pritchard; The Ohio State University, Geraldine Schottenstein Wing for the Historic Costume and Textiles Collection; Philadelphia Museum of Art, Philadelphia, Pennsylvania, The Louise and Walter Arensberg Collection; Neil K. Rector; Sicardi Gallery; Charles Simonyi; Smithsonian American Art Museum, Washington, D.C.; Annette and Robert Swain; Walker Art Center, Minneapolis; Whitney Museum of American Art, New York; Ludwig & Ingeborg Wilding; and private collectors for being generous in sharing with us prized works from their collections. Of these, Neil Rector has been particularly instrumental to the project's vision and realization.

This publication was a major endeavor, growing from an exhibition catalogue to a scholarly text on Op Art. For seeing the big picture and pulling together the disparate pieces, we acknowledge Christopher S. Duckworth, Chief Editor and Head of Publications. Joe Houston, Associate Curator of Contemporary Art, deserves commendation for his insightful reassessment of Op Art and his contribution to resurrecting the memory of this movement. We also thank Jennifer Wilkinson, Curatorial and Collections Assistant, for her attention to every detail; Karli Wurzelbacher, Research Assistant, for her invaluable contributions to biographies and the bibliography; and Heather Brod and Kellie Morgan for their work on the publication. Jeff Simms, Educator for Adult Programming and Film and A/V specialist, and Charles Kleibacker, Adjunct Curator of Design, both lent their expertise and knowledge in their fields to the project, for which we are grateful.

Dave Hickey, writer and scholar, merits special thanks for writing an introduction that contributes immensely to the illumination of Op Art. We extend our heartfelt appreciation to the artists, their representatives, and everyone who provided us with archival resources, participated in interviews, and lent art works and ephemera. ADAGP c/o ARS; Addison/Ripley Fine Art; Albright-Knox Art Gallery; Alexandre Gallery; Getulio Alviani; Ameringer and Yohe Fine Art; Ameringer-Howard Fine Art; Angles Gallery; Richard Anuszkiewicz; Marina Apollonio; ARS; Art Resource; Tim Bavington; Beeldrecht, Amsterdam c/o ARS; Ernst Benkert; Blanton Museum of Art, The University of Texas at Austin; Shirley Blum; Brooklyn Museum; Busch-Reisinger Museum, Harvard University; Carlos Cruz-Diez; Charles Cowles Gallery; Charles Foley Gallery; Charles Simonyi; Charlotte Jackson Fine Art; Conner Contemporary Art; DAAP Galleries and University of Cincinnati Fine Art Collection; Hood Museum of Art, Dartmouth College; The Dayton Art Institute; Sally Hazelet Drummond;

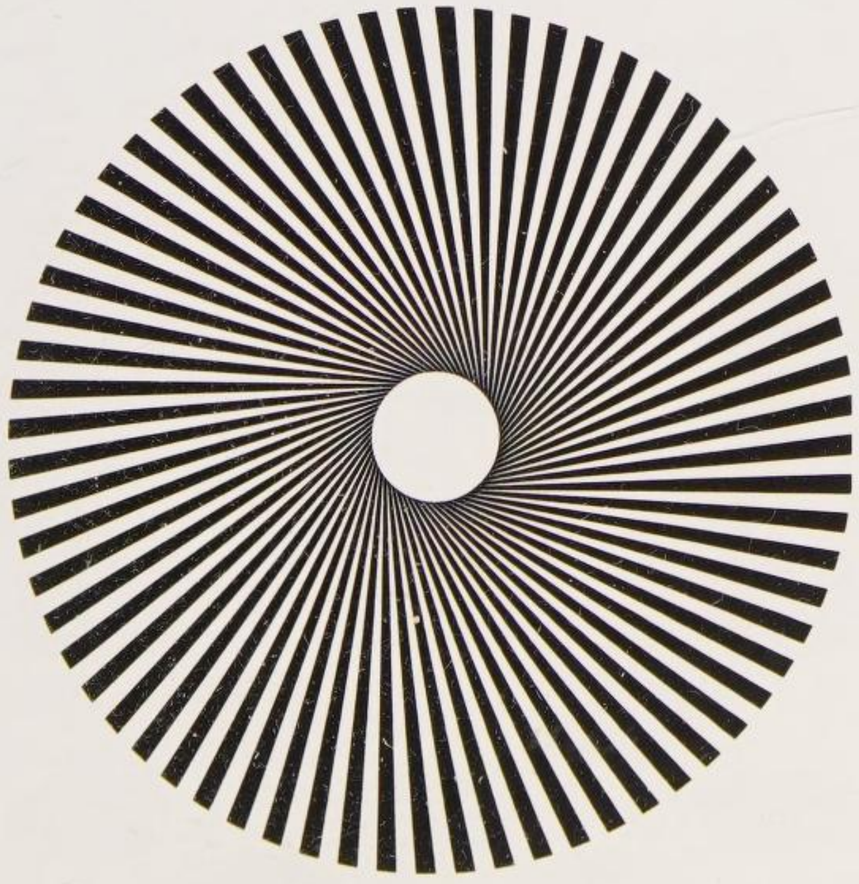
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Finally, we are immeasurably grateful to the staff at Merrell Publishers—Hugh Merrell, Publisher; Nicola Bailey, Art Director; Michelle Draycott, Production Manager; Sadie Butler, Production Controller; Anthea Snow, Managing Editor; Helen Miles, Editor; and most especially, Joan Brookbank, US Director—for their encouragement and partnership in the realization of this publication.

Nannette V. Maciejunes
Executive Director, Columbus Museum of Art



Above: Fig. 3
Almir da Silva Mavignier
Brazilian, born 1925
Convex Surfaces
(Konvexe Flächen)
1966
Oil on canvas
$14^{3}/_{16}$ x $14^{3}/_{16}$ x 2 in. (36 x 36 x 5 cm)
Collection of Getulio Alviani, Milan, Italy
Courtesy of the Artist



Left: Fig. 4
Wolfgang Ludwig
German, born 1923
Cinematic Painting No. XVIII
(Kinematische Scheibe XVIII)
1969
Acrylic on composition board
$43^{5}/_{16}$ x $43^{5}/_{16}$ in. (110 x 110 cm)
Private collection, Columbus, Ohio
Courtesy of the Artist and Sabine Ludwig © 2006 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn

TRYING TO SEE WHAT WE CAN NEVER KNOW

DAVE HICKEY

What had happened? I had a number of conflicting experiences. My work had been hung in the Museum of Modern Art and vulgarized in the rag trade. I had been involved in a sociological phenomenon with alarming implications, and one which was disquieting, also, to many Americans. *The Responsive Eye* was a serious exhibition but its qualities were obscured by an explosion of commercialism, band-wagoning and hysterical sensationalism . . . Most people were so busy taking sides and arguing about what had or had not happened, they could no longer see what was actually on the wall. Misunderstandings and mistaken assumptions took the place of considered and informed judgment.

Bridget Riley
Perception is the Medium
1965

According to the modern view, there is a simpler reason [than Freud's] for unconscious mental processes. People cannot directly examine how many parts of their minds work, such as basic processes of perception, memory, or language comprehension, not because it would be anxiety provoking to do so, but because parts of the mind are inaccessible to conscious awareness—quite possibly because they evolved before consciousness did . . .. Consciousness is a limited-capacity system, and to survive in the world people must be able to process a great deal of information outside of awareness.

Timothy D. Wilson
Strangers to Ourselves; Discovering the Adaptive Unconscious
2002

The quotations from Bridget Riley and Timothy Wilson that introduce this essay are intended to suggest the timeliness of an "Op Art" exhibition at this moment, forty years after *The Responsive Eye* opened at the Museum of Modern Art in New York City. Bridget Riley, on returning to England after this opening, wrote of having become involved in "a sociological phenomenon with alarming implications." This phenomenon, of course, was what we now call "The Sixties," and the most alarming implication of that moment is only now becoming codified in the radical proposition of the "adaptive unconscious" that Timothy Wilson outlines in his book *Strangers to Ourselves*. Over the years, the ramifications of psychedelic drugs, sexual liberation, generational autonomy, optical art, and digital culture have each contributed to a contemporary model of consciousness conceived as a "limited-capacity system." The concept of consciousness as having a "limited capacity," however, was implicit in the 1960s mandate to "expand one's consciousness" and in the vogue of optical art that was designed to test limits of conscious perception.

My point here is that the alarm to which Riley refers turned out in retrospect to be perfectly justified. The implications of Wilson's hypothesis strike directly at the heart of how we perceived ourselves as humans in the twentieth century. First, Wilson's hypothesis dethrones consciousness as the primary signifier of human existence. He argues that consciousness, which is generally identified with wakefulness, is, in fact, a fugitive epiphenomenon that only functions

when it must, when we are surprised into awareness by circumstances that require it. Otherwise, Wilson argues, we cruise the world as dogs do in a dreamlike state of semi-awareness. Secondly, Wilson de-mythologizes Freud's idea of repression and sets aside his idea of the unconscious as a kind of sub-basement where we cage the monsters we have banished from awareness. Wilson replaces Freud's subterranean zoo with a coherent, operative mental system of knowing, thinking, responding, and making judgments that exists outside of our own conscious awareness.

The idea that we each possess a complete apparatus for thinking and judging that we cannot think *about,* of course, creates the circumstance referred to in the title of Wilson's book, of our being "strangers to ourselves." What the special effects of optical art do, specifically, is introduce us to that "stranger" by surprising us into consciousness of mental activities of which we are otherwise unaware, to which we otherwise have no access, and upon which we depend absolutely. Since most of these effects, once we take the trouble to look, are apparently involuntary, the occasion of meeting this unconscious "stranger," who is doing a lot of our seeing and thinking, is one in which our egocentric authority over the visual field is called into question. Under the auspices of optical art, the single prerequisite for looking at art resides in our willingness to try and see it.

Since the whole superstructure of postwar writing and thinking about American art was founded on cultural assumptions about the hegemony of consciousness, the primacy of volition, and the reality of repressed experiences that might be recovered and teased back into consciousness, one can understand just how troubling optical art must have been at the time. Optical art introduces us to an order of experience that is less voluntary and less dependent on education and conscious knowledge than we might wish. It engages us in confronting a world that is much less knowable and less dramatic than Freud imagined. What Op Art steals for us then, and what Abstract Expressionism would have stolen had we cared to notice, is the whole rhetoric of confrontation and heroism that, in postwar America, attached itself to the making and beholding of art. Optical art, Pop Art and Minimal art were, first and foremost, arts of peace, not arts of war.

When Wilson argues that repression, as Freud conceived it, does not exist, he is arguing two things: first, that consciousness, because of its limited capacity, simply *forgets* experiences until they are useful and necessary; secondly, that much of our unconscious mental activity is, in fact, physiologically unknowable and unrecoverable. The implications of this model for the discourse of postwar American art are profound, because, if Wilson is right and repression does not exist, then the much-celebrated act of "expression" (that purportedly overrides repression) is hardly that important. Moreover, if conscious awareness is not required to appreciate visual art then visual art is not an art of the mind, not a "liberal art." It does not create objective, knowable experience or redeeming insight. It is, more properly, an expression of what Riley calls "the eye's mind," or the body's thought.

In retrospect, of course, it is easy to see that the postwar American ideology of "expression" was more of a social metaphor than a psychological one. Social repression, after all, does exist, and it does, in fact, mitigate expression. It is also possible to see that the postwar insistence that art must provide us with conscious knowledge and insight was probably nothing more than a manifestation of intellectual insecurity about the philosophical credibility of postwar American art—an insecurity that was, in fact, totally justified. One may, in fact, trace the hostility that was exhibited toward optical art in 1965 back to the refusal of American art critics to deal with the optical foundations of Abstract Expressionism in the previous decade. Both Op and Ab-Ex, I would suggest, speak more directly to American ways of seeing than to European ways of knowing, being more visible and less knowable than we usually presume.

Unfortunately, the American art community, when first confronted with Abstract Expressionism, fell into willful, collective blindness and justified this blindness with a fictional mythology that centered on the "story" told by the "artist's hand." The critical invention of the "artist's hand narrative" allowed us to *read* Abstract Expressionist paintings rather than *look* at them. More precisely, it allowed us to think, when we looked at these paintings, that we were actually reading the artists' opaque, encoded, gestural "handwriting." This opened the door to narrative interpretations of paintings that are, in fact, as resistant to narrative as

optical paintings. Freudian narratives of repression and expression could be attached to the artist's purportedly unintelligible *écriture*. Primitivist Jungian symbolizing could be evoked to justify its opacity, or, conversely, Marxist narratives about the ineluctable material destiny of painting could be invented to justify the marks' dissolution into abstraction and entropy.

Today, of course, Abstract Expressionist paintings may, if one wishes, be experienced as optical occasions. The handless, immaculate Op paintings that followed them could not be known as anything else, and this escalated level of control, I would suggest, does not so much represent an effort on the part of Op painters to critique Abstract Expressionist paintings, as an effort on their part to armor the Achilles heel that privileged their misinterpretation. In this sense, the flowering of *handless-ness* in American art may be taken as a conscious effort to elude or subvert the mythology of the "artist's hand" along with the problematic, literary interpretations that it made possible. Beginning in the late 1950s, artists who would later be known as Pop artists, Op artists, Kinetic artists, and Minimalist artists simultaneously abandoned the antique tradition of "mark-making," and set about replacing the European narratives of Freud and Marx with a new American brand of literalism.

These artists would propose the literal object, the literal image, the literal motion, and the literal act of seeing. Of all these revolutionary "literalisms," Op Art would prove the most radically resistant to domestication. Minimal art retained, at least, the literal, material object and was consequently responsive to Marxist narratives. Pop art retained the literal image and left a door open to pictorial interpretation. Kinetic art in its literal motion retained the kernel of narrative. Op Art, however, concerned itself with the literal difficulty of our efforts to see the world. In doing so, it daunted all criticism that presumed to interpret the object "as properly seen." Consequently, the aesthetic subtext of Op Art was equally transgressive. It proposed that our pleasure in art derives less from knowing what we are looking at than from the anxiety of *not-knowing* just this. So we take pleasure from the object's singular self-possession, from its resistance to being internalized as a legible, conceptual entity.

Op artists take up a notch the tradition that begins with Antoine Watteau—of making paintings that resist interpretation—by making paintings that resist being seen at all and that, by resisting our efforts to see them, literally move us around the room in the hope of seeing what we cannot. Through this literalist rhetoric, optical art teaches its beholders a lesson taught by psychedelic drugs at a considerably higher level of risk: it insists on the absolute otherness of a world beyond us by dramatizing the threshold at which our ability to interpret that world begins to degrade and disintegrate. The irony is that, by demonstrating the threshold at which perception disintegrates, Op art, almost inadvertently, lowers the threshold at which abstract art can be appreciated, and this may be its greatest transgression against the elitism of American high culture.

Op does its own work for whoever will look. It dispenses with the repertoire of knowledge and experience that is presumed to be required to appreciate abstract art. It replaces the elite, intellectual pleasure of "getting it" with the egalitarian fun-house pleasure of disorientation, of trying to understand something that you cannot. By refusing to set us apart in our relative levels of visual mastery, Op Art makes us one in our anxious, enjoyable failure. More beneficially, as we stand before Op paintings that resist our understanding, we introduce ourselves to our unconscious selves. We become aware of the vast intellectual and perceptual resources that await our command just beyond the threshold of our knowing. These, of course, can only be inferred on the rare occasions when they fail to serve our purposes. Optical art provides those occasions.

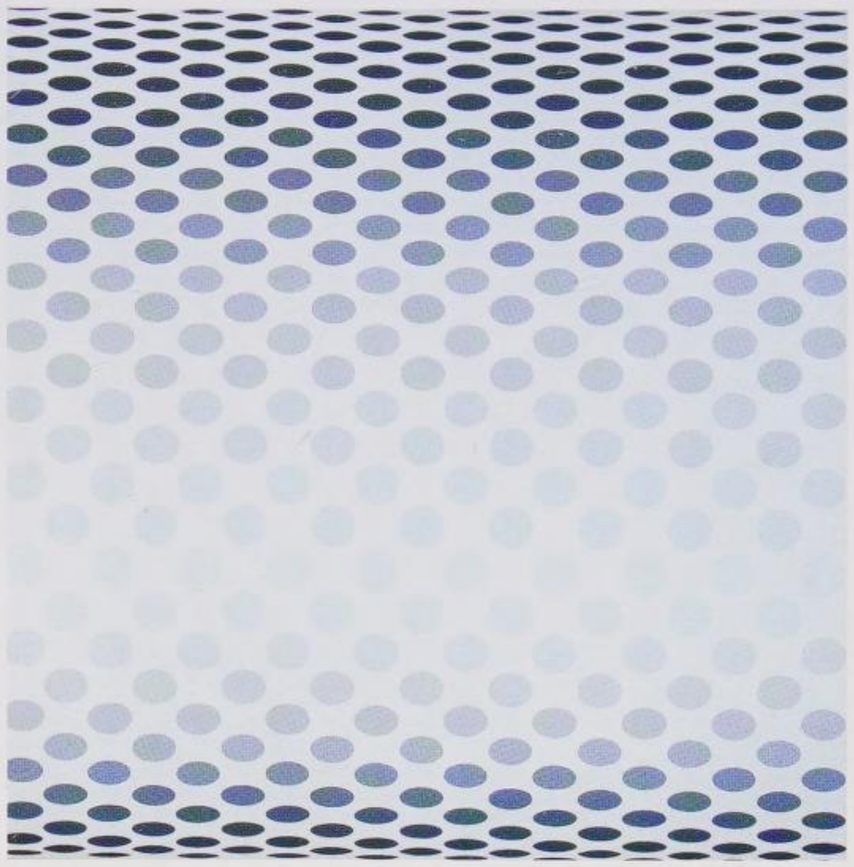


Fig. 5
Bridget Riley
British, born 1931
Balm
1964
Oil on canvas
77¼ x 77¼ in. (196.2 x 196.2 cm)
National Gallery of Art, Washington, D.C.:
Gift of Mr. and Mrs. Burton Tremaine.
1970.37.2 2549/PA

© 2006 Board of Trustees, National Gallery of Art, Washington, D.C. Photography by Lorene Emerson
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(Detail on p. 10)

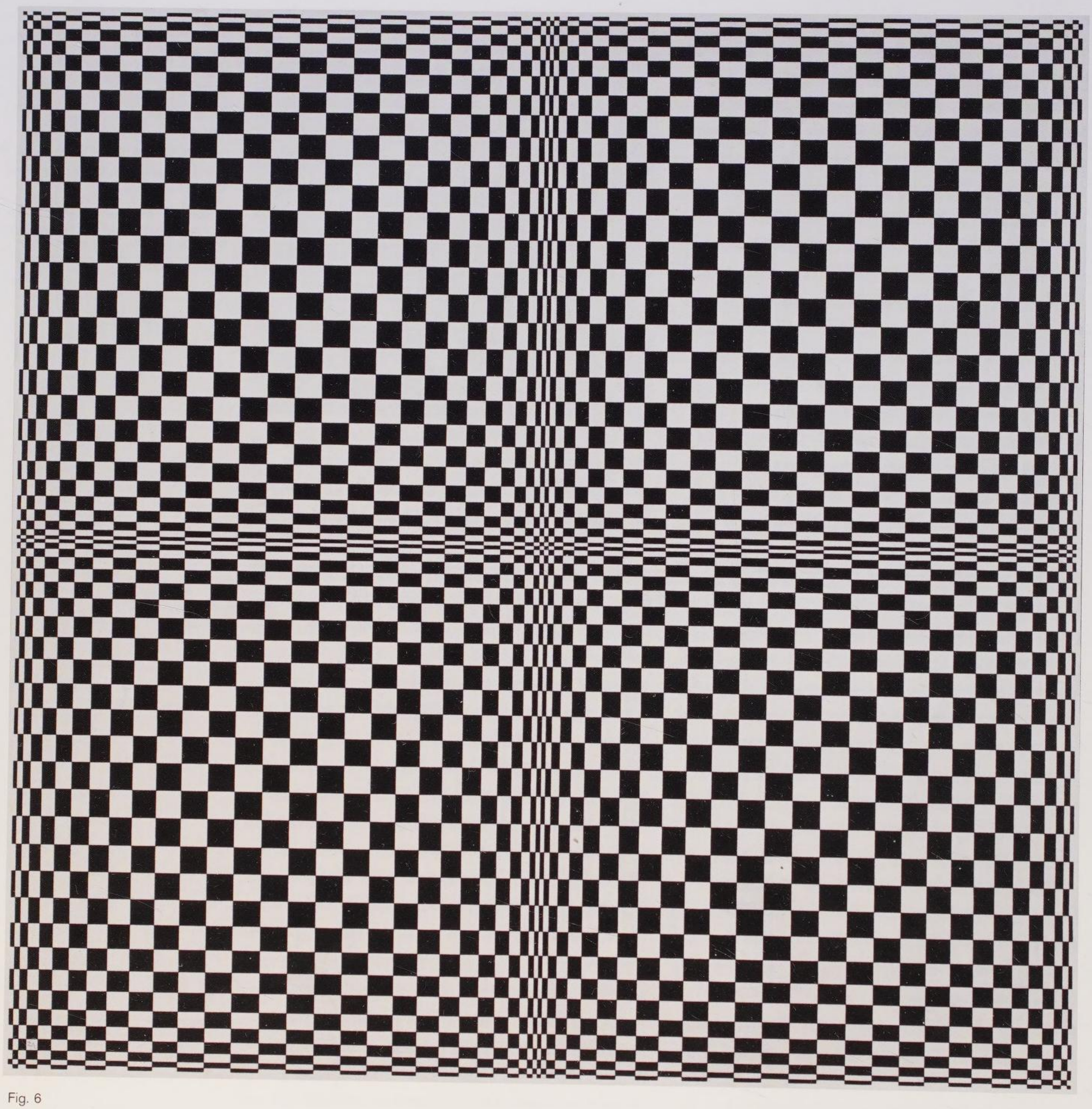


Fig. 6
Edna Andrade
American, born 1917
Color Motion 4-64
1964
Oil on canvas
48 x 48 in. (121.9 x 121.9 cm)
Philadelphia Museum of Art, Philadelphia, Pennsylvania: Gift of Frederick R. McBrien III, 2003. 2003-94-1

Courtesy of Locks Gallery, Philadelphia, Pennsylvania

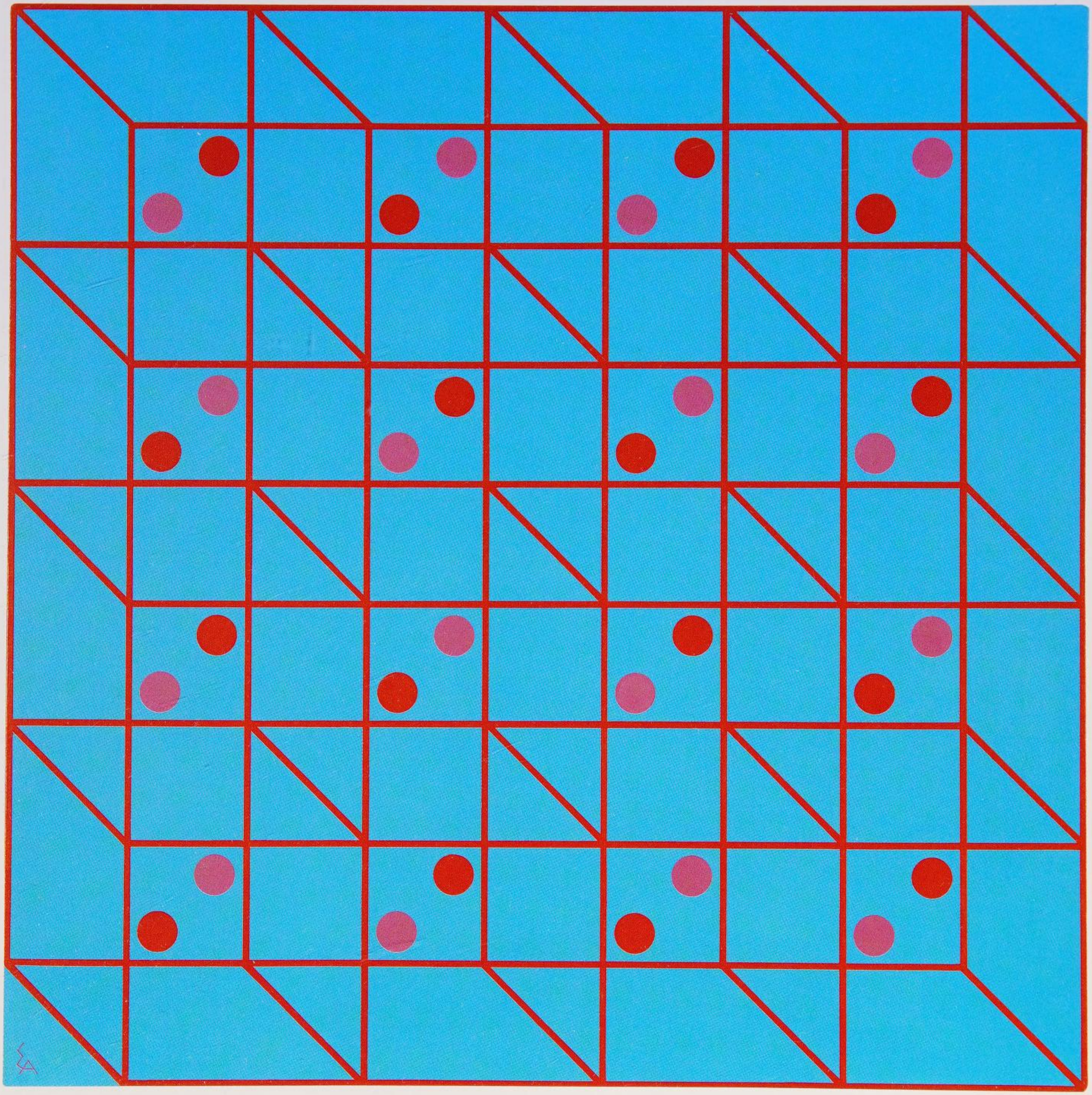
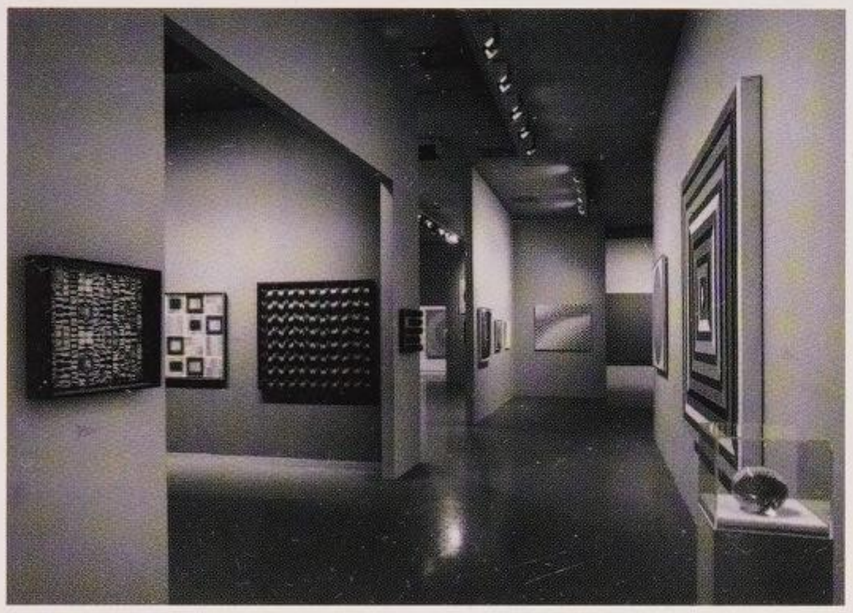


Fig. 7
Edna Andrade
American, born 1917
Interchange
1967
Acrylic on canvas
40 3/4 x 40 3/4 in. (103.7 x 103.7 cm)
Private collection, Columbus, Ohio
Courtesy of Locks Gallery, Philadelphia, Pennsylvania

NEW SENSATION

In February 1965, a steady stream of visitors flowed from 53rd Street in Manhattan into the Museum of Modern Art to witness a new aesthetic, cultural, and commercial phenomenon. Op Art had been christened by the press only three months earlier, but in the brief interim its sensational appearance had exerted widespread influence on the worlds of art, fashion, and advertising. Emerging swiftly and fully formed into mainstream consciousness, the movement proved as polarizing as it was popular. The artists were celebrated on the pages of *Time*, *Life*, and *Vogue* and simultaneously vilified in *ArtForum* and *Art News* before the public had a chance to view their work in depth. Although galleries in New York, London, and Paris already were mounting regular exhibitions of works by painters and sculptors experimenting with anomalous optical and kinetic effects, and museums in London, Rome, and Zagreb had organized group exhibitions of the new abstract tendencies since the beginning of the decade, MoMA's exhibition *The Responsive Eye* was the first recognition by an American museum of the growing movement of "perceptual abstraction," as its curator, William Seitz, described it. He recognized the new international tendency as the next pinnacle in the inexorable evolution of art from an act of mimesis toward an inquiry into the very nature of vision, a shift from a focus on the objective world of appearance to the subjective realm of experience that marked the modern era. According to Seitz, the last instance of such a profound change was that prompted by the Impressionists, who "learned

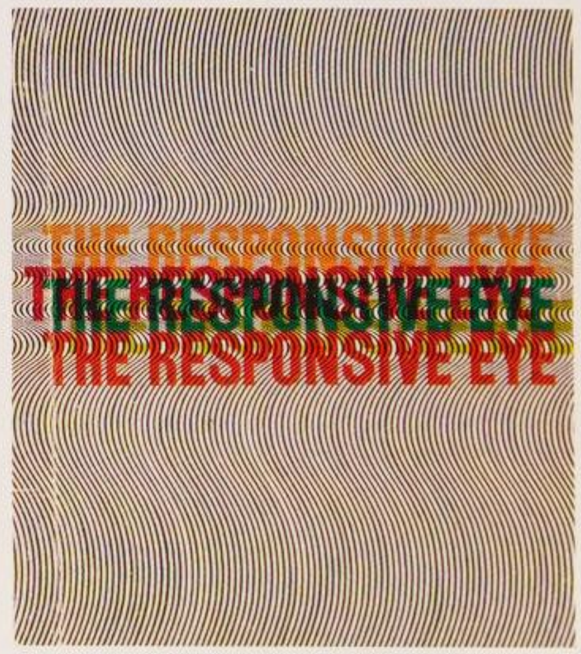


Left: Fig. 8
Installation view of the exhibition *The Responsive Eye* at The Museum of Modern Art, New York, February 25 — April 25, 1965
Photograph: The Museum of Modern Art, New York, New York. IN757.9

Digital Image © The Museum of Modern Art/Licensed by SCALA/Art Resource, New York

that the senses can contradict each other, that perception has its own laws and modes of activity, and that in vision truth and illusion are hard to separate."[1]

The new perceptual abstraction was quickly dubbed "Op Art" by the press, a clever abbreviation for "optical art" that offered the logical reply to the reigning trend of Pop Art. While the artists concerned were both bemused and contemptuous of the term, the public identified with the name immediately, and with the art itself. Op became a defining moment in the history of modern art, manifesting an aesthetic viewpoint that engages the process of perception as both a tool and a subject. This perceptual emphasis, involved both the eye and the mind, by employing structural variations, contiguous or "centrifugal" compositions, linear patterns, and color interactions to generate formal ambiguity, spatial incongruity, and retinal vibrations. In achieving these effects, the artists engaged not only with the latest research in physics

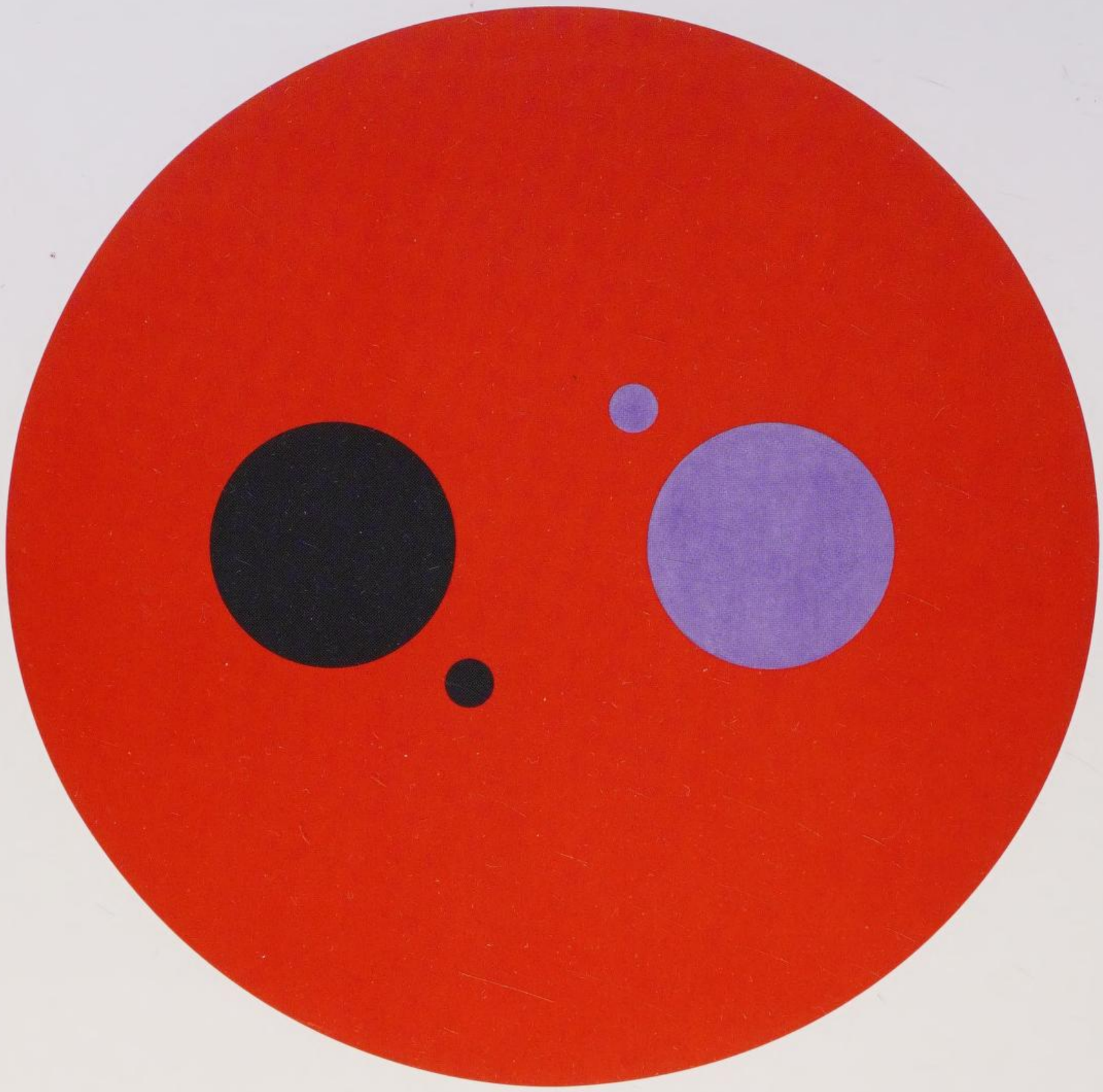


Above: Fig. 9
Exhibition catalogue for *The Responsive Eye* by William Seitz, New York, The Museum of Modern Art, February 25 — April 25, 1965

Printed by The Case-Hoyt Corp., Rochester, New York and The Museum of Modern Art, New York, New York

Right: Fig. 10
Alexander Liberman
American, born Russia, 1912–1999
Continuous on Red
1960
Oil on circular canvas
80 in. diameter (203.2 cm)
The Museum of Modern Art, New York, New York: Gift of Mr. and Mrs. Fernand Leval. 381.1961

Digital Image © The Museum of Modern Art/Licensed by SCALA/Art Resource, New York



Opposite, left: Fig. 13
Stills from the film *Eye on New York: The Responsive Eye*, produced by Gordon Hyatt
1965

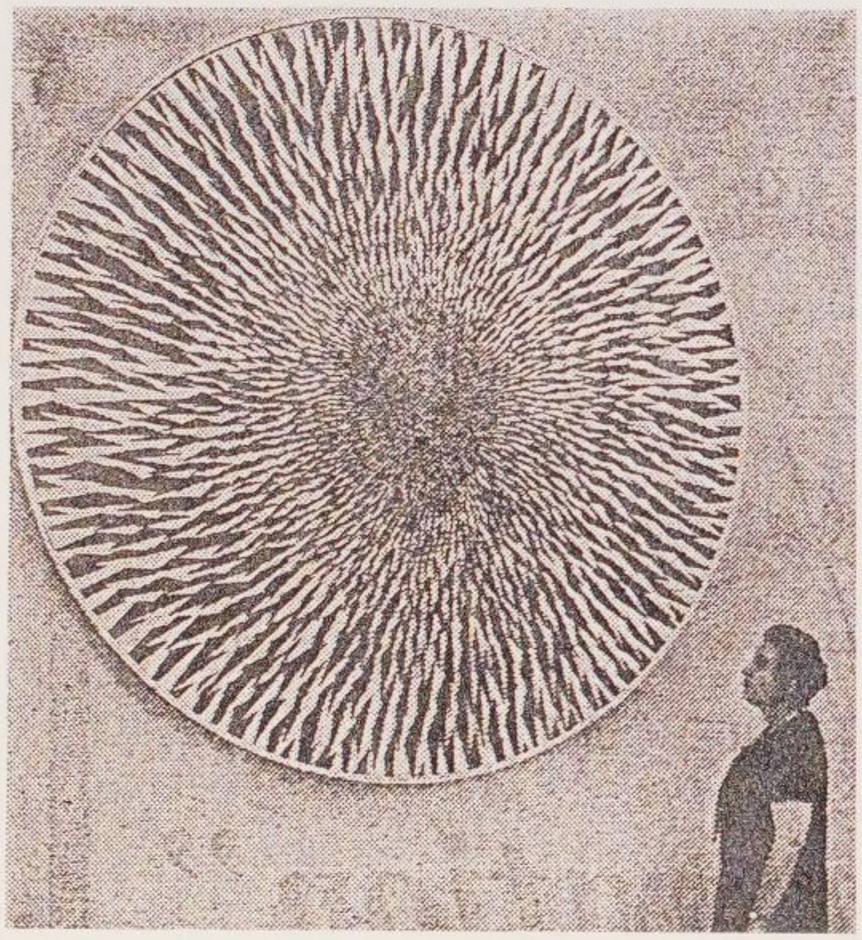
Courtesy of Gordon Hyatt, Producer © Columbia Broadcasting System, Inc., Mike Wallace, Reporter

Opposite, right: Fig. 14
Stills from the film *The Responsive Eye*, directed by Brian de Palma
1965

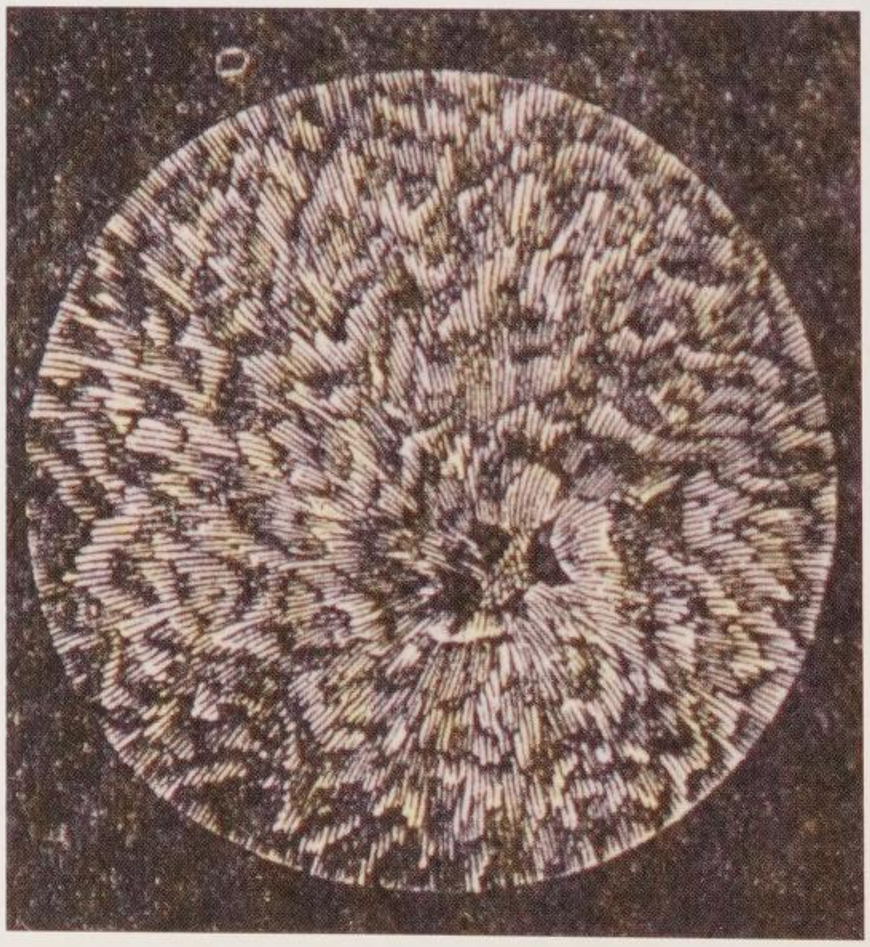
Courtesy of Ken Burrows, Executive Producer
© A Zodiac Associates Production

Right: Fig. 11
Photograph from *Seattle Times*, August 1, 1965
The caption reads: "ON 'WORKSHOP': Dorothy Lahr of the Seattle Art Museum is shown looking at *Bombardment of the Optic Nerve II*, one of the optical art works in an exhibition, *The Responsive Eye*, to be featured on Channel 5's Community Workshop at 9 o'clock this morning . . . "

Courtesy of the Seattle Art Museum Archives, Seattle, Washington



Far right: Fig. 12
Engraving illustrating the anterior of the human eye viewed through the optic lens from *Helmholtz's Treatise on Physiological Optics*, ed. James P.C. Southall, Vol. I, Menasha, Wisconsin (The Optical Society of America) 1924



and optics, but also with Gestalt and experimental psychology, which had gained wide currency in the postwar era. Unlike the genre of kinetic art that also was developing notoriety in the 1960s, Op achieved its dynamic impact with potential, not actual, movement, implied primarily in two dimensions. Many of the artists, including Josef Albers, Richard Anuszkiewicz, Bridget Riley, Julian Stanczak, and Victor Vasarely, made use of the polar sensations of order and instability, which arrest the picture plane in a dynamic state of tension, with the graphic opposition of black and white or the vibrant interactions of color. Although painting was the preferred medium of Op artists, some transcended its traditional boundaries with three-dimensional constructions, electronic sculpture, and light installations, pioneering late twentieth-century forms of interactive and multimedia art in the process.

Opinions of the relative merits of Op were divided from the opening evening of *The Responsive Eye*. A documentary film crew, headed by twenty-four-year-old Brian de Palma, recorded a range of reactions from the rhapsodic to the dismissive (fig. 14). Among the non-Op artists in attendance at the reception was the second-generation Abstract Expressionist Alfred Leslie, who delighted in Op's engagement with the perennial issues of "how to make art and how to make people look at things and learn something about their own lives," while the figurative artist David Hockney declared, "They're actually the things I detest; all those things that make my eyes blink." A demure Josef Albers declined to comment: "I'm the father, I'm not supposed to say anything bad about my babies."[2] Journalists were enthusiastic, though slightly skeptical, about *The Responsive Eye* and the following wave of exhibitions devoted to the subject of perceptual art. In the *New York Times*, venerable critic John Canaday applauded Op's universal appeal, concluding a week after the MoMA opening, "This is a very satisfying thing for a public that has been puzzled and offended by a long series of modern isms. Optical art has a combination of virtues new to modern art: it fascinates, even if for different reasons, both the esthete and the layman. What more, for the time being, could you ask?"[3] By virtue of its direct impact on the viewer, physiologically and psychologically, Op required no special education, making it a supremely democratic art form. This egalitarian position accorded with the politics of many





Fig. 15
Tadasky (Tadasuke Kuwayama)
American, born Japan, 1935
A 200
1965
Acrylic on canvas
47 x 47 in. (119.4 x 119.4 cm)
Collection of the artist

Courtesy of the Artist



Fig. 16
Tadasky (Tadasuke Kuwayama)
American, born Japan, 1935
D 116
1965
Acrylic on canvas
49 x 49 in. (124.5 x 124.5 cm)
Private collection, Columbus, Ohio
Courtesy of the Artist



Above: Fig. 17
"Pogo" cartoon by Walt Kelly from *The New York Post*, Thursday, April 29, 1965
© 2006 Okefenokee Glee and Perloo, Inc. (OGPI)

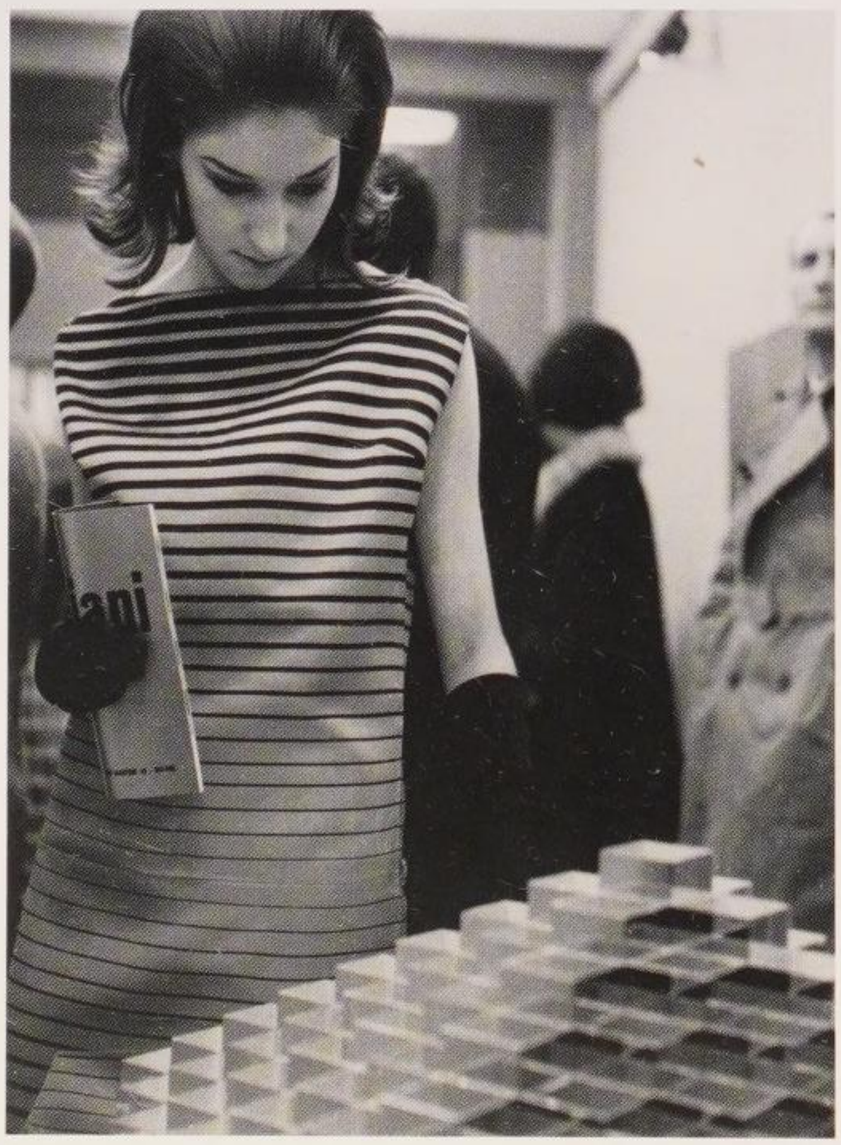
Below: Fig. 18
Photograph of a woman wearing a Positive Negative dress by Getulio Alviani at an exhibition of his works, Milan, Italy
1960s
Courtesy of the Artist

Opposite, top: Fig. 19
Richard Anuszkiewicz
American, born 1930
All Things Do Live in Three
1963
Acrylic on masonite
$21^{7}/_{8}$ x $35^{7}/_{8}$ in. (55.6 x 91.1 cm)
Collection of Neil K. Rector, Columbus, Ohio
© Richard Anuszkiewicz/Licensed by VAGA, New York, New York
(Detail on p. 16)

Opposite, bottom: Fig. 20
Wolfgang Ludwig
German, born 1923
Cinematic Painting (Pittura Cinematica)
1964
Oil on composition board
$24^{1}/_{16}$ x $48^{1}/_{16}$ in. (61 x 122 cm)
Private collection, Columbus, Ohio
Courtesy of the Artist and Sabine Ludwig. Photography by Jürgen Graaff © 2006 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn

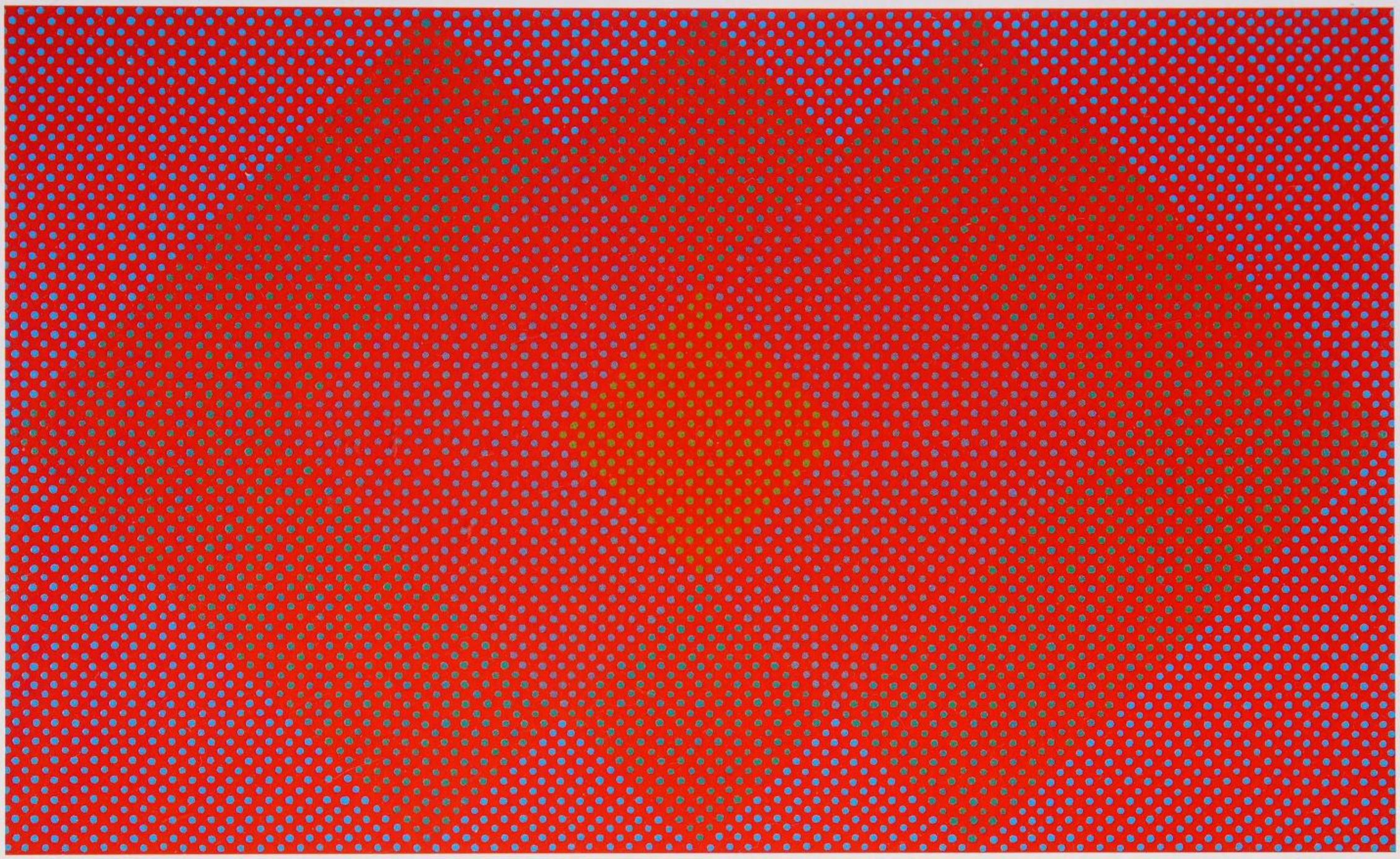
of the younger artists and collectives that had formed internationally to promote a new aesthetic ideology that included the viewer as participant in the art experience. The Paris-based Groupe de Recherche d'Art Visuel (Research Group for Visual Art), or GRAV, sought to "free the public from inhibitions and distortions in their appreciation produced by traditional aesthetics, by creating a new artist-society situation" and to establish "a more exact relationship between the work and the human eye." This socially engaged mission inspired the development of interactive art, often sited in public, non-art spaces, as a vehicle for self-revelation. Op strategies were employed to "acknowledge the existence of uncertain phenomena in the structure and the visual reality of the work, and from this, design new possibilities that open new areas of investigation."[4]

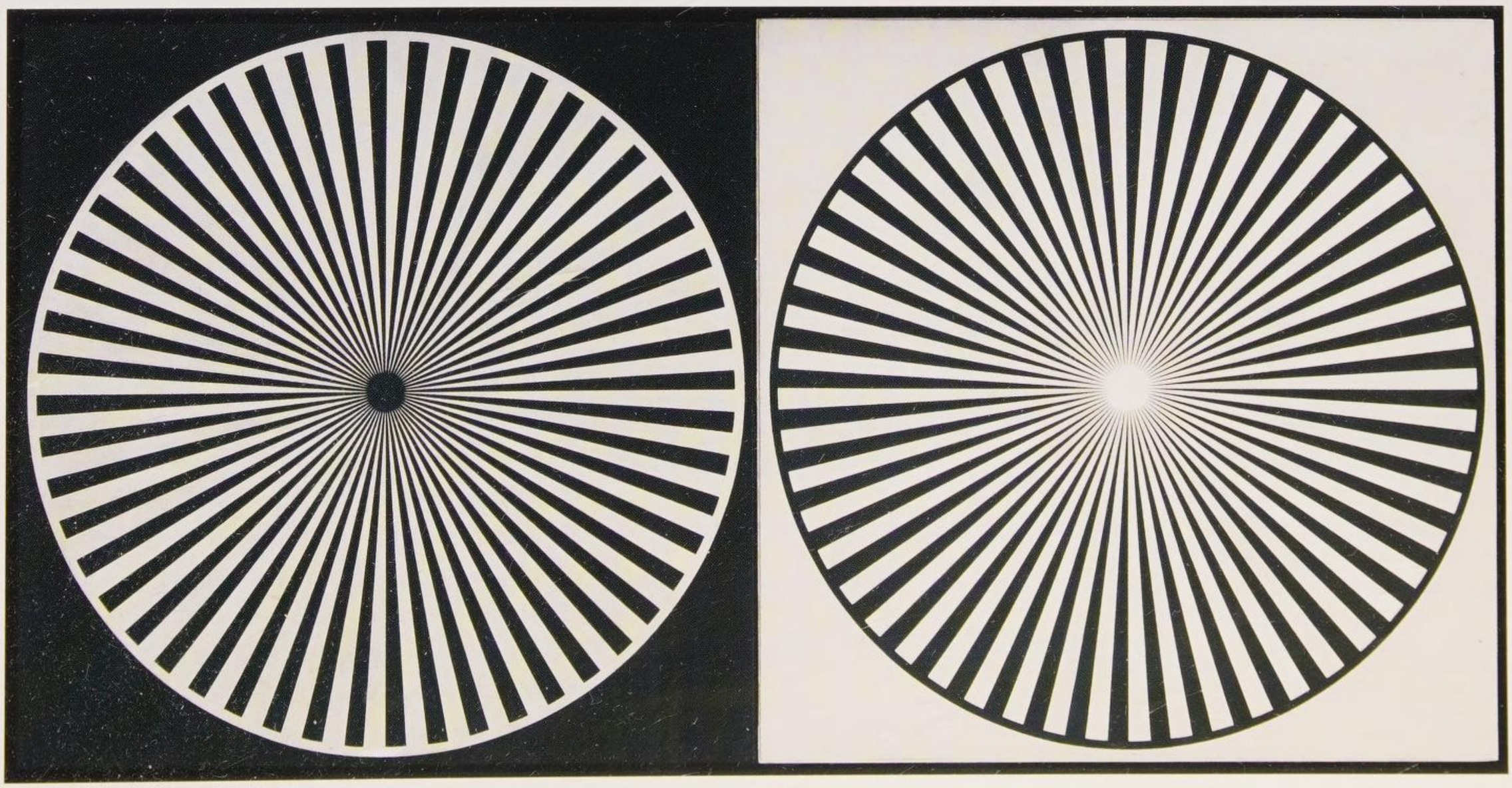
The populist viewpoint clouded critical judgment of the conceptual and formal rigor of many of the artists. In spite of Op's broad appeal, the art press, dominated by structural theorists and minimalist artist–critics, was less tolerant. Writing in the pages of *ArtForum International*, Barbara Rose noted that "Op art . . . goes Pop art one better by being considerably more mindless."[5] For some detractors the prominence of painting in Op was objectionable, with such artists as Robert Morris and Donald Judd dismissing the inherent conservatism of a medium they considered historically entrenched in illusionism. Critic Lucy Lippard called it fashionable "pseudo-scientism" holding "no lasting interest for serious artists,"[6] and Clement Greenberg, a staunch supporter of some of the hard-edged formalist painters among Op's ranks, categorized it as "Novelty Art," along with other emerging modes of the 1960s. Those with stated allegiance to either the minimalist or Pop camps ignored the commonalities between those movements and Op, both in the exploration of systems and structures and in the populist, anti-institutional stance. On the whole, Op's detractors found sensation inferior to expression, and seem to have overlooked Op's defining feature: that its significance lies in the emphatic shift from the object of art to the experience of art. This operative change gave impetus to new aesthetic attitudes and unconventional art forms. Reeling from the backlash that attended Op's introduction to America, Seitz noted in an interview with Mike Wallace in 1965, "It's the absorption of modern art into modern life and that's something we all wanted, but it may change the character of the art a bit too."[7] Albers welcomed the public interest as a "relief from years of waiting for something promising and progressive. It came after years of uncommunicative and non-presentative offerings in art galleries and helpless verbosities in art magazines."[8]



Despite, or perhaps because of, debates over the aesthetic merits of individual artists, the curatorial breadth of Seitz's show, and MoMA's role as a trend-setting institution, *The Responsive Eye* generated unprecedented public interest and gained the museum the largest attendance figures in its thirty-six-year history before embarking on a year-long national tour, which met with a similarly enthusiastic reception.[9] The attention provided such senior artists as Albers with long-awaited affirmation of their accomplishments and made some of Op's younger members, including Anuszkiewicz and Riley, into media celebrities. Not only their art but also the emerging art market in which these artists played a key role fed the popular imagination. Television, magazines, and advertising embraced the eye-catching appeal of Op; and the fashion and interior design industries applied its dizzying motifs to a vast array of accessories and home furnishings.

What began in the galleries and museums quickly became an international cultural phenomenon, shaping







Above: Fig. 21
Cover and spread from *Life*, Vol. 58, No. 15, April 16, 1965, featuring the article: "It's Op from Toe to Top"



Above: Fig. 22
Photograph by Colin Jones of The Who: left to right, Pete Townshend, Keith Moon, John Entwistle, and Roger Daltrey
1966

Photography by Colin Jones © Idols Licensing and Publicity Limited/Colin Jones



Above: Fig. 23
Bridget Riley
British, born 1931
Blaze 3
1963
Acrylic on board
37½ x 37½ in. (92.7 x 92.7 cm)
Private collection

Courtesy of Karsten Schubert, London, England (BR 738). © 2006 Bridget Riley, All Rights Reserved

the aesthetic of a progressive and restless era. As one of the elder Op painters and former Bauhaus student Hannes Beckmann noted in 1965, Op, like any movement before it, "reflects the state of mind we are in. It reflects the spirit of the time."[10] The mathematical, "programmed" structures of optical paintings and the high-tech innovations of related kinetic sculpture and multimedia light works reflected an optimism in technological progress. The pragmatic application of scientific theory was promoted as an agent of social transformation in the face of international political trauma. During the final weeks of the New York debut of *The Responsive Eye*, *Life* magazine published a fashion spread of ready-to-wear Op, photographed in the MoMA galleries (fig. 21). The colorful images of models posed in front of matching paintings by Vasarely and Riley offered a stark contrast to the dramatic black-and-white cover image of a Vietnam combat zone. The juxtaposition is symbolic of the duality of a period marked by technological progress and social unrest.

The unsettling nature of the vibrating colors and pulsating patterns typical of Op resonates with our view of the turbulent 1960s, although the roots of the movement lie in art of previous eras of scientific advance. The technological promise and social ideals expressed in the new art of the 1960s echoed a similar fascination by nineteenth-century artists in scientific progress and human subjectivity. Op also descended from the avant-garde art of European Constructivism, the early twentieth-century tendency toward a pure formal language of shape, line, and color.

The younger generation central to the Op movement—many of them American and British—developed their techniques and formal approaches beginning in 1960, the same year that the artists' collectives focused on viewer participation began to form internationally. The movement, most active from 1964 to 1966, declined sharply in 1968, a historic year marked by the evolving and diverging interests of some of the artists, dissolution of the collectives, and the last major exhibitions devoted to the subject. The memory of the movement survived in numerous historical and technical texts devoted to Op, the last of which was published in 1973. The insistence on structural systems, programmed sequences, and cybernetic theory has had renewed currency for artists



Fig. 24
Peter Sedgley
British, born 1930
Cosmos
1968
Rotating disc with fluorescent oil paint and ultraviolet illumination
$59^{1}/_{16}$ in. diameter (150 cm)
Location unknown

Courtesy of the Artist

Fig. 25

Edna Andrade

American, born 1917

Turbo 2

1966

Oil on canvas

72 x 48 in. (182.9 x 121.9 cm)

Collection of the Montclair Art Museum, Montclair, New Jersey: Gift of the American Academy of Arts and Letters, Childe Hassam Fund. 1969.3

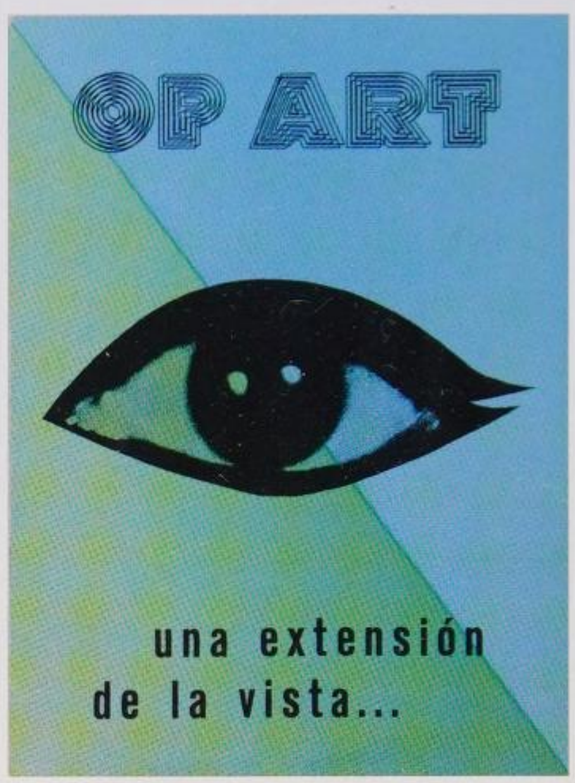
Photography by Peters S. Jacobs, 1999. Courtesy of Locks Gallery, Philadelphia, Pennsylvania



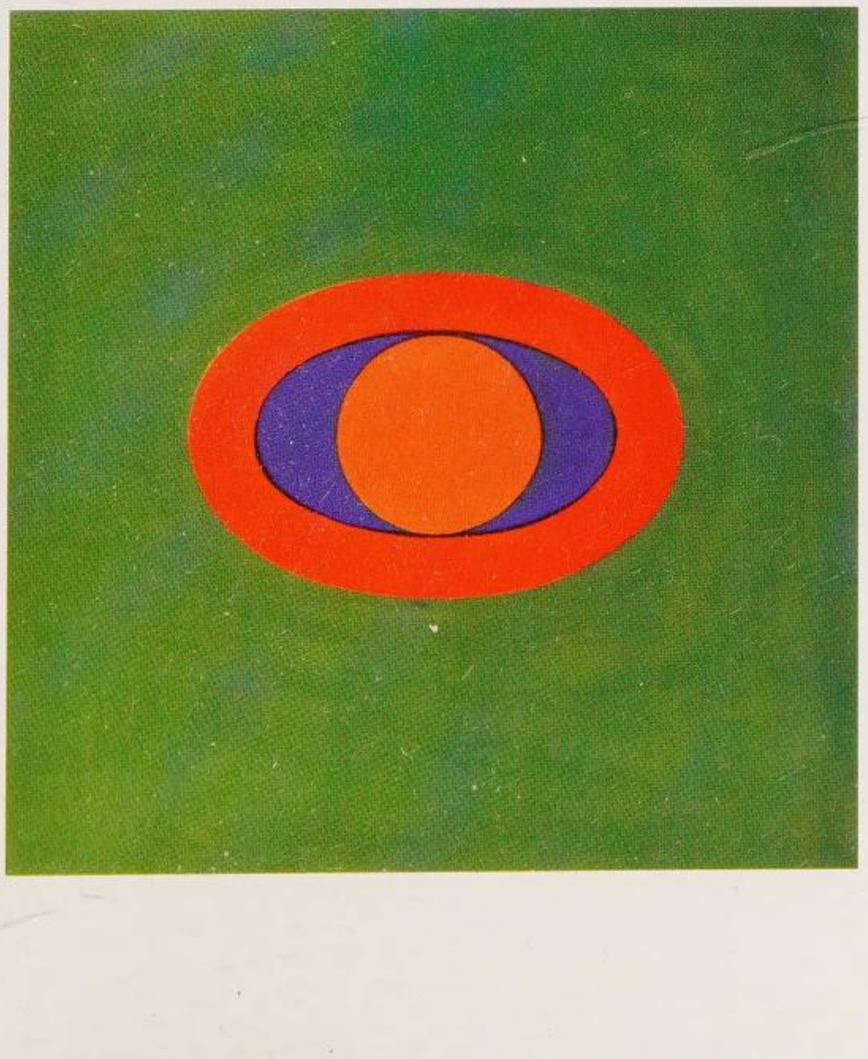
in the twenty-first century, just as the human subject has become further decentered and dematerialized by digital technology and mass media. Once again contemporary artists court a broad integration of art into cultural life.

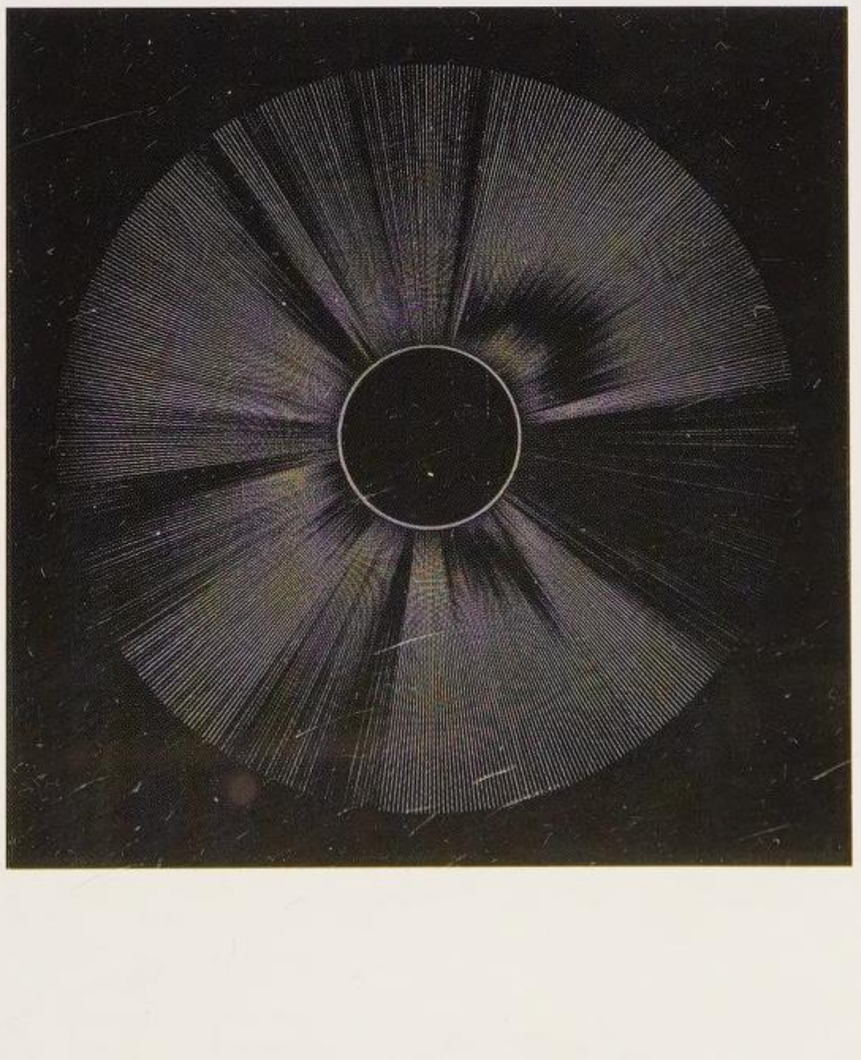
The popularity and commercialization of Op's most salient features now may be reassessed as its strength, propelling it beyond the elite boundaries of modernist art to engage viewers personally on the most fundamental and profound level of perception. Painter Julian Stanczak noted in 1968: "The form and process I use do not strive merely for visual deception, but rather seek to enhance surface action to achieve temporal visual attention."[11] As with all Op Art, the true subject of Stanczak's work is the perceptual experience within the mind of the viewer. The eye, which unites the visceral and the cerebral, emerged as an unconscious talisman of the movement. Op's centrality is implicit in the recurring binocular compositions, radial patterns, and concentric structures of Wolfgang Ludwig and Tadasky, and explicit within the circular, eye-like forms of Edna Andrade and Kenneth Noland. Although the artists deny any symbolic intent in their concentric abstractions, clearly they embrace vision as a catalyst for awareness. For them, the aesthetic experience depends on the stimulation of forty million nerve endings responding to chemical changes in more than 130 million photosensitive receptor cells; the act of vision. Although the movement of Op Art was formalized and popularized in the United States in the wake of *The Responsive Eye*, its origins lay in innovations dating back a century earlier when vision and perception came under close scrutiny by an equally progressive generation of modern artists.

1 William C. Seitz, "The New Perceptual Art," *Vogue*, 145, February 15, 1965, p. 80.
2 Ken Burrows, Executive Producer, Brian de Palma, Director, *The Responsive Eye*, 1965, 16 mm film, A Zodiac Associates Production.
3 John Canaday, "Art That Pulses, Quivers and Fascinates," *The New York Times Sunday Magazine*, February 21, 1965, p. 59.
4 "Transforming the Current Situation in the Plastic Arts," García-Rossi, Le Parc, Morellet, Sobrino, Stein, Yvaral of GRAV, Paris, October 25, 1961 (julioleparc.org).
5 Barbara Rose, "Beyond Vertigo: Optical Art at the Modern," *ArtForum International*, April 1965, p. 31.
6 Lucy Lippard, "Perverse Perspectives," *Art International*, II, March 1967, p. 28.
7 *Eye on New York, The Responsive Eye*, 1965. Interview with Mike Wallace, CBS Sterns Brook Productions.
8 Josef Albers, "Op Art and/or Perceptual Effects," *Yale Scientific*, XL, no. 2, November 1965, p. 9.
9 The Museum of Modern Art, New York, February 23 – April 25, 1965; City Art Museum of St. Louis, May 20 – June 20, 1965; Seattle Art Museum, July 15 – August 23 1965; Pasadena Art Museum, September 25 – November 7, 1965; The Baltimore Museum of Art, December 14, 1965 – January 23, 1966. Although attendance figures were not archived at museums on the exhibition tour, the City Art Museum of St. Louis (now the St. Louis Art Museum) reported its third highest attendance that year in its eighty-six-year history. The wealth of press generated in Seattle is evidence of its broad appeal there as well.
10 *Eye on New York, The Responsive Eye*, 1965, *op. cit.*
11 *Julian Stanczak*, exhib. cat., Dartmouth College, New Hampshire, 1968, unpaginated.



Above: Fig. 26
Exhibition catalogue for *Op Art: Una Extensión de la Vista*, Venezuela, The Marlboro Collection, 1970
Courtesy of Mon Levinson





Far left: Fig. 27
Kenneth Noland
American, born 1924
Fugle
1962
Acrylic on canvas
48 x 48 in. (121.9 x 121.9 cm)
Private collection

© Kenneth Noland/Licensed by VAGA, New York, New York

Left: Fig. 28
Ludwig Wilding
German, born 1927
Black Sun
(Sonne Schwarz)
1966
Wood, Plexiglas, and acrylic, edn 10/10
29 1/2 x 29 1/2 x 3 3/16 in. (75 x 75 x 8 cm)
Collection of the artist

Courtesy of the Artist



ART, OPTICS, AND THE SCIENTIFIC PERSPECTIVE

Among the first modern artists to attempt a form of perception-based art, eschewing traditional narrative and symbolic functions, was Georges Seurat, who had sought an "optical formula for painting" as early as 1876.[1] His analytical approach to aesthetic experience evidenced emerging research in optics and the related disciplines of physiology and experimental psychology in the mid-nineteenth century. The science of color, which engaged both the objective and subjective responses of the viewer, made particular strides in Europe during an era influenced by the dual precepts of positivism and romanticism.

Early in the nineteenth century Johann Wolfgang von Goethe expanded upon Newton's general laws of color in his seminal treatise, *The Theory of Colors* (1810). Unlike Newton, who viewed color as a physical phenomenon emanating from illuminated surfaces, Goethe recognized the interpretive role of individual perception, opening his text with a chapter on "Physiological Colours," "because they belong . . . to the *subject*—to the eye itself. They are the foundation of the whole doctrine."[2] Goethe addressed various properties of color, including the physical, the chemical, and the moral. Together with fellow poet Friedrich von Schiller, he had empathy with color as optimistic, melancholic, phlegmatic, and choleric, temperaments which subsequent theorists would describe less passionately as "temperature." His observations also extended to the contrasting values of black, white, and gray, and he devised geometric test patterns to demonstrate optical phenomena resulting from their graphic juxtaposition.

It was the French chemist Michel-Eugène Chevreul who interpreted these theories for practical use. As superintendent of the dyeing department for the Gobelins state tapestry works in France, Chevreul set out to resolve problems of color brilliance encountered in the weaving process, and his observations of color interaction produced by the warp and weft threads in a tapestry proved consequential for painters as well. Chevreul's principles of color as outlined in his *Laws of Simultaneous Contrast of Colors*, published in 1839, had an immediate impact on French artists in particular,[3] and was widely received amid mounting public interest in the physical sciences. The discoveries of germs and cell function, theories of atomic particles and molecular structure, and the establishment of the Periodic Table of Elements contributed to a growing analytical and reductionist perspective on nature. By the middle of the century, this "elementarism," which was central to Chevreul's analysis of components of color perception, aided the understanding of the interrelated fields of electricity, neurology, and optics.

Shortly after Chevreul's discoveries, German physician and physicist Hermann von Helmholtz published his detailed treatise, *Physiological Optics* (1866), connecting perceptual effects with anatomical mechanisms, which he illustrated with microscopic images. Helmholtz's thesis outlined the three-receptor theory of vision, which explains the function of photosensitive cone-shaped cells that respond to red, blue, and green stimuli within the spectrum of visible

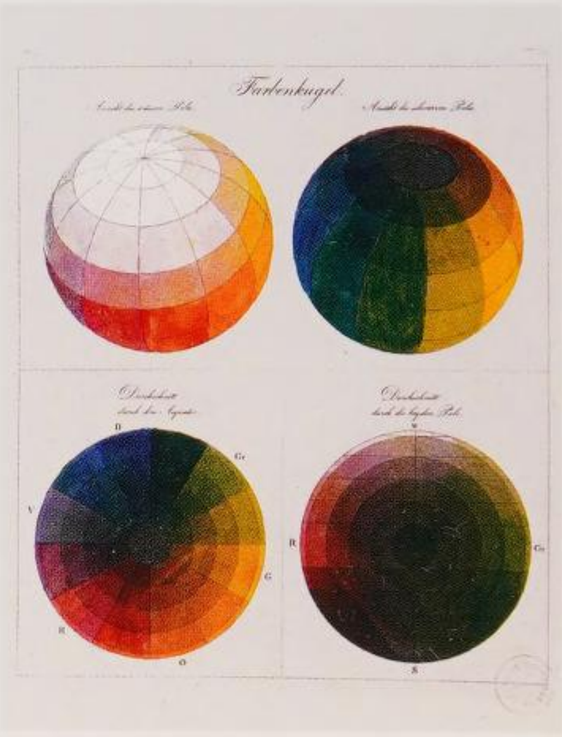
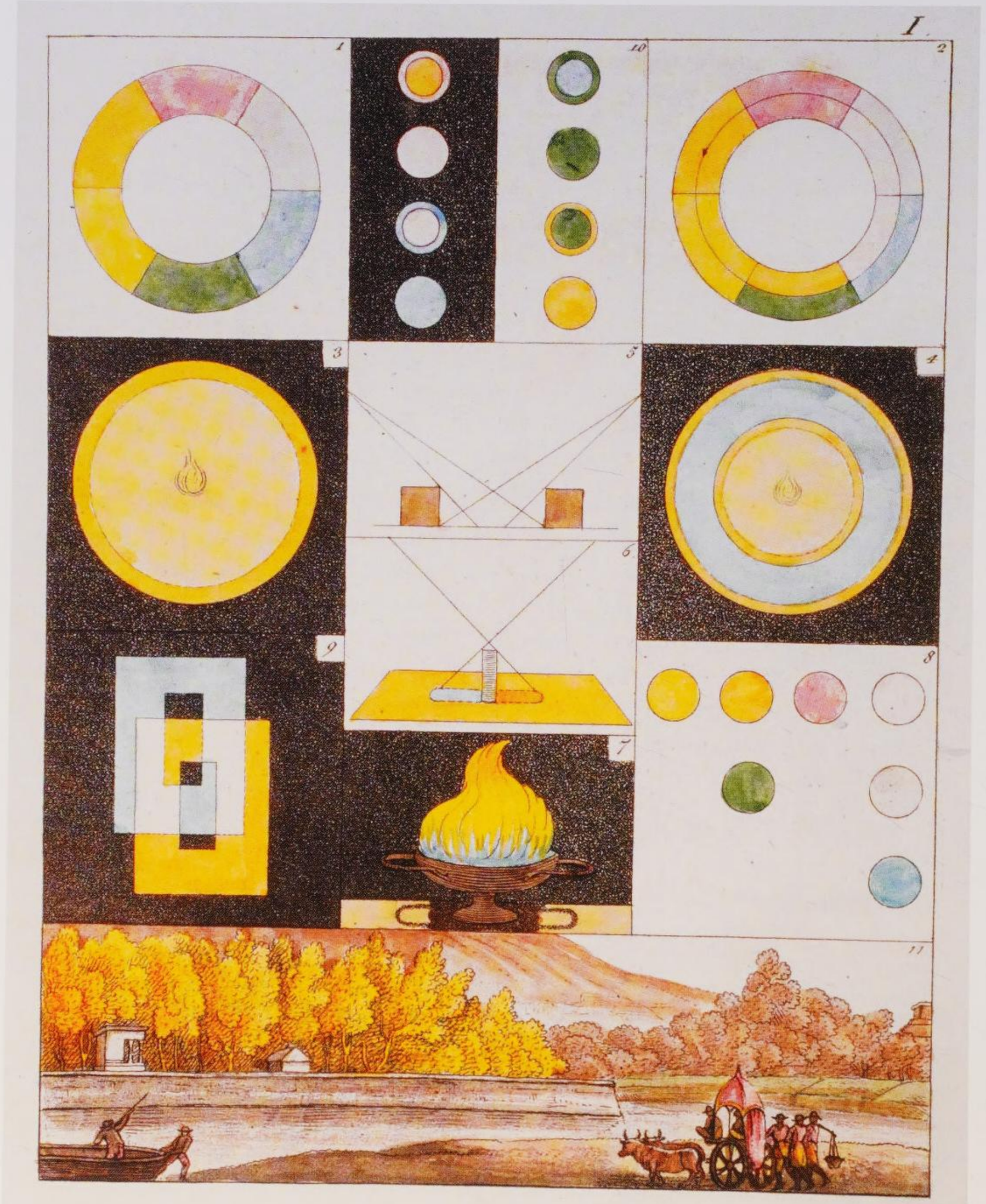


Fig. 29
Hand-colored engraving by Philipp Otto Runge of a color sphere (*farbkugeln*)
1810
Collection of the Goethe-Museum Düsseldorf/Anton-und-Katharina-Kippenberg-Stiftung, Düsseldorf, Germany
Photography by Walter Klein

Fig. 30
Hand-colored engraving by Johann Wolfgang von Goethe: "Diagram I" (*Farbtafel I*) from *Theory of Color* (*Farbenhlehre*), Tübingen (Cotta) 1810
Collection of the Goethe-Museum Düsseldorf/Anton-und-Katharina-Kippenberg-Stiftung, Düsseldorf, Germany

Photography by Walter Klein



light. The perception of color, he noted, is the result of chemical reactions in the retinal cells traveling via optic nerves to the brain. In essence, color is created in the mind, and is, therefore, not only a function of objective neurological processes, but also a function of subjective experience and intuition. Coincidentally, Helmholtz's scientific view of vision was attended by the development of photography, which records vision through a similar process.

In tandem, Chevreul and Helmholtz altered long-held views about visual perception and, in turn, changed the focus of art in their day. Until then, painters had represented a Newtonian world of "local color," the innate color of objects. They were now encouraged to represent the world as perceived by the individual eye. The Impressionists, who were well acquainted with the new theories, began to paint the atmospheric effects of light, independent of local color. This engendered a profound shift from the depiction of "things" to the representation of the entire visual experience. As the critic Jules Castagnary wrote in the journal *Le Siècle* in 1874, "They are impressionists in the sense that they render not a landscape but the *sensation produced by a landscape*."[4]

Most of the Impressionists, though knowledgeable of the new optical science, were in equal measure intuitive in their choice of subject and in their compositional approach. Seurat, one of the younger members of the group, instead sought to make a purely "optical painting" that adhered more strictly to the rule of empirical science. His technique was inspired by the American scientist and amateur painter Ogden N. Rood and the French writer Charles Blanc, both of whom interpreted Chevreul's theories with the art of painting in mind. Seurat was particularly fascinated by Rood's analysis of optical color mixture, a phenomenon observable with "Maxwell's spinning disks." This device, created by scientist James Clerk Maxwell, demonstrated that separate colors painted on halves of a wheel, when spun, would create an optical mixture more pure than that obtained by the physical mixture of paint. In his popular book of 1867, *Grammar of Art and Design*, Blanc diagrammed another method of optical mixture, juxtaposing dots of color to yield luster and intensity. Seurat experimented with this pointillist technique in the 1880s, in his analytical "chromo-luminist" phase. The result was *A Sunday on la Grande Jatte* (*Un Dimanche à la Grande Jatte*), the manifesto for the school of neo-Impressionism, which critic Félix Fénéon would champion. Fénéon was the first to invoke publicly Seurat's concept of *peinture optique* in an article on Paul Signac in 1890, in which he proclaims, "The new technique must correspond to the new manner of seeing. Now the optical painting would be the impressionism."[5] Seurat's preferred term of "optical painting" was quickly overshadowed by the "neo-Impressionist" moniker, which gained impetus in its opposition to the old impressionism.



Fig. 31
Three painted wood screens designed by Johann Wolfgang von Goethe, 1810
Approx. 40 in. high (102 cm)
Klassik Stiftung Weimar, Herzogin Anna Amalia Bibliothek, Weimar, Germany

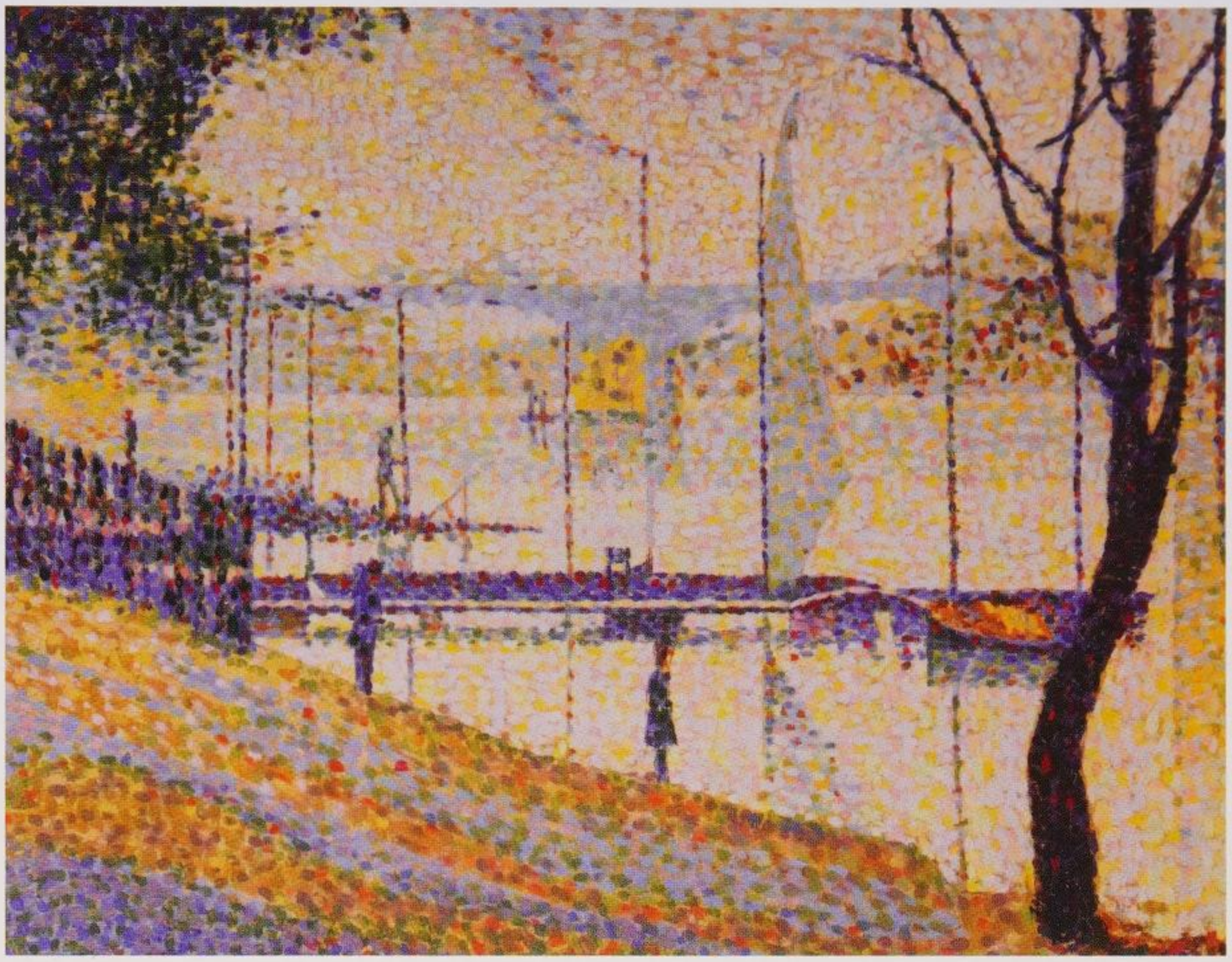


Fig. 32
Paul Signac
French, 1863–1935
Against the Enamel of a Background Rhythmic with Beats and Angles, Tones, and Colors, Portrait of Félix Fénéon in 1890
1890
Oil on canvas
29 x 36½ in. (73.7 x 92.7 cm)
The Museum of Modern Art, New York, New York: Fractional gift of a private collector. 85.1991

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(Detail on p. 28)

Pointillism, or "divisionism," arose in art concurrently with widespread elementarism in chemistry, biology, and genetics, and in some cases artists consciously adopted the visual language of science. Helmholtz's physiology of perception—which he also extended to the science of sound—ultimately prompted his generation to "gaze into the deepest recesses of our own nature,"[6] denoting a seismic shift from the study of the outer world of appearances to one of the inner world of the psyche. Amateur scientist Charles Henry applied ideas from the new psychophysics, which related physical and mental events, and the nascent philosophy of the unconscious in his *Introduction to a Scientific Aesthetic* (1885), a popular publication that impressed Seurat and, especially, Signac, who was quick to embrace the emotional and psychic value of a symbolic, inner language. Both artists employed Henry's bizarre "Aesthetic Protractor," which measured the emotional value of a line based on angles in its changes of direction, a quasi-scientific instrument that evokes the *fin-de-siècle* desire to reconcile empirical science with cosmic philosophy. Signac used the protractor in composing the remarkable painting *Against the Enamel of a Background Rhythmic with Beats and Angles, Tones, and Colors, Portrait of Félix Fénéon* (fig. 32). In this visionary work Fénéon, the prophet of neo-Impressionism, holds a cyclamen, a flower named from the Greek word for "circle," in reference to Goethe's color wheel. In Fénéon's hand, the flower-cum-color wheel serves as a wand that summons an explosive new era of psychic forms with the modernist language of pure abstraction.



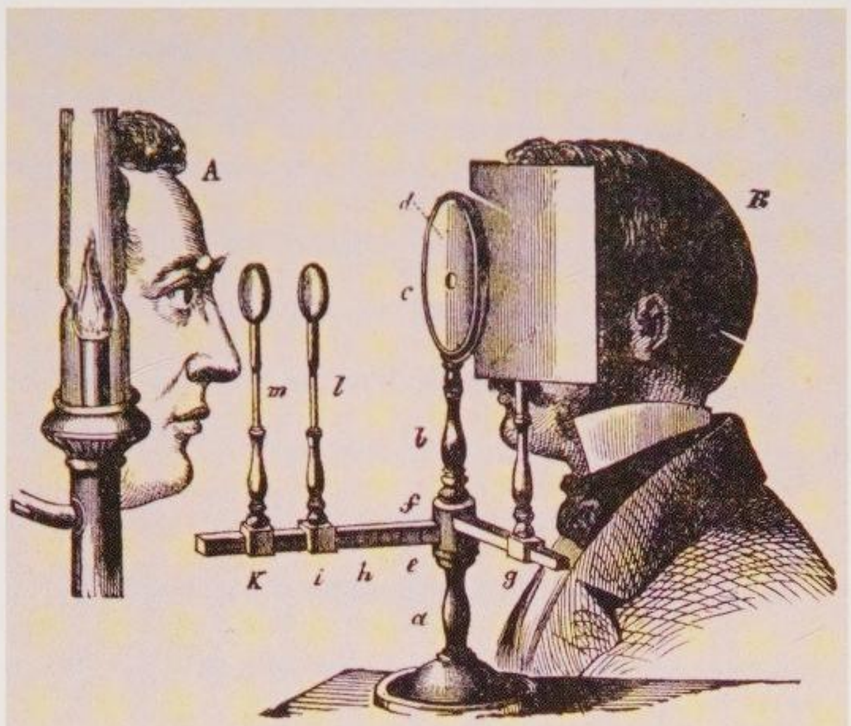


Fig. 108.

Above: Fig. 33
Bridget Riley
British, born 1931
Copy after Le Pont de Courbevoie by Georges Seurat (Kopie nach Le Pont de Courbevoie von Georges Seurat)
1959
Oil on linen
28 x 36 in. (71.1 x 91.4 cm)
Private collection
© 2006 Bridget Riley, All Rights Reserved

Left: Fig. 34
Diagram of G. Theodor Ruete's ophthalmoscope, introduced in 1853 from *Helmholtz's Treatise on Physiological Optics*, ed. James P.C. Southall, Vol. I, Menasha, Wisconsin (The Optical Society of America) 1924

1 Joan Ungersma Halperin, *Félix Fénéon Aesthete and Anarchist in Fin-de-Siècle Paris*, New Haven (Yale University Press) 1988.
2 Johann Wolfgang von Goethe, *Goethe's Theory of Colours*, trans. by Charles Lock Eastlake, London (John Murray) 1840, p. 1.
3 The Impressionists were receptive to Chevreul's observations and two of their younger adherents, Georges Seurat and Paul Signac, visited the chemist in 1884, reportedly to settle a dispute about color theory.
4 John Rewald, *The History of Impressionism*, New York (The Museum of Modern Art) 1946, p. 330.
5 Félix Fénéon, "Signac," *Les Hommes d'Aujourd'hui*, no. 373, Paris, 1890.
6 Hermann von Helmholtz, *Handbook of Physiological Optics*, 3 vols, 1856–67, French translation, Washington, D.C. (Optical Society of America) 1867.

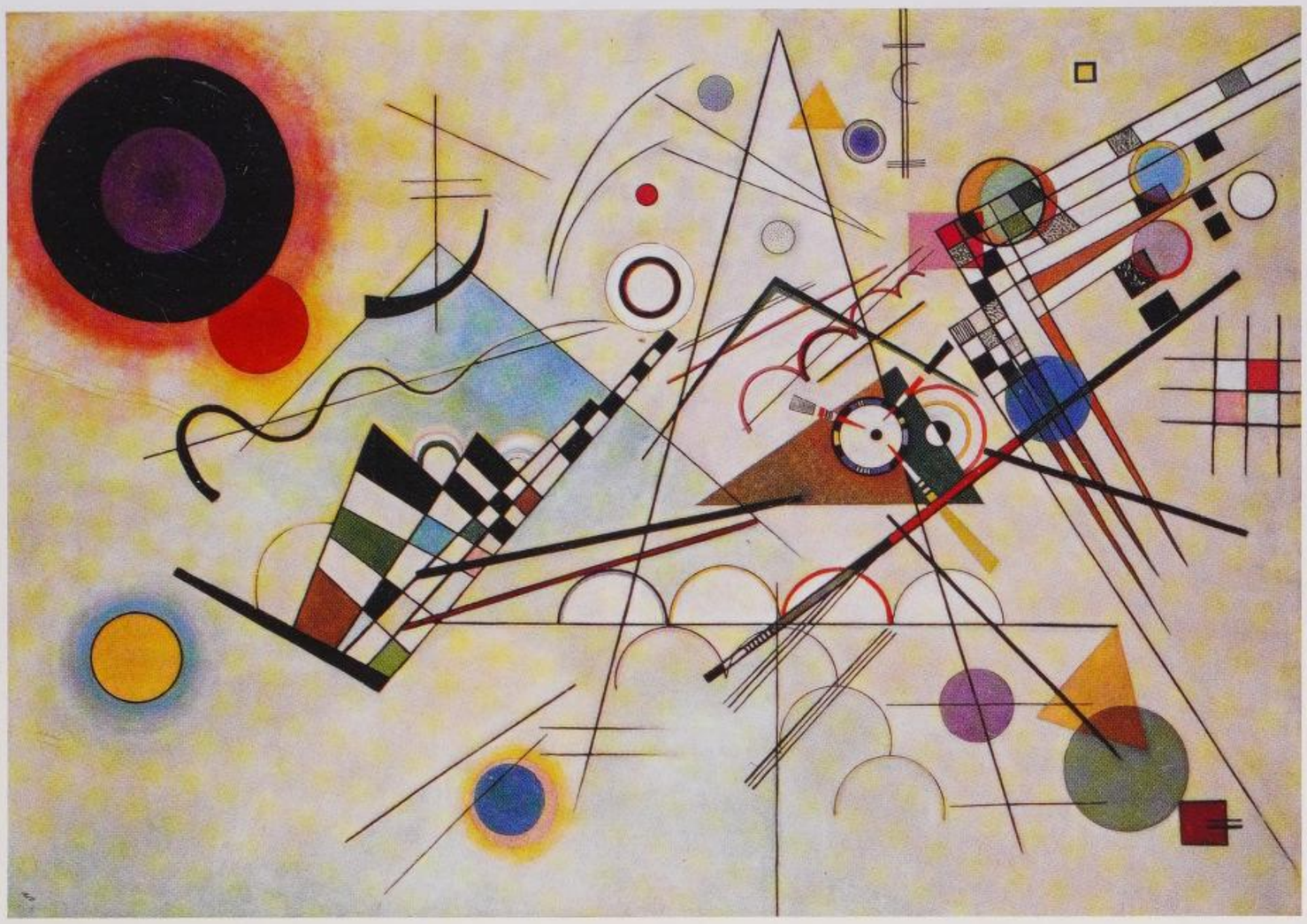


THE INNER EYE

At the dawn of the twentieth century, a modernist spirit heralded the widespread dissolution of pictorial narrative and a growing concern with the elements of visual language itself: color, line, and shape. In Britain, continental Europe, Russia, and the United States, a multitude of aesthetic philosophies and related stylistic movements emerged in quick succession, often in parallel with new theories in experimental psychology and spiritual philosophy. Though geographically and theoretically diverse, these aesthetic movements held in common an interrogation of the act of vision and the personal and cultural formation of meaning. The Euclidean space of Renaissance perspective was dissolved by Seurat's investigation of light, then flattened by Cézanne's Post-Impressionist acknowledgment of the picture plane, and finally reconfigured by Picasso's Cubist compositions. In less than three decades, artists closed the pictorial window that had for centuries provided a clear perspective of the exterior world. Painting became an opaque surface for a new language that could communicate invisible facets of human cognition, emotion, and spirit. This psychophysical perspective portended the evolution of a purely symbolic art form.

Symbolic abstraction emerged in the first decade of the new century, at the same time as Freud's interpretations of dreams and Einstein's theoretical physics. The cultural relevance—and prescience—of experimental art was part of an intellectual zeitgeist that dispelled long-held assumptions about matter, space, and time. Internationally, artists sought to apply the science of vision to painting. In the 1910s, Orphisme in France and Synchromism in America moved beyond the formal structures of Cubism to the invisible realm of sound, reflecting heightened scientific interest in the relationship between visual and aural sensation. Since the Romantic era, music had been accepted as a purely abstract art form with direct psychic and emotional impact, and by the turn of the twentieth century Helmholtz and others had written extensively about sound and vision in analogous terms of tonality, harmony, and chromatic scales. In Germany, Russian-born Wassily Kandinsky was moved by the atonal music of Schönberg to create a painterly equivalent of music, adopting such titles as *Fugue* and *Contrasting Sounds* for his colorful improvisations (see fig. 35).The emotional expression of color was a fundamental inspiration of burgeoning abstraction in painting worldwide.

Orphisme, named by the poet Apollinaire after Orpheus, the mythical musician of antiquity, described the lyrical paintings that rivaled the effects of music. Robert Delaunay, one of Orphisme's progenitors, was a disciple of Blanc and Chevreul and their analytical theories of color, and his abstractions directly employ the form of the color wheel. His early non-representational paintings, *First Disc* (1912–13) for example, feature circular shapes with multi-hued quadrants, indicating his familiarity with Maxwell's experimental spinning disks. Delaunay applies the motif of concentric circular forms throughout subsequent compositions, which appear to reveal the pulsating



Above: Fig. 35
Wassily Kandinsky
Russian, 1866–1944
Composition VIII
1923
Oil on canvas
55 1/8 x 79 1/8 in. (140 x 201 cm)
Solomon R. Guggenheim Museum, New York, New York: Gift, Solomon R. Guggenheim, 1937. 37.262

Photography by David Heald © SRGF, New York
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Right: Fig. 36
Gino Severini
Italian, 1883–1966
Rhythm of the Dance (Dancer)
1913
Oil, plaster, and sequins on board
10 3/4 x 10 3/4 in. (27.3 x 27.3 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of Howard D. and Babette L. Sirak, the Donors to the Campaign for Enduring Excellence, and the Derby Fund.
1991.001.067

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frequencies emanating throughout nature. The connection between the dynamic energies of color and music is raised in a letter to Kandinsky of 1912, in which Delaunay wrote: "I am still waiting until I can find greater flexibility in the laws I discovered. These are based on studies in the transparency of color, whose similarity to musical notes drove me to discover the 'movement of color.' All this, which I believe is unknown to everyone, is for me still in my mind's eye." Delaunay searched for a sublime state: "Clarity will be color, proportion; these proportions are composed of diverse elements, simultaneously involved in an action. This action must be the representative harmony, the *synchronous movement* (simultaneity) of *light* which is the *only reality*."[1] The American movement of Synchromism adopted these color harmonies as its central tenet. Stanton Macdonald Wright and Morgan Russel, Synchromism's chief proponents, rendered the living world in prismatic tonalities to achieve effects analogous to musical compositions. In addition to his observations on optical color mixing, James Clerk Maxwell also theorized that visible color was only a portion of a larger spectrum of electromagnetic radiation, which he deduced also included infrared and ultraviolet light. By 1900, such new scientific techniques as spectrography proved the existence of gamma rays and x-rays, further revealing the invisible world of electromagnetic energy.

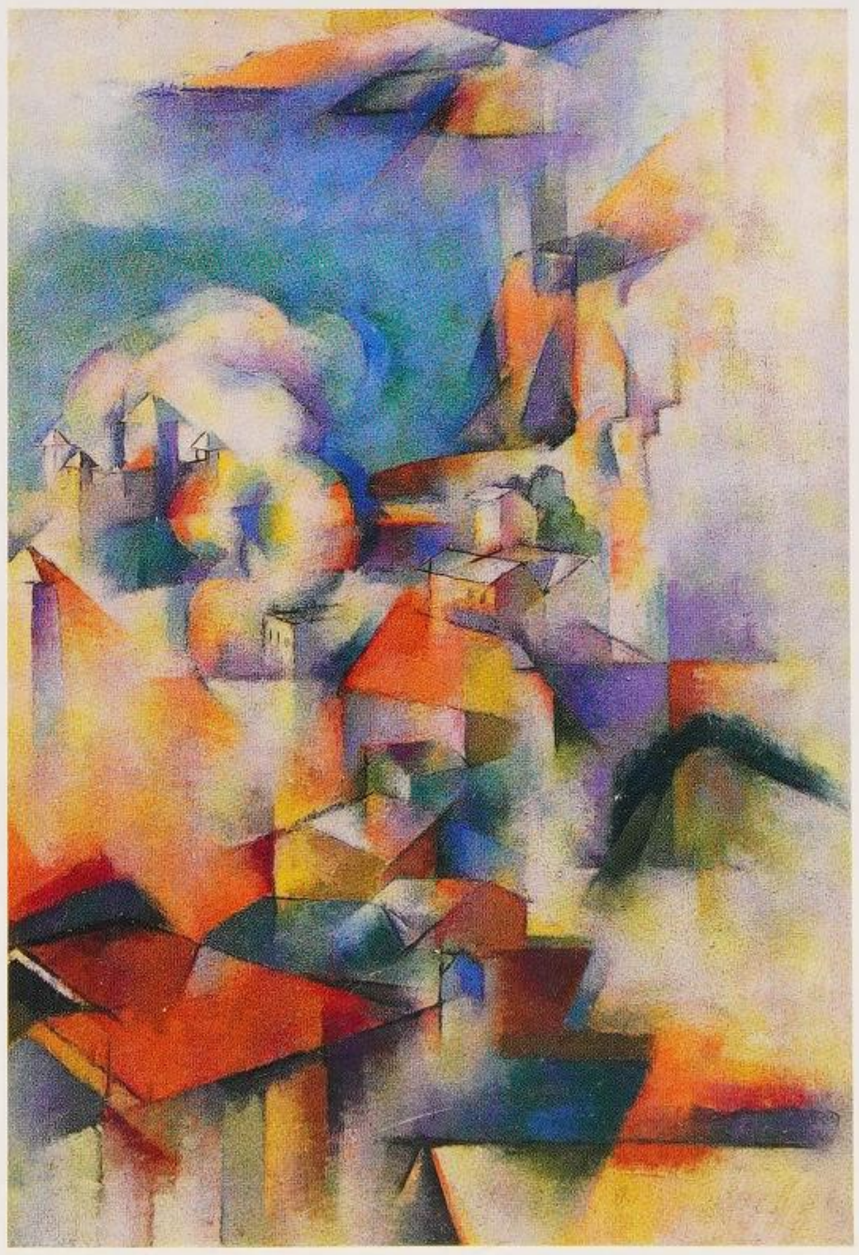
Science provided the vantage point on the world beyond matter for the Italian Futurists, who considered atmospheric energy as their prime subject. The group announced its allegiances in its *Futurist Painting, Technical Manifesto* of 1910: "Who can still believe in the opacity of bodies, since our sharpened and multiplied sensitiveness has already penetrated the obscure manifestations of the medium? Why should we forget in our creations the doubled power of sight, capable of giving results analogous to those of the x-ray?" The non-objective paintings of Giacomo Balla use color interaction to convey the dissolution of nature into pure energy, a form of abstraction that is comparable to music. This is supported by the Futurist concept of chromophony or "the color of sounds," which stresses that "the expression of sound colors and any other displacement in the atmosphere is a manifestation of 'pure optical visuality.'"[2] Their depictions of atmospheric energy derive much from the

theories and the graphical data of scientific texts. The dynamism of speed and motion that Balla and Gino Severini sought to portray on canvas held implications for the new medium of cinema as well. Futurist filmmakers developed such innovative techniques as painting directly on to film stock, to fuse color and speed in a form of "chromatic music."[3] The progressive, often dogmatic, Futurist ideology of color was distinct from that of contemporary Expressionist and Fauve painters, who arbitrarily distorted reality for primal psychological effect, reflecting the global trauma of World War I.

In Russia, the cultural shift to an introspective vantage point was manifest in the spare, formal grammar of the Suprematists, a group founded in 1913 by Kasimir Malevich. Malevich's reductive geometric compositions amounted to a primal language of circles and squares, fundamental symbols imbued with mathematical and cosmic overtones. This mysticism is apparent in his use of the Greek cross, central to the Christianity of the Russian Orthodox Church. After the revolution, the Russian avant garde became a socialist endeavor, turning to what Malevich derided as the base, "constructive art" of Alexander Rodchenko, Vladimir Tatlin, and Naum Gabo. Diverting the essential formal language of Suprematism from a metaphysical role to an overt political function, Constructivism, in time, usurped the Suprematist ideal. In the years immediately following World War I, an elemental language of line, color, and geometry surfaced internationally in support of diverse philosophical precepts.

1 Robert Delaunay, *Theories of Modern Art*, ed. Herschel B. Chipp, Berkeley (University of California Press) 1968, p. 318.
2 Umbro Apollonio, "Chromophony—the Color of Sounds," 1910, in *Futurist Manifestos, Documents of 20th-Century Art*, ed. Robert Motherwell, New York (Viking) 1973.
3 Bruno Corra's *Abstract Cinema-Chromatic Music* of 1912 proposed the application of color directly to film, one of a number of avant-garde techniques that generated a genre of experimental film.

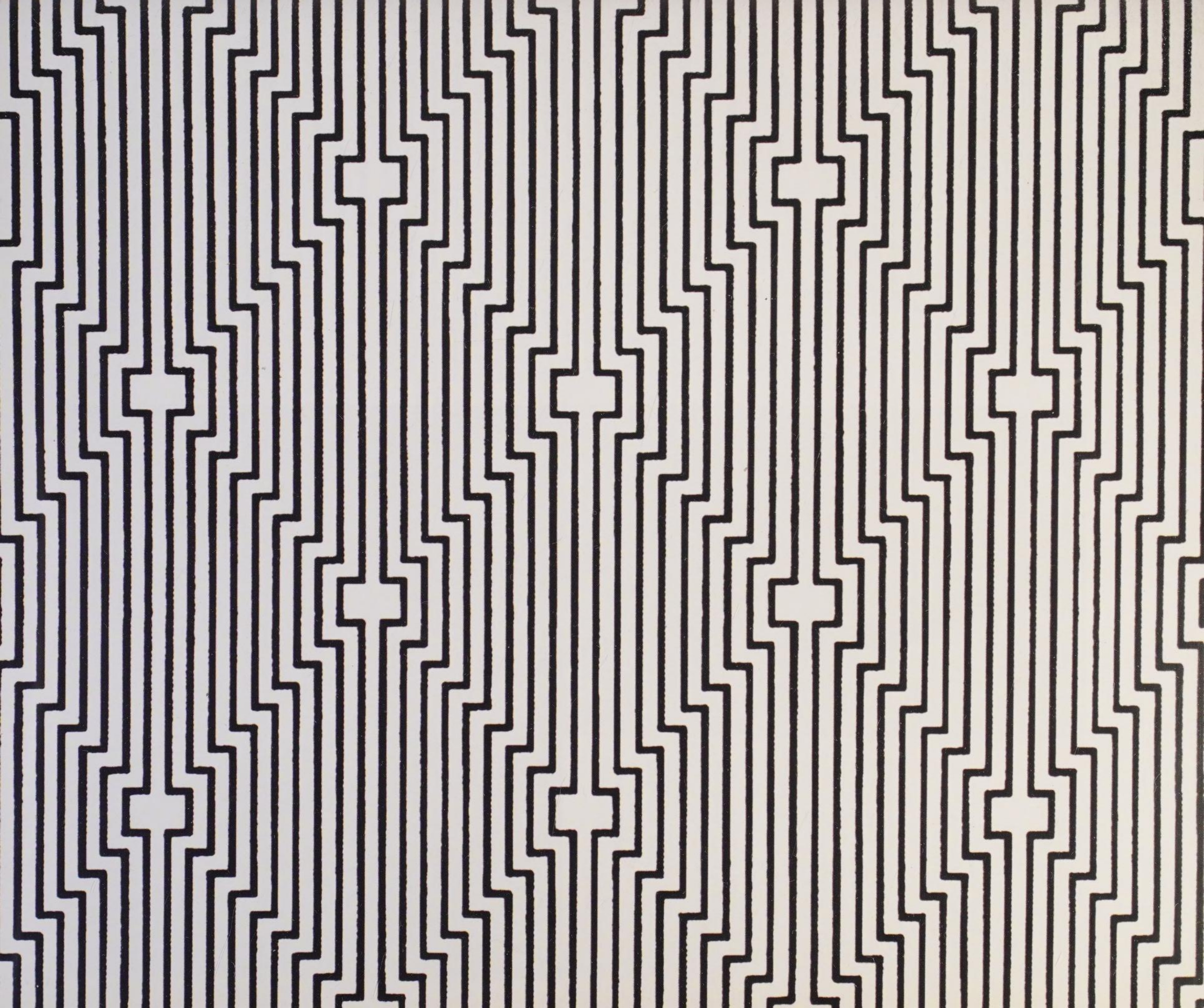




Above: Fig. 37
Robert Delaunay
French, 1885–1941
Portuguese Woman
1916
Oil on canvas
53½ x 61⅜ in. (135.9 x 155.9 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of Howard D. and Babette L. Sirak, the Donors to the Campaign for Enduring Excellence, and the Derby Fund.
1991.001.010

(Detail on p. 34)

Left: Fig. 38
Stanton Macdonald-Wright
American, 1890–1973
California Landscape
c. 1919
Oil on canvas
30 x 22⅛ in. (76.2 x 56.2 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of Ferdinand Howald. 1931.275

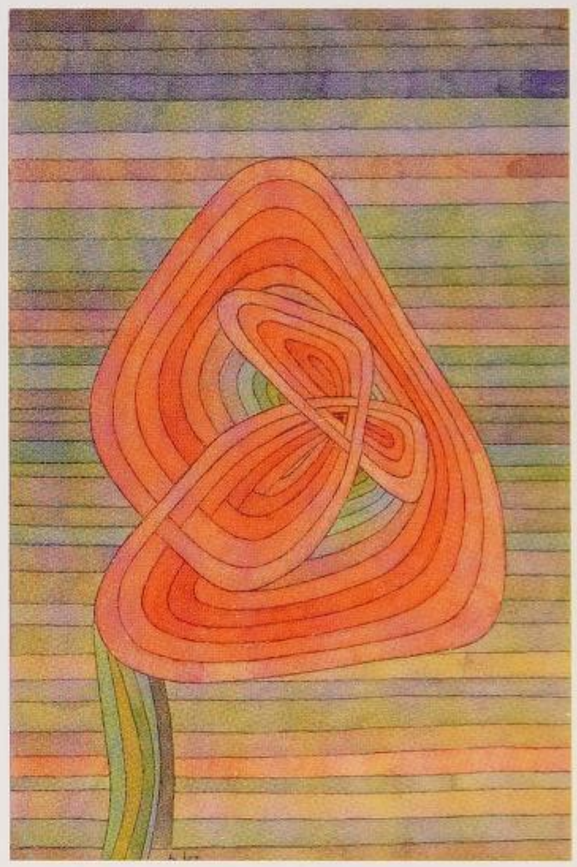


THE FOUNDATIONS OF OP

In the search for a pure language of form, distinct from representations of the natural world, disparate movements of geometric abstraction emerged after World War I. In 1917, the Dutch group De Stijl was formed by Piet Mondrian and Theo van Doesburg, who espoused a minimal vocabulary of rectilinear elements for an "art of pure relations," or what Van Doesburg termed "elementarism." Through their abstract compositions and self-published magazine, they reflected the theosophist search for a divine absolute, paralleled in the Suprematist philosophy of Kasimir Malevich in Russia. The avant-garde ideologies of Dutch Neo-Plasticism and Russian Constructivism were diffused throughout Europe during the 1920s and 1930s by various artists. Mondrian and Van Doesburg relocated to France, eventually following separate paths in their quest for a pure abstract language. Malevich traveled to Poland and Germany, where his exhibitions garnered devoted followings. His compatriot Naum Gabo emigrated to England, where he introduced constructivist ideals to an emerging generation of abstractionists. And the Russian-born El Lissitzky took up residence in Germany to become the Russian cultural ambassador to the Weimar Republic.

An important point of connection for the various branches of the new abstract aesthetic was established in Weimar Germany in 1919 when Walter Gropius formed the Bauhaus school for fine and applied art. The Bauhaus's innovative program integrated art, architecture, and numerous design practices into a progressive curriculum guided by fundamental principles of the basic elements of color and design. Kandinsky, returning to Germany after five years in Russia, joined Paul Klee and Johannes Itten on the faculty, and together they formulated a foundation course in color theory and practice that merged the scientific and metaphysical perspectives of color. László Moholy-Nagy, Max Bill, and Josef Albers (a former student at the school) also taught the preliminary course, which exerted a lasting impact on art and education worldwide. When the Nazi Party officially closed the Bauhaus in 1933, its faculty dispersed throughout Europe and America. Max Bill returned to Switzerland, where he would later found the Hochschule für Gestaltung in Ulm, based on Bauhaus principles. Gropius and Moholy-Nagy moved to England with the hope of starting a new Bauhaus there, but those plans remained unfulfilled and they eventually immigrated to the United States. Gropius took a position at Harvard Graduate School of Design and Moholy-Nagy moved to Chicago, where he



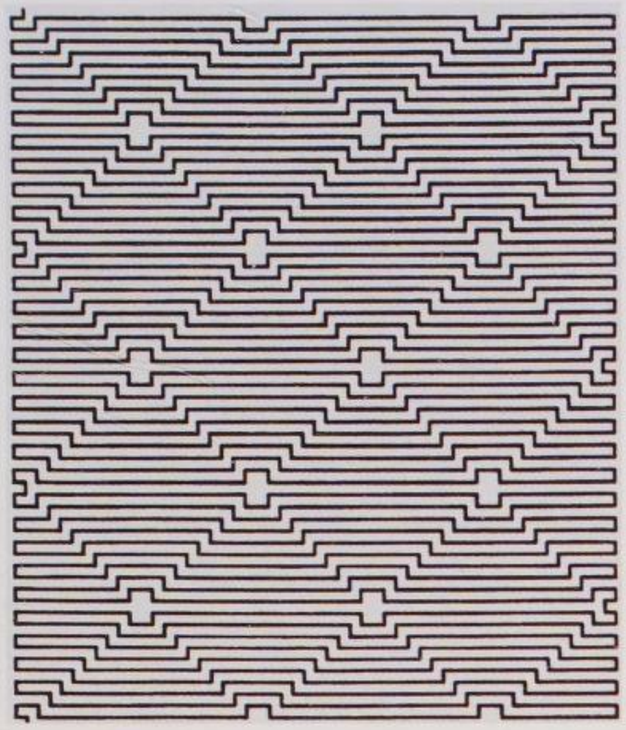


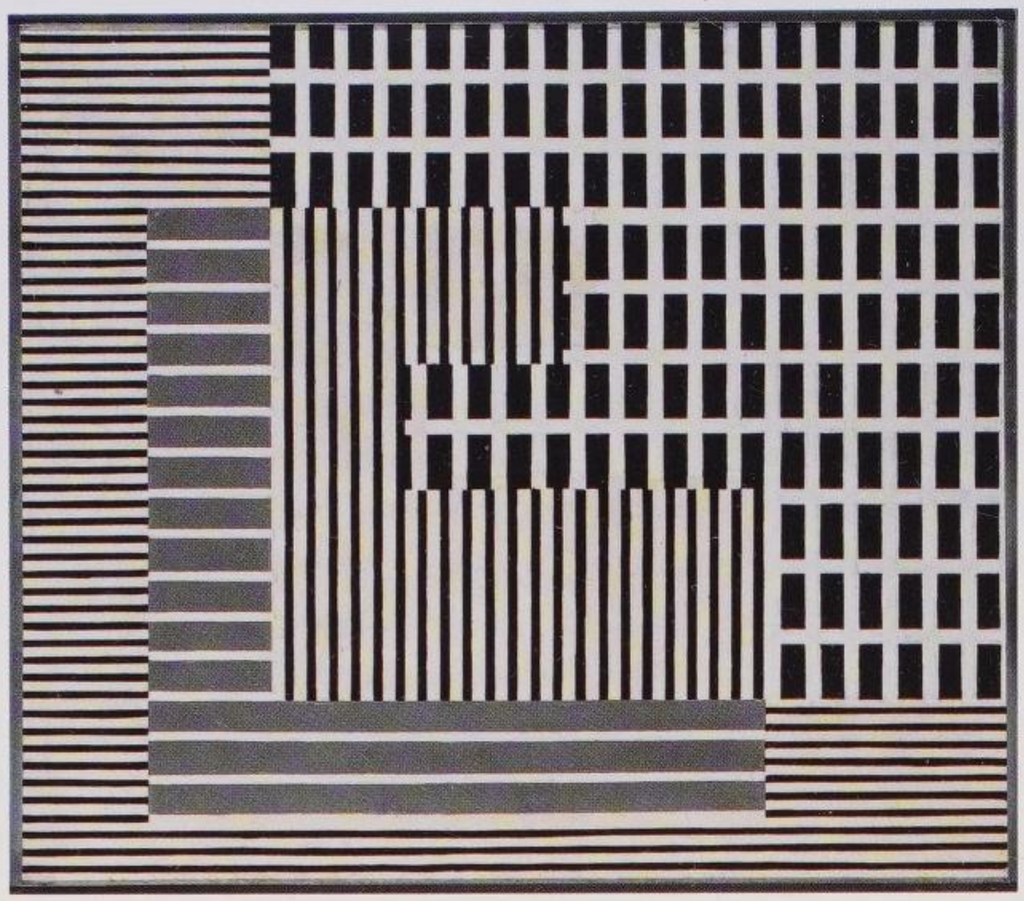
Above: Fig. 39
Paul Klee
German, 1879–1940
Lonely Flower, 1934
Watercolor with pen and black ink on tan paper, laid down
$18^{7}/_{8}$ x $12^{3}/_{8}$ in. (47.9 x 31.4 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of Howard D. and Babette L. Sirak, the Donors to the Campaign for Enduring Excellence, and the Derby Fund.
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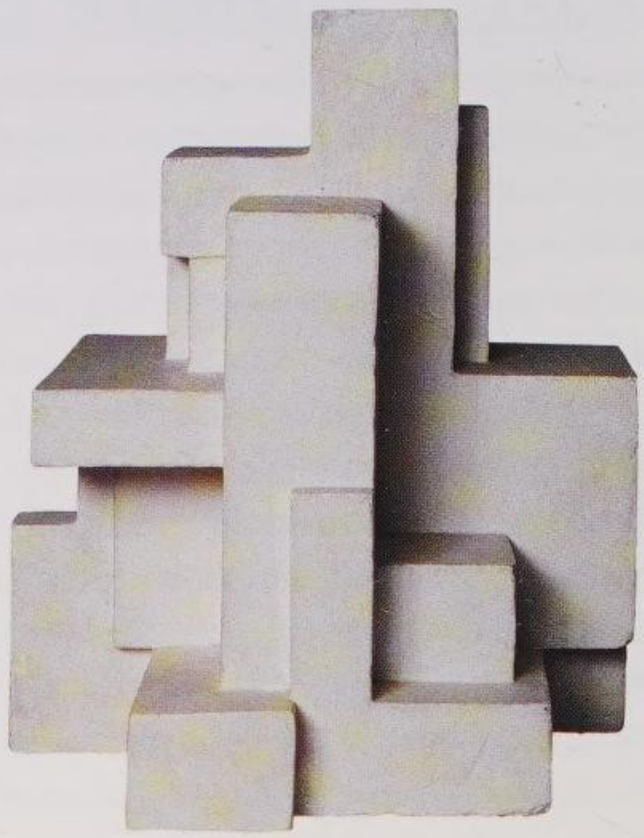
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Left: Fig. 40
Photograph by UMBO (Otto Umbehr) of Josef Albers teaching at the Bauhaus, Dessau, Germany, 1928

Courtesy of The Josef and Anni Albers Foundation, Bethany, Connecticut and Phyllis Umbehr/Gallery Kicken, Berlin, Germany © 2006 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn







Above, left: Fig. 41
Waclaw Szpakowski
Polish, 1883–1973
B: B5
1924
Ink on paper
$11^{3}/_{4}$ x $10^{3}/_{16}$ in. (29.8 x 25.8 cm)
Collection of Getulio Alviani, Milan, Italy
(Detail on p. 38)

Above, center: Fig. 42
Henryk Stazewski
Polish, 1894–1988
Composition
(Kompozycja Fakturowa)
1930–31
Oil on canvas
27 1/2 x 31 1/2 in. (70 x 80 cm)
Museum Sztuki, Łódź, Poland
Photography by Piotr Tomczyk

Above, right: Fig. 43
Georges Vantongerloo
Belgian, 1886–1965
Construction of Volumetric Interrelationships Derived from the Inscribed Square and the Square Circumscribed by a Circle
1924
Cement cast, painted white
$11^{13}/_{16}$ x 10 in. (30 x 25.5 cm)
The Solomon R. Guggenheim Foundation, New York, New York: Peggy Guggenheim Collection, Venice, Italy 1976.76.2553 59
Photography by David Heald © SRGF, New York
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founded the Institute of Design modeled after the Bauhaus. Josef Albers moved to North Carolina at the invitation of Philip Johnson to teach at the new Black Mountain College, where he remained until joining the faculty at Yale University in 1950. Albers influenced a generation of artists at Black Mountain and Yale with his rigorous color theories, which he eventually published in *The Interaction of Color* in 1963.[1]

With the international diffusion of artists and intellectuals during the 1930s and 1940s, the Constructivist aesthetic was seeded in urban centers throughout Europe and the Americas. The basic principles of color and design inherited from the Bauhaus became rooted in the foundation programs in universities and art schools by the end of World War II. In New York in particular, this influx of new ideas also incited a generation of Abstract Expressionists, whose origins lay in European Surrealism. Solidified as a movement in 1951, when the diverse group organized to protest the conservatism of the Metropolitan Museum of Art, their emotive art struck a chord in the collective conscience of postwar America. The movement also came to stand for progressive and democratic ideals and, with the support of Nelson Rockefeller and the Museum of Modern Art in New York, was exported as cultural capital in international exhibitions during the Cold War years. The Abstract Expressionist method of "automatic," or "action," painting gained its counterpart in the European tendency of "Art informel" or "Tachisme" (a reference to Félix Fénéon's characterization of the random Impressionist "blot" in contrast to neo-Impressionist precision). But by the late 1950s, a younger generation of artists was emerging internationally in a climate of a new and progressive ideology, bolstered by science and industry.

The Constructivist tendency lay dormant in America and Britain through much of the 1950s, but maintained its foothold in continental Europe during and after the war. Countering the rising tendencies in Surrealist and representational art, a number of the formalists convened a loose alliance of the Abstraction-Création group, publishing an eponymous journal throughout the 1930s. Among those included in the group were former De Stijl members Mondrian and Georges Vantongerloo, Russian expatriates Kandinsky and Gabo, and Polish artists Wladyslaw Strzeminski and Henryk Stazewski, previously of the Suprematist-inspired Blok group. After the war many of them exhibited under the banner of "Art Concret" in France and, later, "Konkrete Kunst" in Switzerland, and "Movimento Arte Concreta" in Italy. Coined by Van Doesburg years earlier, the term "concrete" gained favor over the historically entrenched "constructivist" heading, to characterize art devoid of symbolic or representational function. Concrete art formed the backbone of a major exhibition, the *Salon des Réalités Nouvelles*, at the Musée d'Art Moderne in Paris in 1946, with annual versions occurring throughout France in ensuing years. Among the artists included

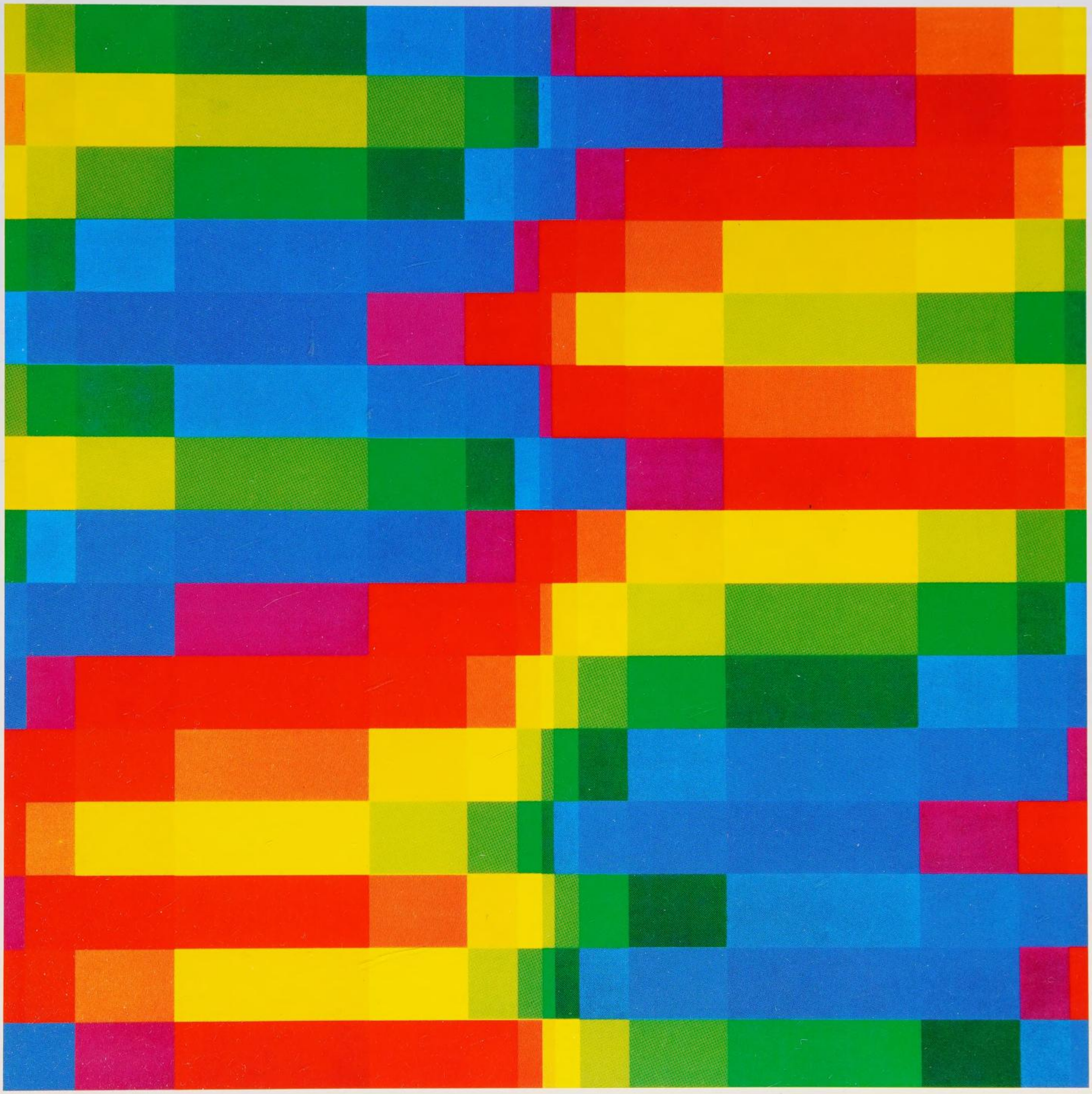


Fig. 44
Richard Paul Lohse
Swiss, 1902–1988
Fifteen Systematic Color Rows with Vertical Condensations, 1950–68
Oil on canvas
59 1/8 x 59 1/8 in. (150.2 x 150.2 cm)
The Museum of Modern Art, New York, New York: The Riklis Collection of McCrory Corporation.
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Right: Fig. 45

Josef Albers

American, born Germany, 1888–1976

Goldrosa

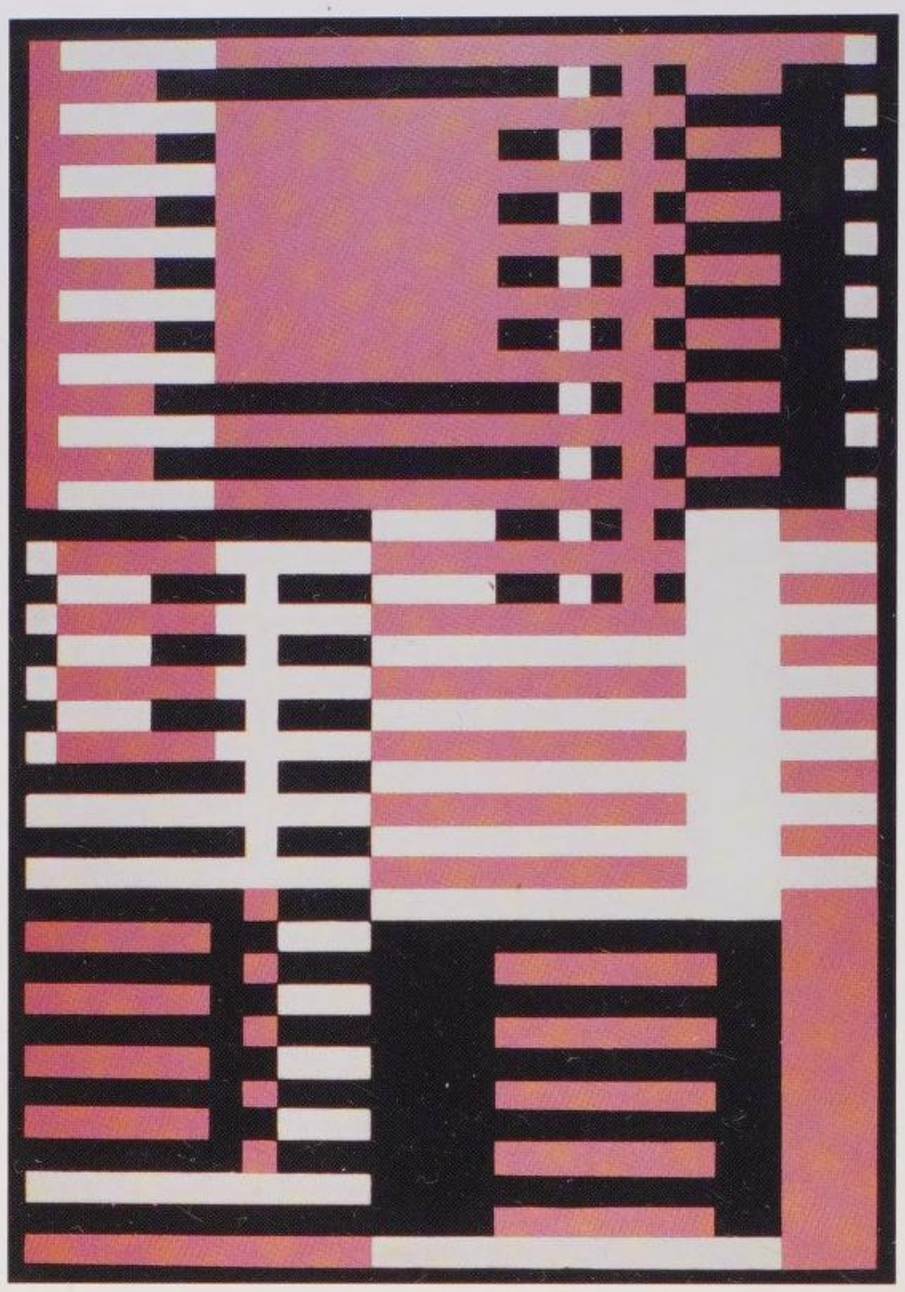
c. 1926

Sand-blasted flashed glass with black paint

17 3/4 x 12 3/4 in. (45.1 x 32.4 cm)

The Josef and Anni Albers Foundation, Bethany, Connecticut. JAAF#1976.6.1

Photography by Tim Nighswander © 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York



Right: Fig. 46

Karl Benjamin

American, born 1925

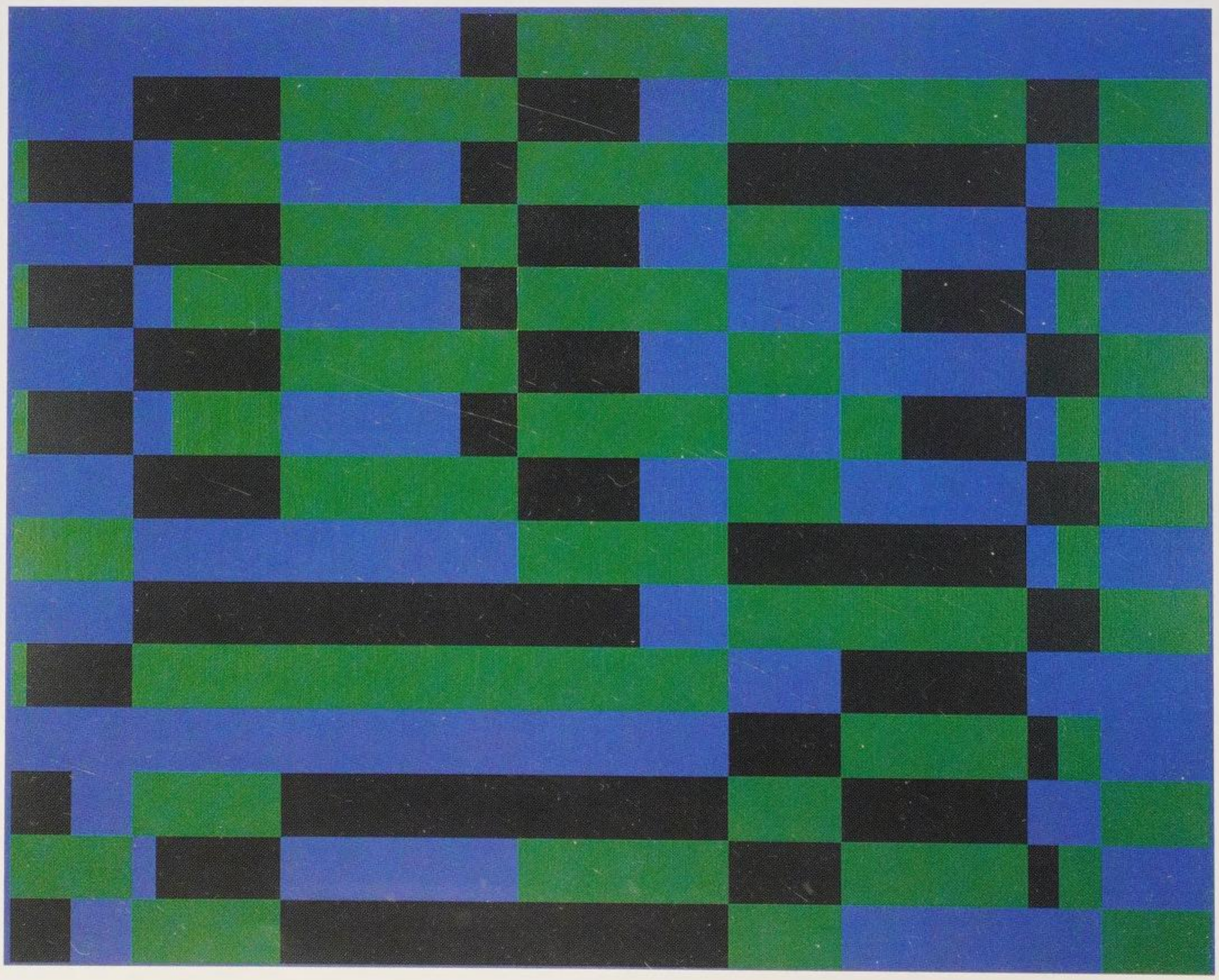
Bars: Black, Blue, Green

1959

Oil on canvas

40 x 50 in. (101.6 x 127 cm)

Courtesy of Louis Stern Fine Arts, West Hollywood, California. © Karl Benjamin, reproduced by permission



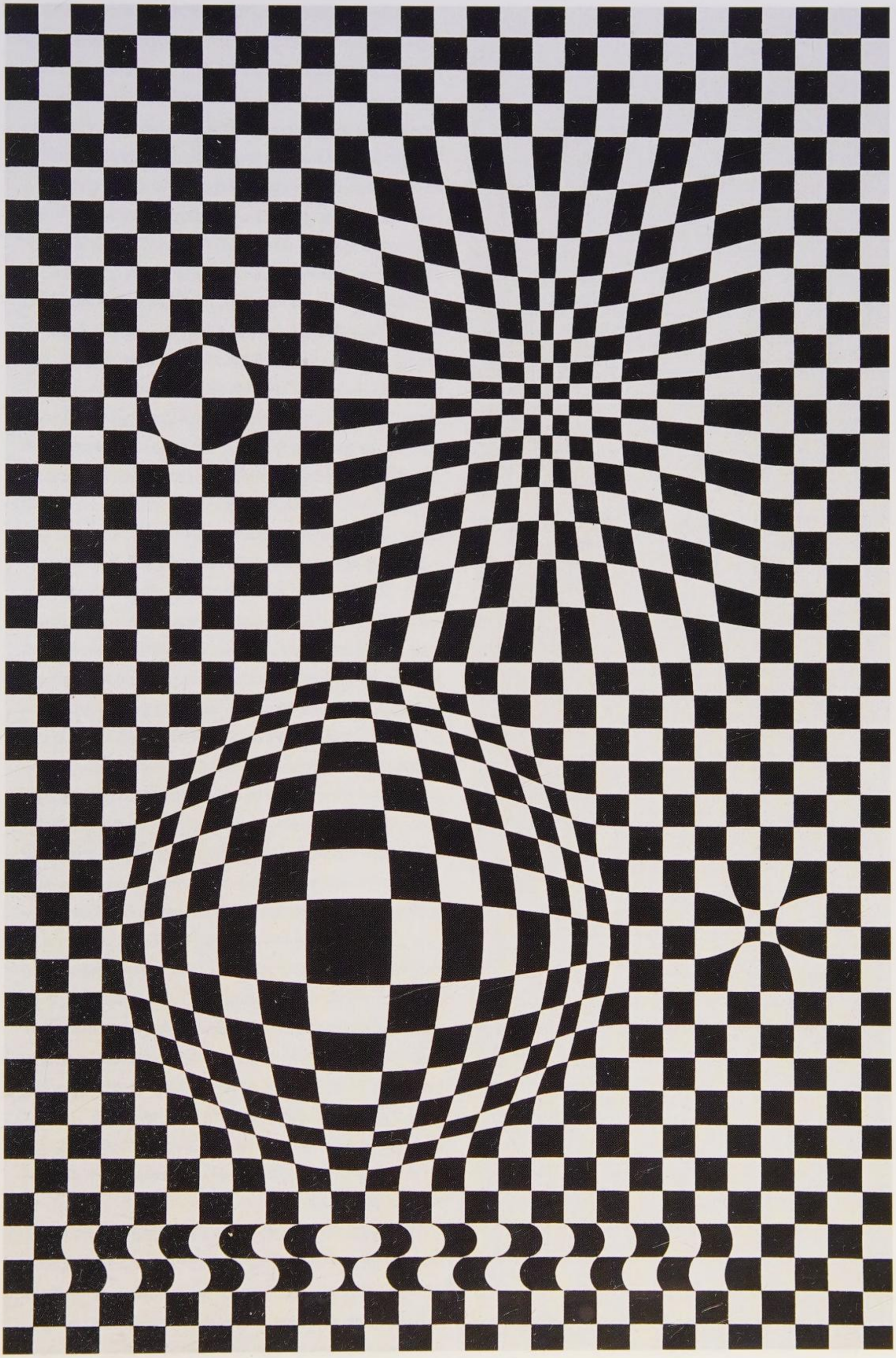


Fig. 47
Victor Vasarely
French, born Hungary, 1906–1997
Vega
1957
Acrylic on canvas
100 x 73 in. (254 x 185.4 cm)
Collection of Charles Simonyi, Seattle, Washington

Courtesy of Michéle Vasarely. Photograph © 1999 Eduardo Calderón © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris



Above: Fig. 48
Photograph of Groupe de Recherche d'Art Visuel (GRAV): left to right, Julio Le Parc, Joel Stein, Horacio García-Rossi, François Morellet, Jean-Pierre Yvaral, and Francesco Sobrino at the Exposition Museum Am Ostwall, Dortmund, Germany
1968

Courtesy of François Morellet



Right: Fig. 49
Photograph of Anonima Group: left to right, Francis Hewitt, Ed Mieczkowski, and Ernst Benkert
c. 1965

Courtesy of Ernst Benkert

was Hungarian-born Victor Vasarely, who had studied at the "Budapest Bauhaus" before settling in Paris in 1930.[2] At the end of World War II Vasarely co-founded a gallery in Paris with the dealer Denise René, which became an important showcase for artists in the constructivist, or concrete, tradition. Galerie Denise René presented such pioneering shows as *Le Mouvement* (1955; see fig. 53), which featured "kinetic art" by esteemed artists including Marcel Duchamp and Alexander Calder, along with such younger artists as Vasarely, the Israeli Yaacov Agam, and the Venezuelan Jesús Rafaël Soto.

Vasarely's career flourished during the 1950s. A prolific painter and sculptor, he exhibited throughout Europe and the Americas, exerting international influence with his bold progressive abstraction. Contrary to the prevailing "informal abstraction," his paintings and constructions combined the elemental forms of constructivism with the systematic logic of science, reflecting his diverse interests, from astronomy to wave mechanics. Vasarely's faith in technology is exemplified by a bold use of geometric forms, rigorous compositional structures, and the inventive application of industrial materials and mass-production techniques. His colleague Soto shared these interests, likewise experimenting with precise formal structures and layered graphic patterns to yield dynamic optical effects. Soto left Venezuela for Paris in 1950, one of the first of many Latin American artists to be attracted to the French capital after the war. During an era of democratic social reform and expanding international commerce, Argentina and Brazil also became important points of contact for the new abstraction, following the inauguration of several museums for modern art. Vasarely exhibited there as early as 1949 and Max Bill, having just opened his design academy in Ulm, was awarded the sculpture prize at the first São Paulo Biennale in 1951. On a subsequent speaking tour of Latin America, Bill expounded his theories of structural and mathematical order. These he later summarized: "Art can originate only when and because individual expression and personal invention subsume themselves under the principle of order of the structure and derive from it a new lawfulness and new formal possibilities."[3] The progressive aesthetic ideology of the new concrete painting and kinetic sculpture, and its concomitant values of technological and egalitarian progress, resonated strongly in regions in economic and social transition. In Latin America artists took up the mantle of concrete art, forming such groups as Arte Concreto-Invencion, Madi, and Grupo Ruptura, intent on defining a new art that broke with the traditions and failings of the past.

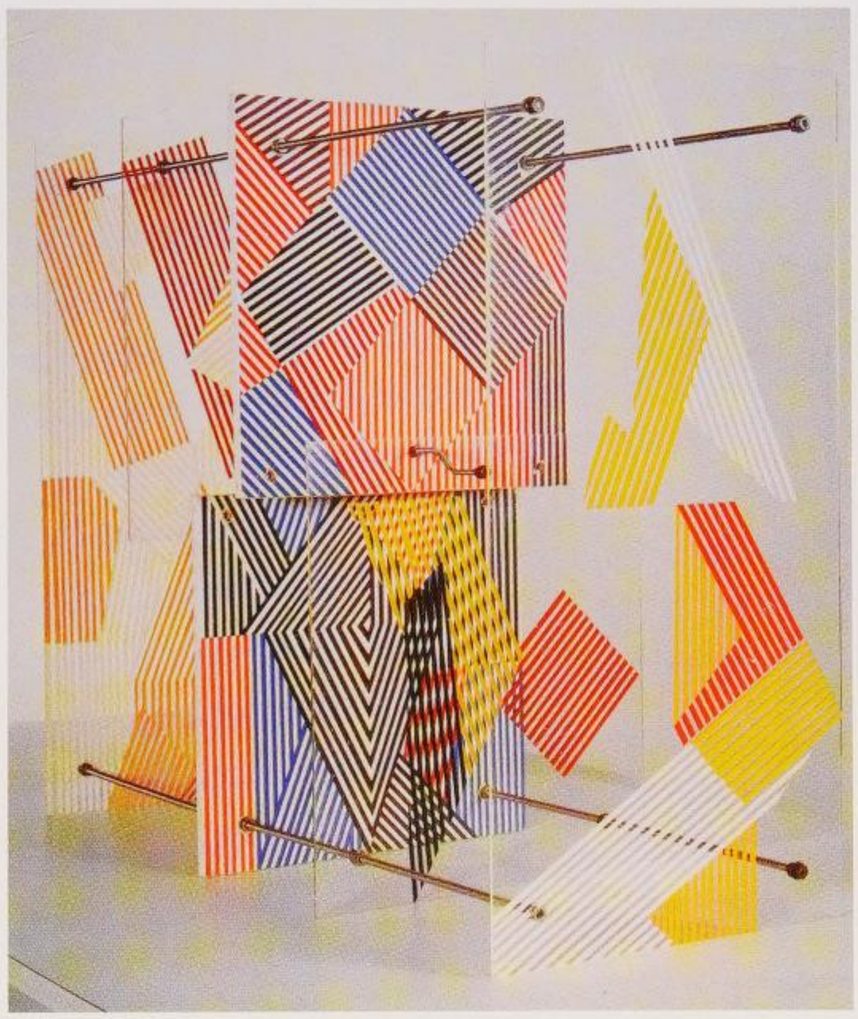
In Europe, a generation was rebelling against what they viewed as the self-absorption and elitism of Abstract Expressionist sensibility. A number of artists' groups formed internationally, their members sharing a common distaste for bourgeois art and its institutions,

professing socialist politics, and sometimes working anonymously within the collective. Among the first groups to emerge in 1957 were the transnational Zero Group, founded in Düsseldorf with Heinz Mack and Yves Klein, and Equipo 57, formed in Paris by a group of Spanish expatriates including Angel Duarte and Juan Serrano. The Italian collectives of Gruppo N, with Toni Costa and Edoardo N. Landi, and Gruppo T, with Gianni Colombo and Gabriele de Vecchi, formed in Padua and Milan respectively. The following year, the Groupe de Recherche d'Art Visuel (GRAV) was founded in Paris, with Julio Le Parc, François Morellet, and Jean-Pierre Yvaral among its members. Also in 1960, Ernst Benkert, Francis Hewitt, and Ed Mieczkowski organized the sole American collective, Anonima Group, in Ohio. In addition, NUL in Amsterdam and Effekt Group in Munich emerged at this time.[4] Many of the collectives issued provocative and dogmatic manifestos positioning themselves in opposition to the official power structures in art and society with language reminiscent of the Futurist manifestos of half a century earlier. While the phenomenon of the collectives is a significant part of the developing neo-Constructivist aesthetic, there were many influential artists who independently shared this perspective, including the Venezuelans Carlos Cruz-Diez and Soto, the Germans Ludwig Wilding and Wolfgang Ludwig, the Italian sculptor and designer Getulio Alviani, and the Swiss electronic artist Karl Gerstner. By 1961, a critical mass of artists working in a Constructivist vocabulary and focused on creating an alternative, viewer-centered experience appropriate to a progressive and egalitarian era had emerged.

The concrete aesthetic was less pronounced in postwar art in the United States, although the New York association American Abstract Artists (AAA) counted many of its adherents among its ranks, including Piet Mondrian, who had relocated to New York in 1940, and Josef Albers. Albers's course in color at Yale University, based on the Bauhaus program he had helped devise, attracted such students as Richard Anuszkiewicz and Julian Stanczak. They formed part of a core group of students for whom the investigation of color came to be of primary interest, an unexplored avenue leading to pure perceptual abstraction. Their study was given impetus by principles of perceptual psychology then gaining

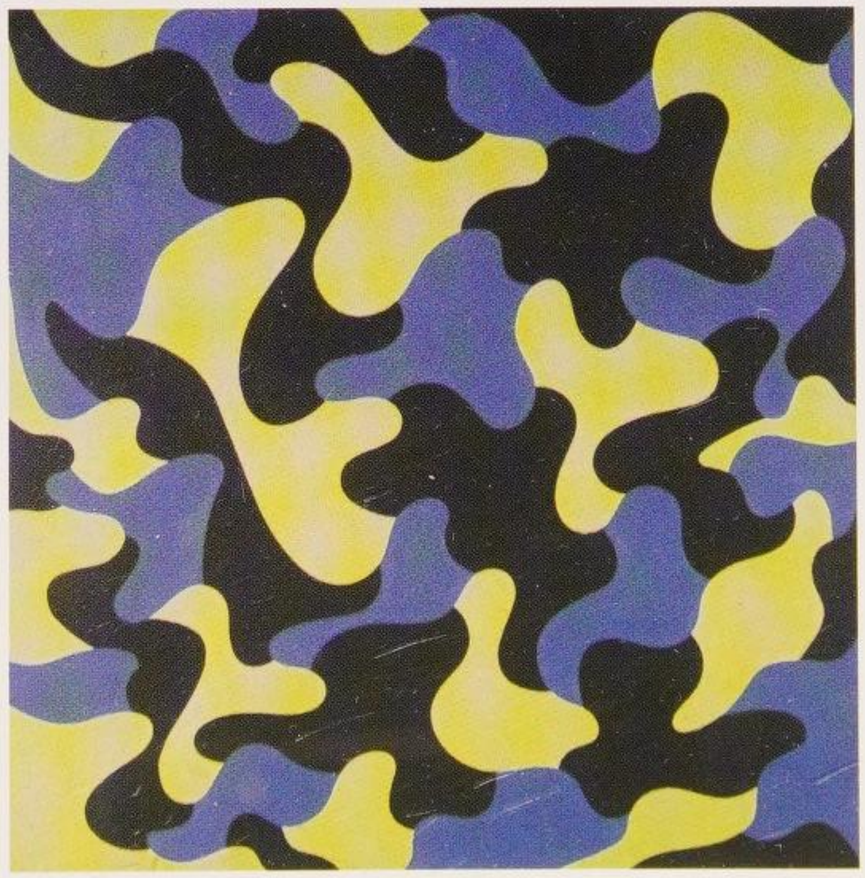


Left: Fig. 50
Bob Goodnough
American, twentieth century
Bomb II
1965
Oil, acrylic, and charcoal on canvas
80 x 104 in. (203.2 x 264.2 cm)
Columbus Museum of Art, Columbus, Ohio: Museum purchase with funds provided by Neil K. Rector. 2006.010



Left: Fig. 51
Jesús Rafaël Soto
Venezuelan, 1923–2005
Transformable Harmony (Harmonie Transformable)
1956
Plexiglas, wood, lacquer, and metal
39 3/8 x 15 3/4 x 39 3/8 in.
(100 x 40 x 100 cm)
Fundación Museo de Arte Moderno Jesús Soto, Ciudad Bolívar, Venezuela

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Left: Fig. 52
Equipo 57
Spanish, active 1957–1961
Untitled
c. 1959
Oil on board
29 1/2 x 29 1/2 in. (75 x 75 cm)
Courtesy of Galerie Denise René, Paris, France

Right: Fig. 53
Installation view of *Le Mouvement II*,
Galerie Denise René, Paris
1964–65

Courtesy of Galerie Denise René, Paris, France



Right: Fig. 54
Carlos Cruz-Diez
Venezuelan, born 1923
Chromosaturation for a Public Place
1969
Wood, colored Plexiglas, and electric lights
Eighteen chambers, each 47 1/4 x 47 1/4 in. (120 x 120 cm)
Installation at the "Art in the Street" festival, organized by the National Centre of Contemporary Art at the exit of Odeon metro station, Boulevard Saint Germain, Paris

Courtesy of Atelier Cruz-Diez and Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris



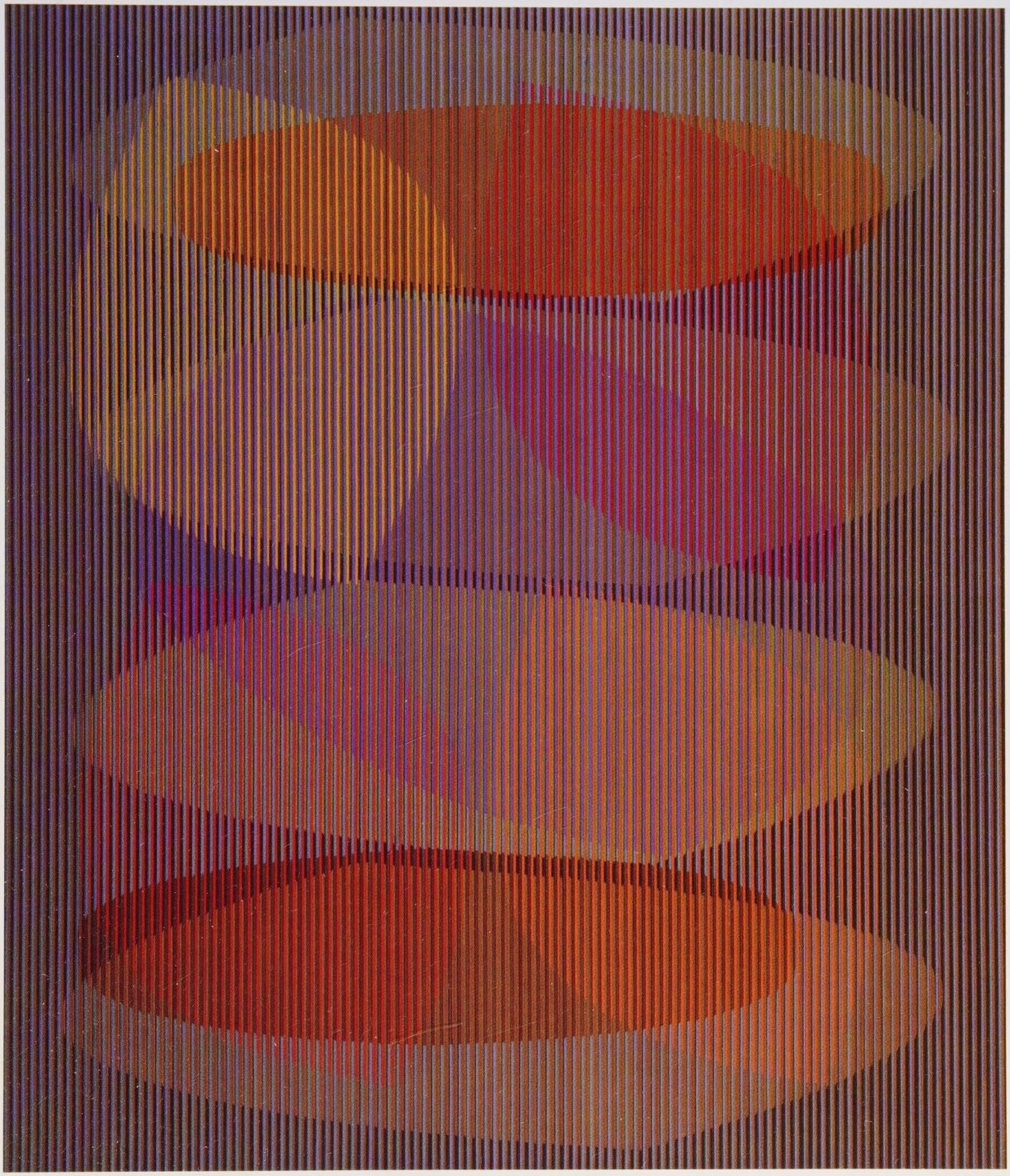


Fig. 55
Carlos Cruz-Diez
Venezuelan, born 1923
Physichromie 174
1965
Aluminum, plastic, and cardboard
$23^{5}/_{9}$ x 20 x $1^{3}/_{4}$ in.
(59.7 x 50.8 x 4.5 cm)
Private collection

Courtesy of Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

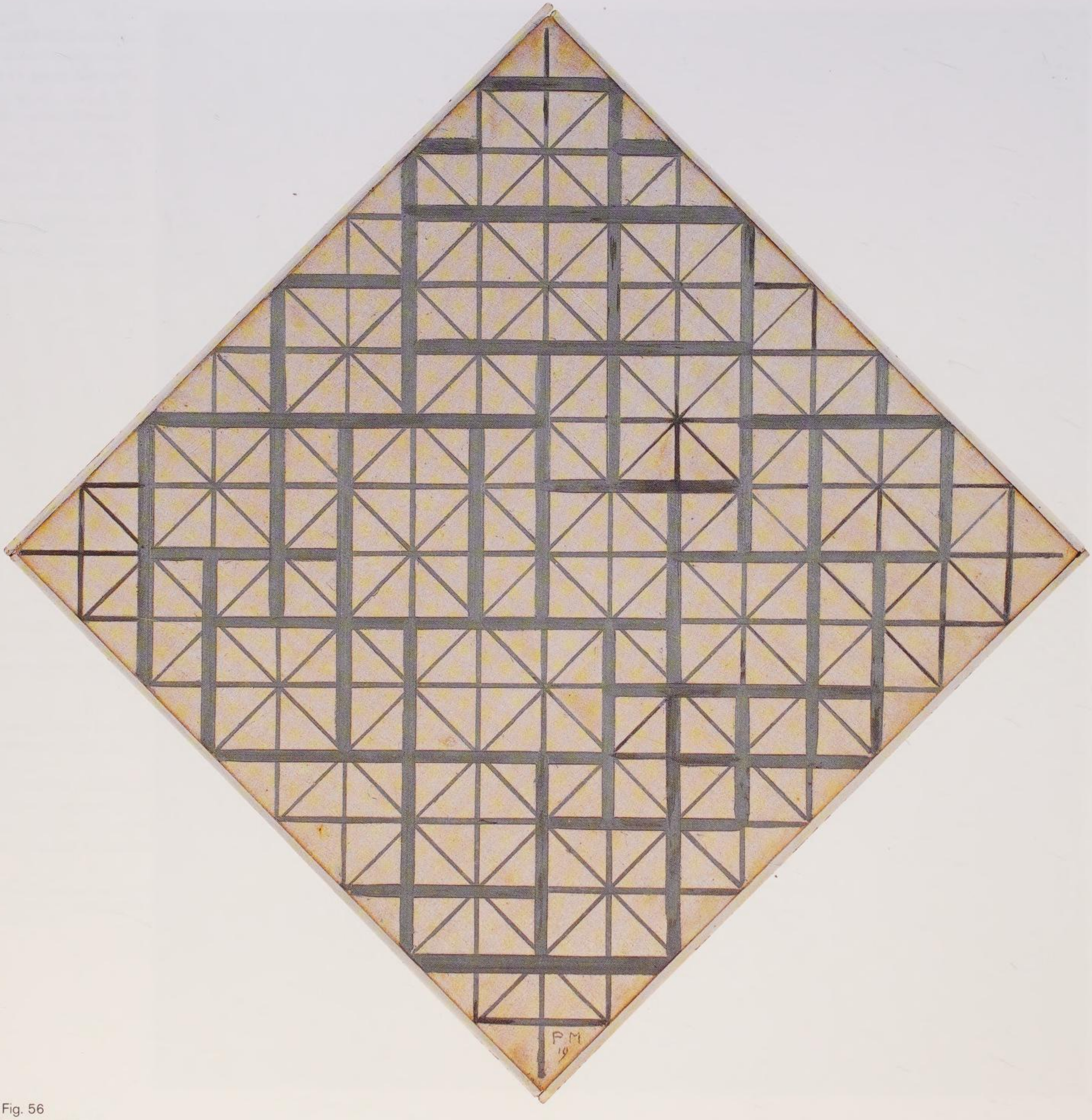
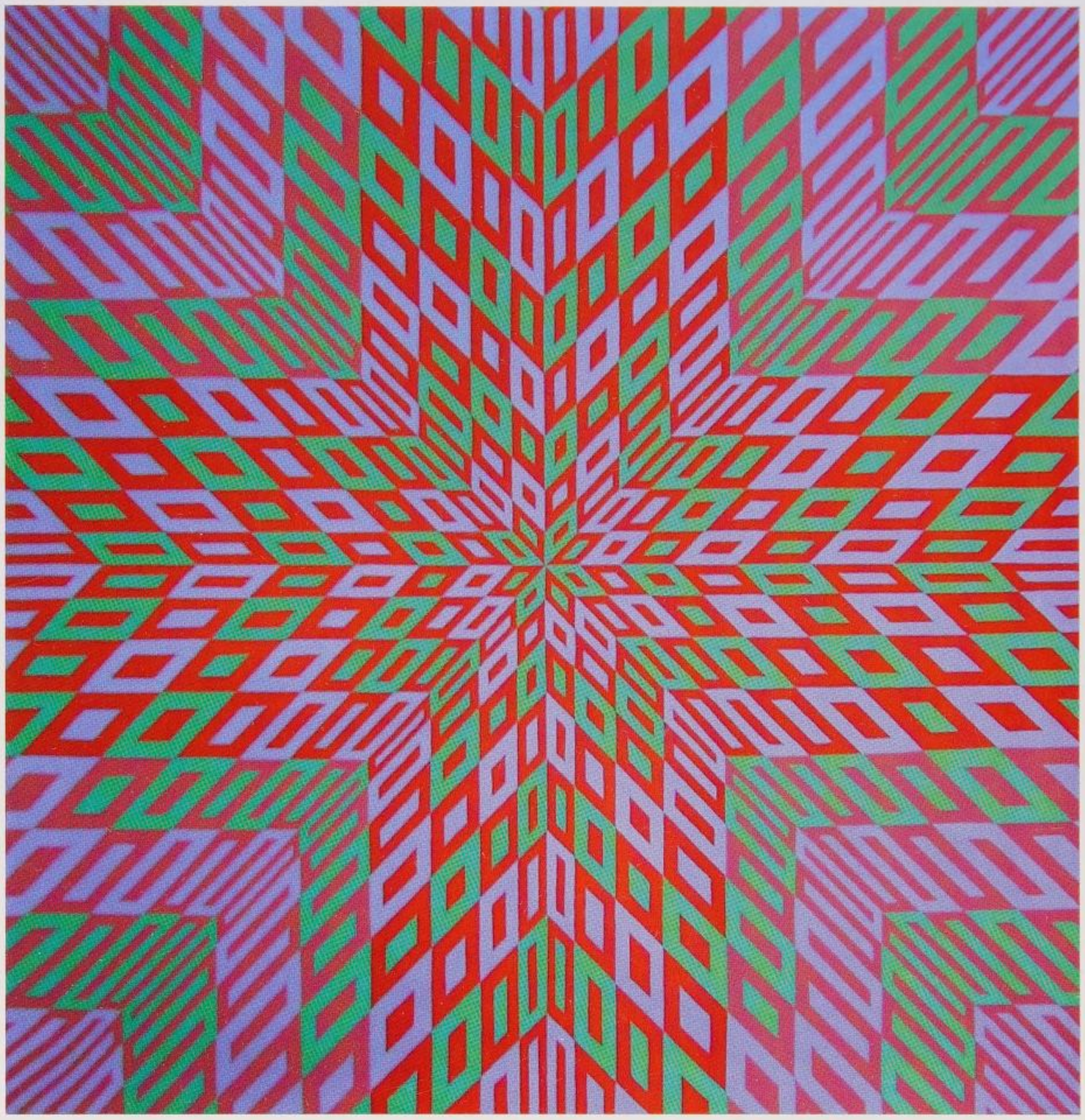


Fig. 56
Piet Mondrian
Dutch, 1872–1944
Composition with Grid 4: Lozenge Composition, 1919
1919
Oil on canvas
23 5/8 x 23 5/8 in. (60 x 60 cm) (sides)
Philadelphia Museum of Art, Philadelphia, Pennsylvania

© 2007 Mondrian/Holtzman Trust c/o HCR International, Warrenton, VA

currency in academia. Rudolf Arnheim, a Gestalt theorist who had contact with the Bauhaus before immigrating to the United States, published *Art and Perception: A Psychology of the Creative Eye* in 1954, which exerted a profound influence. Stanczak spent months translating it from English into his native Polish. In 1958, shortly after Anuszkiewicz and Stanczak graduated, Albers retired from teaching to devote himself to his art and his writings on color.

By 1960, Abstract Expressionism was on the wane and a new mode of abstraction that exploited principles of perception was in its ascendancy, gaining notice initially under the terms "Hard-Edged," "Post-Painterly Abstraction," "Geometric Abstractionists," and "Neo-Formalists." In the early 1960s, the work of Abstract Expressionists, including Ad Reinhardt and Bob Goodnough (fig. 50), embodies a shift within the group to encompass both the expressive and the geometric. In Latin America, Britain, and Canada, as well, the tendency was surfacing with a new generation of artists. In continental Europe, however, the new concrete art was reaching a critical mass, as a result of the presence of Vasarely and Soto, who supported many facets of the emerging abstraction, along with the Galerie Denise René. The first major exhibition to corral a number of these disparate identities under a meaningful banner was *Nouvelle Tendance* (New Tendency) held in Zagreb, Yugoslavia, in October 1961. The invitational exhibition included sixty artists working independently or as part of a group, and drew international attention to the latest experiments in concrete art. In the next few years, a loosely defined movement formed under the name New Tendency, and similar exhibitions were mounted in Yugoslavia and elsewhere in Europe. The group, which also included artists from the US and Great Britain, gave shape to a growing phenomenon of perceptual art.



Above: Fig. 57
Richard Anuszkiewicz
American, born 1930
Untitled
1961
Oil on canvas
54 x 52 in. (137.2 x 132.1 cm)
Private collection, Columbus, Ohio

© Richard Anuszkiewicz/Licensed by VAGA, New York, New York



Left: Fig. 58
Carlos Cruz-Diez
Venezuelan, born 1923
An Optical Modulation of the Surface
(Modulación Úptica de la superficie)
1957
Wood and acrylic
27 x 29 1/8 in. (68.5 x 74 cm)

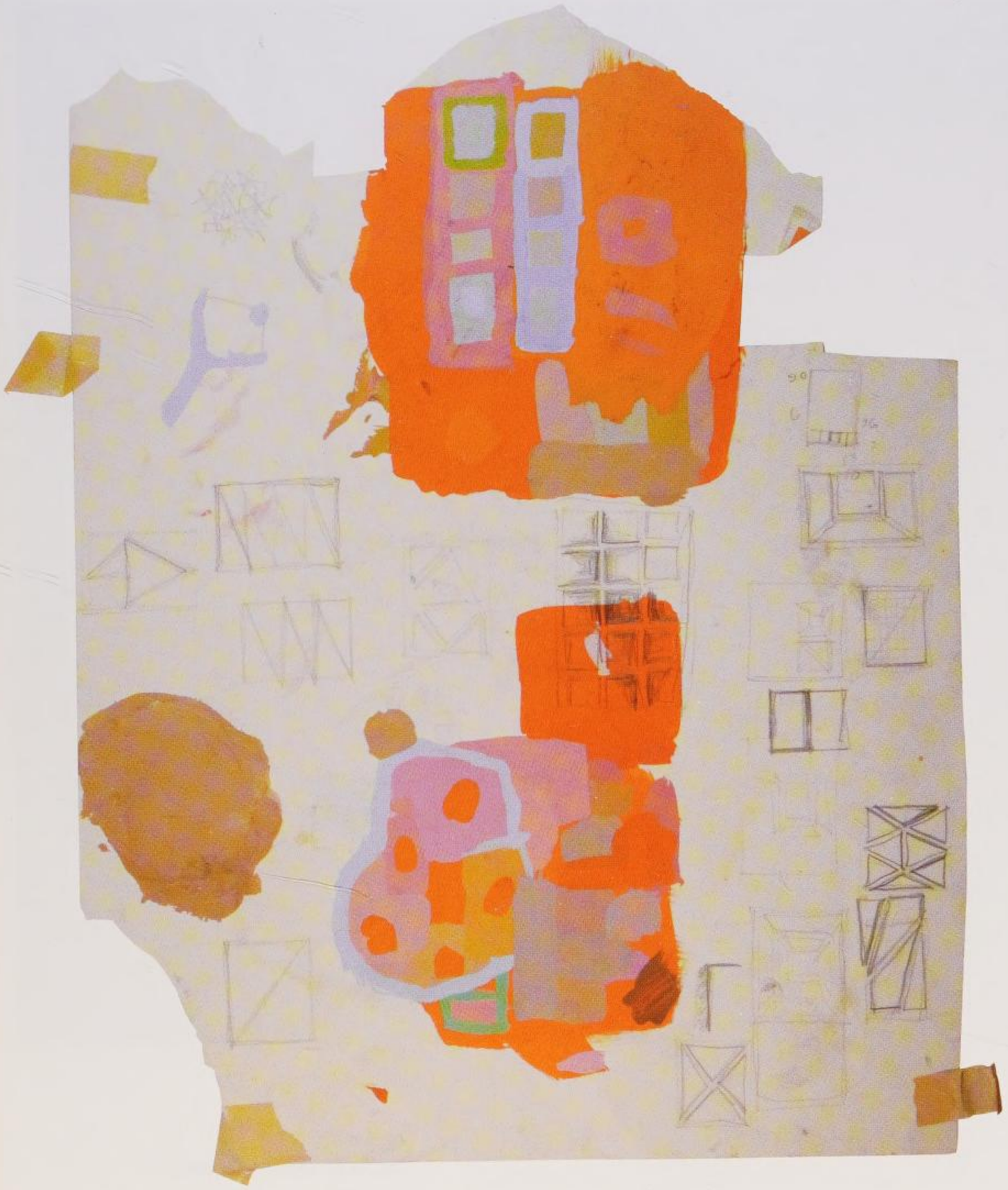
Courtesy of Atelier Cruz-Diez and Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

1 Many Abstract Expressionist artists were trained in Bauhaus principles by Albers. However, this was only a part of a broad multidisciplinary experimental program at Black Mountain, a fertile ground for such artists as Merce Cunningham and Robert Rauschenberg.

2 "Budapest Bauhaus" was the nickname for the Mehely Academy. Vasarely was a student of Alexander Bortnijk, a graduate of the Bauhaus, from whom he learned the Bauhaus principles of color and optics of Itten and Albers.

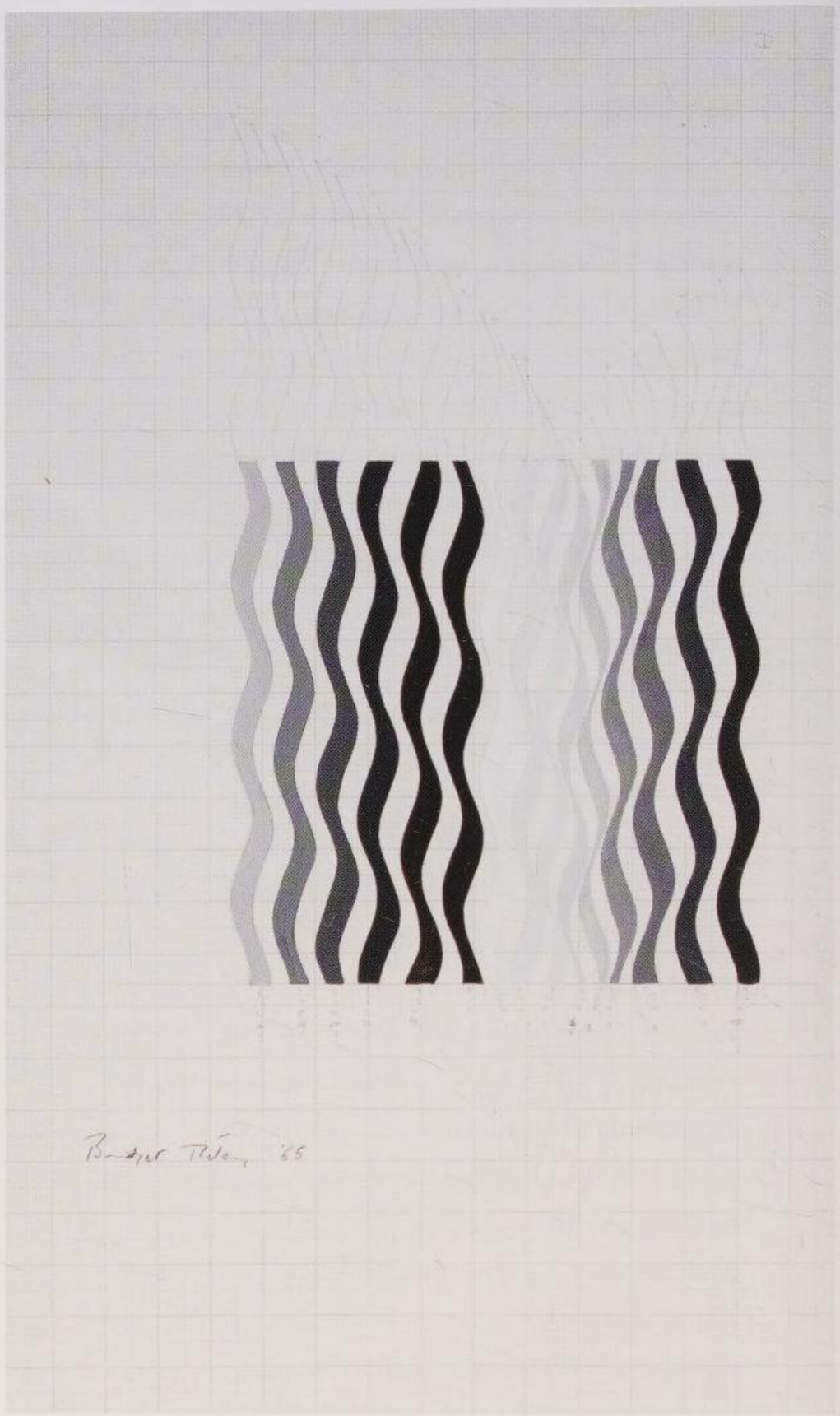
3 Max Bill, "Structure as Art? Art as Structure?" in Gyorgy Kepes, ed., *Structure in Art and Science*, New York (George Braziller) 1965, p. 15.

4 And later in the decade Peter Sedgley and Bridget Riley founded the British cooperative SPACE (Space Provision Artistic, Cultural and Educational).



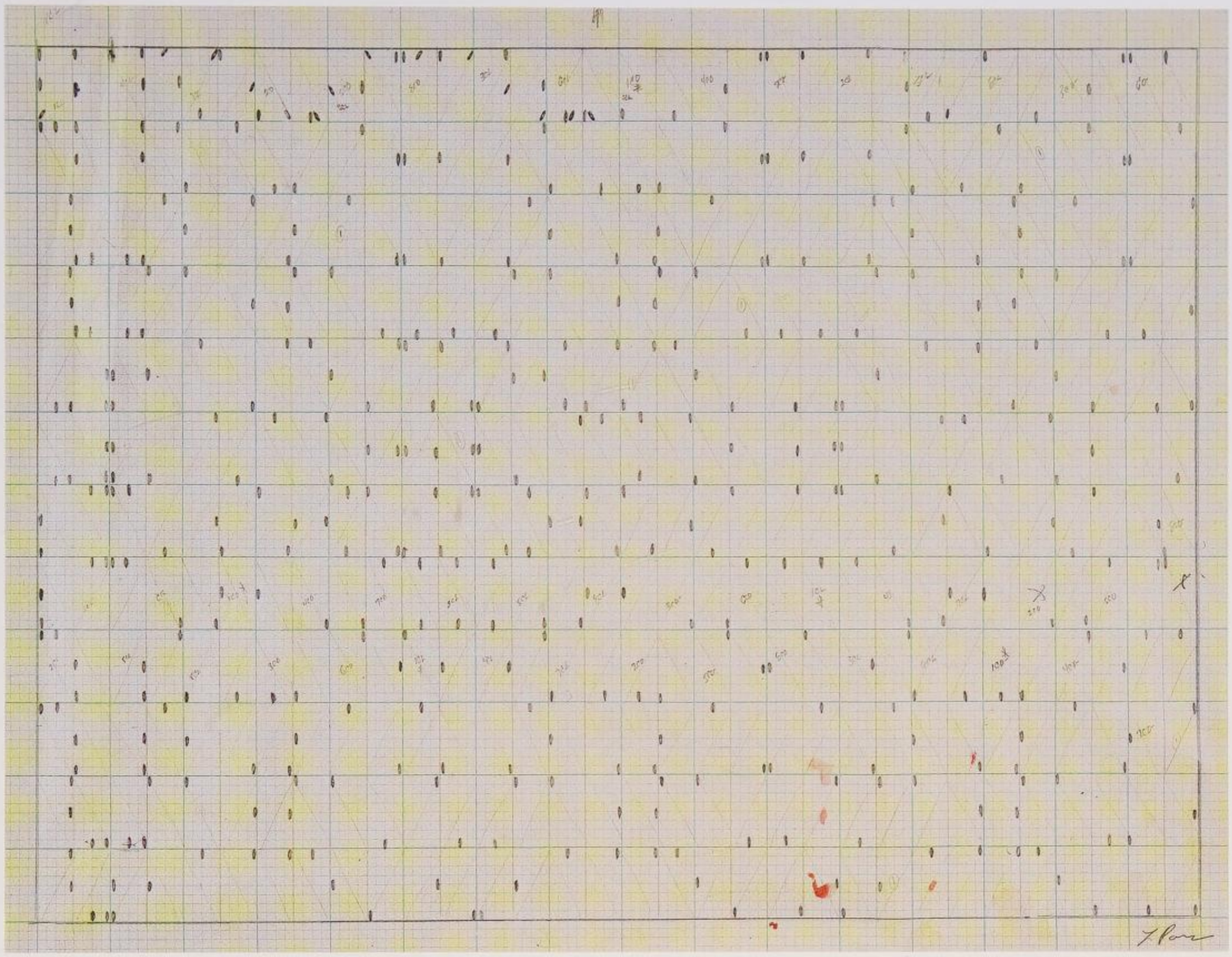
Above: Fig. 59
Richard Anuszkiewicz
American, born 1930
Untitled sketch
Undated
Acrylic and pencil on paper
18 x 13½ in. (45.7 x 34.3 cm)
Private collection

© Richard Anuszkiewicz/Licensed by VAGA, New York, New York



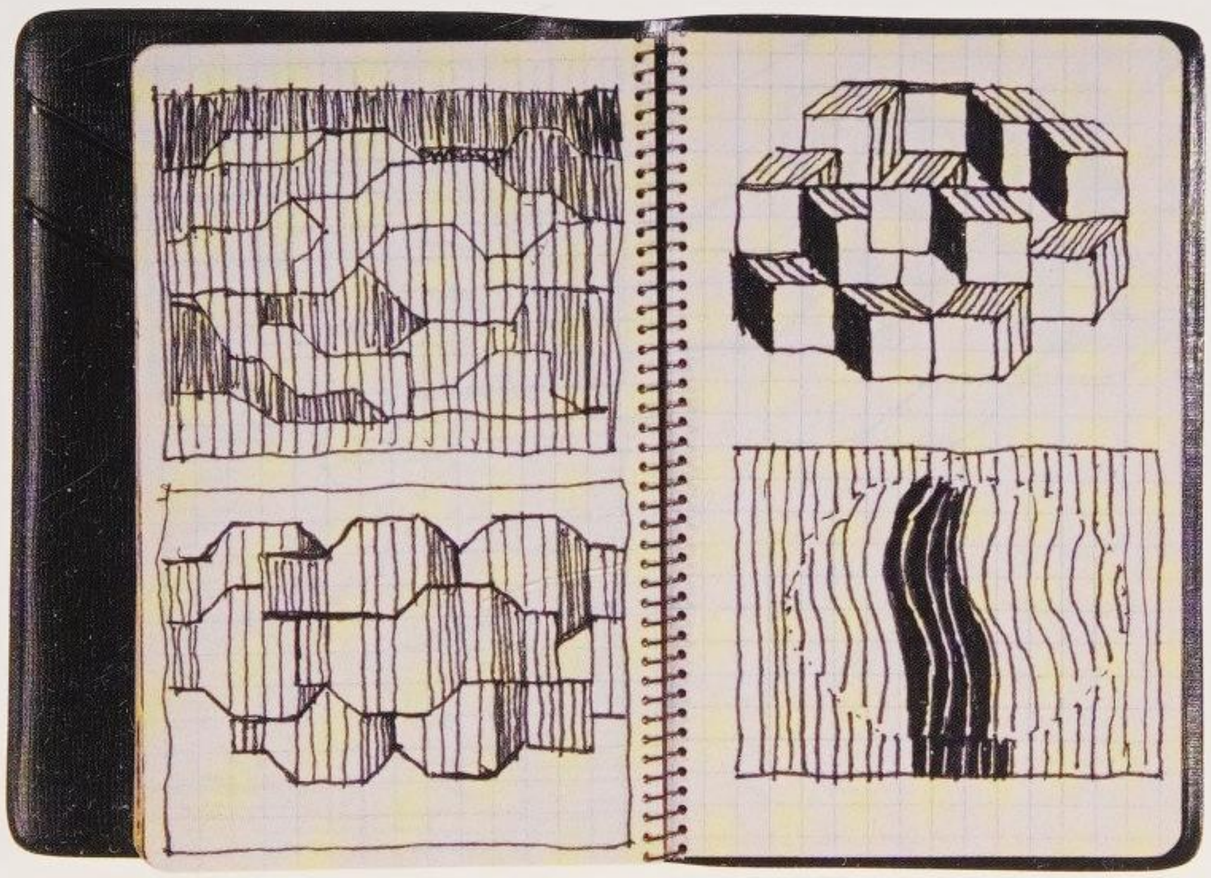
Above: Fig. 60
Bridget Riley
British, born 1931
Untitled XXI
1965
Gouache and pencil on graph paper
28 x 16 in. (71.1 x 40.6 cm)
Private collection

Courtesy of PaceWildenstein, New York, New York. Photography by Kerry Ryan McFate © 2006 Bridget Riley, All Rights Reserved



Left: Fig. 61
Larry Poons
American, born Japan 1937
Untitled
1962
Graphite and red watercolor on graph paper with blue lines
13 x 17 in. (33 x 43.2 cm)
National Gallery of Art, Washington, D.C.: Andrew W. Mellon Fund
1975.56.1 B-28489/DR

Photography by Dean Beason © 2006 Board of Trustees, National Gallery of Art, Washington © Larry Poons/Licensed by VAGA, New York, New York



Left: Fig. 62
Julian Stanczak
American, born Poland 1928
Untitled sketches
1958
Ink in sketchbook
5 1/4 x 8 1/2 in. (13.3 x 21.6 cm), open
Collection of the artist

Courtesy of the Artist

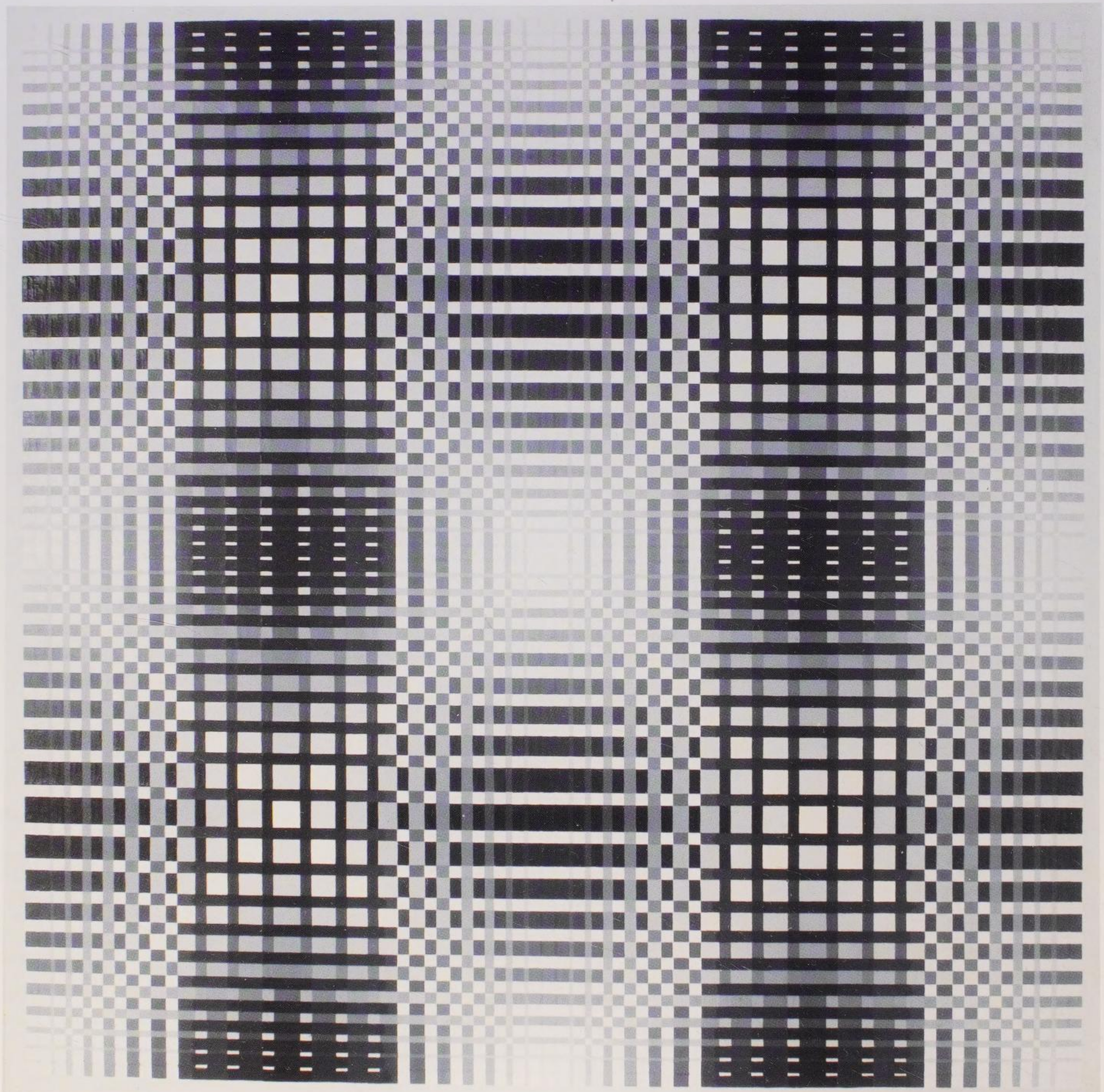


Fig. 63
Ed Mieczkowski
American, born 1929
Labyrinth
1967
Acrylic on canvas on board
48 x 48 in. (121.9 x 121.9 cm)
The Marilynn and Carl Thoma Collection

Courtesy of LewAllen Contemporary, Santa Fe,
New Mexico © Ed Mieczkowski

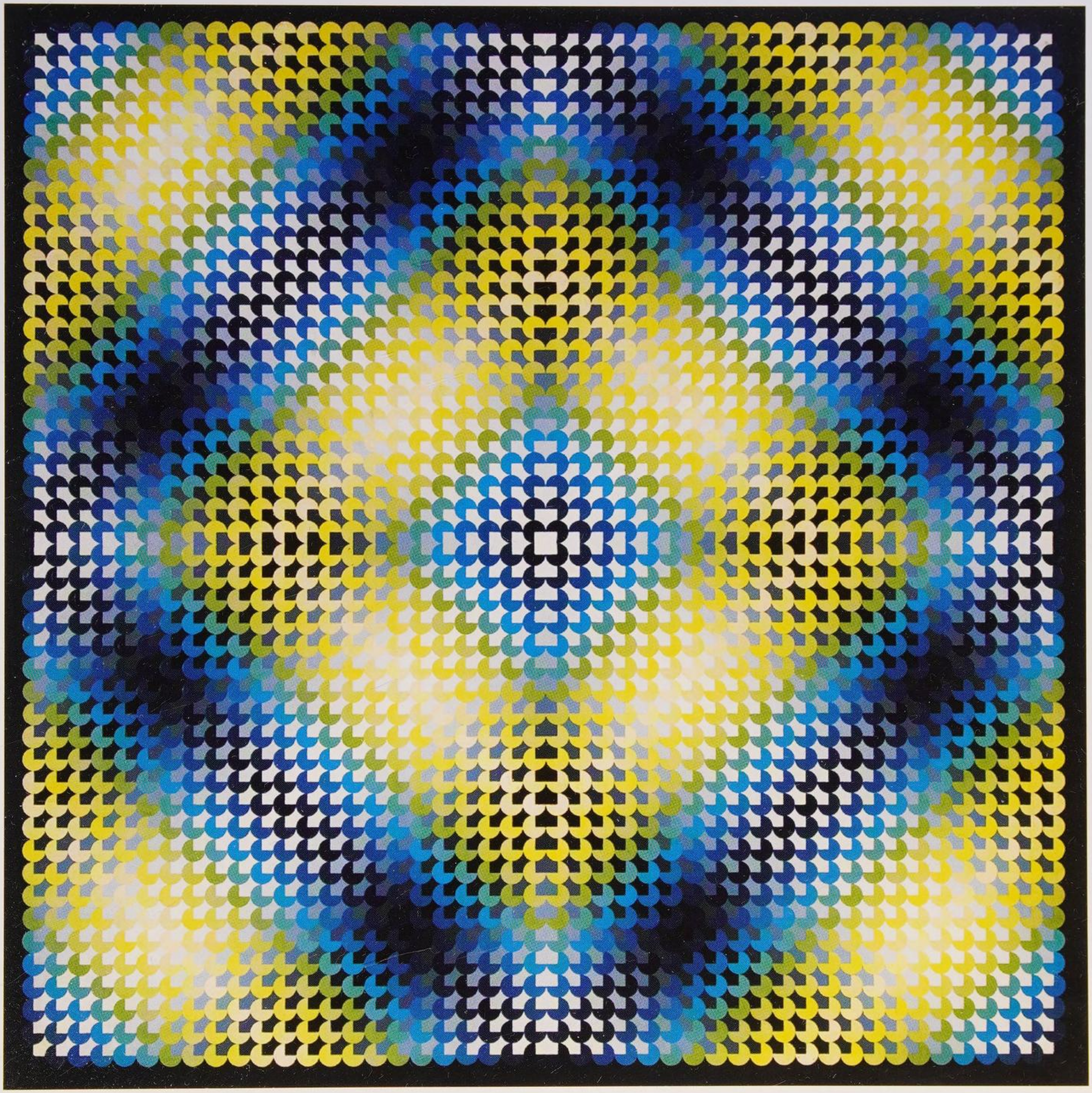


Fig. 64
Ed Mieczkowski
American, born 1929
Blue Bloc
1967
Acrylic on canvas
48 x 48 in. (121.9 x 121.9 cm)

Courtesy of LewAllen Contemporary, Santa Fe, New Mexico © Ed Mieczkowski

1965: THE YEAR OF OP

Perceptual abstraction, devoid of narrative and symbolic content, received initial attention in Europe, where the Constructivist tradition maintained its aesthetic imprint. The New Tendency exhibitions that debuted in Zagreb in 1961 inspired similar shows in London, Venice, and Paris of emerging abstractionists opposed to the "informal" art of the previous generation. Following the commercial success of galleries like Denise René in Paris and Signals Gallery in London, the new art gained a foothold in New York, and artists from Canada, Britain, France, and Germany were catching the attention of American dealers by the early 1960s. Betty Parsons, Sidney Janis, Howard Wise, and Chalette Gallery exhibited the hard-edged geometric abstractionists, and Richard Feigen, Martha Jackson, East Hampton Gallery, Kootz Gallery, and The Contemporaries showed some of the younger descendants of the Constructivist aesthetic. A group of devoted collectors, including Joseph Hirshhorn, Seymour Knox, and Larry Aldrich, sustained and promoted the work early on, hanging it in their own public museums. Architect Philip Johnson, a trustee of the Museum of Modern Art, was particularly influential in the careers of the young artists. (He bought a painting directly out of Tadasky's Soho studio, before the young artist had exhibited publicly. This, the artist's first sale, was immediately followed with a purchase by MoMA.) As well as cultivating his own collection, Johnson donated works by a number of the new abstractionists to the museum and encouraged such fellow architects as Minoru Yamasaki to incorporate the work in their commercial buildings. Chase Bank was among the first corporations to realize the architectural potential of optical art, amassing one of the first international collections of the nascent movement.

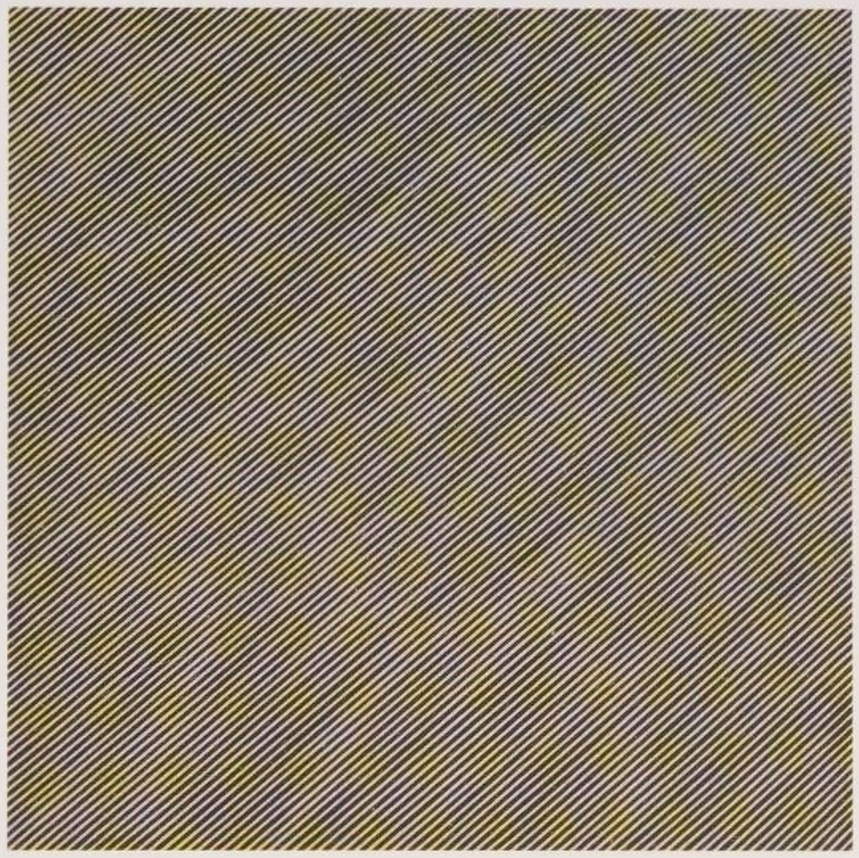


Fig. 65
Bill Komodore
American, born Greece, 1932
Vermont
1964
Liquitex on canvas
63 x 62 3/4 in. (159.9 x 159.4 cm)
National Gallery of Art, Washington, D.C.:
Gift of Mr. and Mrs. Burton Tremaine.
1971.87.5.2618/PA

© 2006 Board of Trustees, National Gallery of Art, Washington, D.C.

Postwar New York was an international economic and cultural center, and home to a critical mass of acclaimed artists, but the city still counted only a handful of serious contemporary art galleries, sustained by a small clientele of wealthy benefactor-collectors. The arrival of Pop in the early 1960s promoted a democratic attitude in art and encouraged a broader, middle-class market for artists. Andy Warhol and Roy Lichtenstein helped to revive the printmaking medium, and museum shops and department stores nationwide were able to offer affordable multiples in addition

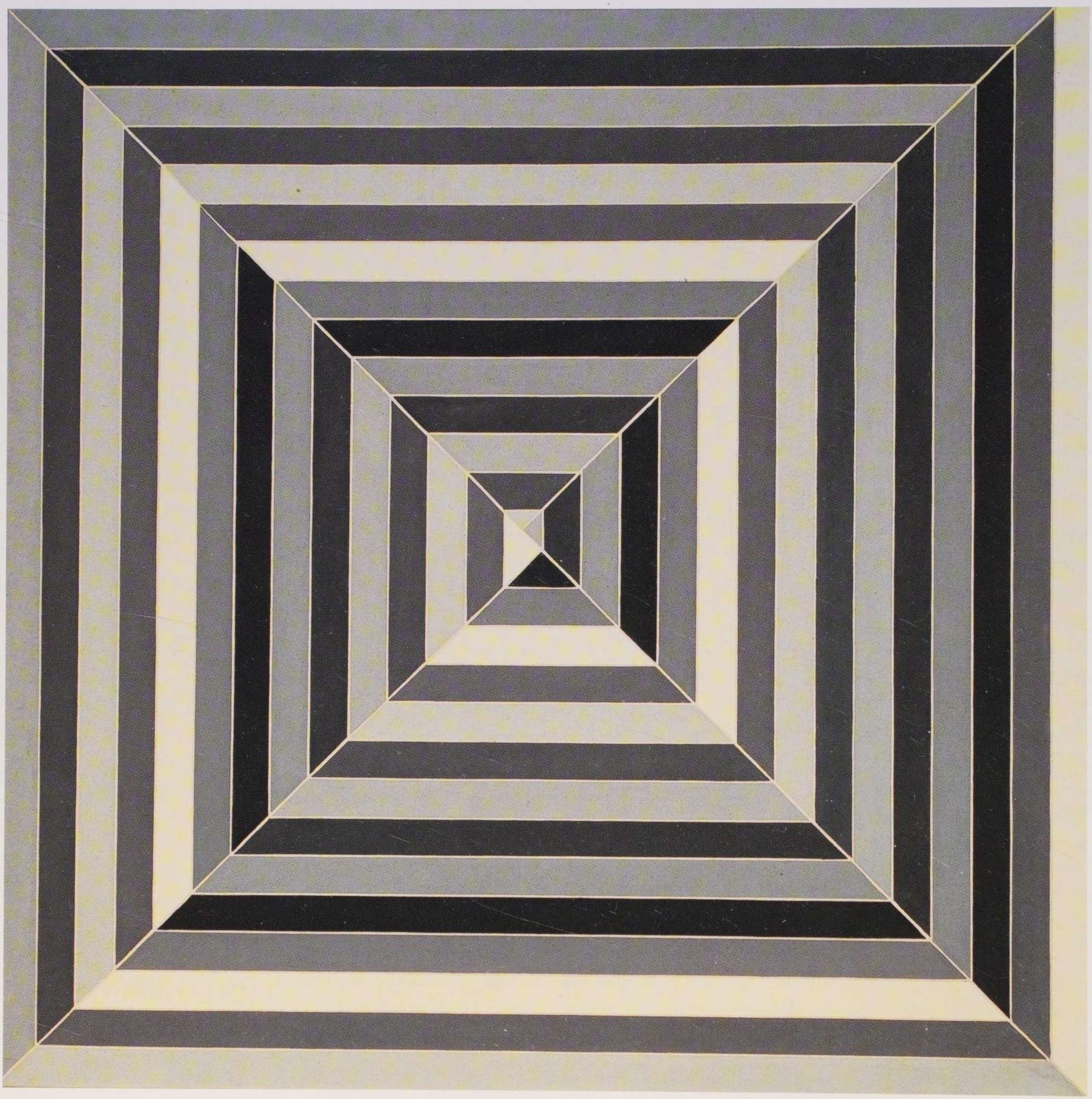


Fig. 66
Frank Stella
American, born 1936
Line Up
1962
Acrylic and graphite on canvas
77 x 77¼ in. (195.6 x 196.2 cm)
Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C.: Gift of the Joseph H. Hirshhorn Foundation, 1966
HMSG 66.4762

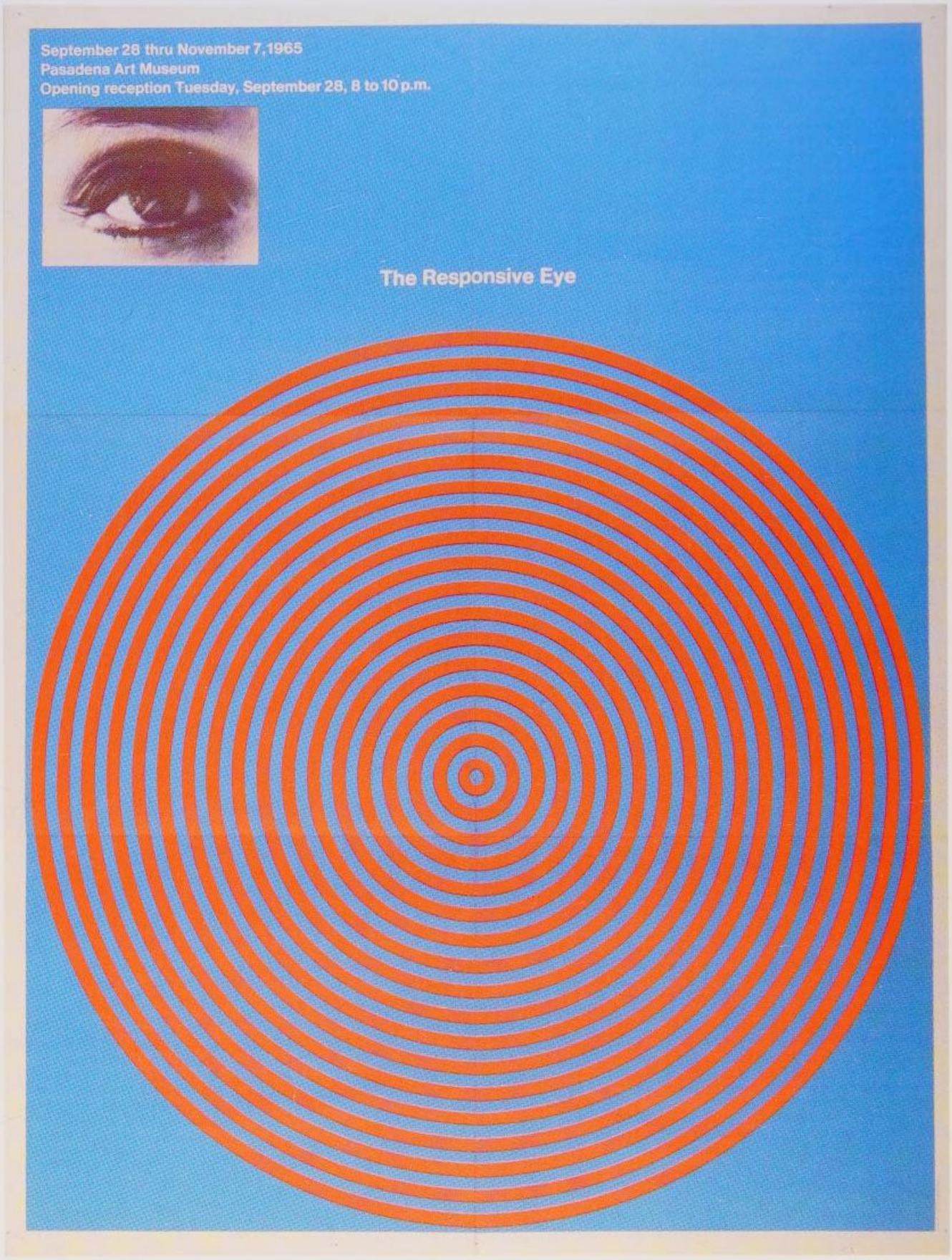
Photography by Lee Stalsworth © 2006 Frank Stella/Artists Rights Society (ARS), New York

to clothing, furniture, and appliances. Perceptual abstraction arrived in this moment of increased public interest and conspicuous consumption.

The Museum of Modern Art was the first museum in America to recognize officially the new abstraction gaining momentum on its shores in the wake of the New Tendency exhibitions touring Europe. William Seitz, a senior curator at MoMA, was well aware of what was happening in the studios of New York, and beginning in 1962, he extended his search to other American cities and to European capitals with the aim of mounting an exhibition of the international phenomenon. Though geographically and formally diverse, the new art was nevertheless distinct from the Abstract Expressionist school that MoMA was continuing to promote to international audiences. In his doctoral dissertation on Abstract Expressionism some years earlier, Seitz had emphasized structure, color interaction, and other formal elements that he now saw as the primary vehicles of the new perceptual artists.[1] The result was the greatly anticipated *The Responsive Eye,* which opened triumphantly at MoMA in early 1965, to unprecedented public interest.

Seitz did not propose an all-encompassing term to define the artists in his exhibition. His checklist numbered one hundred painters, sculptors, and interdisciplinary collaboratives whose work employed a wide array of approaches, including hard-edged geometry, analytical structure, spatial illusion, and perceptual ambiguity. The term Op came into parlance in late 1964, an invention of the American press, which was quick to define the new, hypervisual art that Seitz was then gathering for his show. The minimalist sculptor Donald Judd was the first to use the term in his review of Julian Stanczak's exhibition *Optical Paintings*, but it was Jon Borgzinner, a correspondent for *Time* magazine, who promoted the clever derivation of Pop, then enjoying wide publicity (see fig. 68).[2] Borgzinner's mother was an assistant at Martha Jackson Gallery and was aware of Stanczak's show if not of Judd's comments.[3]

Borgzinner's unaccredited article "Op Art: Pictures that Attack the Eye" appeared in October of 1964 in *Time* magazine, with numerous color illustrations. The following month, *Life* magazine published "Op Art," opening with a large spread reproducing Bridget Riley's mesmerizing painting *Current* (fig. 108).[4] Also



Above: Fig. 67
Exhibition poster for *The Responsive Eye*, Pasadena, Pasdena Museum of Art, September 28 – November 7, 1965
Courtesy of Tadasky (Tadasuke Kuwayama)

Left: Fig. 68
Page from *Time*, Vol. 84, No. 17, October 23, 1964, featuring the article: "Op Art: Pictures that Attack the Eye," by Jon Borgzinner

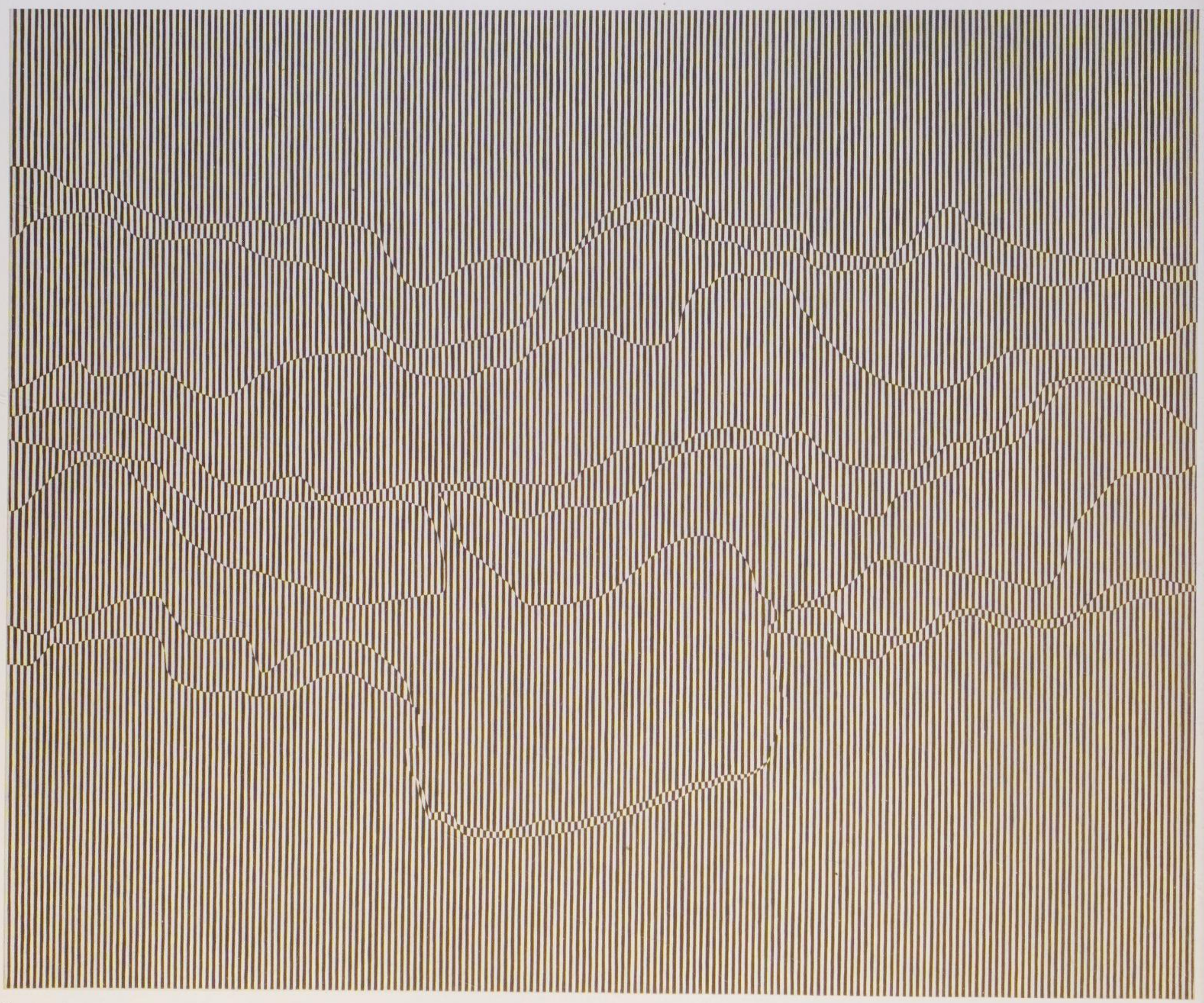


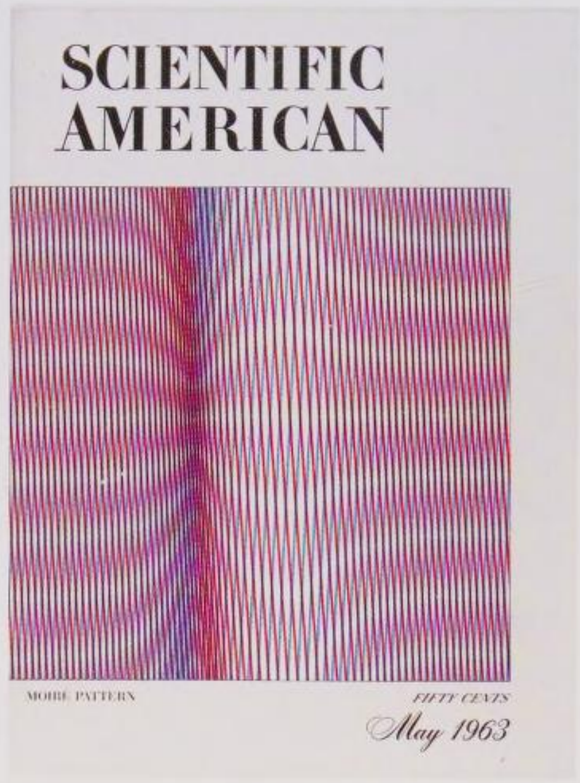
Fig. 69
Julian Stanczak
American, born Poland, 1928
Determinative Focus
1962
Synthetic polymer and tempera on canvas
35½ x 45½ in. (90.2 x 115.5 cm)
Smithsonian American Art Museum,
Washington, D.C.: Gift of Mr. and Mrs.
David K. Anderson, Martha Jackson
Memorial Collection. 1980.137.96

Photography by Smithsonian American Art Museum,
Washington, D.C./Art Resource, New York

printed in anticipation of *The Responsive Eye*, this article defined Op for the public and helped to make Riley the movement's icon. With a solo exhibition running concurrently at Richard L. Feigen & Co. in Manhattan, and as part of a traveling group exhibition of new British art touring the States, Riley was poised to capture the lion's share of attention. Her electric composition *Current* was featured on the invitation and catalogue cover for *The Responsive Eye*, becoming, by default, a symbol of the new movement. In addition to her exacting and engaging paintings, Riley's public profile was amplified by such photogenic appearances in the press as Lord Snowdon's portraits of the artist emerging from her environmental painting *Continuum* that appeared in the pages of *Vogue* that fall (fig. 249).[5]

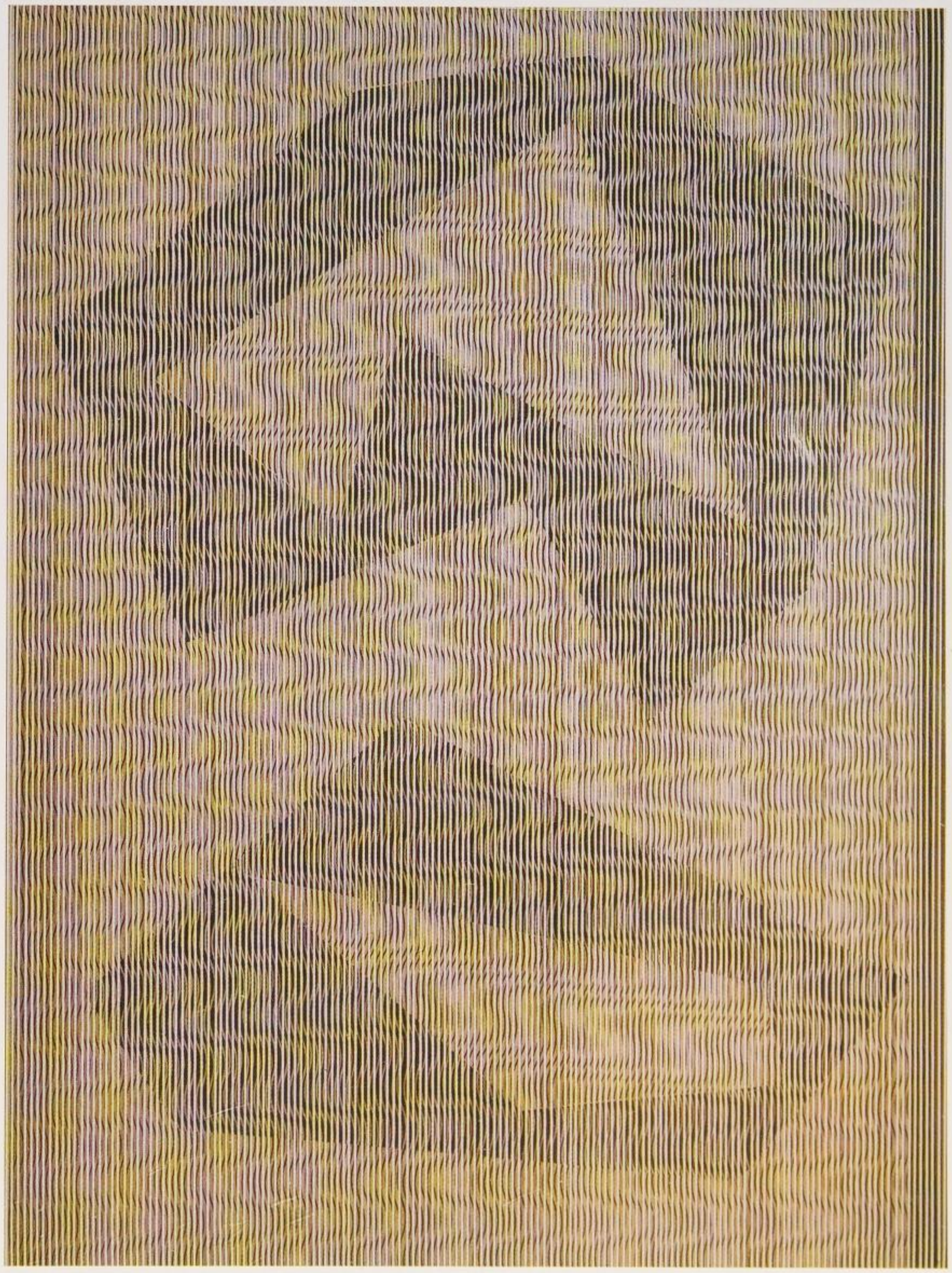
Following Julian Stanczak's *Optical Paintings* show at Martha Jackson Gallery in 1964, other galleries followed suit, invoking the term in their exhibitions. Op soon became synonymous with the new abstraction. Josef Albers was particularly opposed to the name "optical art," considering it as nonsensical as "wood carpentering or foot walking."[6] He insisted to Stanczak, who was not consulted by Jackson in naming the show, that the term "perceptual painting" was more accurate. A number of artists immediately disavowed the label of Op. Painter Ben Cunningham dismissed it as "public relations" and kinetic sculptor George Rickey called it "destructive." [7]

Op Art was not the first aesthetic movement to be named by the press—a number of styles and schools, dating back to Impressionism, were given their name by critics. In addition to lamenting the term, some bemoaned the broad characterization of Op as too superficial for the wide array of concerns and formal approaches grouped under the banner. However, few art-historical monikers can embrace the complexity of any school or movement, let alone one with such international reach. The polar differences between the dionysian figuration of Willem de Kooning and the platonic formalism of Barnett Newman seem difficult to reconcile under the single banner of Abstract Expressionism, yet these artists rallied together as such for self-empowerment. Despite protestations among artists, the word Op quickly struck a chord and helped the public to grasp the revolutionary shift away from representation and toward the act of perception.



Left: Fig. 70
Cover from *Scientific American*, Vol. 208, No. 5, May 1963, featuring the article: "Moiré patterns" by Gerald Oster and Yasunori Nishijima

Below: Fig. 71
Mon Levinson
American, born 1926
White Moving Planes – VI
1964
Mixed media construction
22½ x 16 in. (57.2 x 40.6 cm)
Collection of the artist
Courtesy of the Artist

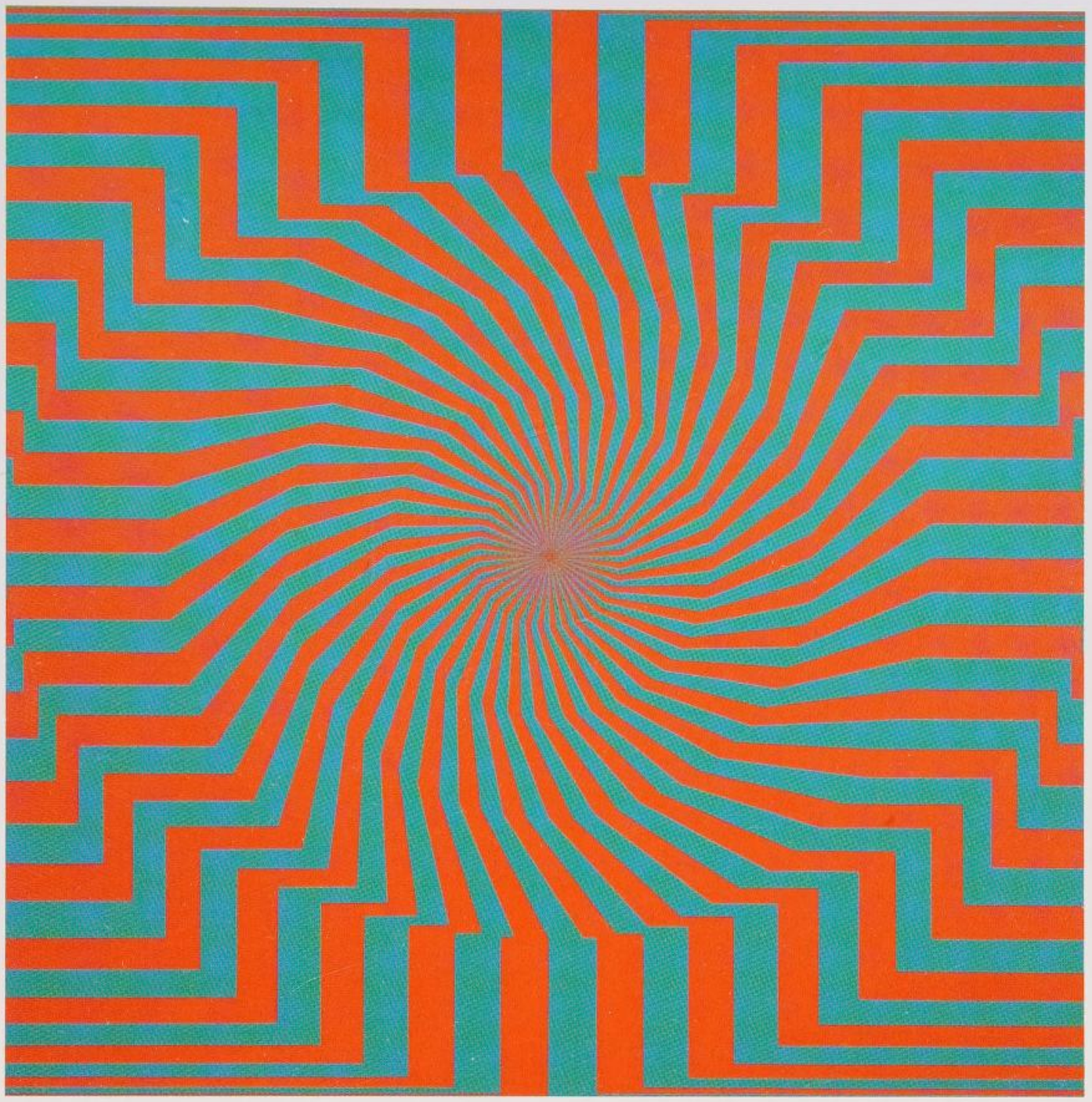


"Op" was a more descriptive term than that of New Tendency, which had thus far defined the numerous branches of perceptual abstraction.

In addition to its visual appeal, Op gained currency as an appropriate aesthetic for the progressive era of the 1960s that heralded momentous advances in computers, aerospace, and industry, the decade in which television finally penetrated 90 percent of American homes. Science, in its broadest sense, was the engine of modernity that could provide the tools for global economic and social progress. Some perceptual artists appropriated its techniques and iconography in their work, even referring to their practice as "research." Gerald Oster, a scientist and artist, introduced fellow artists to the moiré effect and published his findings in *Scientific American* in 1963. Moiré fringes, garnered from the misalignment of two or more sets of parallel lines or other regular structures, reveal what Oster referred to as a "simple analogue of complex phenomena" with a variety of practical applications.[8] New York artist Mon Levinson, who had neither a scientific nor a studio art training, noted that in the process of making his multi-layered moiré constructions, he was, in essence, "discovering physics" in his own studio. He considered moiré patterns to be empirical tools that "permit the observations of another set of opposites which engage me: dynamics versus statics."[9] Within this climate of experimentation, critic and curator Peter Selz described the movement in 1966 as trying to "come to grips collectively with the mass culture in which they [the artists] live and to find an artistic affirmation for the modern technological world . . . like their Bauhaus predecessors [they] appear to believe in man's perfectability—or at least his improvement—and they hope to approach this goal by working collectively toward a synthesis of art, science and technology."[10] The concept of art as a form of research distinguished a number of the collaboratives, most notably Groupe de Recherche d'Art Visuel (GRAV), whose interactive projects explored psychology, sociology, and communication theory. In an essay titled "Towards Science in Art," GRAV founding-member Francis Molnar outlined the aims of their interdisciplinary practice: "The artists equipped with a solid scientific knowledge will be drawn to collaborate with the experts in order to establish the programme of an art that can truly be called humanist."[11]

While physics, optics, and experimental psychology motivated some of the Op artists, providing insight into the crucial process of perception, the connection of art to science is often only indirect. Gerald Oster, whom Seitz included in *The Responsive Eye*, provided an exceptional instance of the union of the disciplines. Technology, the functional application of science, was more directly visible in the systemic and computational structures and industrial materials that imbued much of the geometric abstraction with futuristic connotations. As a young immigrant working in Brooklyn, Rakuko Naito experimented specifically with commercial metallic paints as a means to move beyond the constraints of conservative Japanese tradition. This progressive association struck a chord not only with such New York artists as Frank Stella, a longtime friend of Naito, but also with Julian Stanczak in Cleveland, Lorser Feitelson in Los Angeles, and Vasarely in Paris, who likewise experimented with the new metallics. Like the nineteenth-century invention of the collapsible paint tube that attended the Impressionist revolution of *plein-air* painting, the development of any new material or medium carries aesthetic consequences, particularly at a time when modernity holds a promise of utopia. Vasarely had long been keen on the role of technology in the service of egalitarian progress, promoting the idea of the "multipliable" work of art. In his 1954 manifesto "Towards the Democratisation of Art," he implores: "Let us not fear the new tools which technique has given us. We can only live authentically in our own time."[12] For Vasarely, geometry and physics have cosmic implications, as suggested by the titles of such works as *Lux Novae* (fig. 100), *Vega* (fig. 47), and *Metagalaxie*. This programmatic theme in art became the subject of an exhibition of optical, kinetic, and electronic art entitled *Arte Programmata* that toured Britain and the United States concurrently with *The Responsive Eye*, and was sponsored by Olivetti Corporation, who were then launching the first desktop computer.[13] Computer technology carried theoretical, if not yet practical, associations for the artists engaged with structural systems, and "programmed art" became a subdivision of the Op aesthetic, which GRAV member François Morellet referred to as "the cybernetic choice" facing artists in 1965.[14]

However, nature, not technology, was the point of



Left: Fig. 72
Edna Andrade
American, born 1917
Turbo 1
1965
Oil on canvas
50 x 50 in. (127 x 127 cm)
Columbus Museum of Art, Columbus, Ohio:
Museum Purchase, Derby Fund. 2006.015

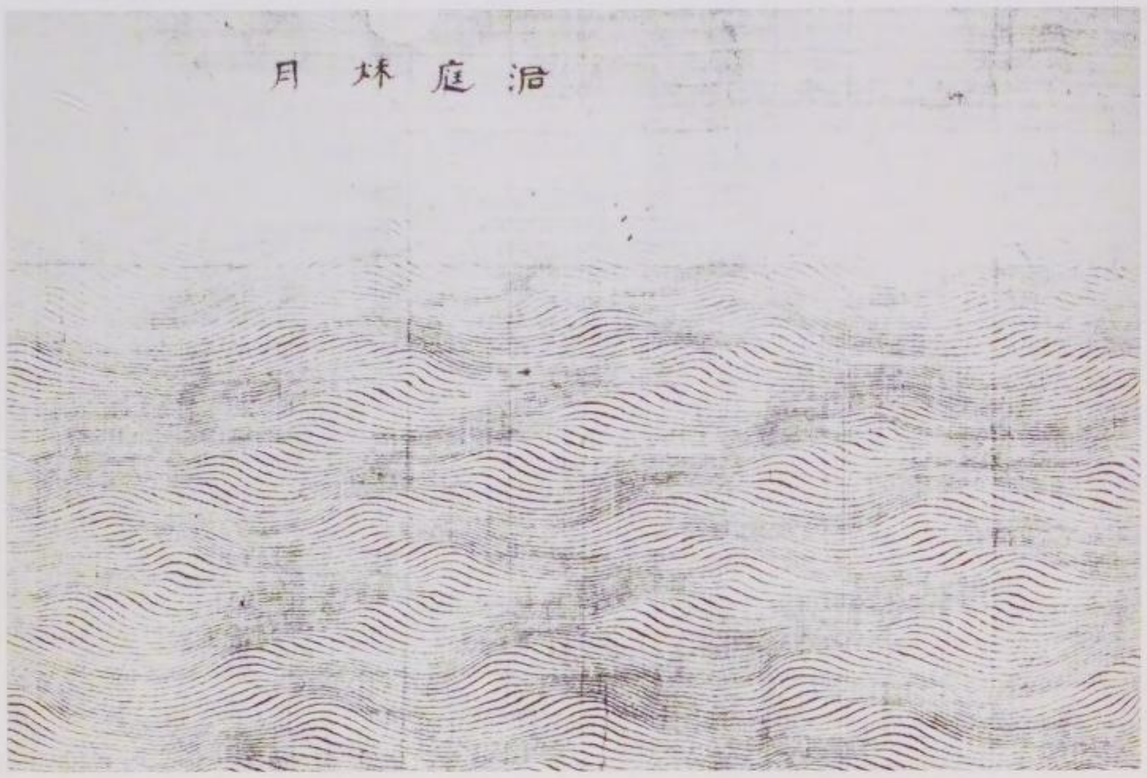
Courtesy of Locks Gallery, Philadelphia, Pennsylvania.
Photography by Aaron Igler

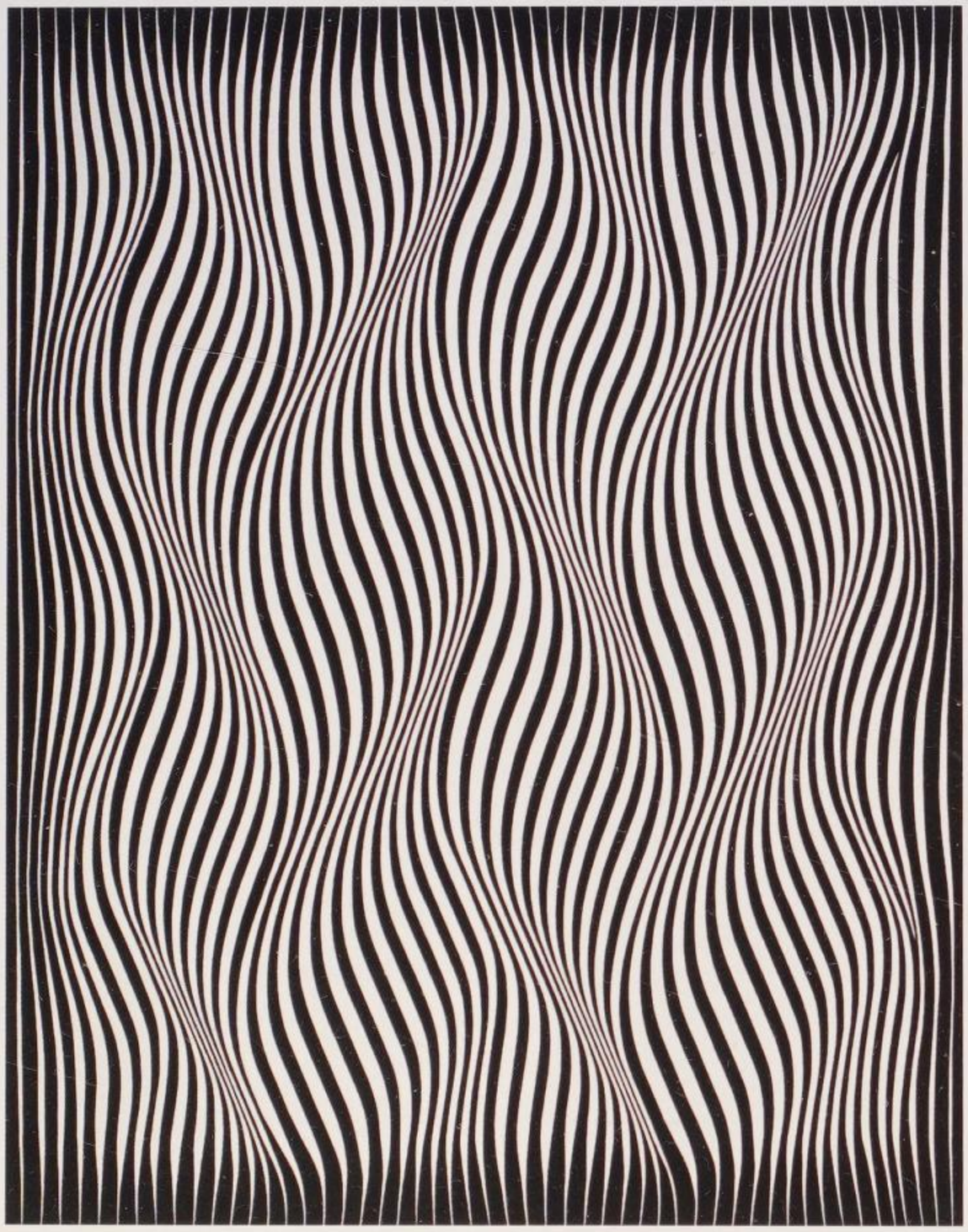
(Detail on p. 54)



Left: Fig. 73
Larry Poons
American, born Japan 1937
Northeast Grave
1964
Acrylic and pencil on canvas
80⅛ x 90⅛ in. (203.5 x 228.9 cm)
Hirshhorn Museum and Sculpture Garden,
Smithsonian Institution, Washington, D.C.:
Gift of Joseph H. Hirshhorn, 1966
HMSG 66.4106

© Larry Poons/Licensed by VAGA, New York,
New York





Top: Fig. 74
Unknown Chinese artist
A Wave Under the Moon
Twelfth century
Ink on silk, detail of a scroll
Courtesy of the University of Hawaii Press, Honolulu, Hawaii

Above: Fig. 75
Julian Stanczak
American, born Poland 1928
Provocative Current
1965
Acrylic on canvas
66 x 53 in. (167.6 x 134.6 cm)
Collection of the artist
Courtesy of the Artist

departure for the optical presentations of many of the artists, including Julian Stanczak and Bridget Riley. As Stanczak noted in 1965, "In my work I do not try to imitate or to interpret Nature; but with the response to the behavior of colors, shapes, lines, I try to create relationships that would run parallel to man's experiences with reality."[15] Stanczak's teenage depictions of jungle vegetation, made while in exile on the Ugandan coast during World War II, convey undulating patterns of arabesque lines that he later distilled into rhythmic abstractions. The landscape is still discernible within the vertical strands of *Determinative Focus* (1962), and emerges in the unruly ribbons of *Remnants of Late Colour* (fig. 76), a pulsating composition of gray and red linear contours that evoke the mountainous furrows of the Ohio landscape in which he had recently settled. These natural structures become a schematic undulating pattern in *Provocative Current* (fig. 75) painted the following year.[16] The abstract motif of *Provocative Current* is an echo of historic renderings of nature dating back to Leonardo da Vinci's studies of water and to twelfth-century Chinese scroll paintings (see fig. 74). The ability of abstract art to resonate with nature, rather than merely depict it, was acknowledged by Naum Gabo in a statement on Abstraction-Création made decades earlier: "By means of constructive techniques today, we are able to bring to light forces hidden in nature and to realize psychic effects . . . We do not turn away from nature, but, on the contrary, we penetrate her more profoundly than naturalistic [art] was able to do."[17]

Riley's earliest pure abstractions were likewise an attempt to conjure for the viewer an experience of nature, a goal that she shared with Seurat, whose work provided an early model. Riley painted landscapes in Seurat's pointillist technique, gaining practical knowledge of optical vibration (see fig. 33). She soon moved beyond the conventions of representation into the realm of pure sensation with abstract works such as *Static* (1961) or *Blaze* (*Blaze 3*, fig. 23), which trigger in the viewer an experience equivalent to an atmospheric electric charge; not an illusion, but an "event." Riley denied any conscious connection to science or optics and employed only rudimentary mathematics in planning her compositions. Nevertheless, she stated in 1965: "My work has

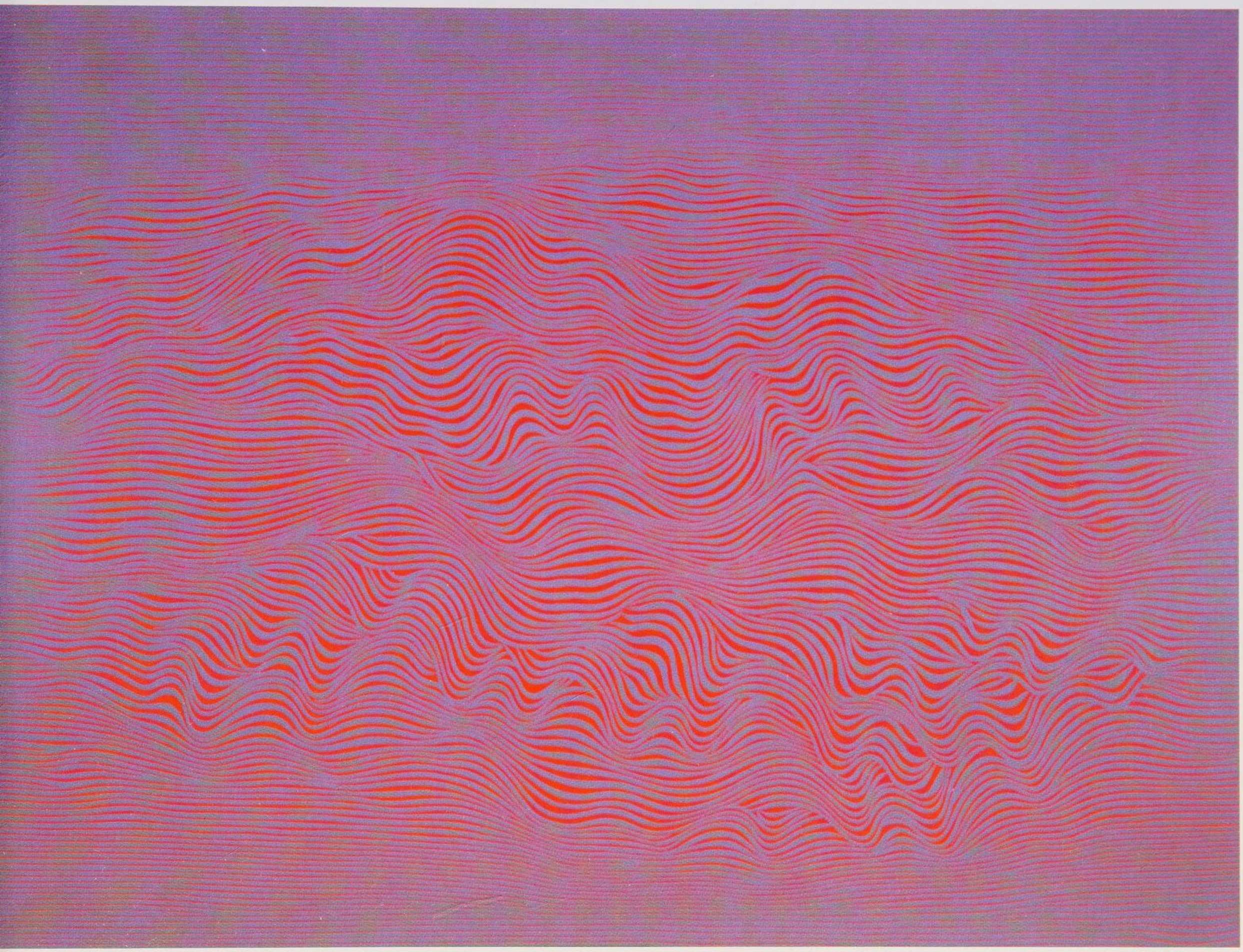


Fig. 76
Julian Stanczak
American, born Poland 1928
Remnants of Late Colour
1964
Acrylic on canvas
53 x 72 in. (134.6 x 182.9 cm)
Collection of the artist
Courtesy of the Artist

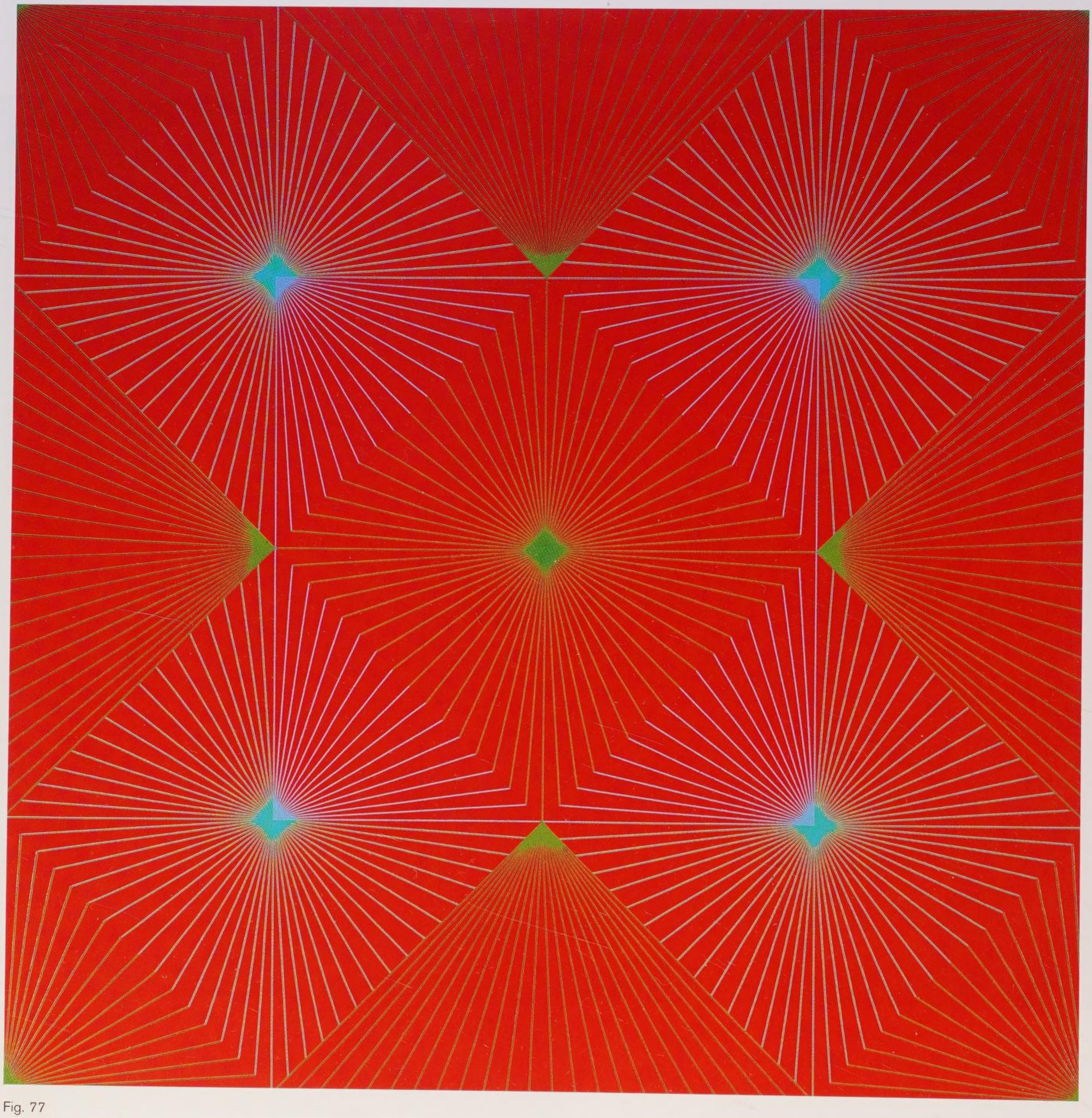


Fig. 77
Richard Anuszkiewicz
American, born 1930
Complementary Fission
1964
Acrylic on panel
48 x 48 in. (121.9 x 121.9 cm)
Private collection, Columbus, Ohio

Courtesy of Charles Foley Gallery, Columbus, Ohio
© Richard Anuszkiewicz/Licensed by VAGA,
New York, New York

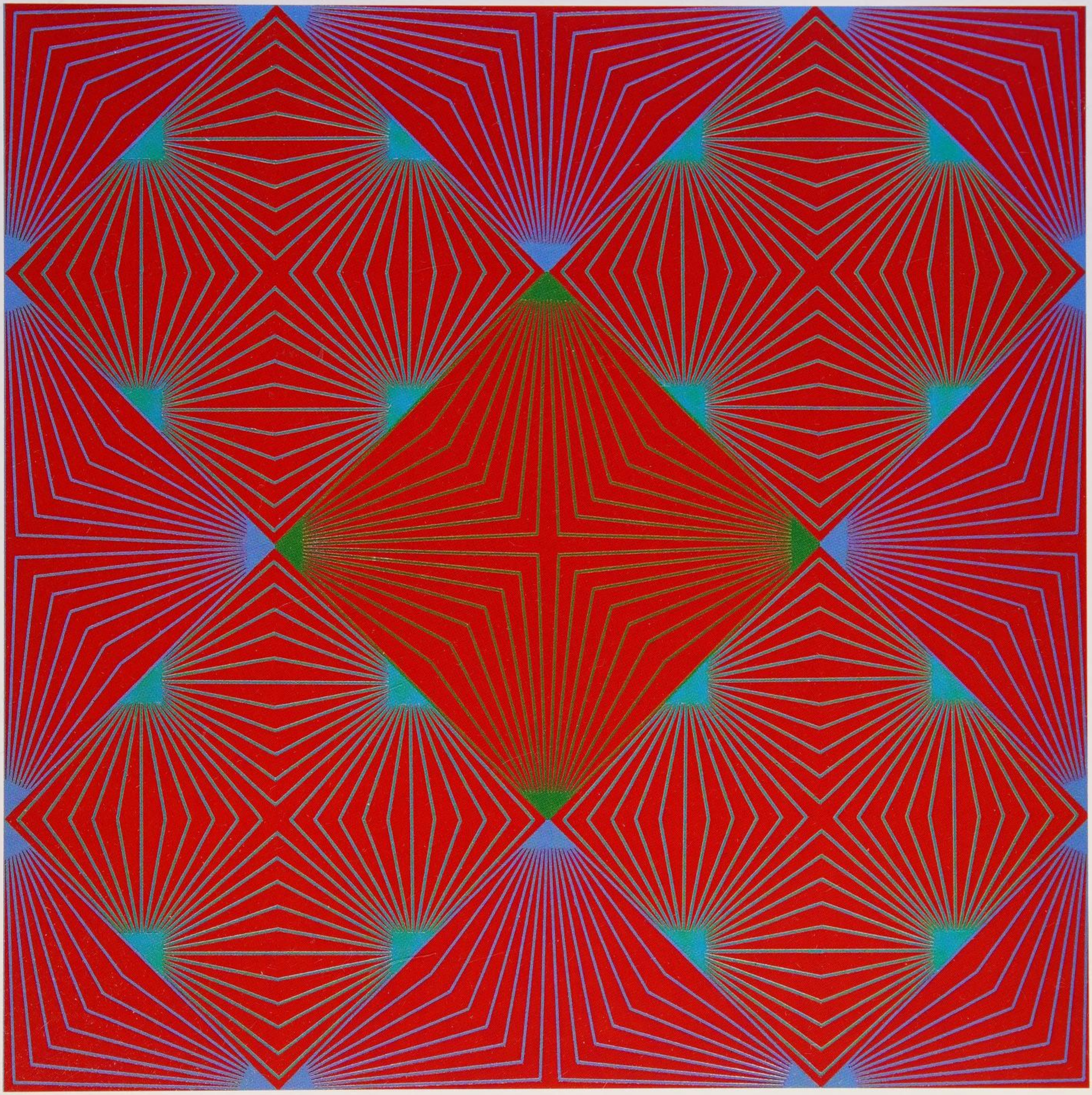
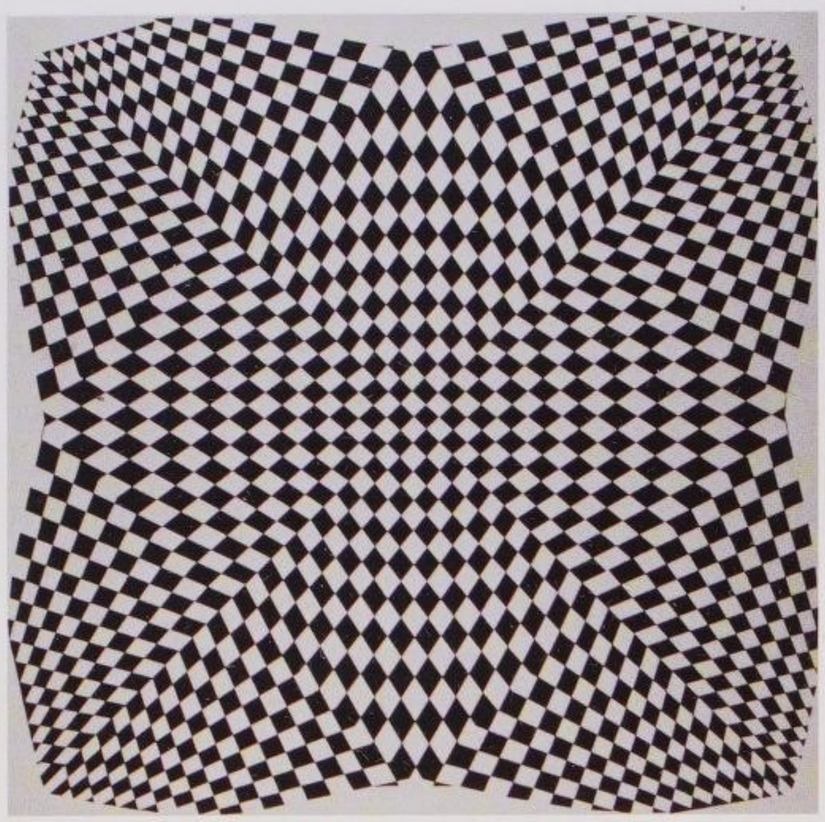


Fig. 78
Richard Anuszkiewicz
American, born 1930
Luminous
1964
Acrylic on board
24 x 24 in. (61 x 61 cm)
Collection of George Nauyok and Joseph Pritchard, San Francisco, California

Photography by Ian Reeves © Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Right: Fig. 79
Ernst Benkert
American, born 1928
Black and White Op*Tickler
1964
Liquitex on canvas
24 x 24 in. (61 x 61 cm)
Location unknown

Courtesy of the Artist



Below: Fig. 80
Photograph of a panel discussion, "Geometry in Art," at Anonima Gallery, New York. Left to right: Anthony Hill, Charles Parkhurst, Ed Mieczkowski, Donald Judd, and Ernst Benkert
April 1964

Courtesy of Ernst Benkert. Photography by Adelaide de Menil



developed on the basis of empirical analyses and syntheses, and I have always believed that perception is the medium through which states of being are directly experienced."[18] This direct visual *and* visceral experience is central to the iridescent color contrasts in Richard Anuzskiewicz's precise abstractions, the concentric radial quiver of Tadasky's concentric patterns, and the pulsating hues of Peter Sedgley's light projections. Movement, produced either optically or kinetically, engages the body in an active aesthetic experience. Op's lasting contribution lies in the tenet that experience is a form of knowledge.

The psychophysiological experience of Op is sometimes cumulative, but often immediate, requiring no art-historical education. But the relative speed of sensory stimulation does not denigrate the quality or significance of the experience. The flickering patterns and spatial distortions generated by optical painting and sculpture can offer momentary fascination for the casual observer, providing easy fodder for its detractors to dismiss the art as mere optical illusions, or as what Kenneth Noland wryly termed optical "delusions." Op painters were criticized in the pages of the then rising art press, particularly *ArtForum International*, whose writing staff included prominent minimal and conceptual artists and theorists suspicious of sensational art. In a review of Stanczak's *Optical Paintings* exhibition, sculptor Donald Judd revealed his ideological position: "One of these paintings has green and magenta stripes and another red and blue lines. The intensity of color is also greater in these. Red-and-blue is often used and is usually moderate in intensity and uninteresting. The lines are painted with a brush and vary in thickness. . . ."[19] Written just months before the publication of his minimalist treatise on "specific objects," Judd's matter-of-fact description of material and process emphasizes the object of Stanczak's art to the exclusion of any sensual experience. Judd also notes his concerns about the coming "seasonal interest" that may sweep diverse work into one package, and in a literary roll of the eyes, ends the review with the minimal, two-word sentence: "Op art." Ironically, this terse summation would provide the name for the rising movement he feared, and Stanczak would become one of its most enduring figures.

The dismissal of Op by some leading critics was prejudiced by a theroretical distrust of painting, which was prominent in the movement. According to Judd, the main purpose of painting is illusion, and therefore, even formalist abstraction tends to suggest objects, figures, and space—only monochrome canvases could avoid such allusions to the surrounding world. In any event, the flat, rectilinear plane was a limitation that was the "main thing wrong with painting."[20] Among artists, this discomfort with tradition prompted the use of shaped canvases and three-dimensional reliefs, and the addition of illumination to painting. Lucy Lippard called optical art "The New Illusionism . . . an art of little substance with less to it than meets the eye."[21] Barbara Rose considered it "expressively neutral, having to do with sensation alone."[22] Her remarks emphasize the theoretical divide between the epistemological and ontological viewpoints,

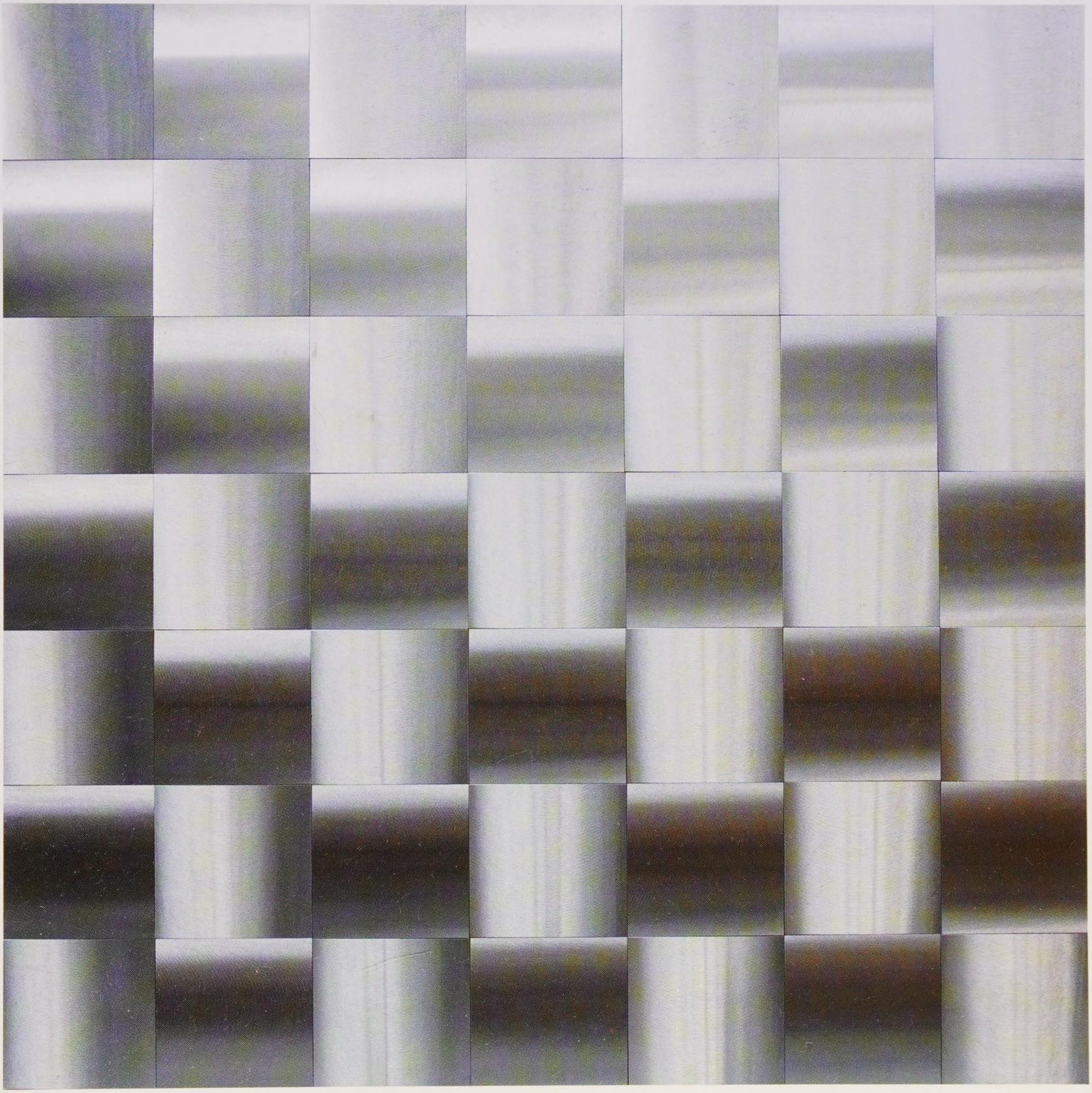


Fig. 81
Getulio Alviani
Italian, born 1939
Surface of Vibrating Textures
(Superficie a Testura Vibratile)
1963
Metal, aluminum, and wood
38½ x 37 in. (97.8 x 96.5 cm)
Miami University Art Museum, Oxford, Ohio:
Gift of Mrs. Robert B. Mayer and Children
in Memory of Robert B. Mayer. 1979.S.8.1

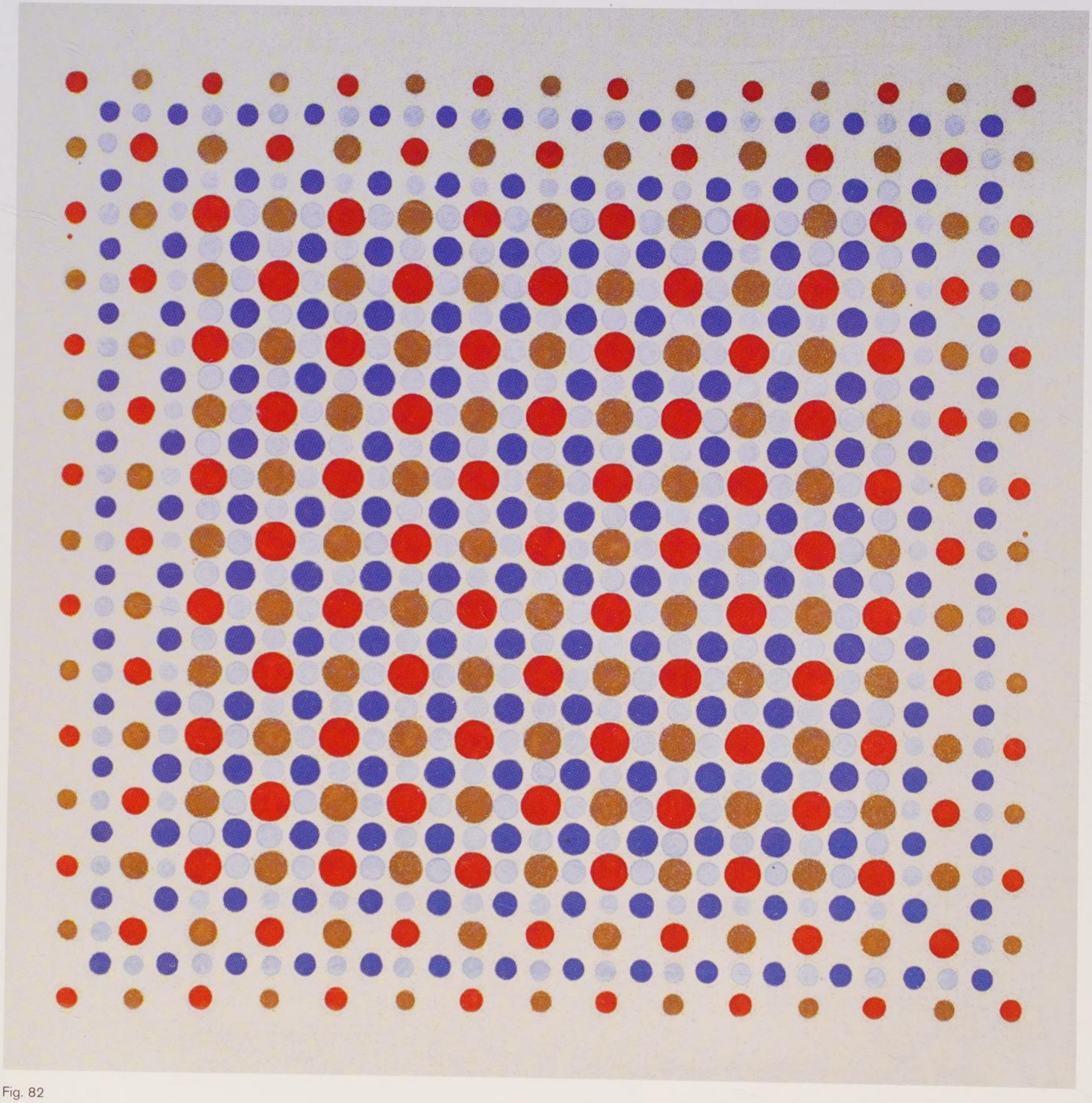


Fig. 82
Thomas Downing
American, 1928–1985
Untitled
1960
Acrylic on canvas
102 x 102 in. (259.1 x 259.1 cm)

Courtesy of Conner Contemporary Art,
Washington, D.C., and The Estate of Vincent Melzac



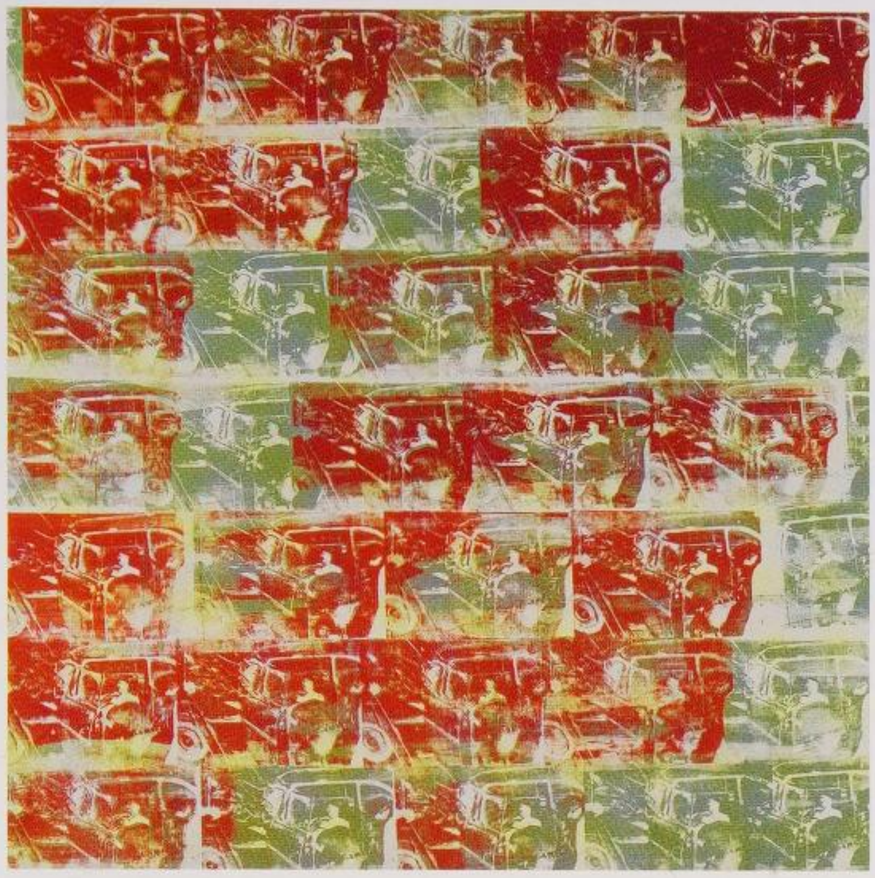
Fig. 83
Kenneth Noland
American, born 1924
Split Spectrum
1961
Acrylic on unsized canvas
$69^{15}/_{16}$ x $69^{15}/_{16}$ in. (177.6 x 177.6 cm)
Blanton Museum of Art, Austin, Texas: Gift of
Mari and James A. Michener, 1991 1991.280

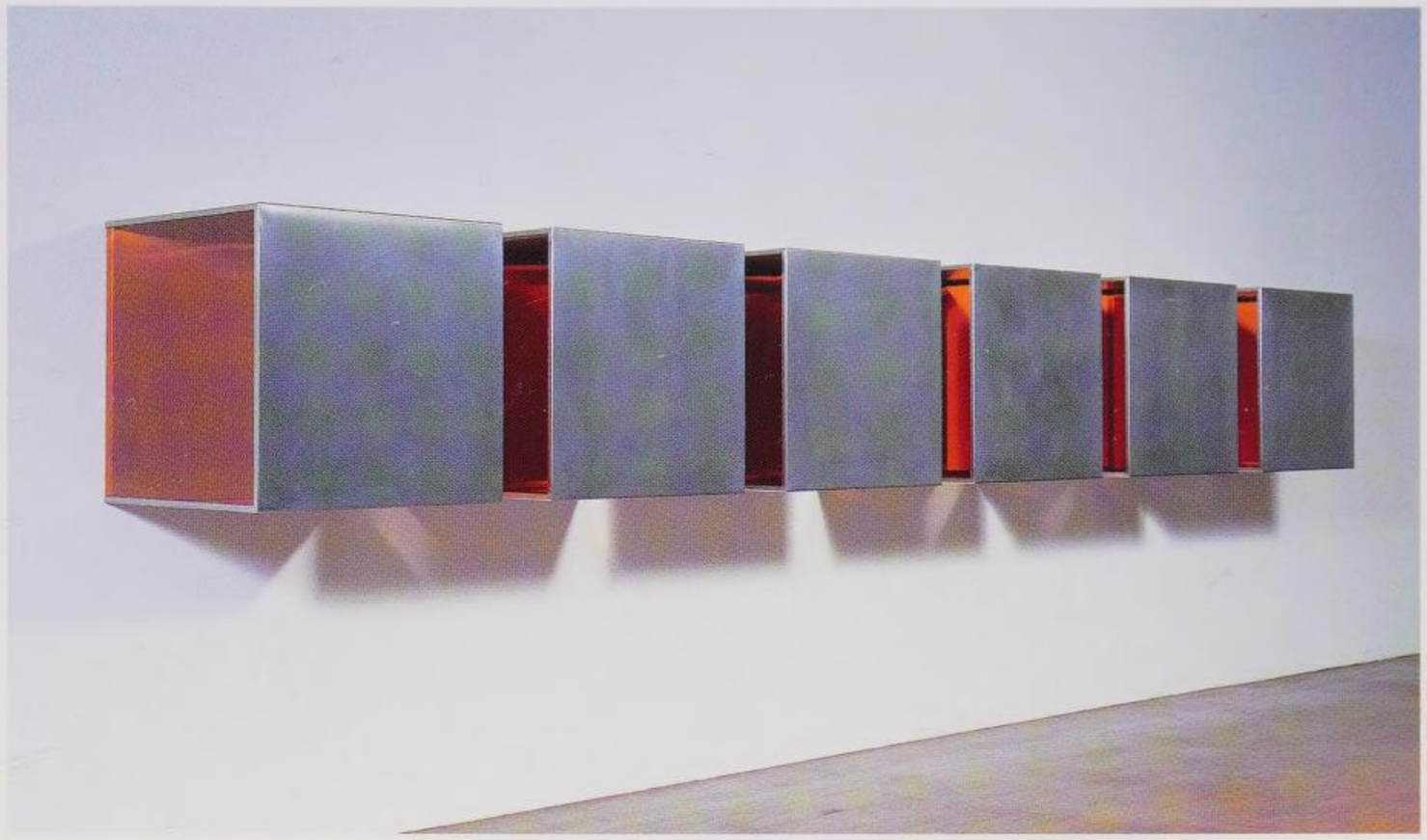
© Kenneth Noland/Licensed by VAGA, New York, New York



Fig. 84
Frank Stella
American, born 1936
Slieve Bawn
1964
Metallic powder in polymer emulsion
on shaped canvas
77 x 81 1/2 in. (195.6 x 207 cm)
Columbus Museum of Art, Columbus,
Ohio: On loan from a private collection

© 2006 Frank Stella/Artists Rights Society (ARS),
New York





privileging the conceptual over the experiential.

So quick was the art press to dismiss optically based art that a month before *The Responsive Eye* even opened, Sidney Tillam penned an article in *Arts Magazine* with the title "Optical Art: Pending or Ending?"[23] The critical furor only increased after the enormous public response to the exhibition, which traveled to St. Louis, Seattle, Pasadena, and Baltimore with great fanfare, and the ensuing commercialization of its bold imagery. The misgivings noted by the art press stemmed in part from the broad curatorial brush with which Seitz had painted his show, including among the artists descendants of European Constructivism along with emerging American hard-edged or "post-painterly" abstractionists. But the unprecedented popularity of Op was also partly responsible for its rapid downfall. Too easily assimilated into the marketplace and applied indiscriminately to all manner of functional design, it left some of the artists and their supporters disillusioned by the commercial art-world mechanism. The popular press also expressed a fascination with the rapidly growing market for the work of Op artists, some reviews of their work amounting to little more than a price list: another sensational angle.

The critical backlash against Op overlooked the particular strengths of its best practitioners and its relationship to the contemporaneous, critically praised movements of Pop and Minimalism. The mass media imagery of Warhol, Lichtenstein, and James Rosenquist did much to engage the public by using familiarity and humor, subverting the pretension and elitism of art. Op too shared in this democratizing process. Its practitioners often spoke emphatically against elitism and such artist collectives as Anonima and GRAV countered the individualist stance that had characterized the Abstract Expressionist movement. As Philadelphia-based painter Edna Andrade has noted, one did not need an education to understand Op; "it was a truly democratic art form."[24] Minimalists like Donald Judd and Robert Morris held the cult of the genius in similar suspicion, and adopted commercial materials and industrial processes concurrently with Op artists. Despite the apprehension with which Op's critics viewed painting as an inherently conservative medium, such painters as Vasarely, Riley, and Morellet explored systems and periodic structures with conceptual rigor, technical invention, and attention to the architectural environment. In these aspects the best of the movement's painting bears comparison not only with Minimalist sculpture, but also with serial music and experimental film of the era.

The point of divergence between Op and other movements that emerged in the 1960s is, however, equally significant. Pop and Minimalism emphasized the material object of art and the artist's process as prime subjects. Unlike these—or any other postwar modernist movement—Op places the viewer's experience as its utmost subject. As Bridget Riley succinctly stated, "perception is the medium,"[25] a notion that recast John Dewey's philosophy of "art as experience" for a new era. That search for the sensory "event" found its natural extension in multimedia and installation, art

Above, left: Fig. 85
Andy Warhol
American, 1928–1987
Optical Car Crash*
1962
Silkscreen on linen
$81^{7}/_{8}$ x $82^{1}/_{8}$ in. (208 x 208.5 cm)
Kunstmuseum Basel, Basel, Switzerland: G 1970.4

Photography by Kunstmuseum Basel, Martin Bühler. © 2006 Andy Warhol Foundation for the Visual Arts/ARS, New York

* Warhol rarely titled his works and this painting, from a group of "optical" paintings made in late 1962, was likely titled by Warhol biographer Rainer Crone in 1970, also the year of the earliest recorded exhibition of *Optical Car Crash*.

Above, right: Fig. 86
Donald Judd
American, 1928–1994
Untitled
1966/68
Stainless steel and Plexiglas in six parts
Six cubes, each 34 x 34 x 34 in.
(86.4 x 86.4 x 86.4 cm)
Milwaukee Art Museum, Milwaukee, Wisconsin: Layton Art Collection, purchase, L1970.25

© Judd Foundation/Licensed by VAGA, New York, New York

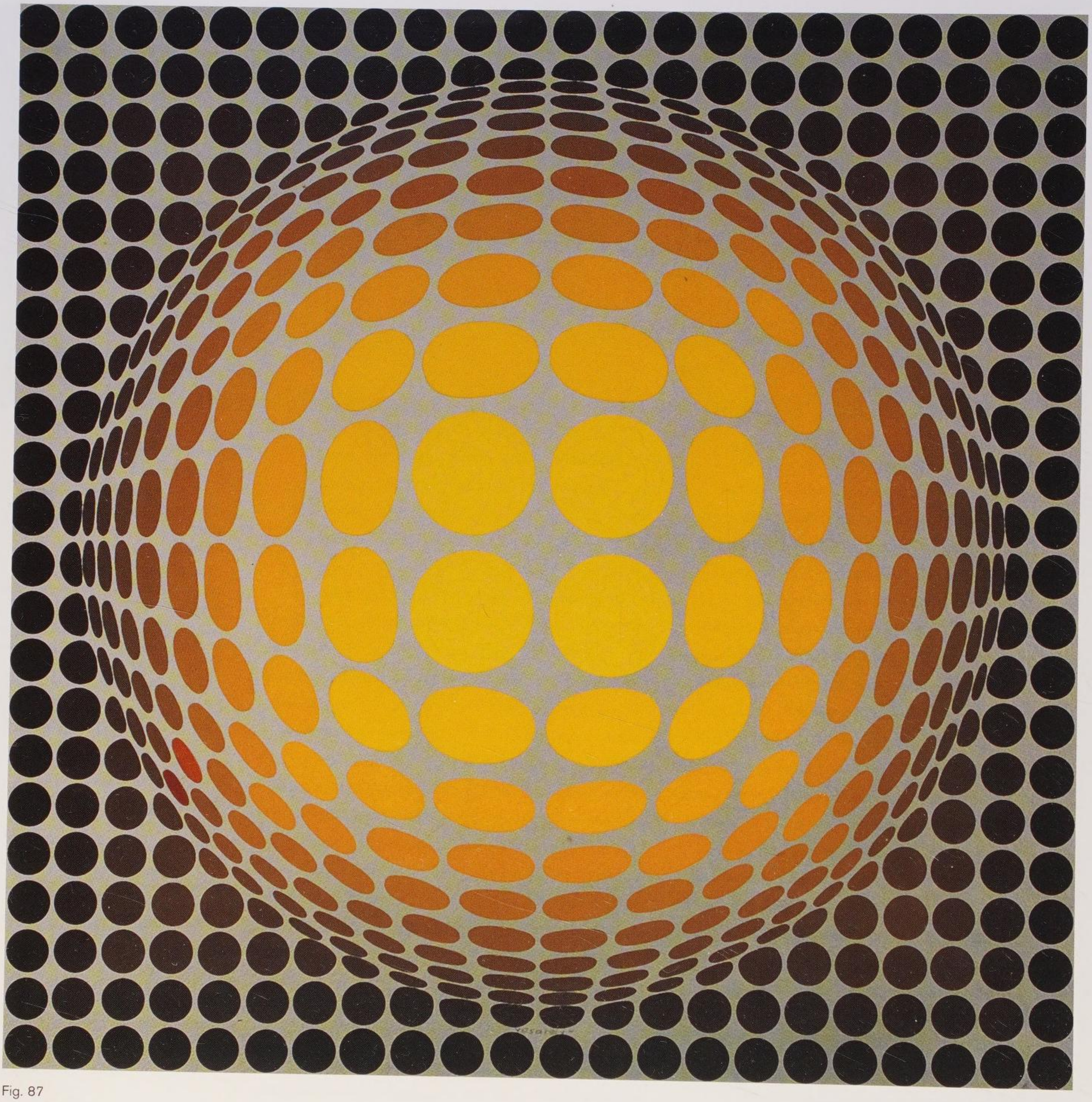


Fig. 87
Victor Vasarely
French, born Hungary, 1906–1997
Vega Or
1969
Oil on masonite
19 3/4 x 19 in. (50.2 x 48.3 cm)
Collection of Charles Simonyi, Seattle, Washington

Courtesy of Michèle Vasarely. Photograph © 1999 Eduardo Calderón © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

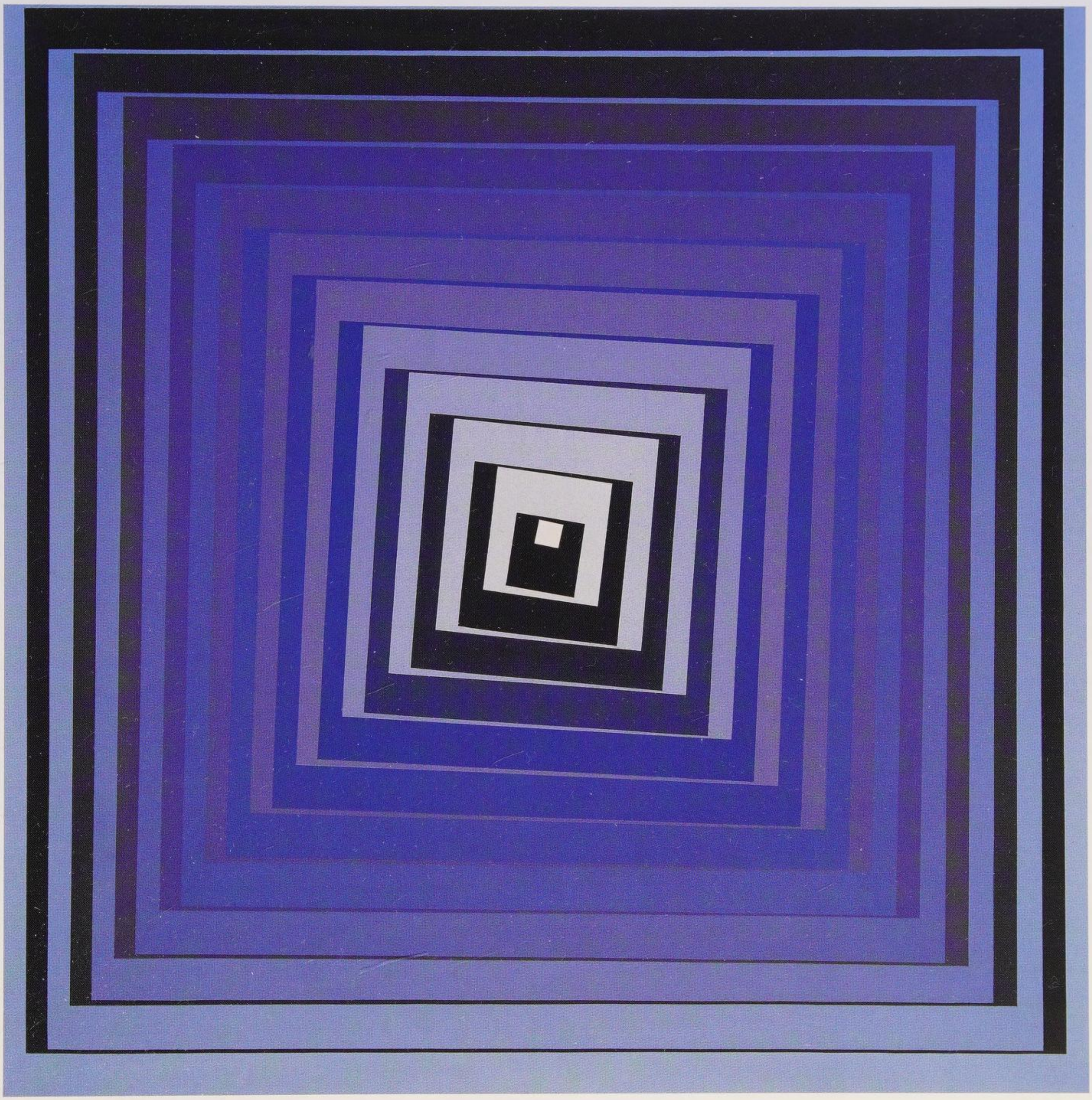
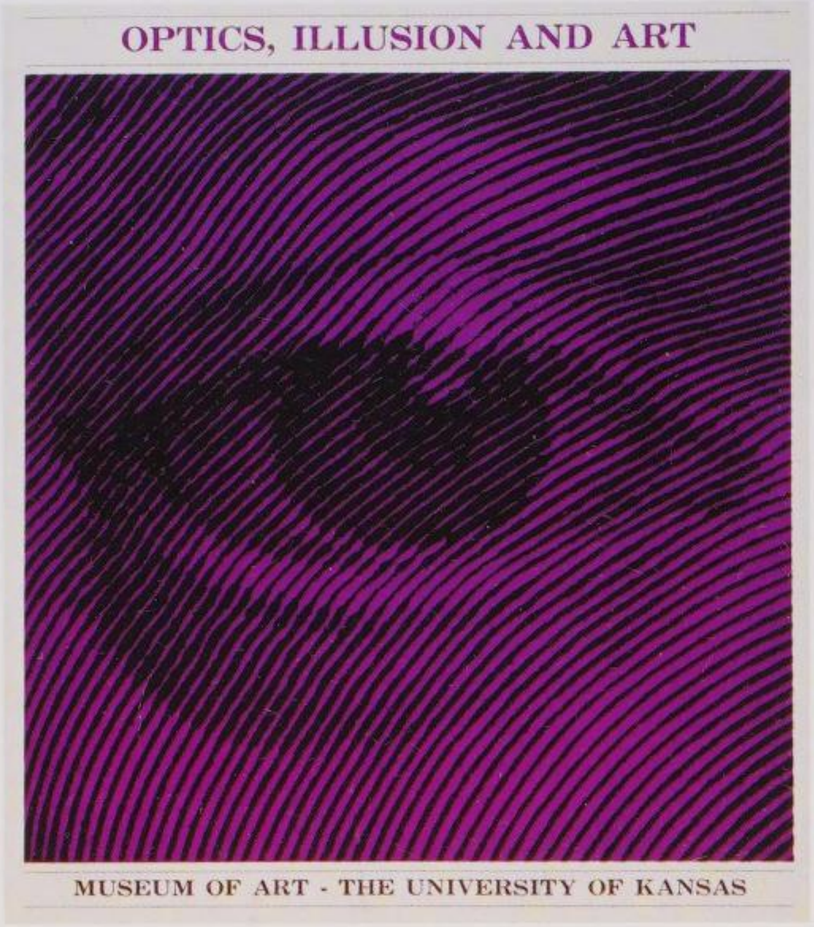


Fig. 88
Victor Vasarely
French, born Hungary, 1906–1997
Vonal Lila
1968
Acrylic on canvas
56¼ x 56¼ in. (142.9 x 142.9 cm)
Collection of Charles Simonyi, Seattle, Washington

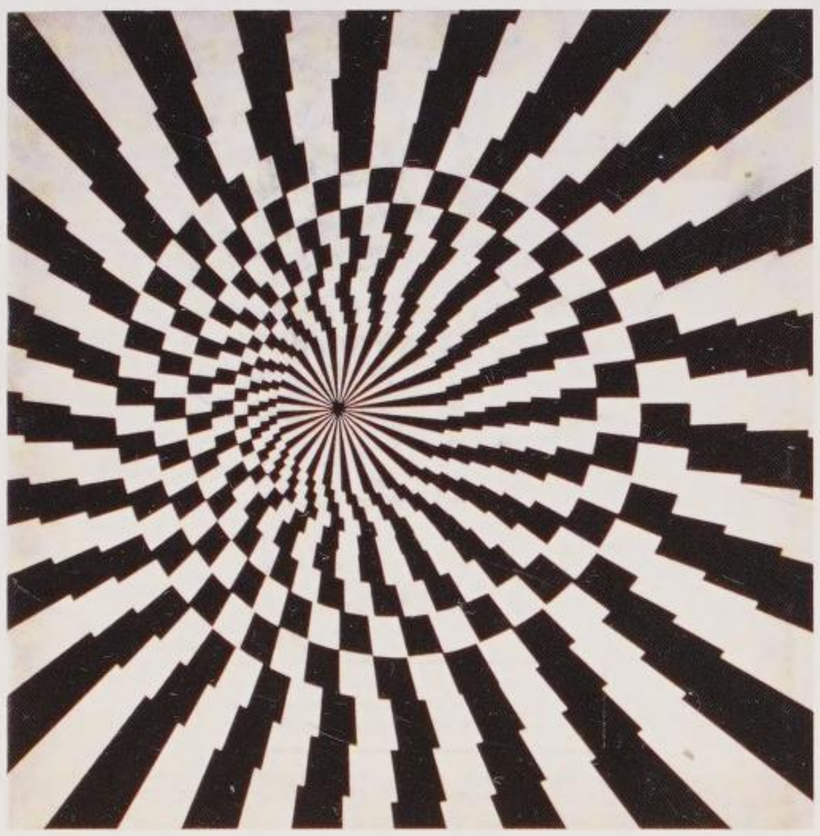
Courtesy of Michéle Vasarely. Photograph © 1999 Eduardo Calderón© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Right: Fig. 89
Exhibition catalogue for *Optics, Illusion and Art*, Lawrence, Kansas, Museum of Art, University of Kansas, May 14 – June 7, 1965

Courtesy of Mon Levinson



Right: Fig. 90
Exhibition catalogue for *Art et Mouvement: Art Optique et Cinétique*, Paris, Museum of Tel Aviv with Galerie Denise René, May–June 1965



Right: Fig. 91
Exhibition catalogue for *Pop and Op*, travelling exhibition, sponsored by Philip Morris Inc., 1965–67

Courtesy of Mon Levinson



practices that gained urgency in this historical shift from object to experience, and was perhaps the final salvo in the history of modernist abstraction.

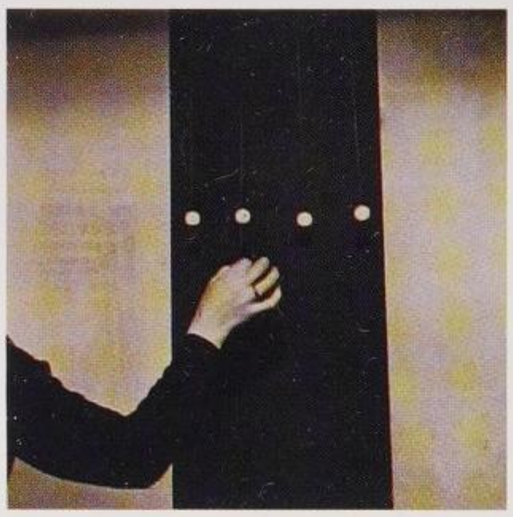
The decorative potential and easy marketability of Op did not detract from the meaning inherent in the art. Its trembling patterns, vibrating colors, and perilous structures reflect the psychic and social state of the mid-1960s, a period of desegregation, urban riots, political assassinations, and a televised war in Southeast Asia. Bill Komodore noted that he felt the stress everywhere around him when he stepped out on to the streets of New York, "I tried to make that tension the subject of my work."[26] This intention is well articulated by Anton Ehrenzwieg's characterization of the point of "crisis" in his unstable visual systems. One writer noted that the preponderance of the target pattern in the paintings of Tadasky and others bore an unstated relation to the assassination of President Kennedy.[27]

In 1965, the year in which *The Responsive Eye* toured America, comprehensive exhibitions were launched in Glasgow (*Art and Movement*), Brussels (*Lumière, Mouvement et Optique*), Bern (*Licht und Bewegung*), Tel Aviv (*Art et Mouvement: Art Optique et Cinétique*), and London (*Arte Programmata*) among other places, proving Op's international cultural resonance. The runaway success of the movement was a mixed blessing for William Seitz as well as for the artists. A week before *The Responsive Eye* opened, Seitz was already wistful about the untimely demise of perceptual art,[28] "In the world of 1913 this could have led to a movement with the importance and duration of Cubism, Expressionism, or Surrealism; but in the atmosphere of 1965 it is a question whether any new movement, tendency, or style can withstand the public onslaught for so long."[29] Seitz resigned from MoMA that year to assume directorship of the art museum at Brandeis University in Massachusetts, "worn out and embittered" according to one account, "by the storm he whipped up."[30] Op was officially canonized as a movement in succeeding years and a number of books devoted to the subject appeared in Britain and the United States up until the early 1970s. Art-history texts continued to note the movement, but often with such a qualification as: "although its effects are undeniably fascinating, [the artists] encompass a relatively narrow range of concerns that lie for the most part outside the mainstream of modern art."[31] Op lost











its dominance to photorealism, superrealism, and new narrative art of the 1970s, but its most esteemed practitioners continued to evolve their formal vocabulary and explore perceptual effects. Their insistence on an art of experience paved the way for innovative new forms of sensory-based art.

1 William C. Seitz, "Abstract Expressionist Painting in America, An Interpretation Based on the Work and Thought of Six Key Figures," diss., Princeton University, 1955, unpublished.

2 Jon Borgzinner, "Op Art: Pictures that Attack the Eye," *Time*, Vol. 84, October 23, 1964.

3 According to Leah Gordon, *Time* magazine researcher and reporter who worked closely with Jon Borgzinner from 1963 to 1965, and assisted in the article of October 23, 1964. In an interview with this author in November 2006, Gordon recalled Borgzinner proposing, without premeditation, the term "Op" for the emerging trend at a weekly story conference.

4 Warren R. Young, "Op Art", *Life*, Vol. 57, December 11, 1964, pp. 132–40.

5 *Vogue*, v. 147, November 15, 1965, p. 96.

6 Josef Albers, "Op Art and/or Perceptual Effects," *Yale Scientific*, XL, No. 2, November 1965, p. 8.

7 *Eye on New York: The Responsive Eye*, CBS, 1965.

8 Gerald Oster and Yasunori Nishijima, "Moiré Patterns," *Scientific American*, May 1963, p. 63.

9 *Mon Levinson, Vibrations 11*, exhib. cat., New York, Martha Jackson Gallery, 1965, unpaginated.

10 Peter Selz, "Arte Programmata," *Arts Magazine*, 39, March 1965, p. 21.

11 Francis Molnar "Towards Science in Art," *Directions in Art, Theory, and Aesthetics*, ed. Anthony Hill, Greenwich, Connecticut (New York Graphic Society), 1968, p. 209.

12 Victor Vasarely, "Towards the Democratisation of Art," *Directions in Art, Theory, and Aesthetics*, *op. cit.*, p. 104.

13 Olivetti's P101, a forerunner of modern desktop computers using magnetic cards, debuted in 1965.

14 François Morellet, "The Choice in Present-Day Art," *DATA*, 1968, p. 236.

15 *Julian Stanczak, Vibrations 11*, exhib. cat., New York, Martha Jackson Gallery, 1965, p. 9.

16 Coincidentally, a number of American Op artists, Stanczak included, were enthralled by the aerial photography of Swiss naturalist Georg Gerster, whose Saharan desert photos were published in England in 1961.

17 *Geometric Abstraction in America*, New York, Whitney Museum of American Art, 1962, unpaginated.

18 Bridget Riley, "Perception is the Medium," *Art News*, 64, No. 6, October 1965, p. 32.

19 Donald Judd, "In the Galleries," *Arts Magazine*, October 1964, p. 64.

20 Donald Judd, "Specific Objects," *Minimalism*, London (Phaidon) 2000, p. 209.

21 Lucy Lippard, "New York Letter," *Art International*, March 1965.

22 Barbara Rose, "Beyond Vertigo: Optical Art at the Modern," *ArtForum International*, April 1965, p. 31.

23 Sidney Tillam, "Optical Art: Pending or Ending?," *Arts Magazine*, January 1965, pp. 16–23.

24 Interview with the author, 2006.

25 Bridget Riley, "Perception is the Medium," *op. cit.*, p. 31.

26 Interview with the author, June 2006, unpublished.

27 Allen S. Weller, "Circles, Men and Others," *The Joys and Sorrows of Recent American Art*, Champaign (University of Illinois Press) 1968, unpaginated.

28 His catalogue essay for *The Responsive Eye* assiduously avoids any attempt at christening a new movement of "optical" or "retinal" art. An expanded text on the subject he was reportedly planning was never published.

29 William C. Seitz, "The New Perceptual Art," *Vogue*, 145, February 15, 1965, p. 143.

30 Howard Junker, "Finders Keepers," *Harper's Bazaar*, November 1966, p. 144.

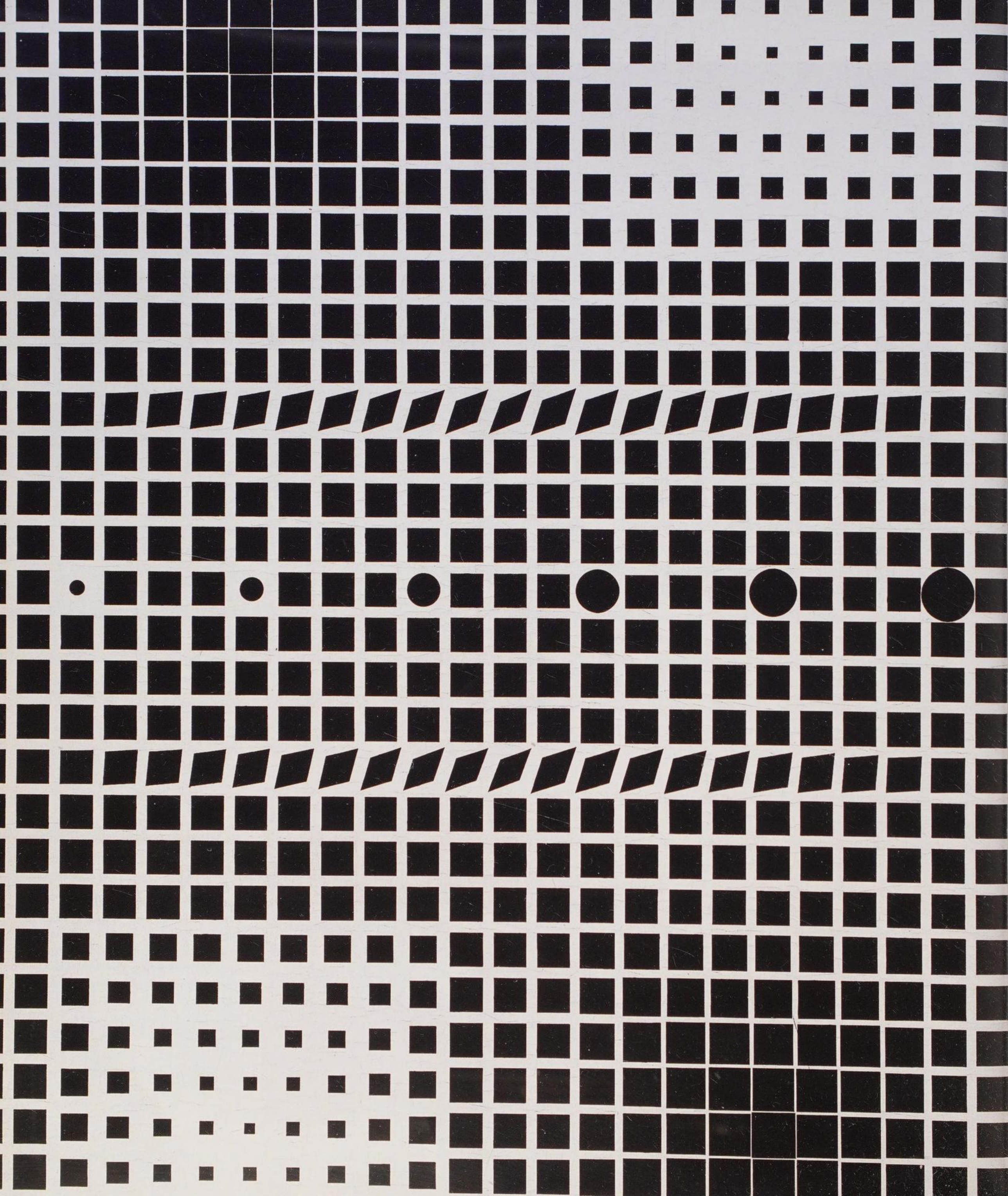
31 H.W. Janson, *History of Art*, 5th edn, New Jersey and New York (Prentice Hall, Inc. and Harry N. Abrams, Inc.) 1995, p. 804.

Above, left: Fig. 92
Carlos Cruz-Diez
Venezuelan, born 1923
Chromointerference Environment
1977
Wood, acrylic, paint, and eight mobile projectors
315 x 315 x 118 in. (800 x 800 x 300 cm)
Installation at the Contemporary Art Museum Sofia Imber/Sala CADAFE, Caracas, Venezuela

Courtesy of Atelier Cruz-Diez and Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Above, right (group): Figs. 93 a–d
Photographs from the exhibition catalogue by GRAV for *Participation*, Museum am Ostwall, Dortmund, Germany, February 11 – March 31, 1968
All works shown by **Julio Le Parc**
Argentinean, born 1928
Clockwise from top left:
Mirror (Miroir)
1966
Glasses for Another Vision (Lunettes Pour une Vision Autre)
1965
Environment, Surprised Movement with Light Blowing (Environment, Mouvement Surprise avec Lumière Pulsante)
1967
Balls to Vibrate (Boules à Vibrer)
1963

© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris



BLACK AND WHITE

Negatives–positives . . . the hallucinatory play of black and white . . . I deduced therefrom, philosophically speaking, that white and black signs, and the inevitable antinomy of the ideas of the past, like "day and night", "angel and devil", "good and evil", are in reality complementaries, a fertile androgynous idea. Coupling affirmation and negation in unity is making knowledge integral. What a prospect! . . . White and black, yes and no, it is the binary language of cybernetics, making possible the building of a plastic bank in electronic brains. White and black, it is the indestructibility of art-thought and hence the perenniality of the work in its original form.[1]

Victor Vasarely, 1965

Many Op artists, even after working with color early in their careers, eliminated it from their work to rediscover fundamental principles of visual design in black-and-white paintings and constructions. Victor Vasarely, Jesús Rafaël Soto, Julian Stanczak, and Bridget Riley each focused on the perceptual potential of black and white, before systematically exploring the elements of color. Some, including Marina Apollonio and Ludwig Wilding, did so exclusively throughout most of their careers. As Stanczak notes of his linear compositions of the early 1960s, "by painting them in black and white . . . I could have a very pure observation of what was happening visually."[2]

The spectral opposites of black and white embody the most extreme visual contrast and can summon myriad optical effects, including spatial illusion, virtual motion, after-images, and phantom color. Goethe made observations on such phenomena in his theories on optics and color, but it was Gestalt psychologists who later explained how the brain interprets perception to create these phenomena in the mind. Rudolf Arnheim convincingly applied Gestalt principles to

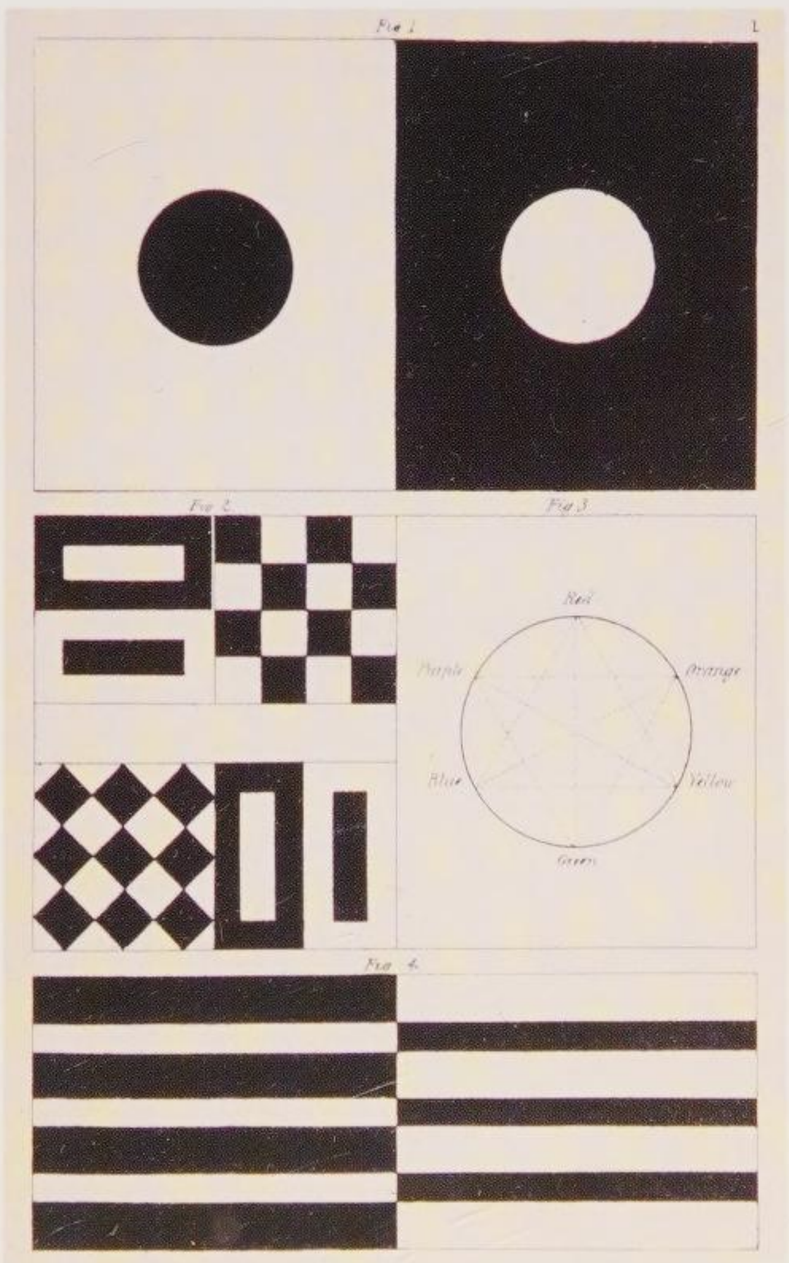
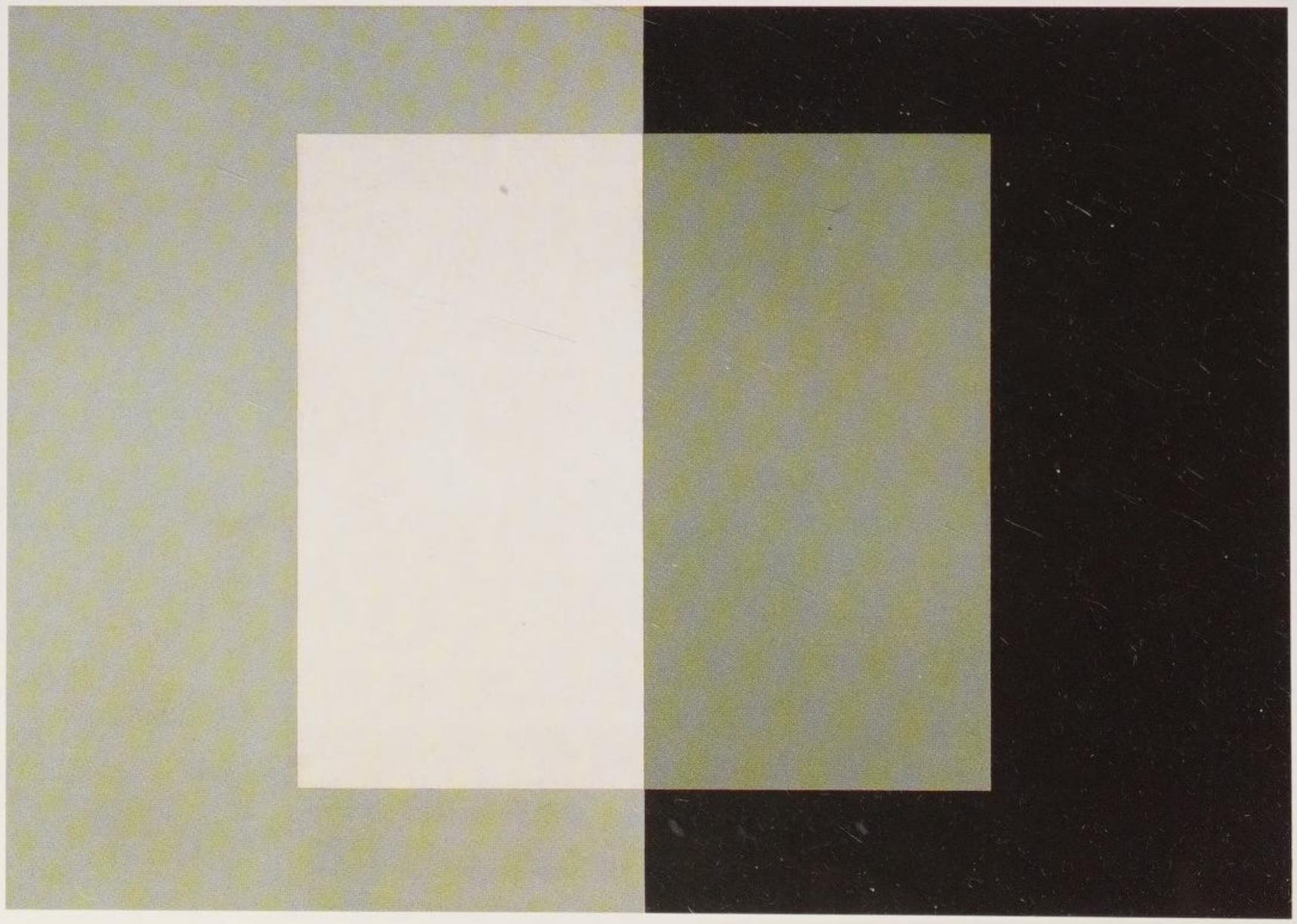


Fig. 94
Diagram for testing the effects of black-and-white objects on the eye from *Goethe's Theory of Colours*, transl. by Charles Lock Eastlake, London (John Murray) 1840

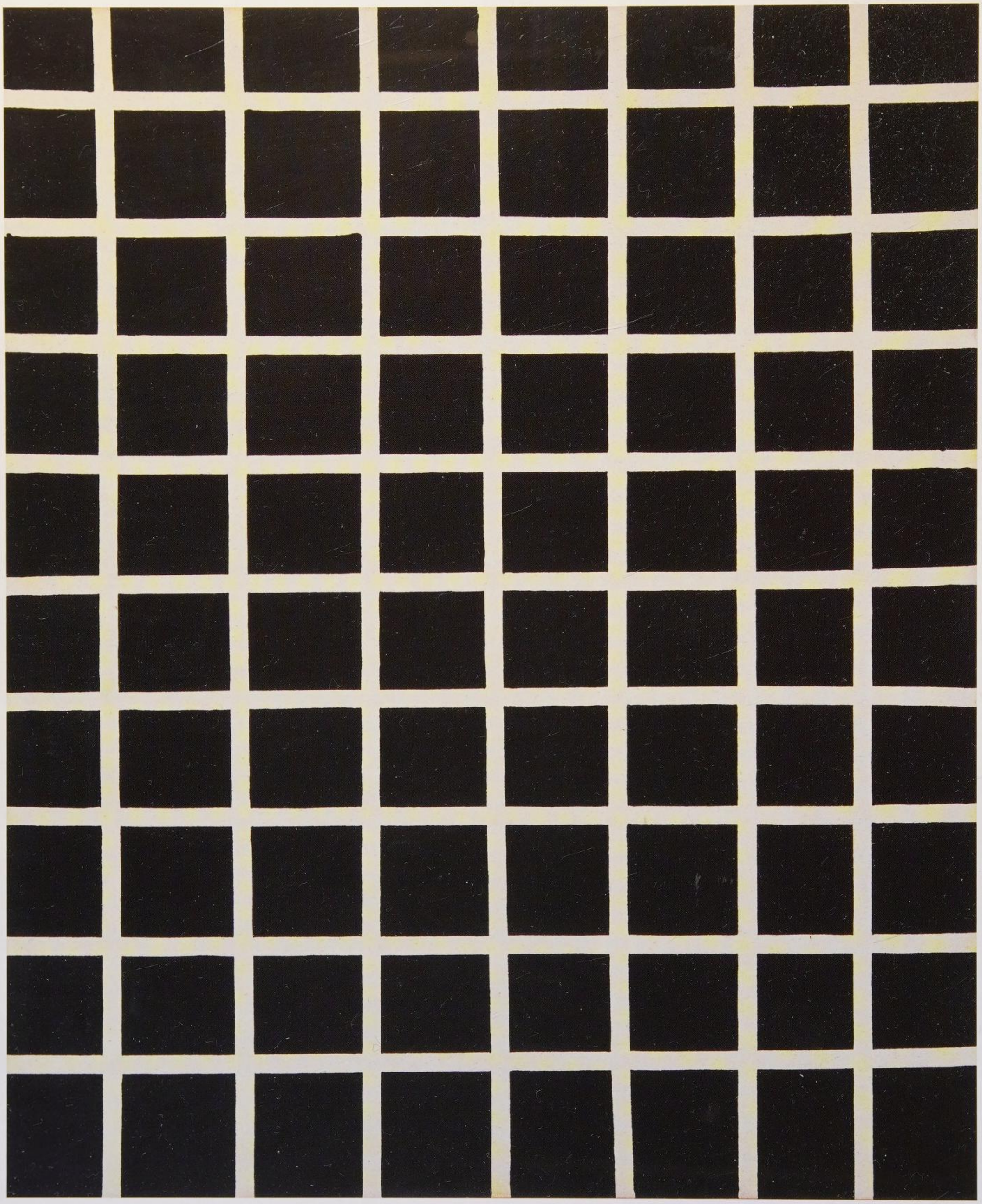
Right: Fig. 95
Frederick Hammersley
American, born 1919
Sugar Free #7
1966
Oil on canvas
36 x 42 in. (91.4 x 106.7 cm)
Courtesy of Charlotte Jackson Fine Art, Santa Fe, New Mexico

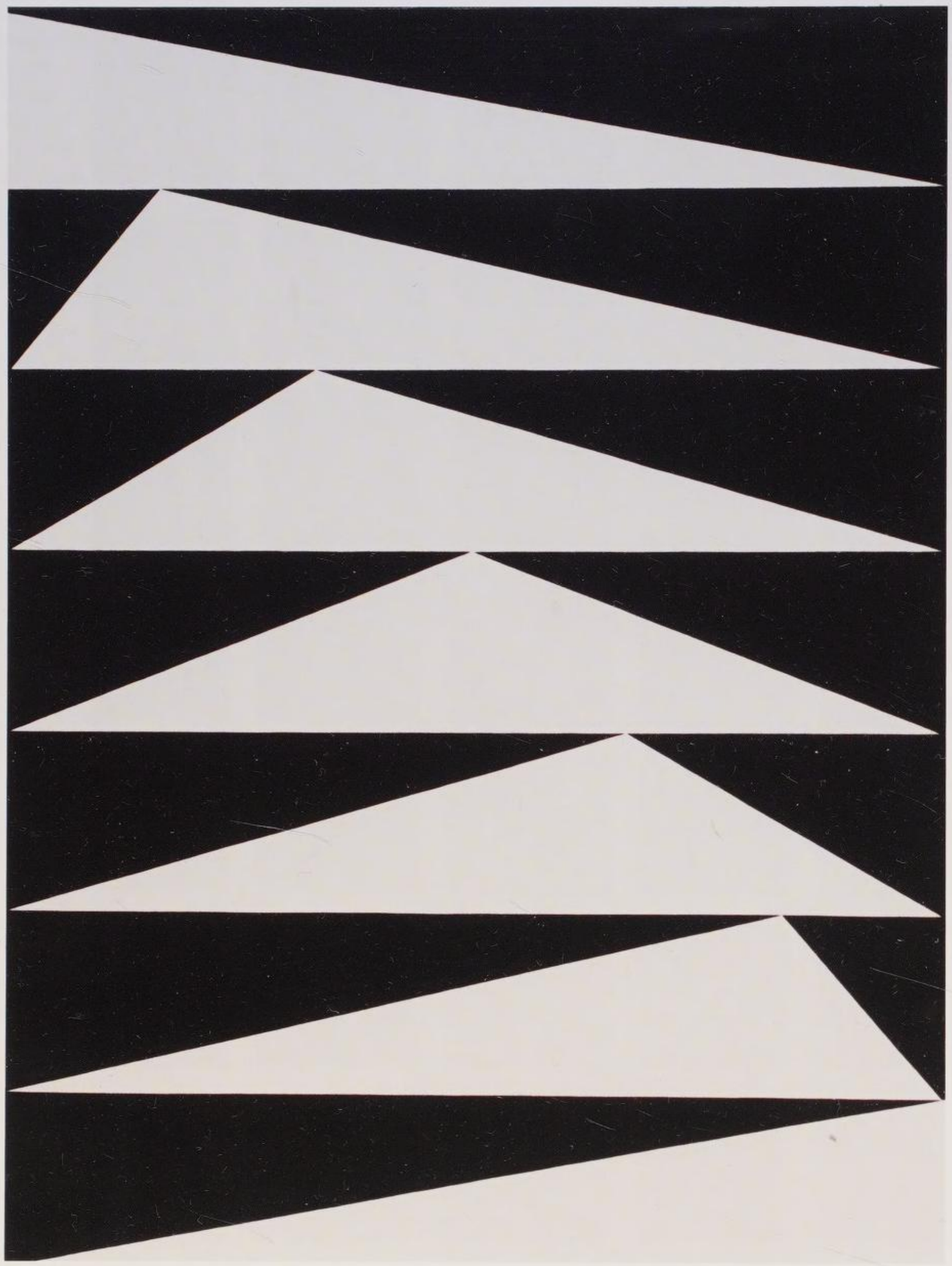


Right: Fig. 96
John McLaughlin
American, 1898–1976
No. 5–1961
1961
Oil on canvas
42¼ x 60⅛ in. (107.3 x 152.7 cm)
Santa Barbara Museum of Art, Santa Barbara, California: Gift of Katherine Peake in memory of her mother, Alice F. Schott. 1982.67



Opposite: Fig. 97
Bill Komodore
American, born Greece 1932
Thousands
1964
Synthetic polymer on canvas
60½ x 49½ in. (153.7 x 125.7 cm)
Whitney Museum of American Art, New York, New York: Purchase. 65.68
Photography by Sheldan C. Collins





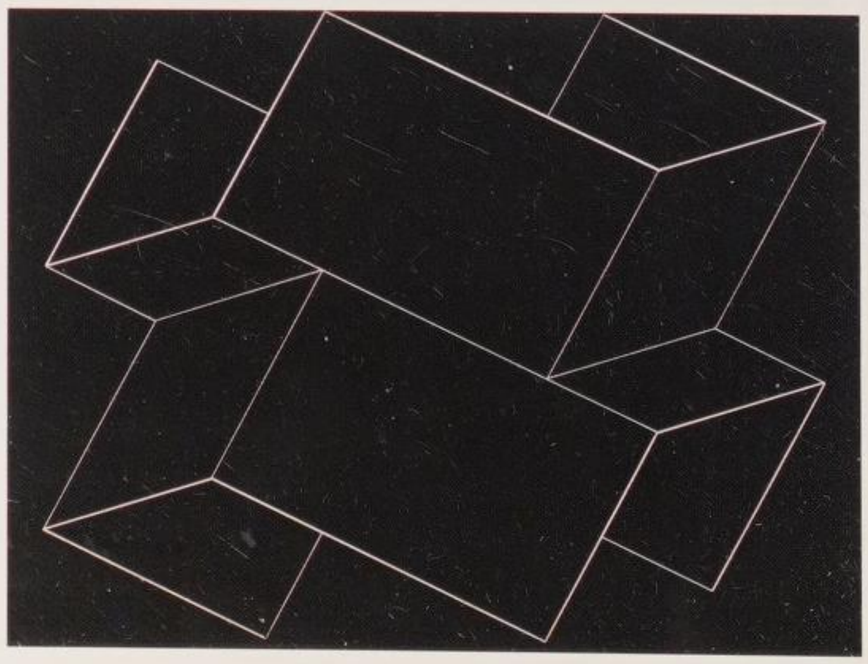
Above: Fig. 98
Jeffrey Steele
British, born 1931
Triangulation
1960
Oil on canvas
$27^{15}/_{16}$ x $20^{7}/_{8}$ in. (71 x 53 cm)
Collection of Getulio Alviani, Milan, Italy

visual art in such writings as *Art and Visual Perception: A Psychology of the Creative Eye* (1954), which gained a devoted following among an emerging generation of postwar artists. He illustrated how the mind searches for a unifying structure to vision and makes meaningful images from incomplete or conflicting visual information. Optical illusions, which accentuate the disjuncture between knowledge and vision, became an early subject of interest to perceptual artists. Josef Albers, for instance, depicted paradoxical three-dimensional forms in his *Structural Constellations* engravings (see fig. 99), and Bill Komodore demonstrated the mysterious appearance of after-images in his painting *Thousands* (fig. 97).

A fundamental method of visual activation is found in figure/ground reversal resulting from the interpenetration of shapes. Particularly when black and white are juxtaposed in a pattern of equal measure, their position can reverse erratically in the mind's eye. It was precisely the ambiguity of this perceived reversal that drew Vasarely to the zebra as a subject of his first black-and-white works. A simplified version of this phenomenon is visible in Frederick Hammersley's *Sugar Free* #7 (fig. 95)—a title that humorously connotes his economy of means—which presents evenly spaced bands of black and white. Although one acknowledges the flat surface of the canvas, it is difficult to reconcile the stripes as existing on a single plane. John McLaughlin adds the effect of overlapping transparency to his classic figure/ground compositions, thereby implying a greater spatial complexity. A more complex, and therefore disturbing, deployment of figure/ground ambiguity is apparent in the alternating black and white stripes of Rakuko Naito's paintings

Right: Fig. 99
Josef Albers
American, born Germany, 1888–1976
Structural Constellation
c. 1950
Machine engraving on black vinylite
17 x $22^{1}/_{2}$ in. (43.2 x 57.2 cm)
The Josef and Anni Albers Foundation, Bethany, Connecticut. JAAF#1976.8.1751

Photography by Tim Nighswander © 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York



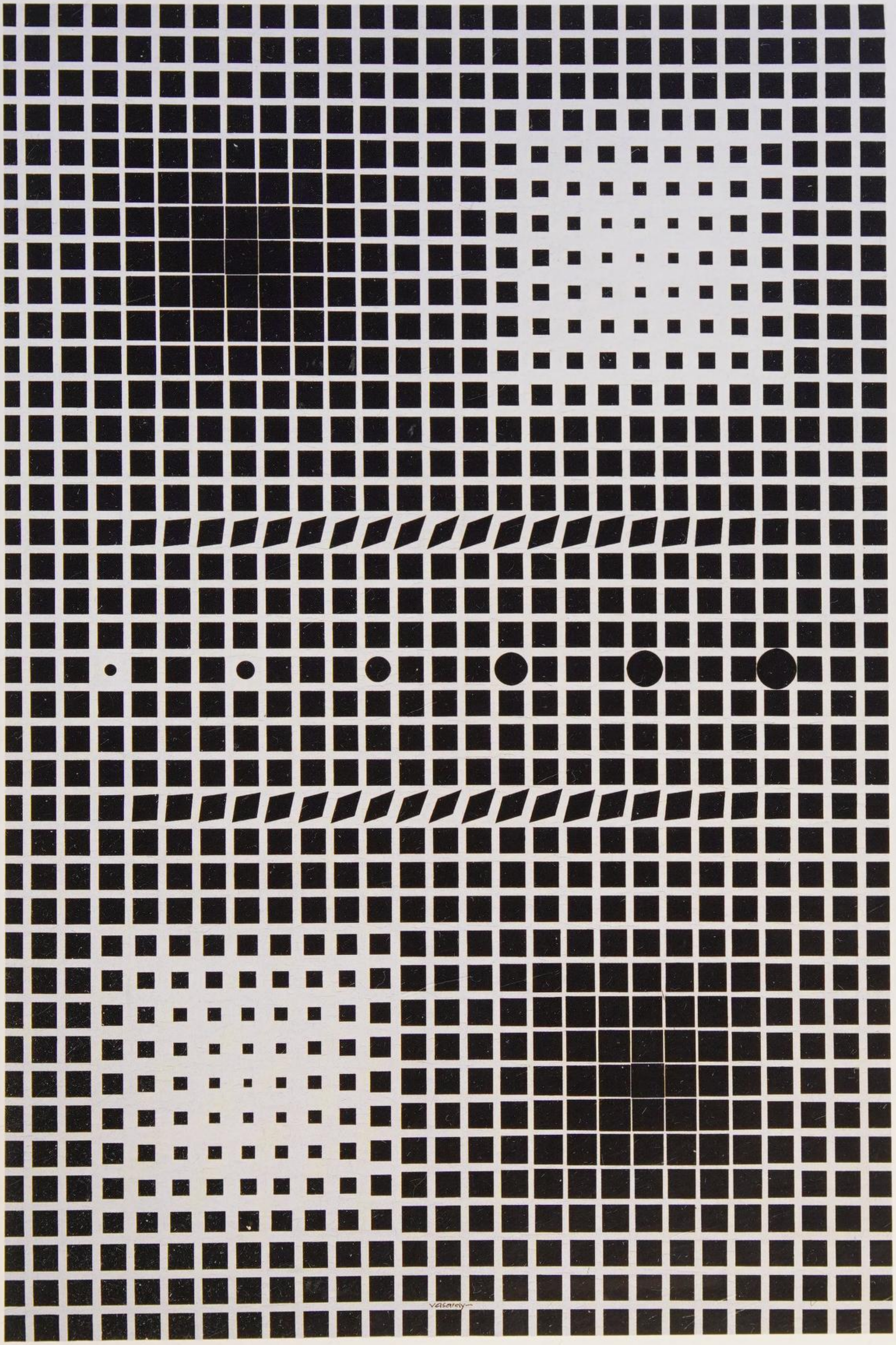


Fig. 100

Victor Vasarely

French, born Hungary, 1906–1997

Lux Novae

1962

Acrylic on canvas

$76^{3}/_{8}$ x $45^{11}/_{16}$ in. (194 x 116 cm)

Courtesy of Michéle Vasarely and the Vasarely Estate © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

(Detail on p. 76)

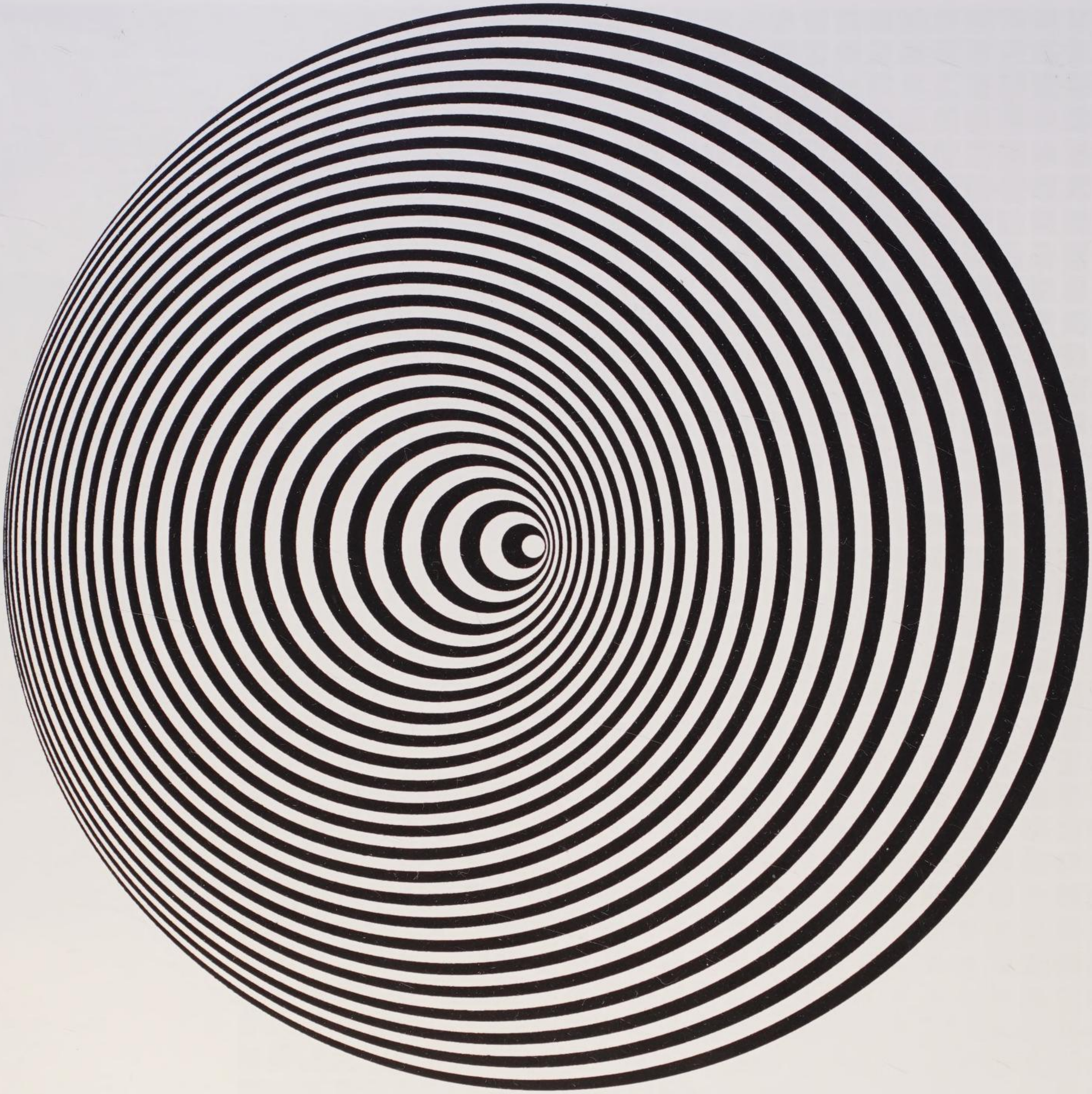


Fig. 101
Marina Apollonio
Italian, born 1940
Circular Dynamics
(Dinamica circolare)
1968
Painted wood disk, motorized
$15^{3}/_{4}$ in. diameter on square base of
$23^{5}/_{8}$ x $23^{5}/_{8}$ in. (40 cm on square base of
60 x 60 cm)
Collection of Getulio Alviani, Milan, Italy

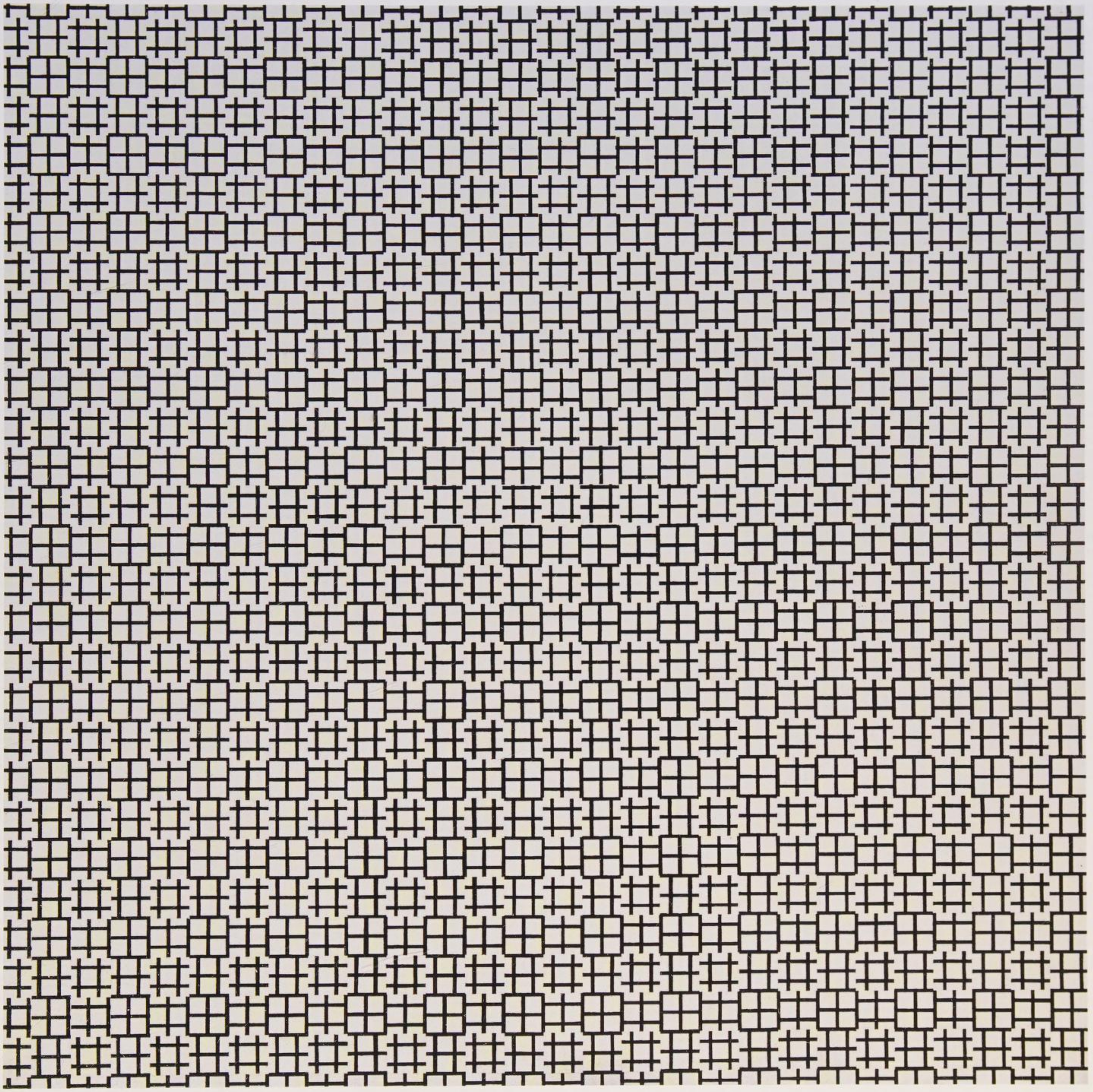
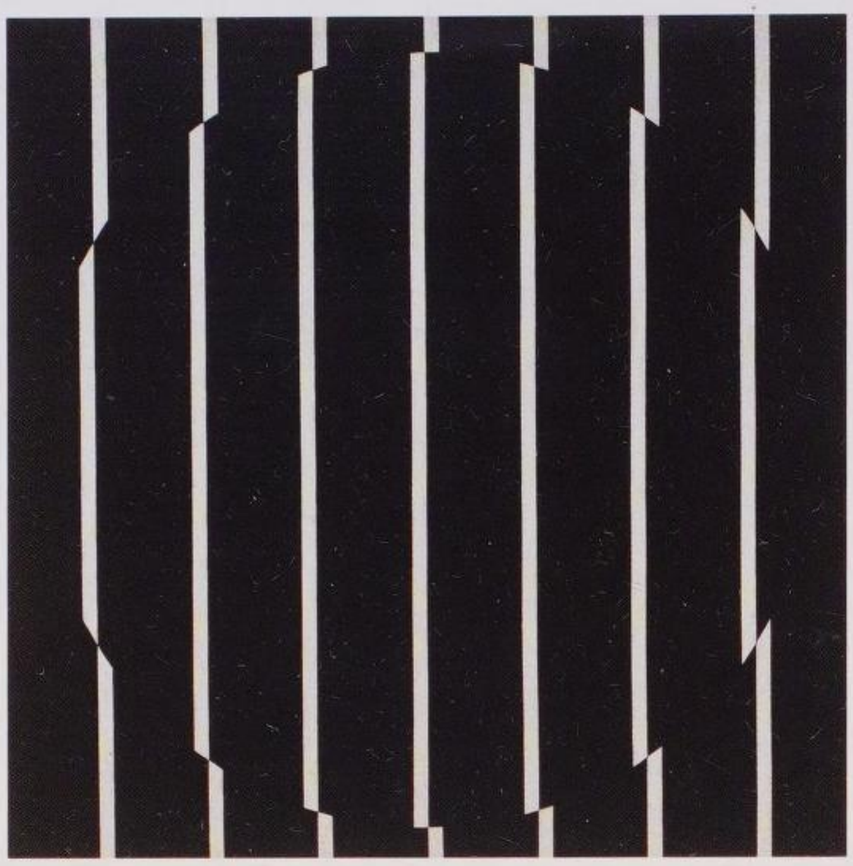


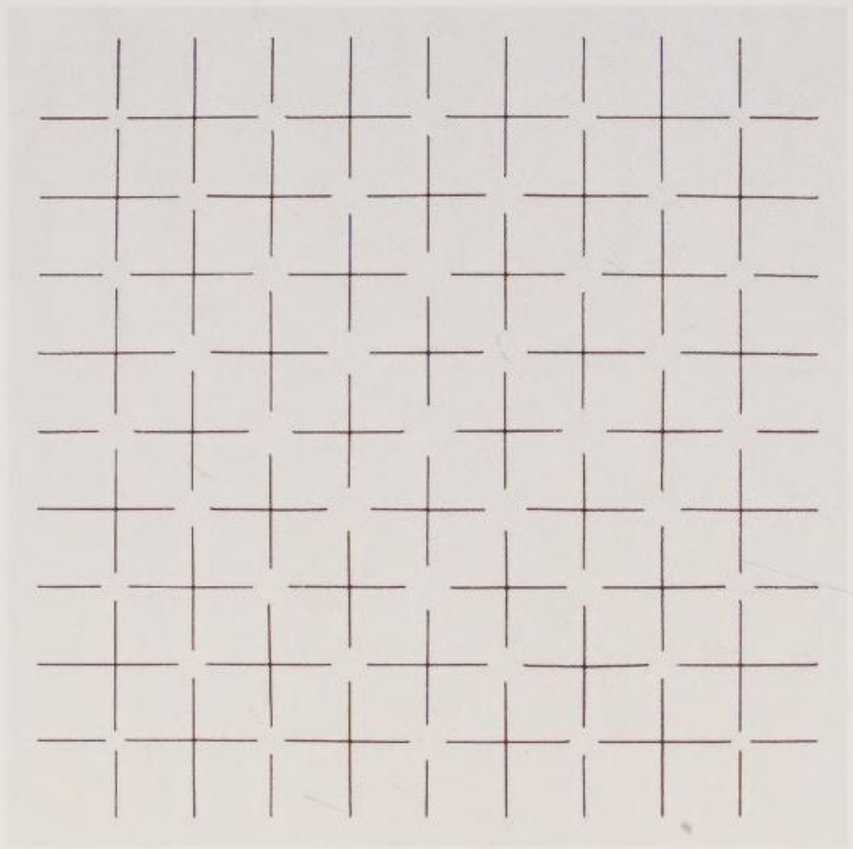
Fig. 102
François Morellet
French, born 1926
Tirets 0–90°
1960
Oil on canvas
$31^{7}/_{16}$ x $31^{7}/_{16}$ in. (80 x 80 cm)
Musée de Grenoble, Grenoble, France:
Donation of Foundation Abstraction and
Square (Vaduz–Liechtenstein) in 1987.
MG 4185

Photography © Musée de Grenoble. © 2006 Artists
Rights Society (ARS), New York/ADAGP, Paris

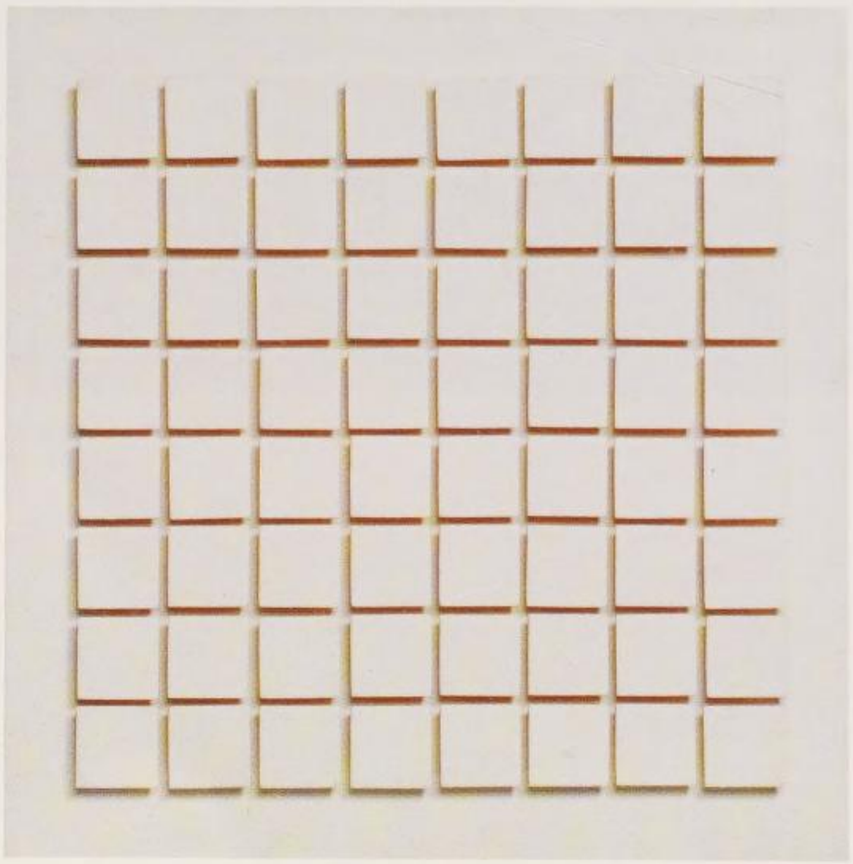
Right: Fig. 103
Rakuko Naito
American, born Japan 1935
Black and White Stripe – Circle with Thin White Stripes
1965
Acrylic on canvas
32 x 32 in. (81.3 x 81.3 cm)
Collection of the artist
Courtesy of the Artist



Right: Fig. 104
Edoardo Landi
Italian, born 1937
Visual Structure (Struttura visuale)
1961–71
Elastic on masonite
26 x 26 x 1 3/8 in. (66 x 66 x 3.5 cm)
Collection of Getulio Alviani, Milan, Italy



Right: Fig. 105
Luis Tomasello
Argentinean, born 1915
Atmosphere Chromoplastique 120A
1965
Acrylic on wood relief
23 5/8 x 23 5/8 x 2 5/16 (60 x 60 x 5.9 cm)
Courtesy the Artist and Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris



(see figs. 103, 106), and in François Morellet's *Tirets 0–90°* (fig. 102), in which small white squares alternately advance and recede in a dense, overall pattern, creating a dynamic and fluctuating visual field. Morellet, who began exploring optical phenomena in the early 1950s, often employed a systematic and repetitious structure for his paintings and sculptures. On prolonged viewing, they appear to quiver as our eyes attempt to focus on any specific area of the composition.

The introduction of variables within a continuous pattern results in an even more unstable "periodic structure" that can fluctuate visually. Victor Vasarely was among the first to explore the dual components of repetition and variation in such paintings as *Lux Novae* (fig. 100), which features a gridded arrangement of small geometric units. By subtly adjusting the shape of these units throughout the painting, he creates a sense of space, light, and motion, punctuated by the appearance of black dot after-images within the white grid. Any formal structure can be activated to achieve similarly dynamic effects. Spiral, concentric, and radial patterns have also been employed with great effect as witnessed in the work of Marina Apollonio, Tadasky, and Wolfgang Ludwig, whose *Cinematic Paintings* (for example, figs. 3, 20) seem to pulsate at their core, inexplicably radiating colors from their black-and-white designs. The mysterious appearance of phantom color was noted by Goethe as "the primordial phenomena of all appearance of color occasioned by refraction"[3] when describing his observations of refracted light seen through prisms against black-and-white backgrounds. The lens pictures of Karl Gerstner demonstrate this phenomenon using black-and-white patterns of concentric circles that, when viewed through a convex plastic casing, emanate a myriad of colors at the periphery (see fig. 114).

This optical flicker is pronounced in the work of Bridget Riley, who introduces slight variables into complex linear systems in such works as *Tremor* (fig. 107), in which a triangular unit is modified incrementally throughout the composition to produce a sense of movement. The sinewy contours of *Current* (fig. 108) provide an even more spectacular visual phenomenon. The linear structure of the painting shifts direction and gathers into tight folds, making it difficult for the viewer's eyes to focus. The overwhelming

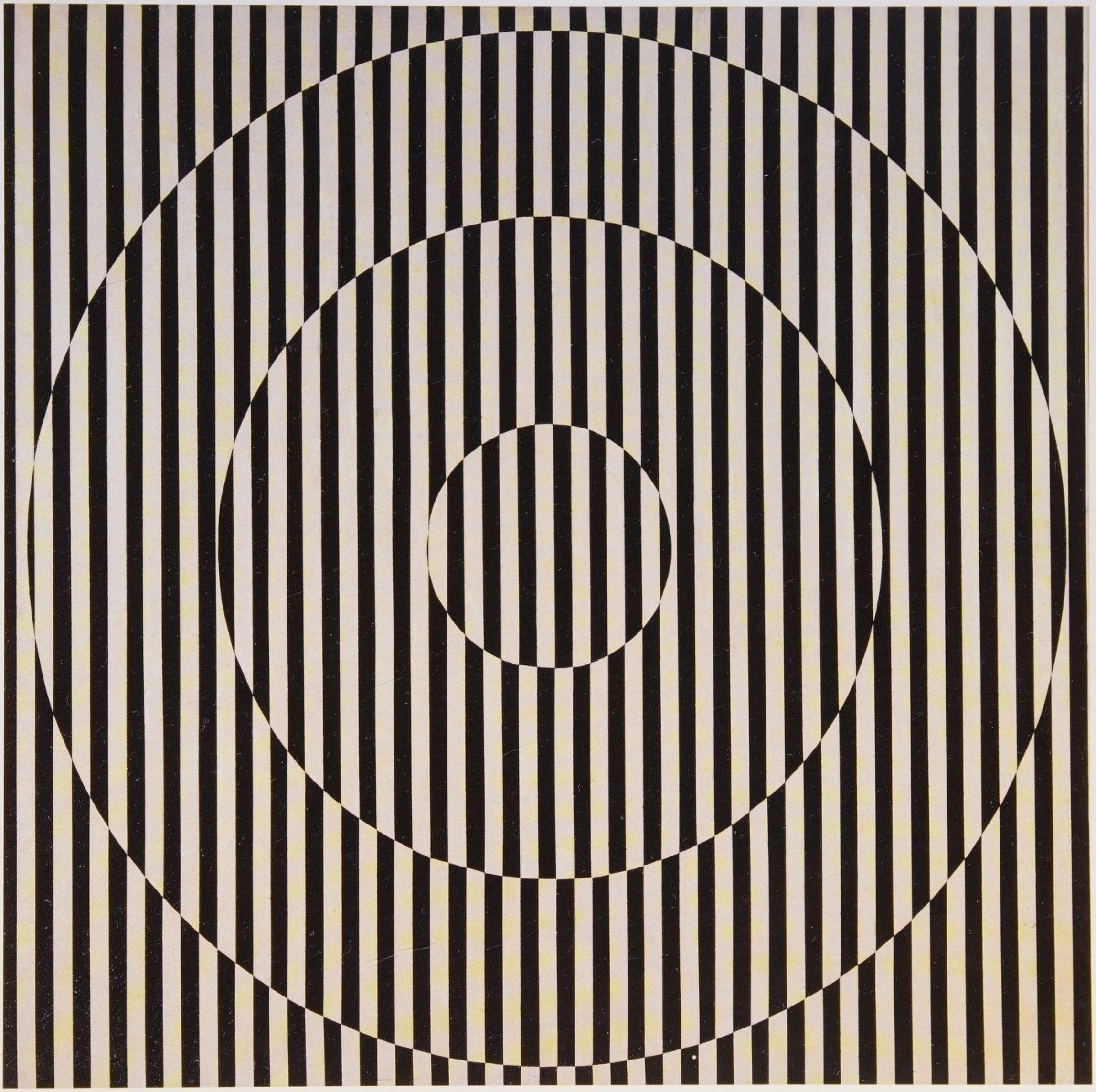


Fig. 106
Rakuko Naito
American, born Japan 1935
Black and White Stripe – Circle
1965
Acrylic on linen
46 x 46 in. (116.8 x 116.8 cm)
Collection of the artist

Courtesy of the Artist

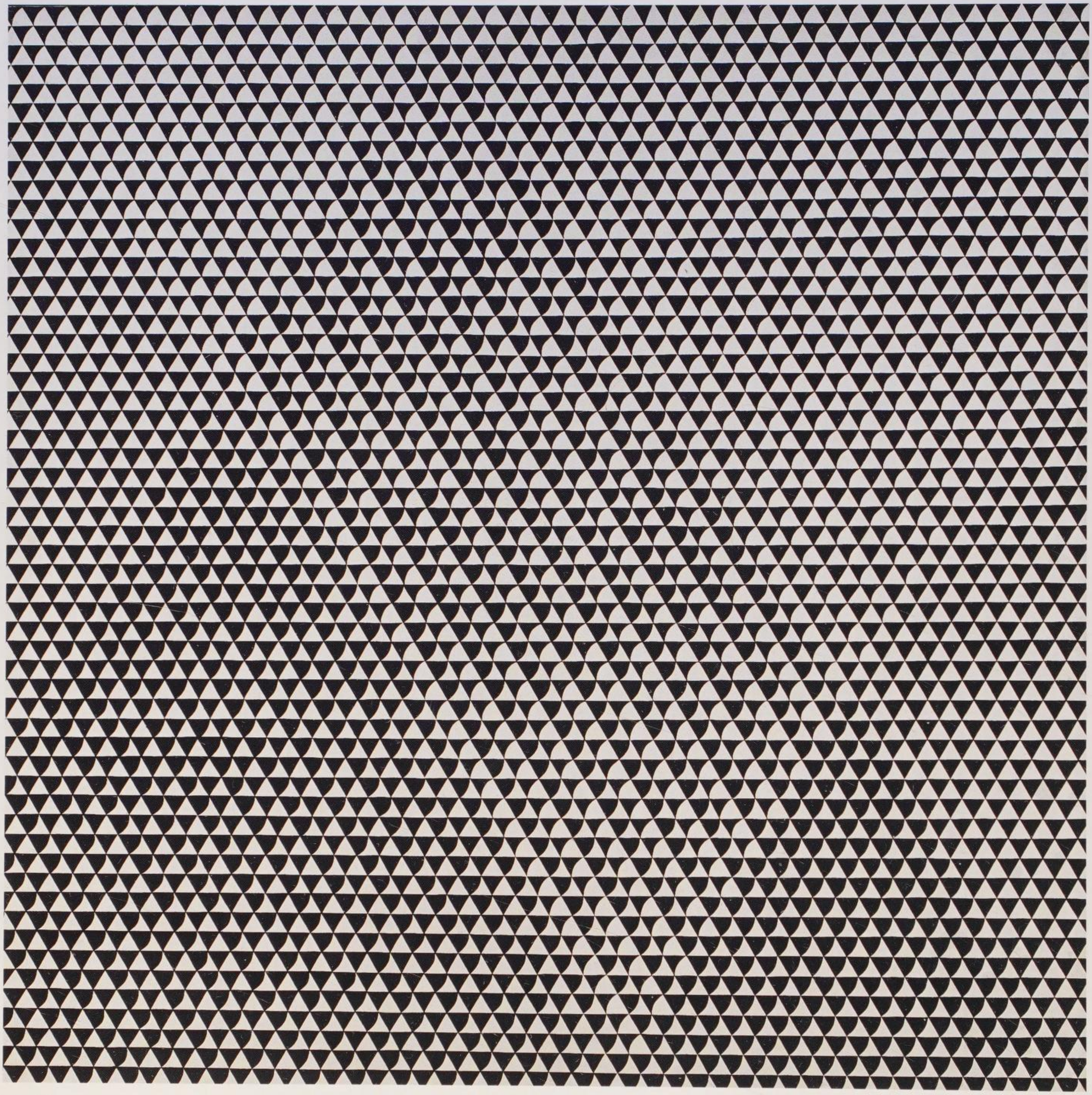


Fig. 107
Bridget Riley
British, born 1931
Tremor
1962
Emulsion on board
48 x 48 in. (122 x 122 cm)
Private collection

Courtesy of Karsten Shubert, London, England
© 2006 Bridget Riley, All Rights Reserved

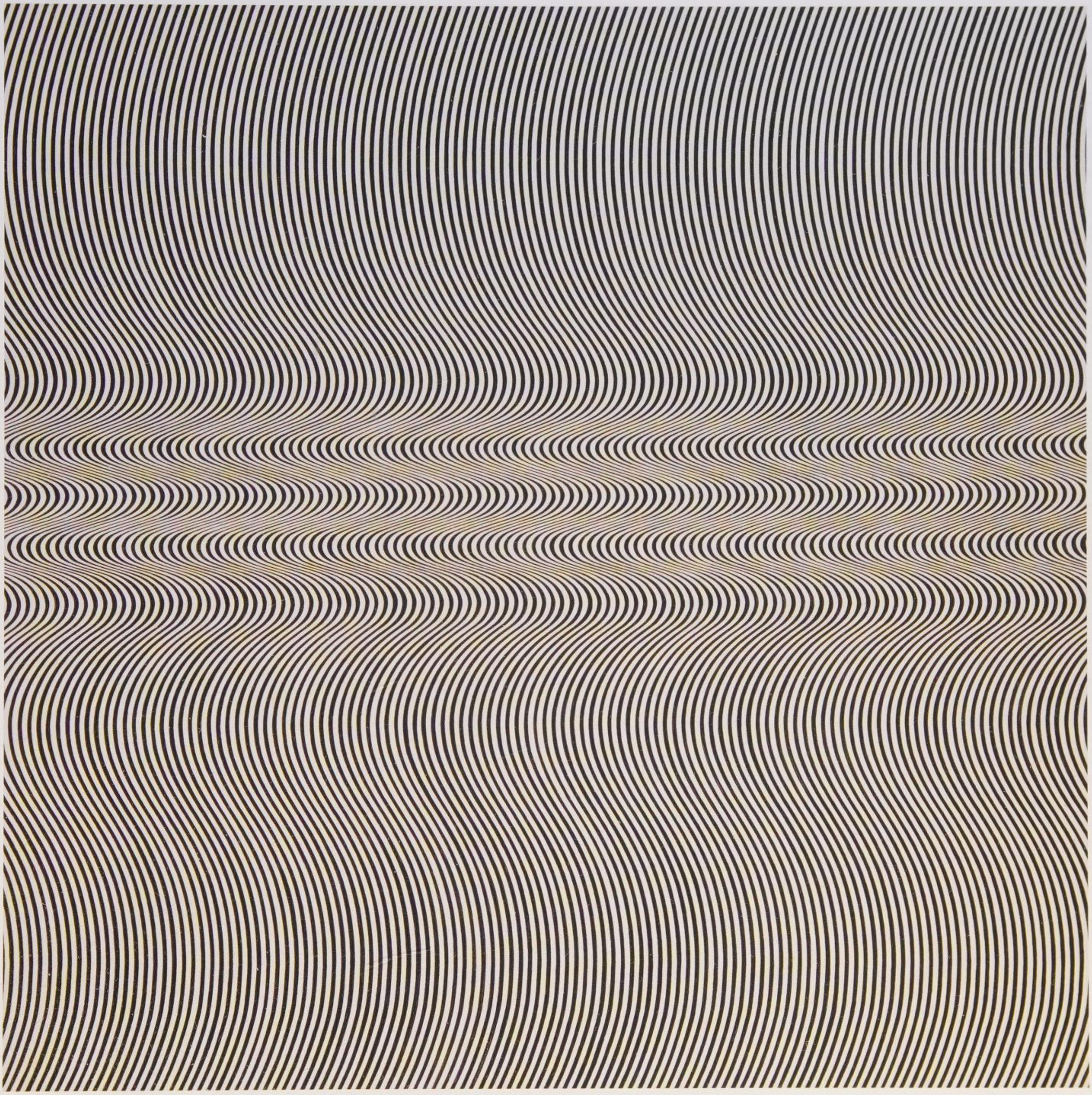
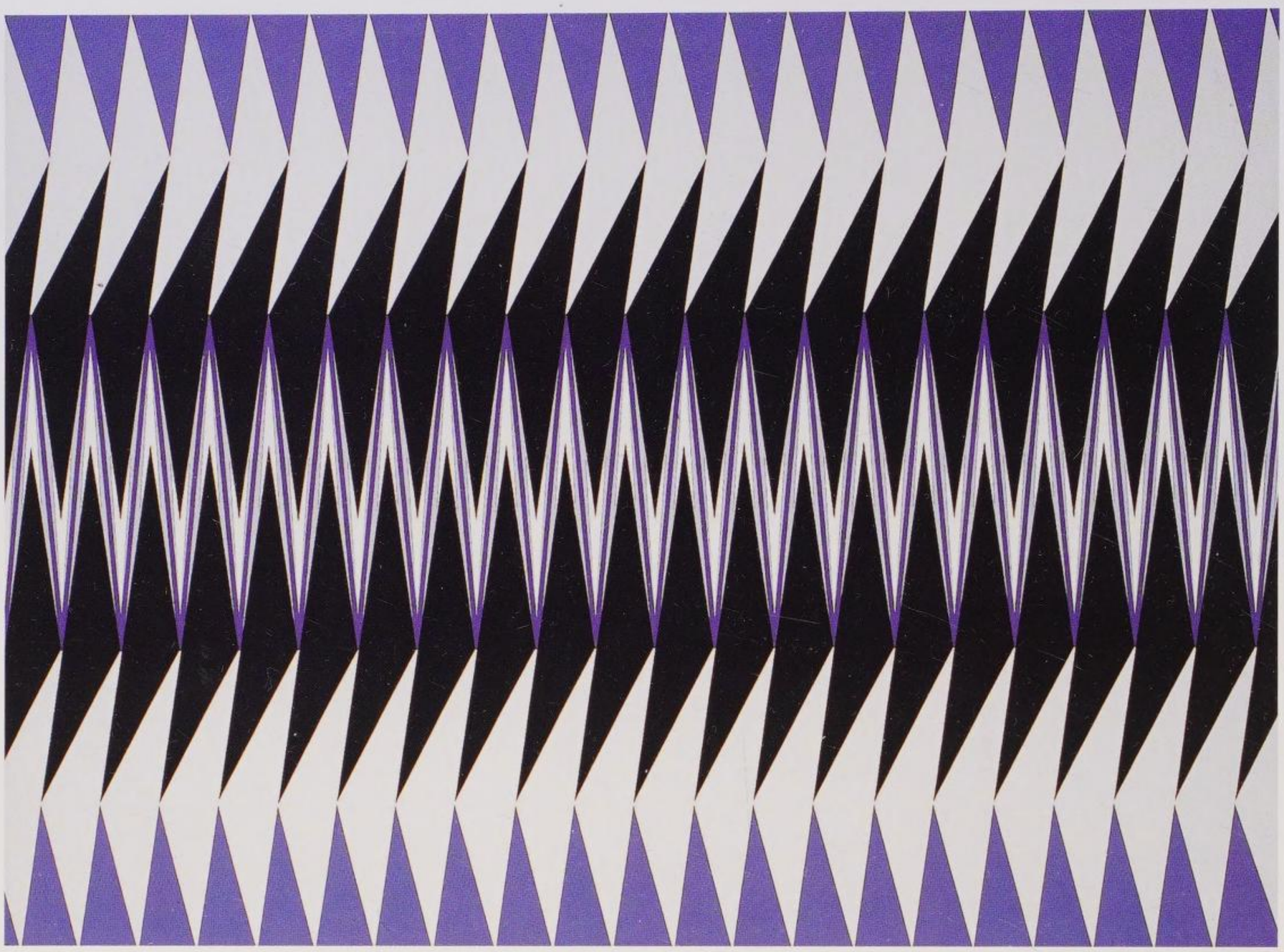


Fig. 108
Bridget Riley
British, born 1931
Current
1964
Synthetic polymer paint on composition board
$58^{3}/_{8}$ x $58^{7}/_{8}$ in. (148.3 x 149.5 cm)
The Museum of Modern Art, New York, New York: Philip Johnson Fund. 576.1964

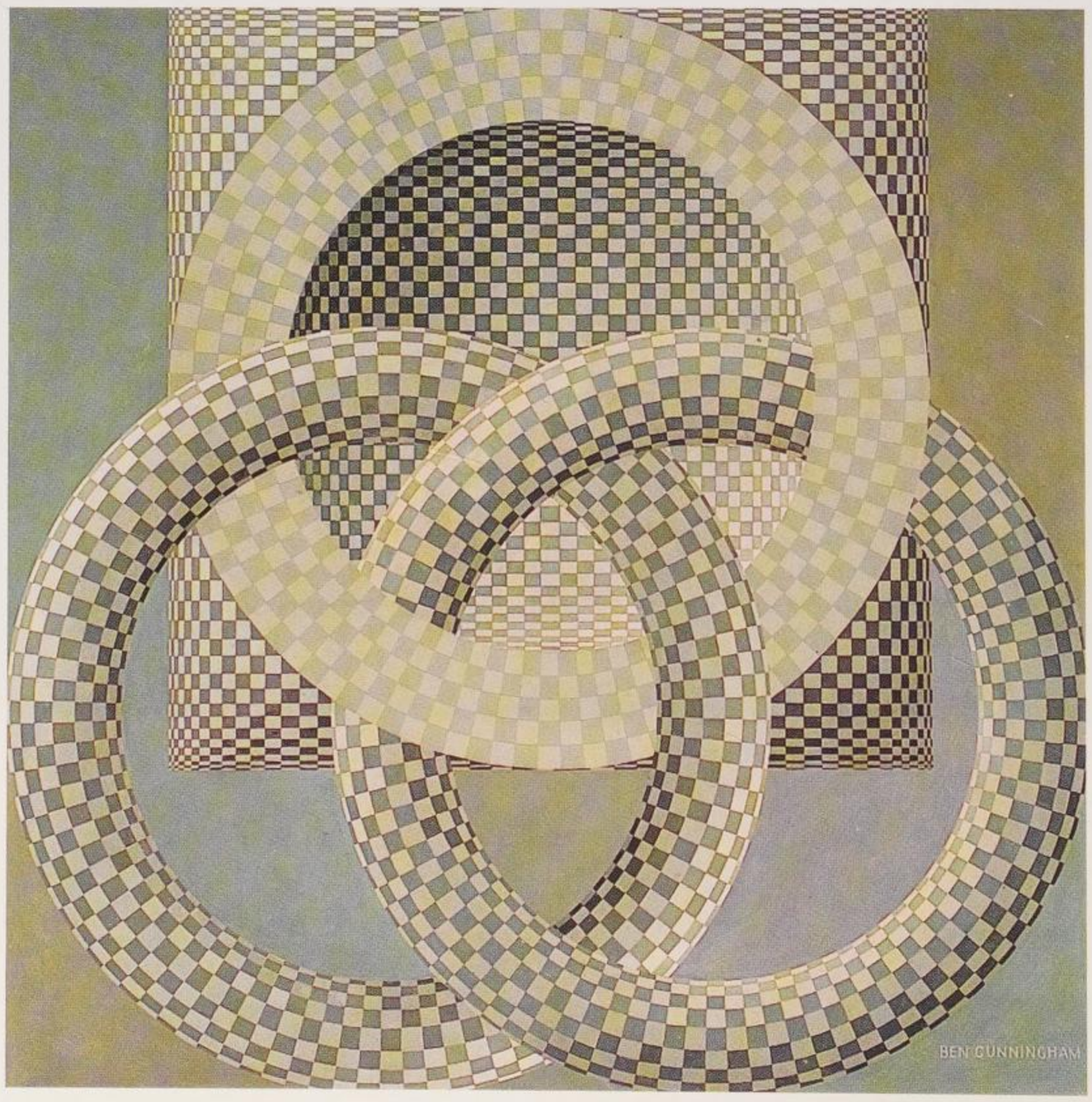
Digital Image © The Museum of Modern Art/Licensed by SCALA/Art Resource, New York © 2006 Bridget Riley, All Rights Reserved

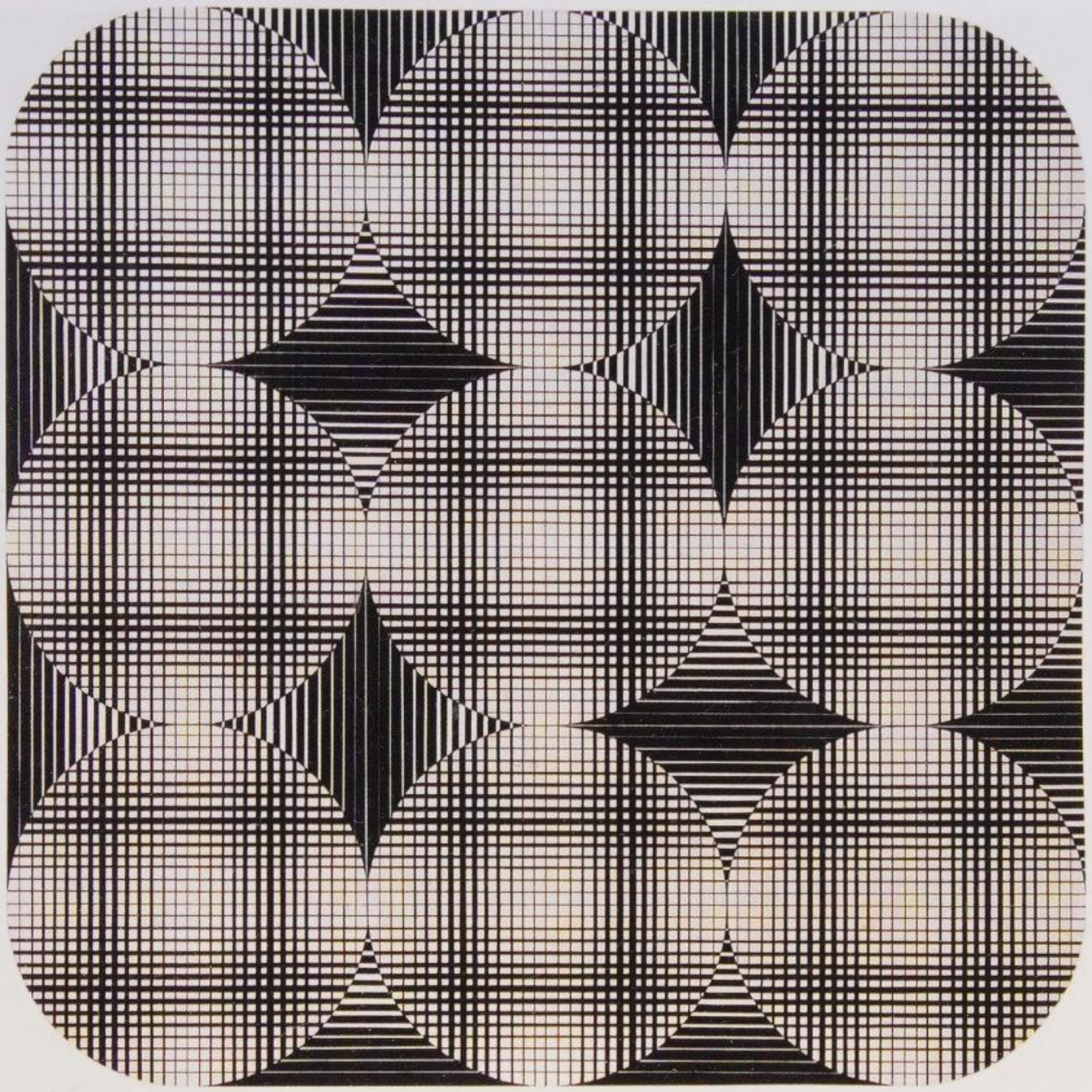
Right: Fig. 109
Francis Celentano
American, born 1928
Phalanx
1965
Acrylic on canvas
47 3/4 x 64 1/2 in. (121.3 x 163.8 cm)
Henry Art Gallery, University of Washington, Seattle, Washington: Henry Gallery Fund, purchased by Parnassus and Northwest Craftsman Fund. 67.14

Photography by Richard Nicol

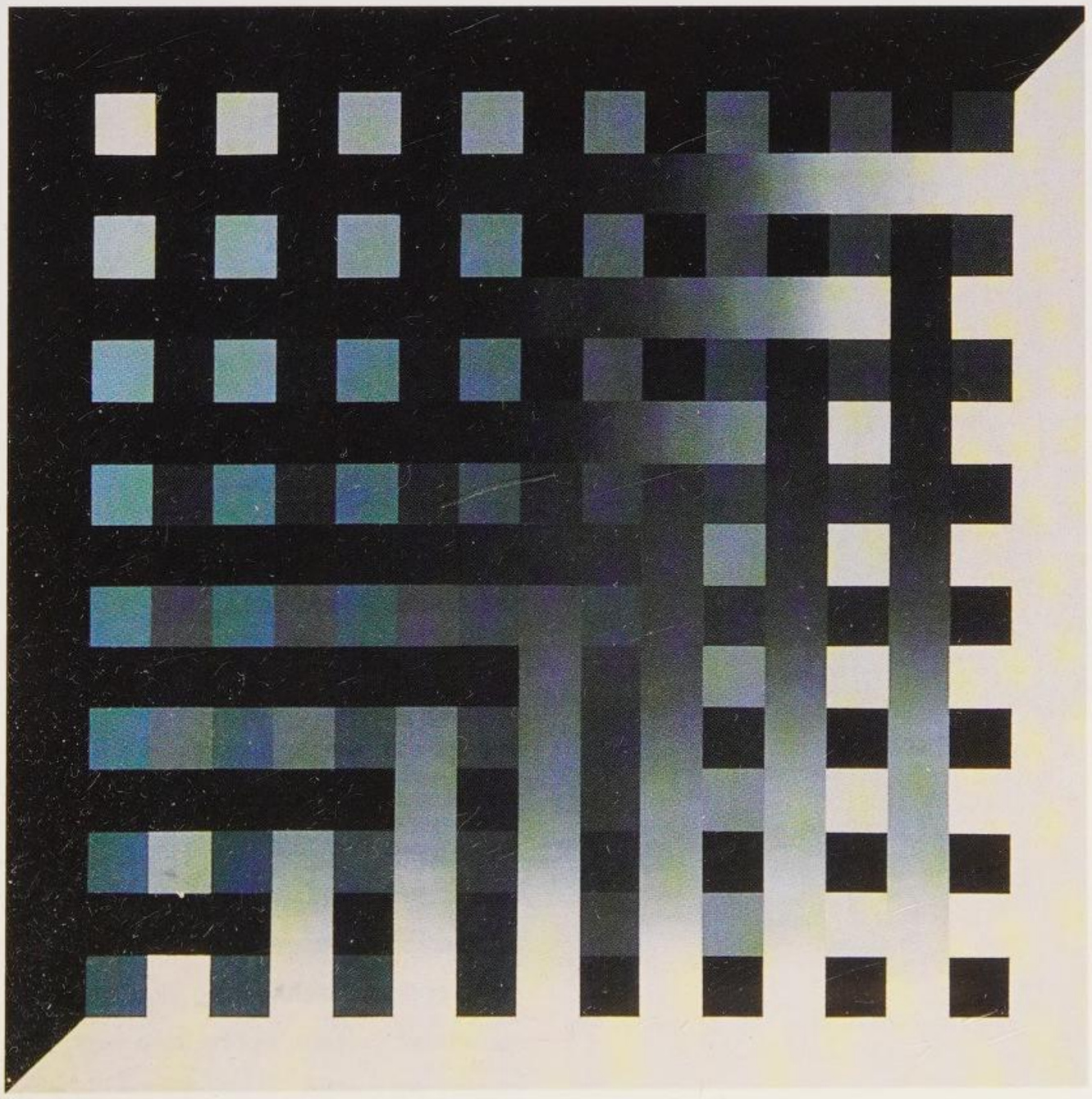


Right: Fig. 110
Ben Cunningham
American, 1904–1975
Untitled
c. 1964
Oil on masonite
30 x 30 in. (76.2 x 76.2 cm)
Private collection, Columbus, Ohio

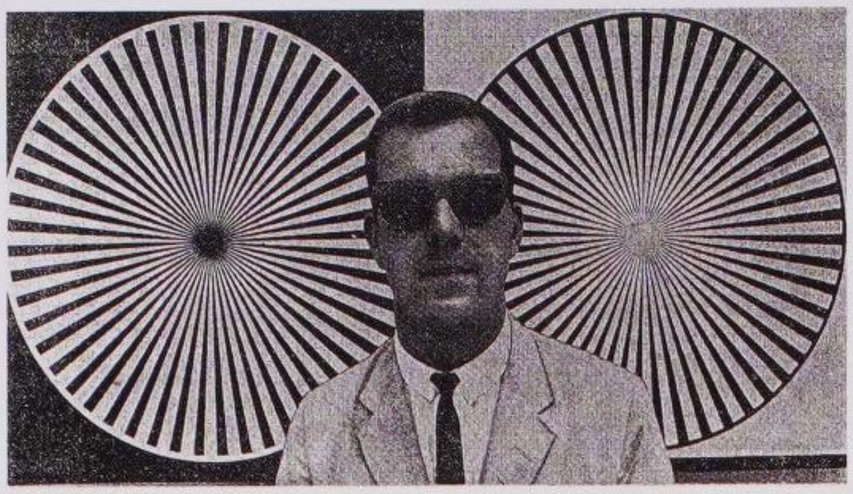




Left: Fig. 111
Ernst Benkert
American, born 1928
Warsaw #4
1965
Acrylic on paperboard
24 1/2 x 24 1/2 in. (62.2 x 62.2 cm)
Courtesy of the Artist and LewAllen Contemporary, Santa Fe, New Mexico



Left: Fig. 112
Francis Hewitt
American, 1936–1992
Overlap Series #3
1967
Acrylic on masonite
36 x 36 in. (91.4 x 91.4 cm)
Collection of Karen Hewitt, Burlington, Vermont



Right: Fig. 113
Photograph from the *Seattle Post-Intellegencer*, July 18, 1965
The caption reads: "It requires a hardy eye as well as a responsive one to survive an 'op' art show. Dr. Gregory Eisen shields eyes with sun glasses. Behind him at show in the Seattle Center Art Pavilion are 'Cinematic Paintings,' two big pie-like wheels that dazzle the eye of the beholder."
Courtesy of the Seattle Art Museum Archives, Seattle, Washington



Above: Fig. 114
Karl Gerstner
Swiss, born 1930
Lens Picture #19
1962
Mixed media construction with Plexiglas lens and fluorescent light
25 x 25 x 4 1/2 in. (63.5 x 63.5 x 11.4 cm)
Private collection

stimulation pushes perceptive faculties to a crisis point, eliciting red, yellow, and blue pulsing color from within the folds. In such works as *Current*, Riley induces a sense of discomfort and vertigo, creating a visceral event that some contemporary critics described as an act of visual "violence" against the viewer, an intention that Riley denied. Her black-and-white vibrations were among the works that caused museum guards to petition for permission to wear sunglasses in *The Responsive Eye*, and her black-and-white wiggles even inspired packaging for anti-vertigo medication.[4]

There is a similar effect in Julian Stanczak's *Anywhere–Everywhere* (fig. 115), which superimposes two linear structures. Where these systems traverse, our vision becomes challenged, and the surface begins to quiver with light and color, summoning the effect of a moiré pattern. When two or more regular structures are superimposed at varying degrees, a moiré "fringe" occurs, creating surprising new patterns and spatial distortions. These "fringes" can serve as magnification lenses, a peculiar phenomenon that has scientific application in the field of microscopy and astronomy. One of the first artists to explore moiré effects was Jesús Rafaël Soto who, using Plexiglas sheets, superimposed one regular pattern over another. A tertiary pattern would emerge from this combination, much like the occurrence of phantom overtones in music. Following this principle, Soto also created *Vibration Structures* in which wires, hanging in front of linear patterns, seem to vibrate like a stringed instrument as one passes in front of the work. Moiré effects can become even more pronounced when the space between the two patterns is increased, as in the case of the Plexiglas constructions of Ludwig Wilding and Mon Levinson. Levinson, who recalls being inspired by the effects seen through an elevator gate, has created inexplicable moiré fringes from multiple sheets of patterned acrylic positioned in shallow boxes, as in *White Moving Planes – VI* (fig. 71). To see the impact of three-dimensional moiré constructions, the viewer must physically interact with the work, shifting his or her viewpoint.

Jean-Pierre Yvaral adds another element of interaction in *Acceleration Optique* (fig. 121), which superimposes transparent vinyl cords in front of a bold geometric pattern. Acting as a lenticular lens, the cords distort the pattern differently for each eye, heightening

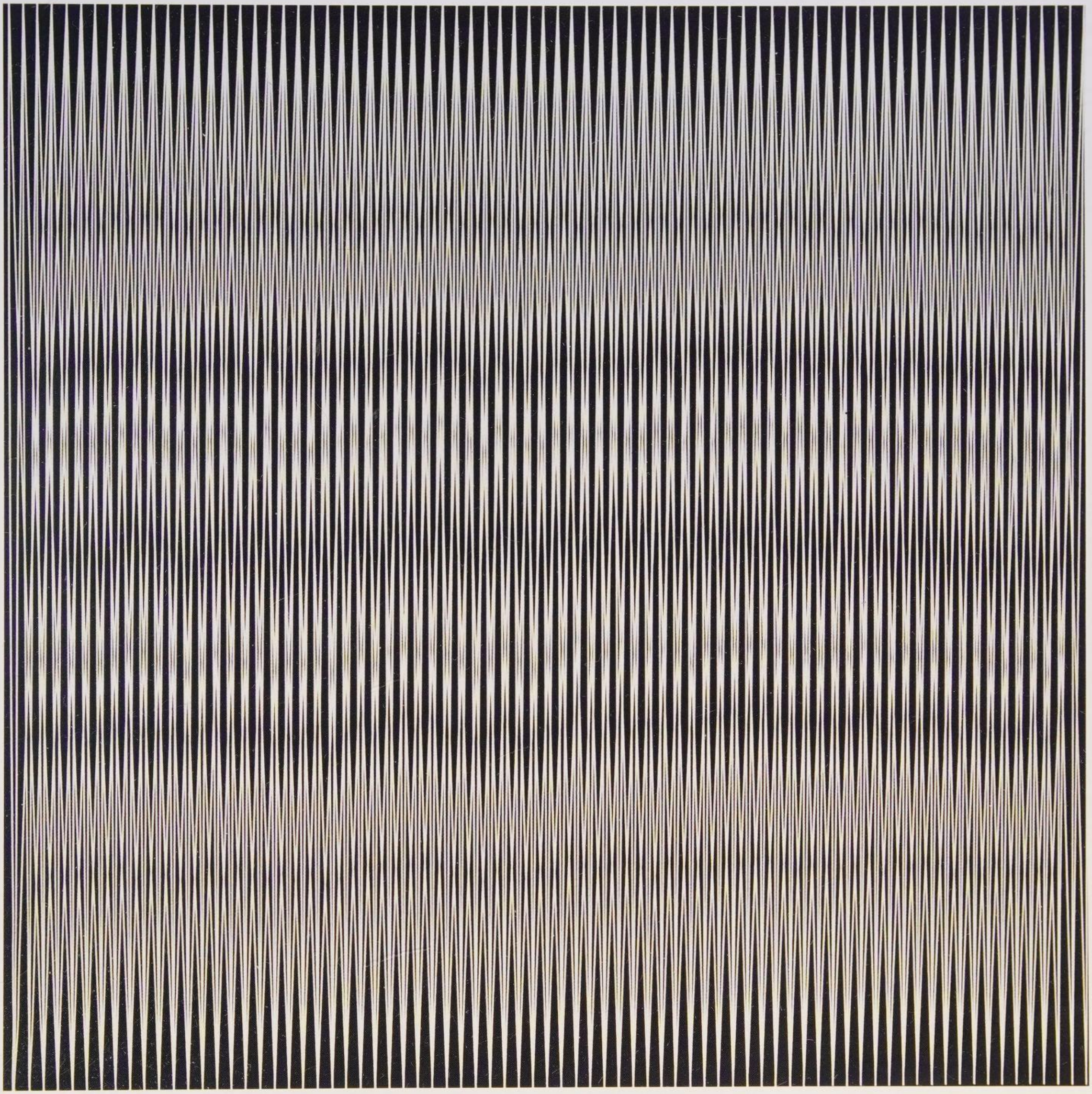
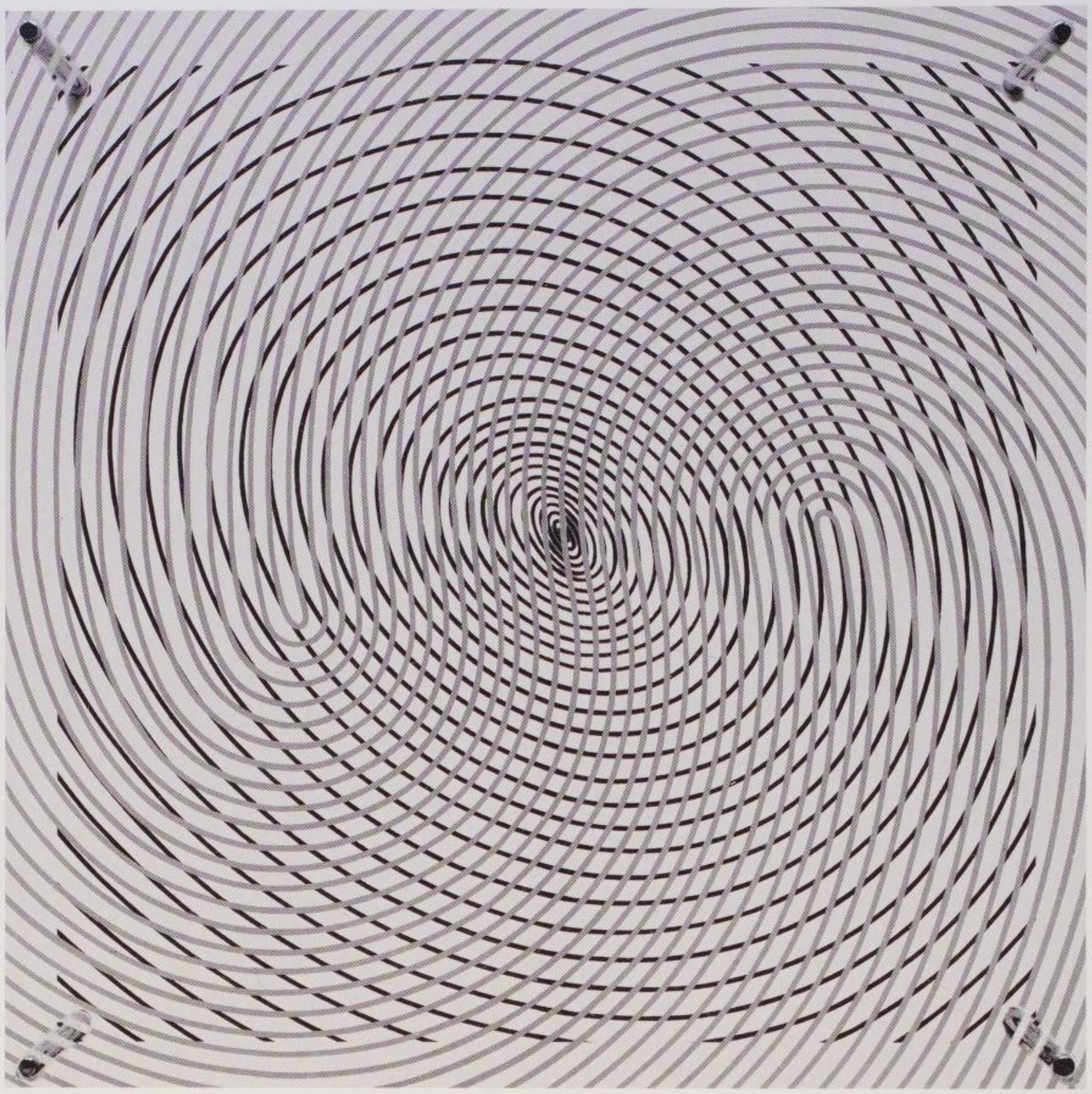
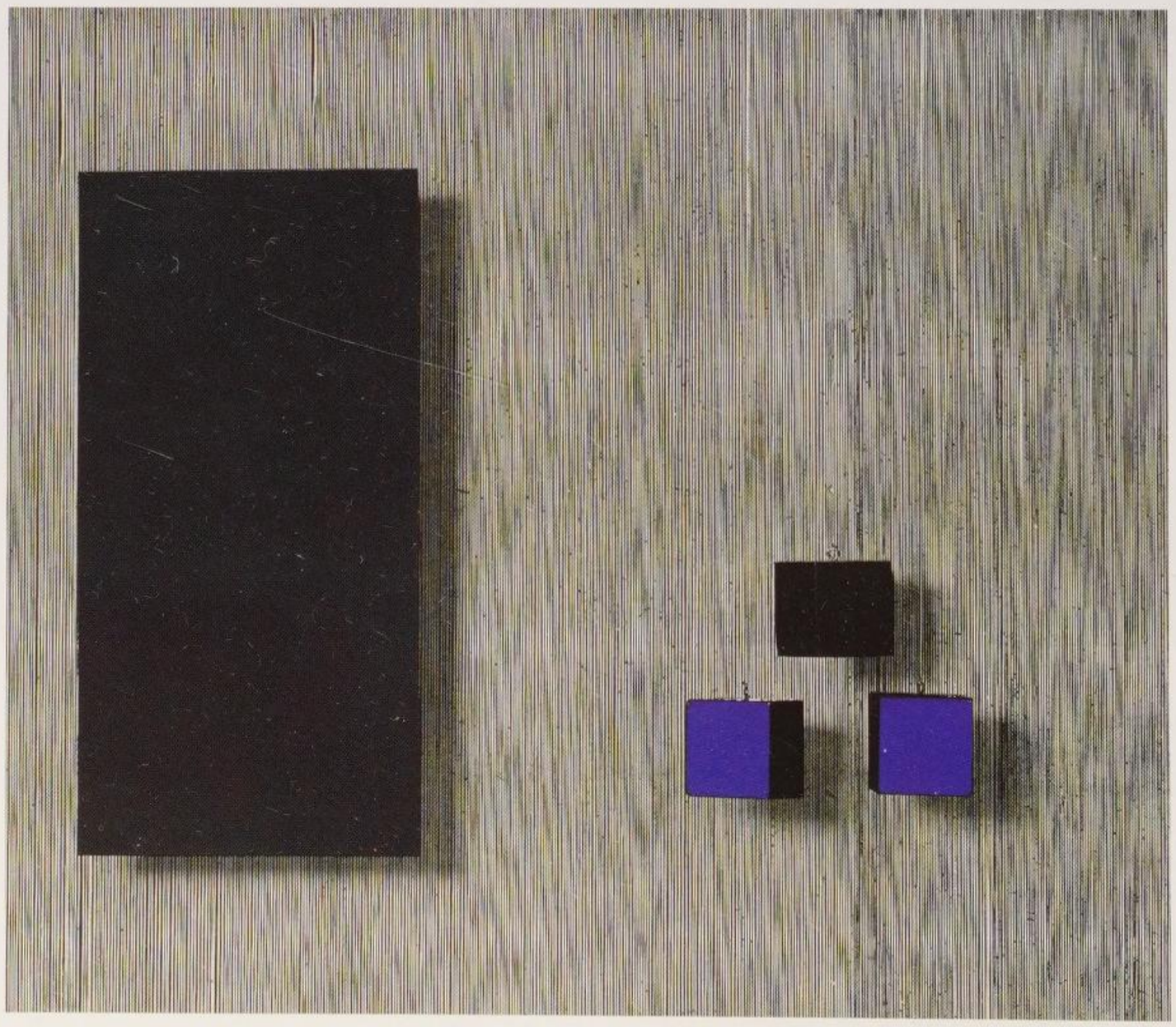


Fig. 115
Julian Stanczak
American, born Poland 1928
Anywhere–Everywhere
1967
Acrylic on canvas
76 x 76 in. (193 x 193 cm)
Collection of the Artist

Right: Fig. 116
Jesús Rafaël Soto
Venezuelan, 1923–2005
Spiral
(Spirale)
1955
Plexiglas, wood, enamel, and metal
$15^{5}/_{16}$ x $15^{5}/_{16}$ x $3^{1}/_{2}$ in. (39 x 39 x 9 cm)
Collection of Getulio Alviani, Milan, Italy
© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris



Right: Fig. 117
Jesús Rafaël Soto
Venezuelan, 1923–2005
The Three Blue Cubes
(Les Trois Cubes Bleus)
1962
Paint on wood and metal with nylon filament
$39^{3}/_{8}$ x $39^{3}/_{8}$ in. (100 x 100 cm)
Marcia Cristina and Pablo Henning Collection, Houston, Texas
Courtesy of Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris



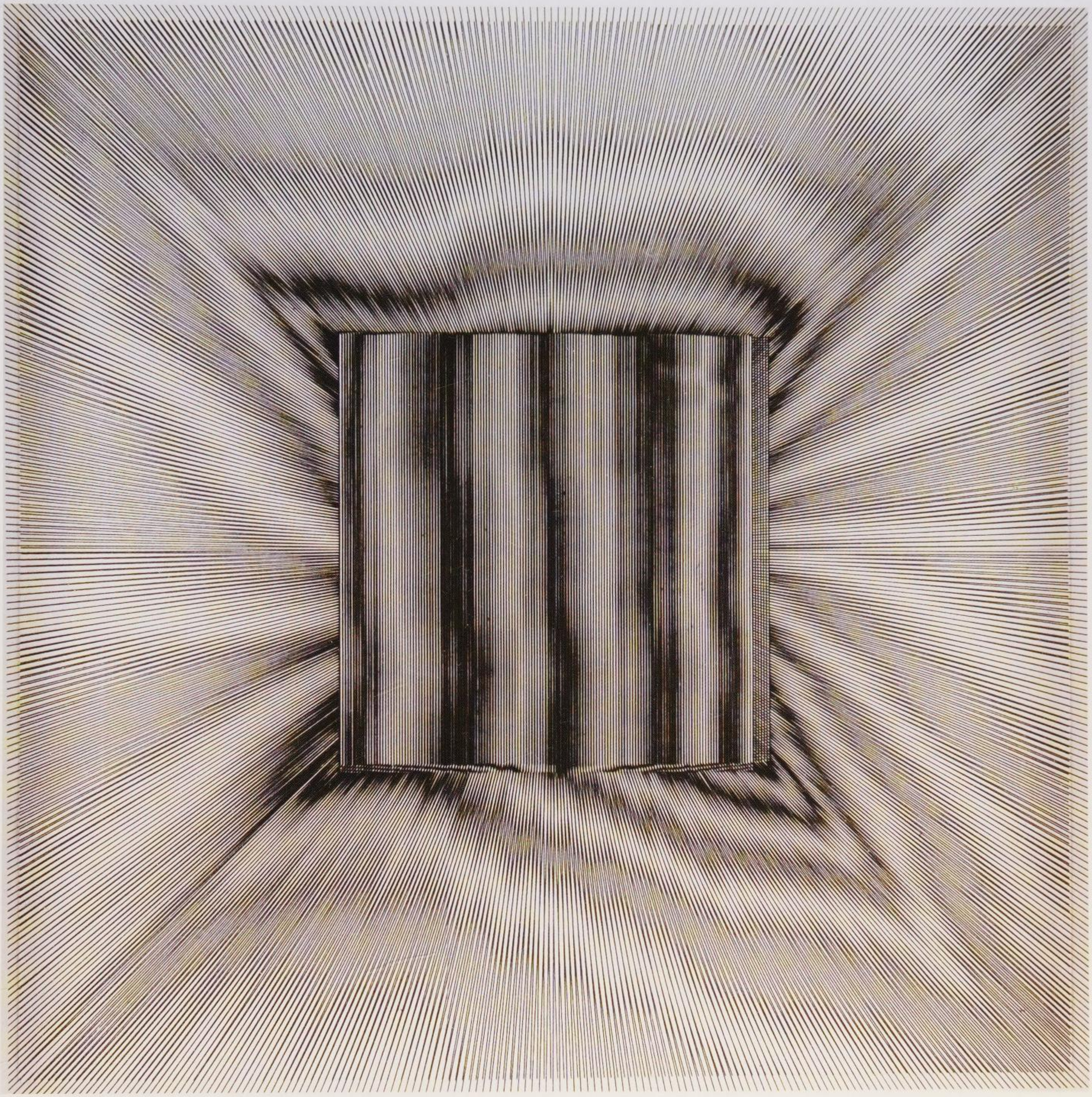


Fig. 118
Ludwig Wilding
German, born 1927
D. R. – Motiv
1966
Wood, Plexiglas, and acrylic, edn 7/10
29½ x 29½ x 3⅛ in. (75 x 75 x 8 cm)
Collection of the artist

Courtesy of the Artist

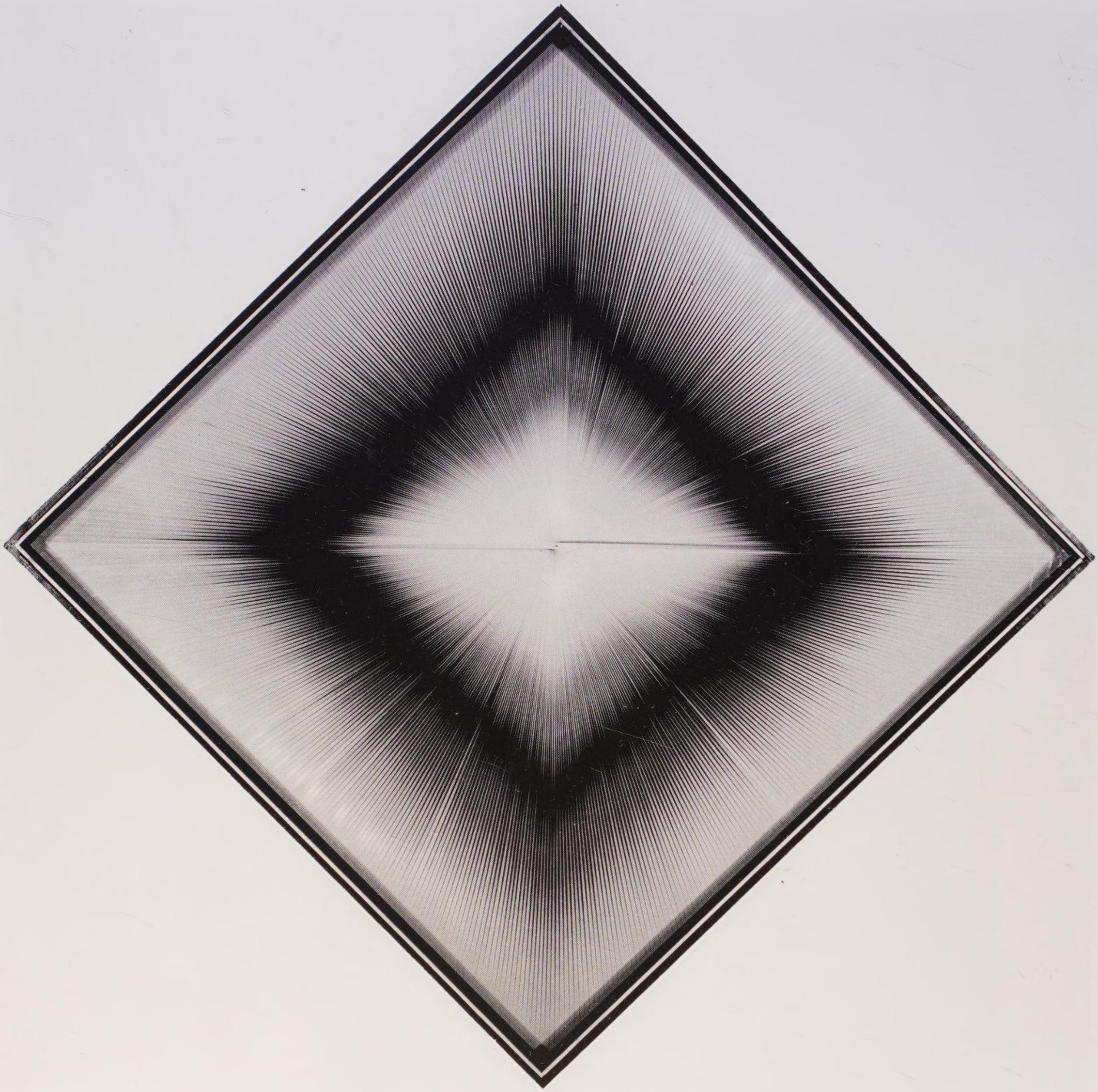


Fig. 119
Toni Costa
Italian, born 1935
Visual Dynamics 1
1965
Wood on Plexiglas on polyethylene
51 x 51 in. (129.5 x 129.5 cm)
The JPMorgan Chase Art Collection



Fig. 120
Mon Levinson
American, born 1926
The Edge II
1965
Mixed media construction
24 x 24 in. (61 x 61 cm)
Collection of the artist

Courtesy of the Artist, New York, New York

Fig. 121

Jean-Pierre Yvaral

French, 1934–2002

Acceleration Optique

1962

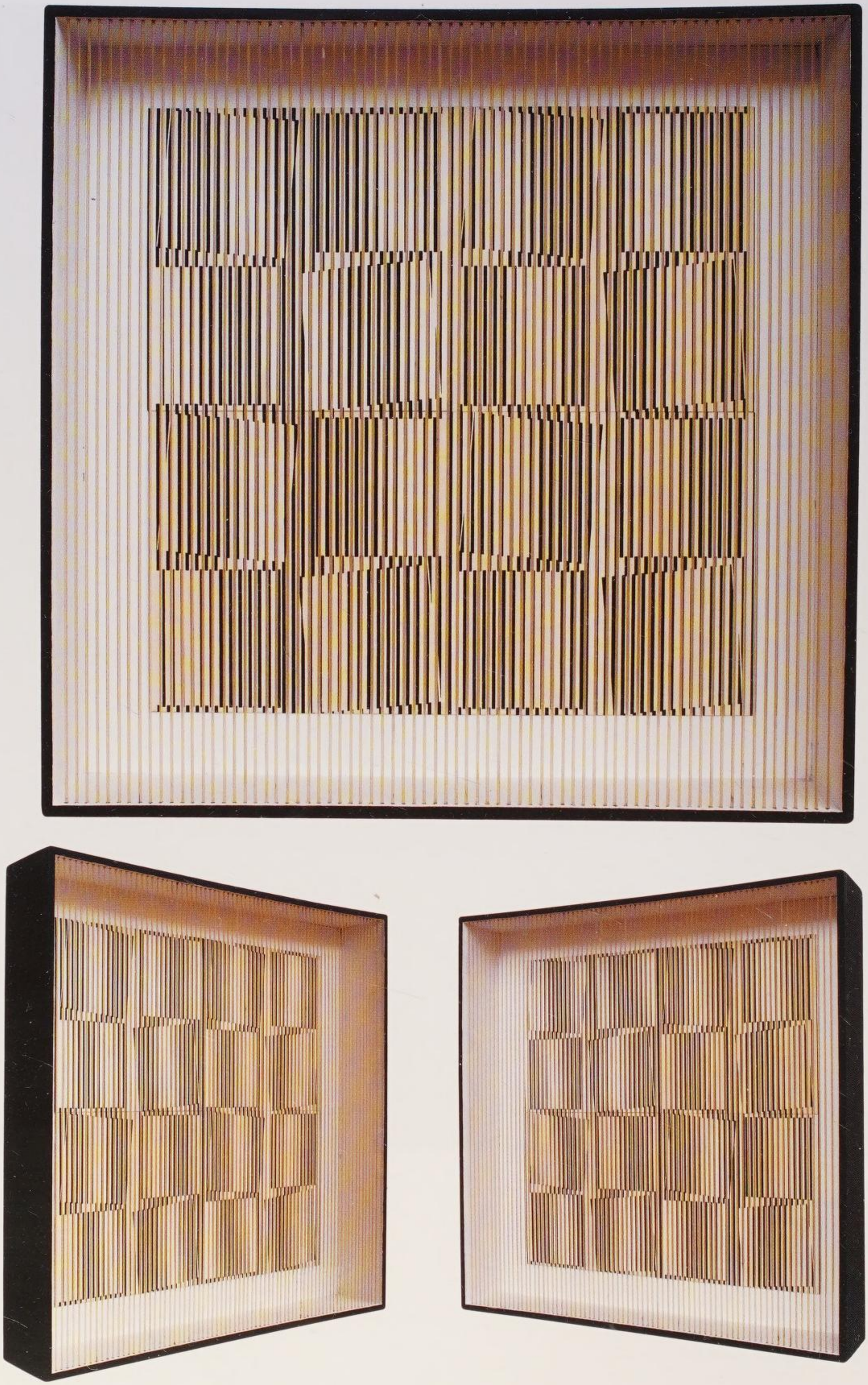
Painted wood and vinyl tubing (three views)

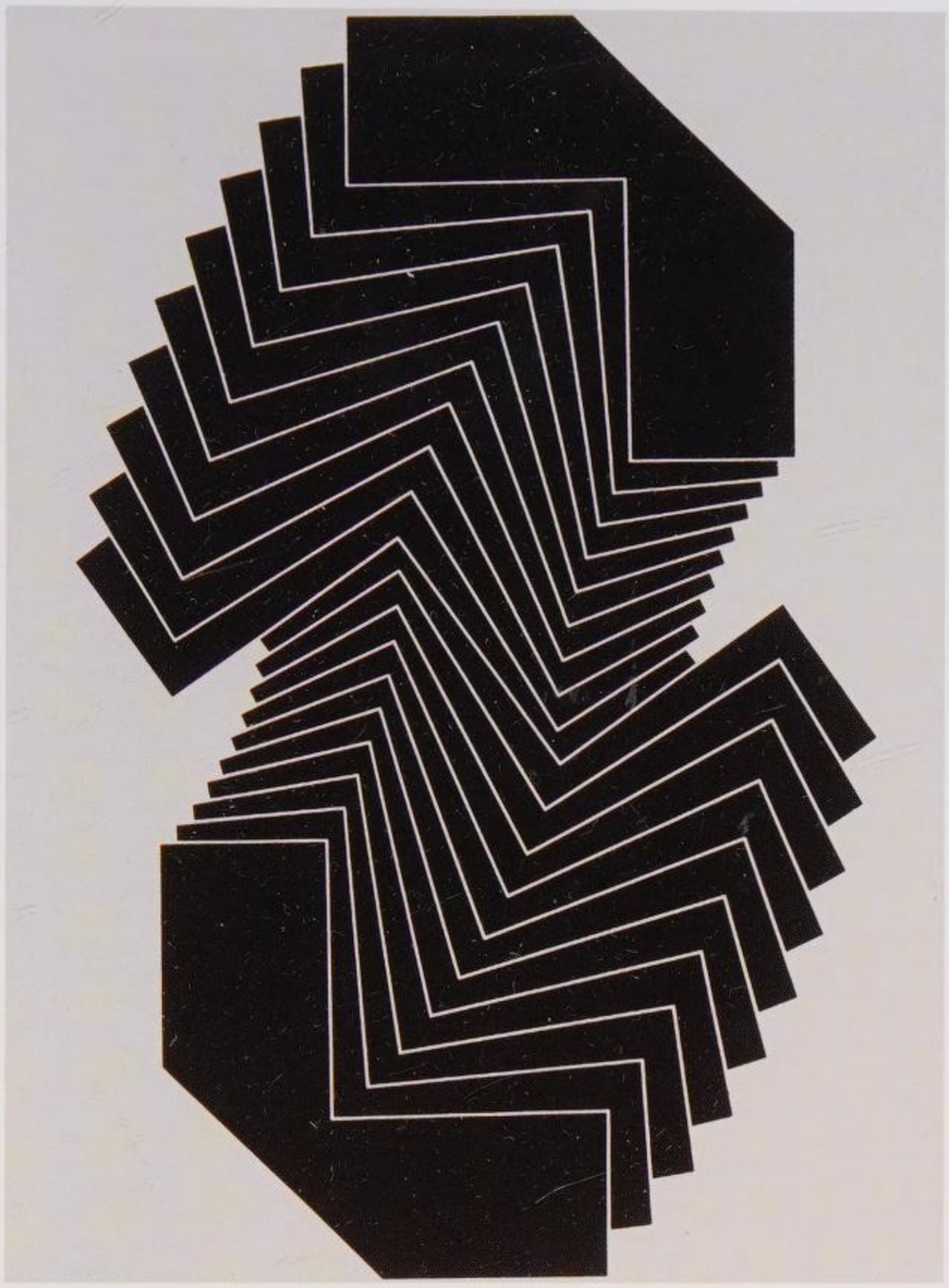
$48^{3}/_{4}$ x $48^{3}/_{4}$ x $8^{1}/_{2}$ in.

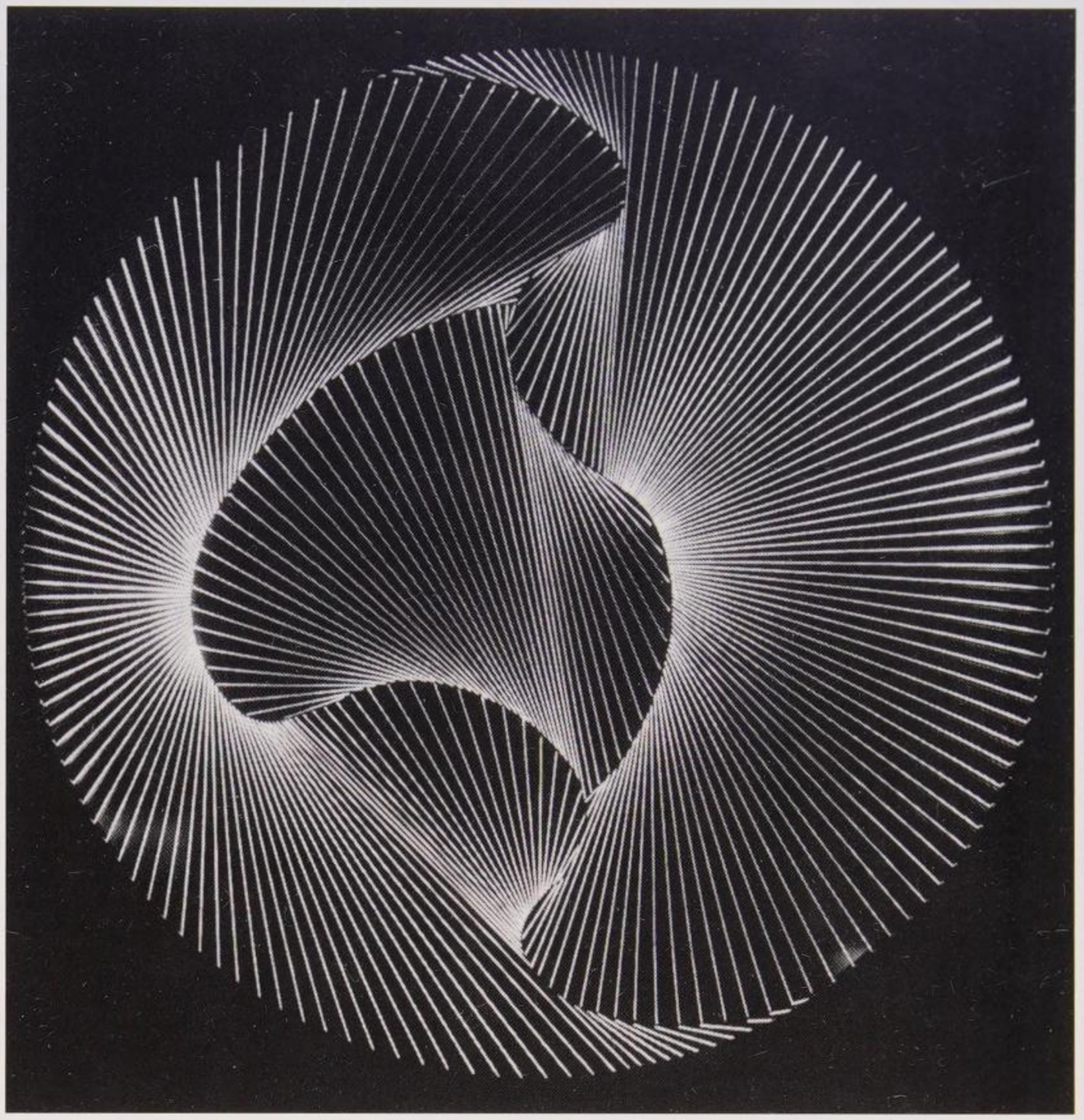
(123.8 x 123.8 x 21.6 cm)

Miami University Art Museum, Oxford, Ohio: Gift of Beatrice Cummings Mayer. 1991.529

© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris







the sense of spatial ambiguity. Son of Victor Vasarely and a member of the French collective GRAV, Yvaral considered art to be a catalyst for personal and social transformation and sought to "restore the primal quality of vision." Along with other members of the group, he incorporated the elements of participation and play, tools that could lead toward self-discovery. In stating his intentions for the group's work, he articulates a significant role for perceptual art in general: "The result of all this seems to me to be an education in visual perception itself. Separated from the work, the spectator can see in the natural as well as in the cultural environment visual effects that have previously remained unobserved."[5]

1 Marcel Joray, ed., *Vasarely, Plastic Arts of the 20th Century*, 1969, p. 112, 1st English edn. of the 1964 French publication.

2 Neil Rector, "Communicating in a Different Way: The Julian Stanczak Interviews," unpublished manuscript, Columbus, Ohio 2000, p. 112.

3 Johann Wolfgang von Goethe, *Goethe's Theory of Colours*, transl. by Charles Lock Eastlake, London (John Murray) 1840, p. 83.

4 Pfizer, Anti-Vert drug packaging, *c.* 1973.

5 Jean-Pierre Yvaral, "Aims," in *Directions in Art, Theory, and Aesthetics*, ed. Anthony Hill, Greenwich, Conn. (New York Graphic Society) 1968, p. 270.

Above, left: Fig. 122
Franco Grignani
Italian, 1908–1999
243 Periodical
(243 periodica)
1968
Tempera and ink on cardboard
$27^{3}/_{8}$ x $19^{7}/_{8}$ in. (69.5 x 50.5 cm)

Courtesy of Arte Struktura, G.F. Bonomi and Getulio Alviani, Milan, Italy

Above, right: Fig. 123
Angel Duarte
Spanish, born 1930
V32
1963
Glass, aluminum, and neon
$19^{11}/_{16}$ x $19^{11}/_{16}$ x $2^{3}/_{4}$ in. (50 x 50 x 7 cm)
Collection of Getulio Alviani, Milan, Italy

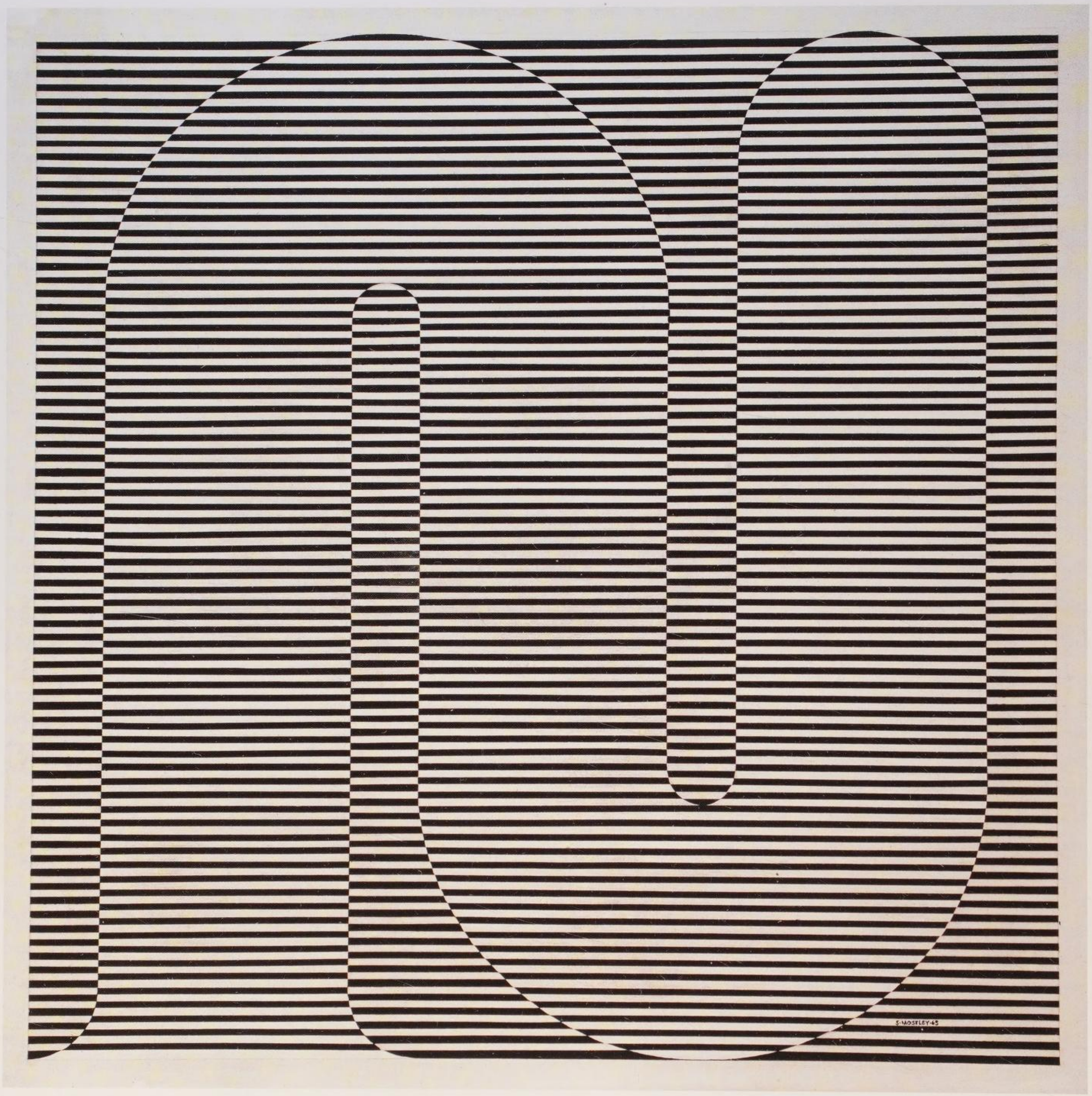


Fig. 124
Spencer Moseley
American, 1925–1998
Little Portuguese Bend
1965
Acrylic on canvas
40 x 40 in. (101.6 x 101.6 cm)
Tacoma Art Museum, Tacoma, Washington:
Gift of Max Moseley and Grendl Lofkvist
Moseley. 1999.46.8

Photography by Richard Nicol

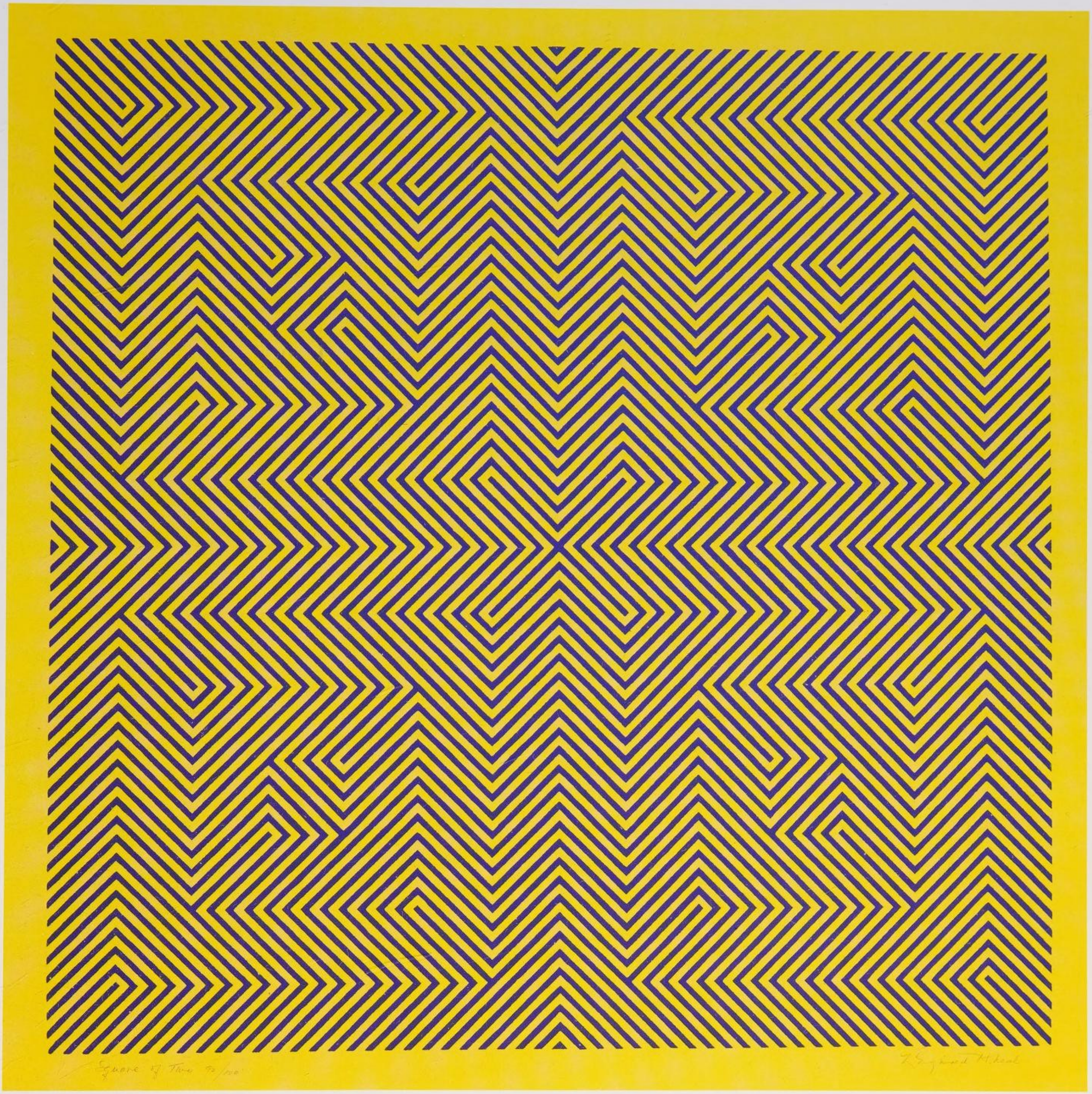


Fig. 125
Reginald Neal
American, born England, 1909–1992
Square of Two
c. 1965
Color lithograph, edn 92/100
21 1/4 x 21 1/4 in. (54 x 54 cm)
Private collection, Columbus, Ohio

MONOCHROME

No lines or imaginings, no shapes or composings or representings, no visions or sensations or impulses, no symbols or signs or impastos, no decoratings or colorings or picturings, no pleasures or pains, no accidents or ready-mades, no things, no ideas, no relations, no attributes, no qualities—nothing that is not of the essence.[1]

Ad Reinhardt, 1962

Kasimir Malevich's search for a supreme language of form led him to create the most reductive paintings that had yet been seen. His *Suprematist Composition: White on White* of 1918 eliminated nearly every formal element that had sustained Western painting for centuries: space, line, and color. What remains is a composition of a cool white square set askew against a background of a warmer white, a difference that registers only slightly on the viewer's eye. *White on White* does not function as painting had previously; it provokes the viewer to look more closely and with greater effort. Thus, painting becomes not the end in itself, but the catalyst for a transcendent experience. Ever since Malevich's attempts to move the viewer beyond the constructed world to the metaphysical realm, the genre of the monochrome has carried spiritual connotations. The Abstract Expressionists Mark Rothko and Barnett Newman, who claimed a transcendent function for abstraction, at times came close to Malevich's minimal composition in their quest for a visual equivalent to the absolute. They both created works for the Rothko Chapel in Houston, a place of worship designed around a series of dark maroon canvases. Yves Klein also explored the transcendent potential of monochrome, devising his own color, International Klein Blue, a densely pigmented ultramarine paint with heavenly connotations.

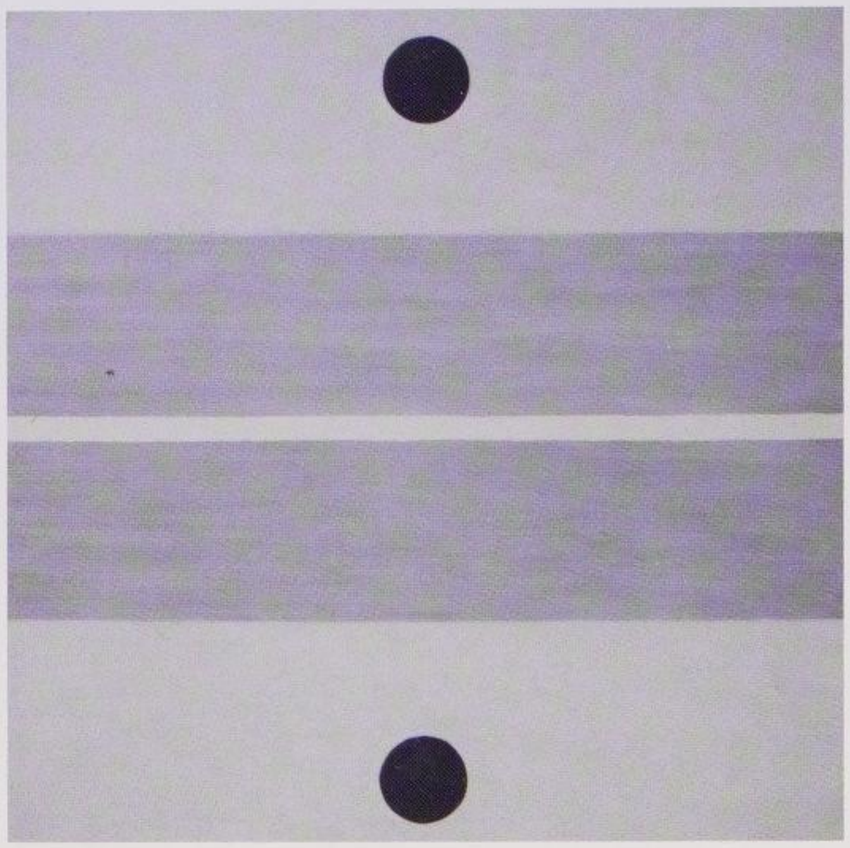
Goethe and his compatriot Philipp Otto Runge were among the first to denote an emotional equivalent of given spectral hues. Their romantic interpretation of color temperament was revised by such early twentieth-century non-objective painters as Kandinsky, who detailed the emotional effects of spectral colors, much like assigning emotion to notes on a keyboard. Though culturally influenced, such associations were often based in nature, thus connecting local color with emotional content. Behavioral psychologists applied the scientific method to color, adopting tests to gauge human response. The universal associations gained from color research were enlisted for a variety of practical uses, from diagnosing psychic disorders to selling supermarket products.[2] This growing area of applied psychology promoted renewed interest in the theories of the nineteenth-century physicists Chevreul and Blanc, who provided direction for the color iconography of early abstractionists. In the 1950s, their seminal texts were republished alongside new works on color theory by Bauhaus alumni Johannes Itten and Josef Albers. The environmental influence of color was also explored by art historian and amateur psychologist

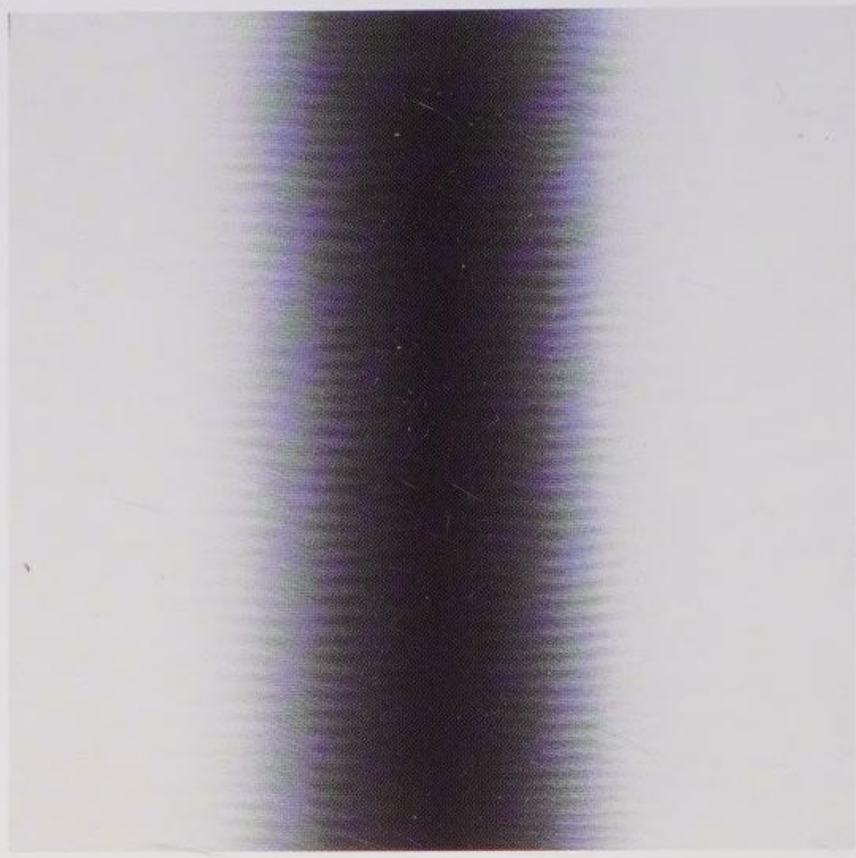
Right: Fig. 126
Agnes Martin
American, born Canada, 1912–2004
Untitled
1960
Oil on canvas
70 x 69½ in. (177.8 x 176.5 cm)
Private collection

Courtesy of PaceWildenstein, New York, New York. Photography by Gordon R. Christmas © 2006 Agnes Martin/Artists Rights Society (ARS), New York

Far right: Fig. 127
Wojciech Fangor
Polish, born 1922
#8
1964
Oil on canvas
42 x 42 in. (106.7 x 106.7 cm)
Collection of Joseph Masheck

Courtesy of Mitchell Algus Gallery, New York, New York





Faber Birren, who devised color code specifications for the US Navy to reduce accidents. Indeed, as Birren notes in his *Color Psychology and Color Therapy* of 1950, color could be prescribed like pills to heal psychophysical ills. Laden with environmental, emotional, and commercial associations, color in its singular form could nevertheless express or elicit sensations and meaning.

Among the earliest painters to devote themselves solely to the monochrome was Ad Reinhardt, whose compositions became increasingly spare in form and color during the 1950s. Although a founding member of the Abstract Expressionists, Reinhardt soon veered away from the group, insisting on a "non-expressionist" art that existed for its own sake. By 1960, he was consistently working within a square format, chosen for its neutrality. Divided into a grid of nine, this structure evokes the iconic image of the Greek cross, to which Malevich had also been drawn. This evocation, combined with his penchant for black, lends his mature paintings an elegiac quality. While careful not to speak in religious terms, he declared that he sought to make paintings that were "self conscious (no unconsciousness), ideal, transcendent, aware of no thing but Art (absolutely no anti-art)," an absolutism analogous to that of Malevich.[3] The aesthetic effect lies not in the painting itself, but in the very act of seeing. At first glance Reinhardt's canvases appear as one continuous color, usually black, but on prolonged inspection are revealed as a variety of closely related tints of the constituent hue. The experience is akin to stepping into the darkness. These subtle visual transitions force retinal cells to re-circuit; as the receptors responsible for detecting color in daylight become useless, the receptors responsible for ascertaining minor value differences in darkness take over. This physiological transformation to night-vision has a psychological effect. Reinhardt's monochromes, although often more modest in size than the architecturally scaled canvases of Rothko and Newman, invite an immersive experience beyond the immediate environment of the gallery space.

At the other end of the visible spectrum, Agnes Martin's paintings of the 1960s are repeatedly based on white. However, her work relies not on color alone, but also on the fine grids that delineate their surface. Like Reinhardt's paintings, their visual threshold is low, prompting a decelerated and careful examination, which in turn attends a psychological and even physiological response. Martin has spoken of her desire to demonstrate her "joy" of an imagined order and, simultaneously, the impossibility of achieving ideal perfection. This humanist vantagepoint is echoed in the work of Sally Hazelet Drummond, who emerged on to the New York scene shortly after Martin. In her radiant paintings, a single hue is suffused with a softly pulsating light derived from a stippled technique, a methodology with roots in the pointillist and futurist transcription of solar energy: radial patterns of staccato brushwork draw the viewer's gaze to the center point of a cosmic textural field. They represent a fullness of accumulated substance, paint, energy, and space that

Fig. 128

Agnes Martin

American, born Canada, 1912–2004

Garden

1964

Synthetic polymer and colored pencil on linen

72⅛ x 72⅛ in. (183.2 x 183.2 cm)

Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C.: Holenia Purchase Fund and Joseph H. Hirshhorn Purchase Fund, 2001. HMSG 01.10

Photography by Lee Stalsworth © 2006 Agnes Martin/Artists Rights Society (ARS), New York

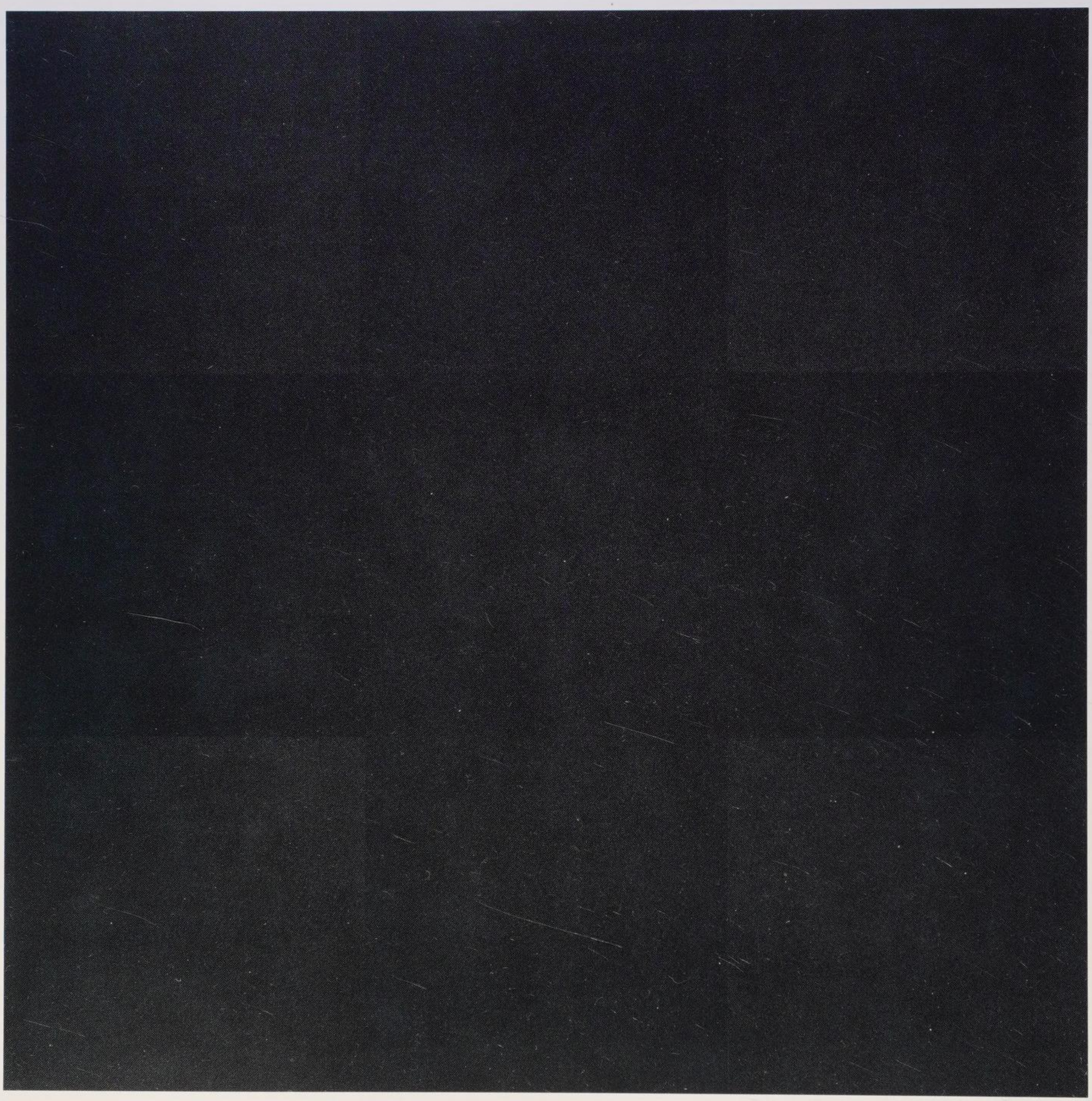


Fig. 129
Ad Reinhardt
American, 1913–1967
Abstract Painting
1960–66
Oil on canvas
60 x 60 in. (152.4 x 152.4 cm)
Solomon R. Guggenheim Museum, New York,
New York: By exchange, 1993. 93.423.9

Photography by David Heald © SRGF, New York
© 2006 Estate of Ad Reinhardt/Artists Rights Society
(ARS), New York

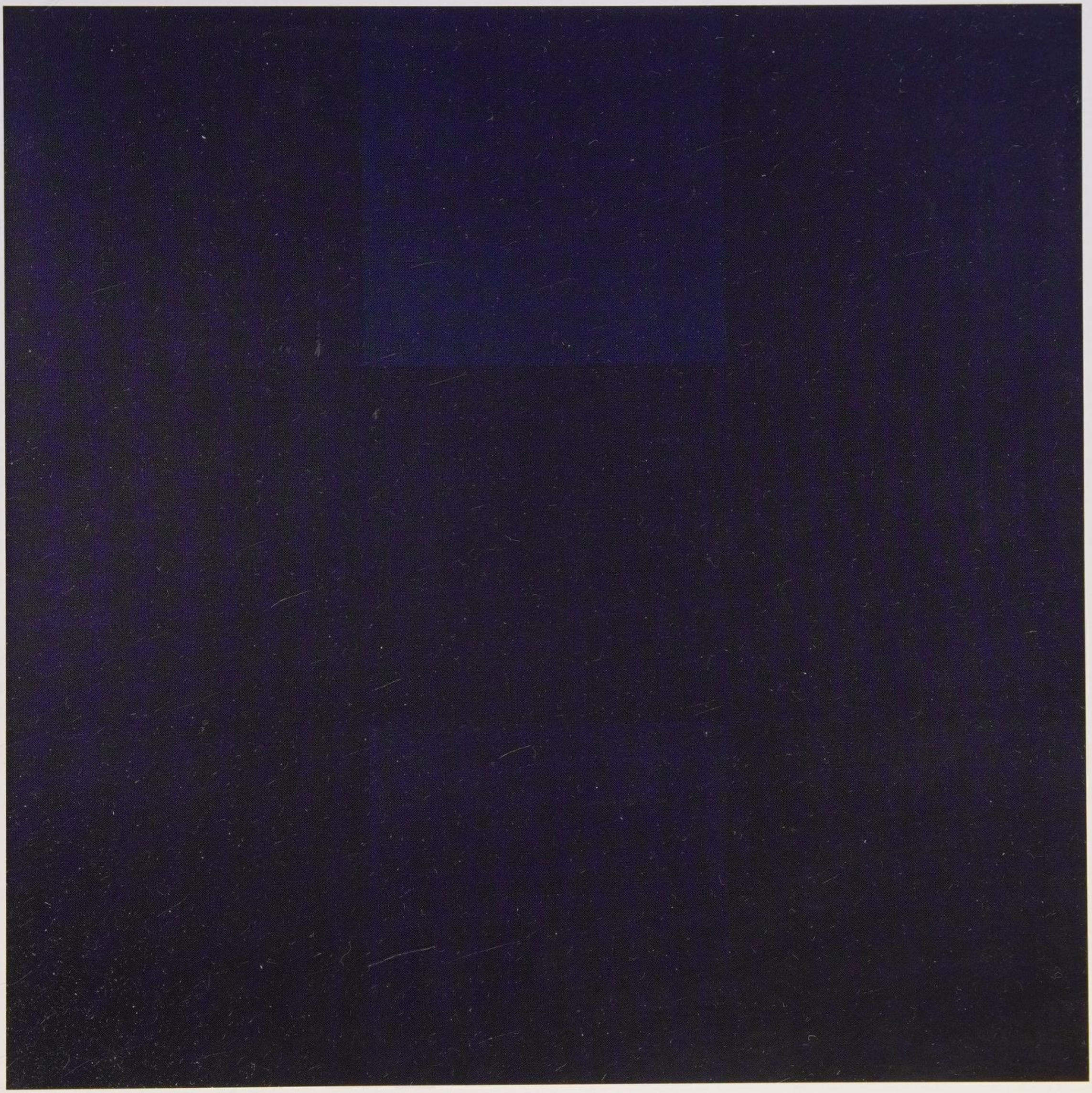


Fig. 130
Ad Reinhardt
American, 1913–1967
Abstract Painting
1963
Oil on canvas
60 x 60 in. (152.4 x 152.4 cm)
Milwaukee Art Museum, Milwaukee,
Wisconsin: Gift of Friends of Art. M1967.22

© 2006 Estate of Ad Reinhardt/Artists Rights Society (ARS), New York

(Detail on p. 100)

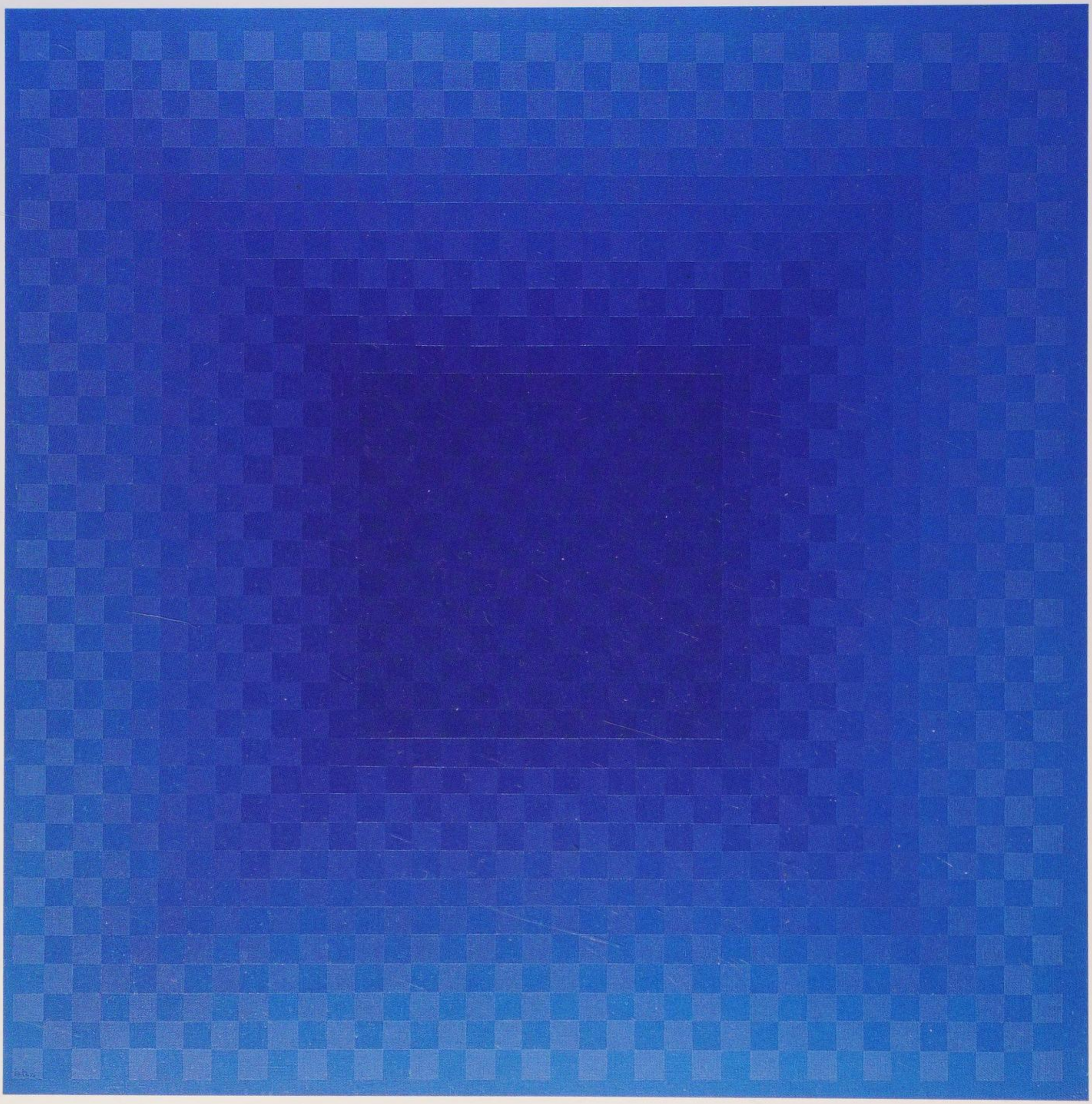


Fig. 131
Hannes Beckmann
American, born Germany, 1909–1977
Muted Center (Blue Light)
1965–73
Acrylic on canvas
40 x 40 in. (101.6 x 101.6 cm)
Hood Museum of Art, Dartmouth College,
Hanover, New Hampshire: Gift of the artist.
P.973.118

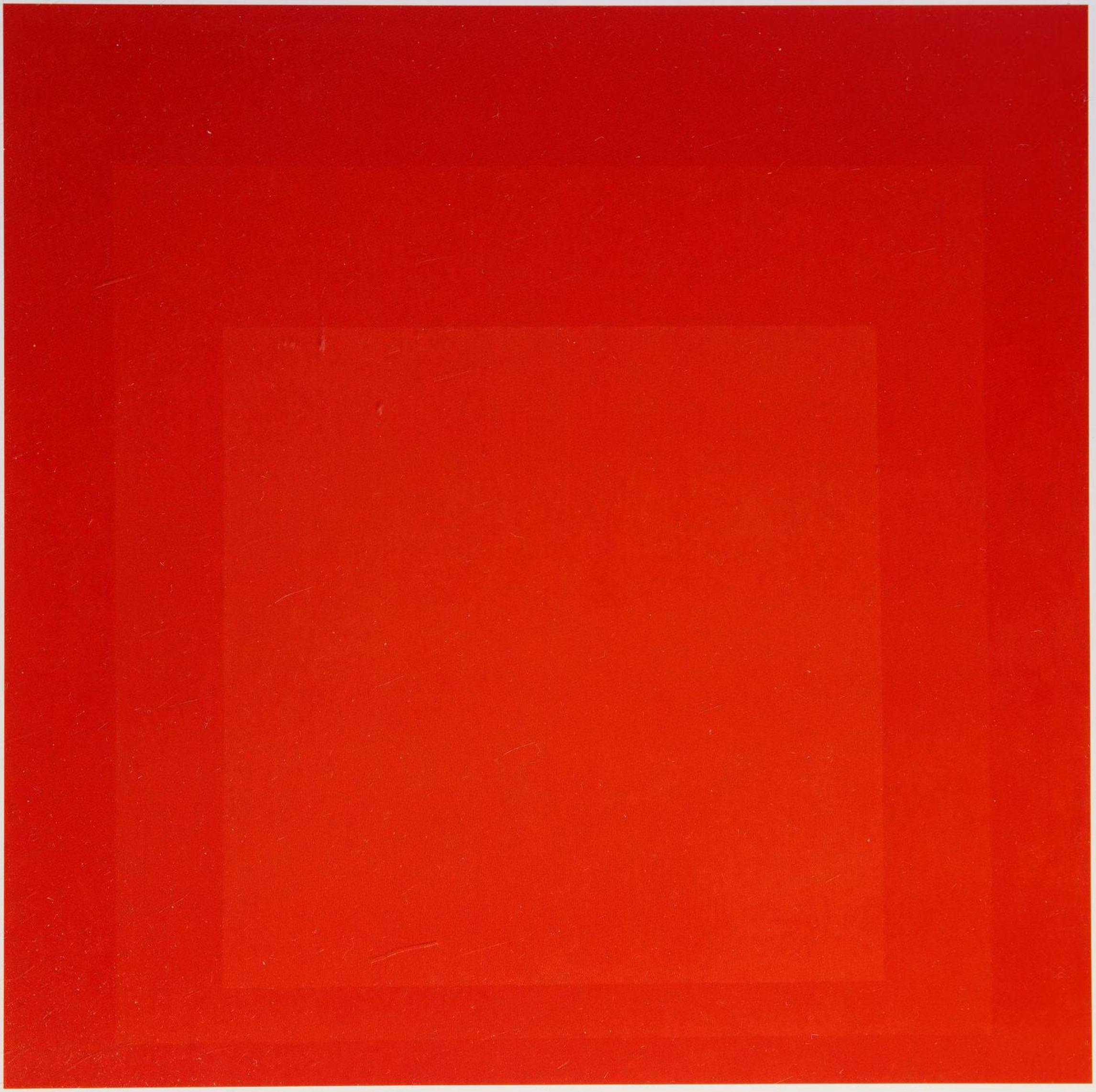


Fig. 132
Josef Albers
American, born Germany, 1888–1976
Homage to the Square: Sentinel
1968
Oil on canvas mounted on masonite
48 x 48 in. (121.9 x 121.9 cm)
The Dayton Art Institute, Dayton, Ohio:
Gift of Society Bank 1986.15

© 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

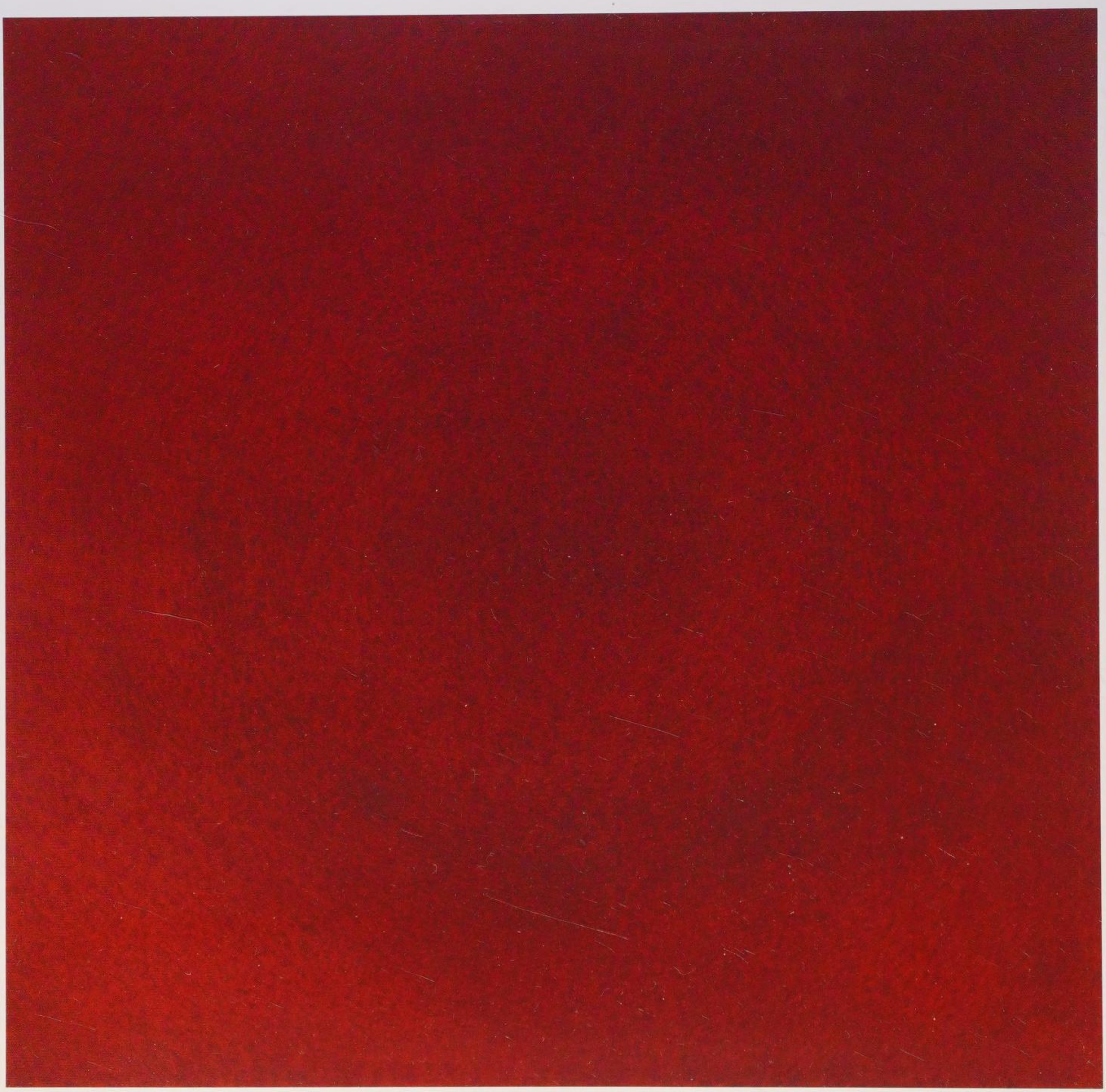


Fig. 133
Sally Hazelet Drummond
American, born 1924
Presence of the Heart
1962
Oil on canvas
60 x 60 in. (152.4 x 152.4 cm)
Private collection, Columbus, Ohio

Courtesy of the Artist and Alexandre Gallery, New York, New York

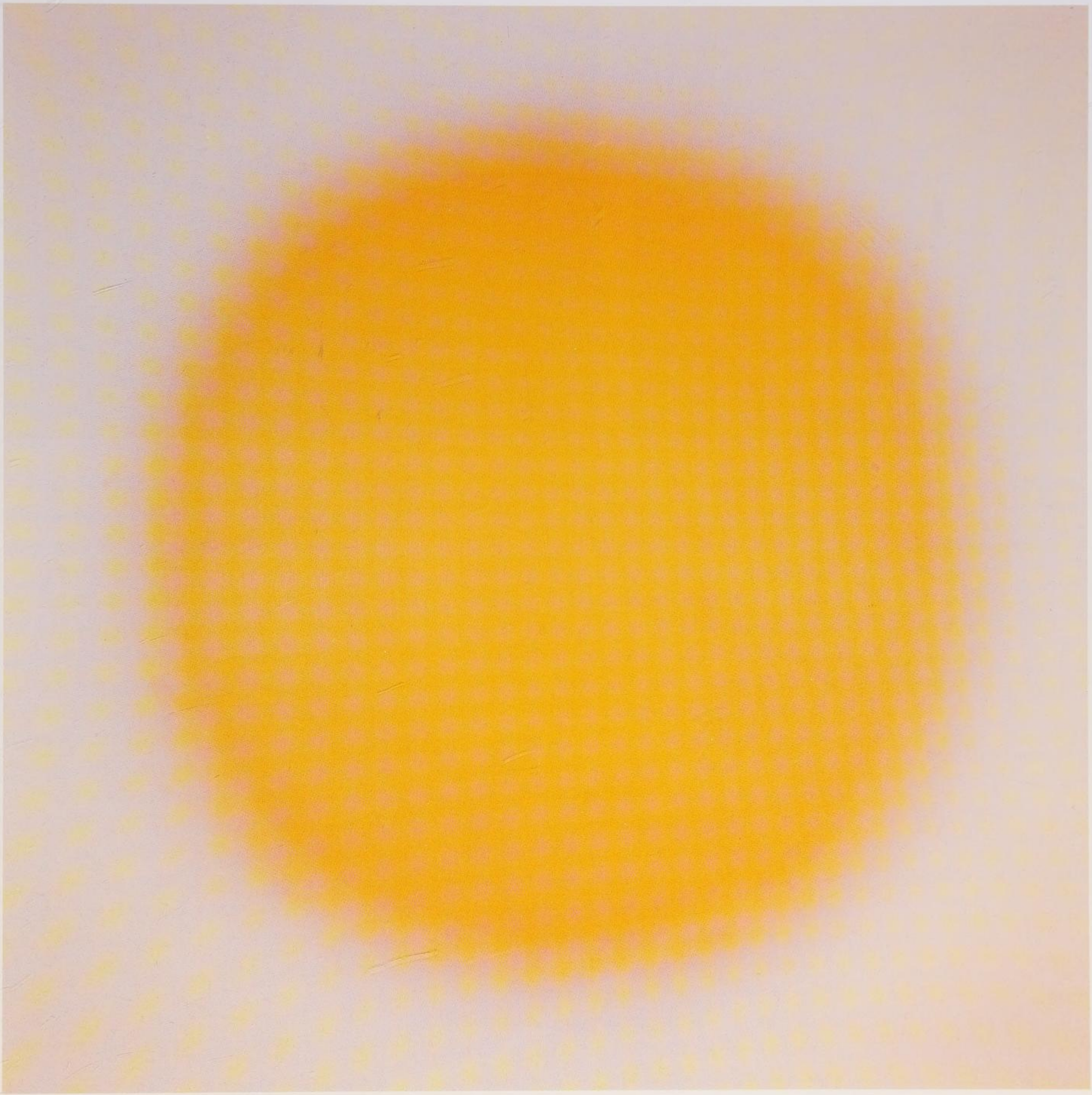
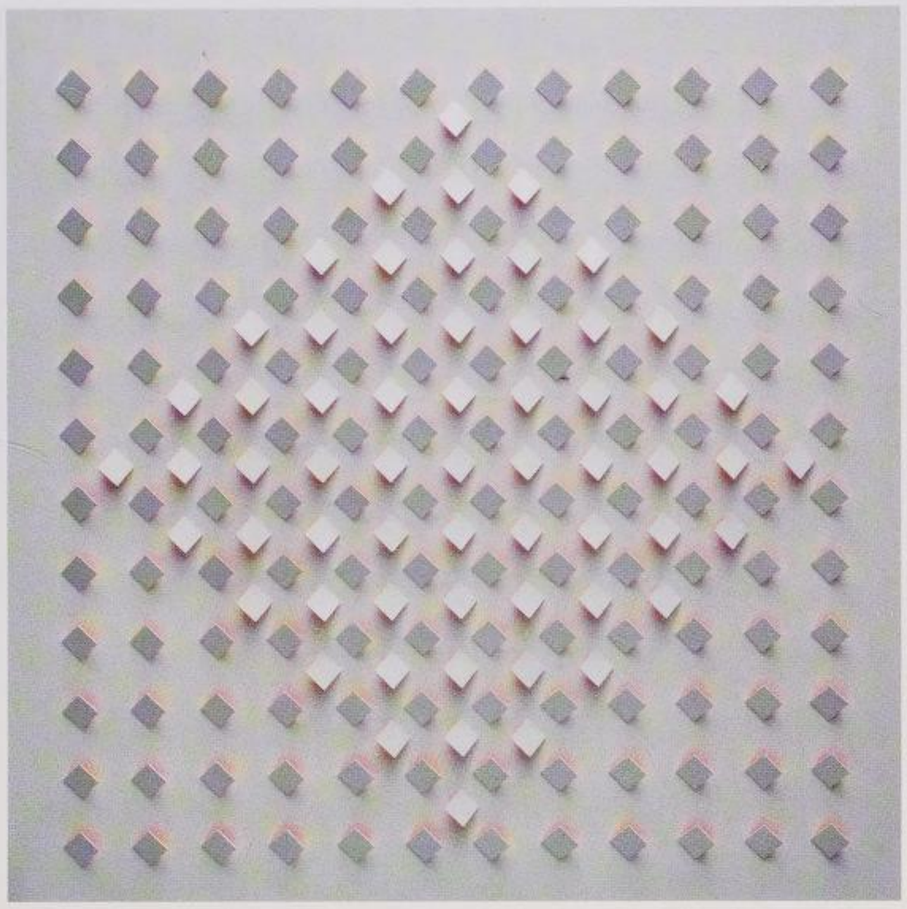
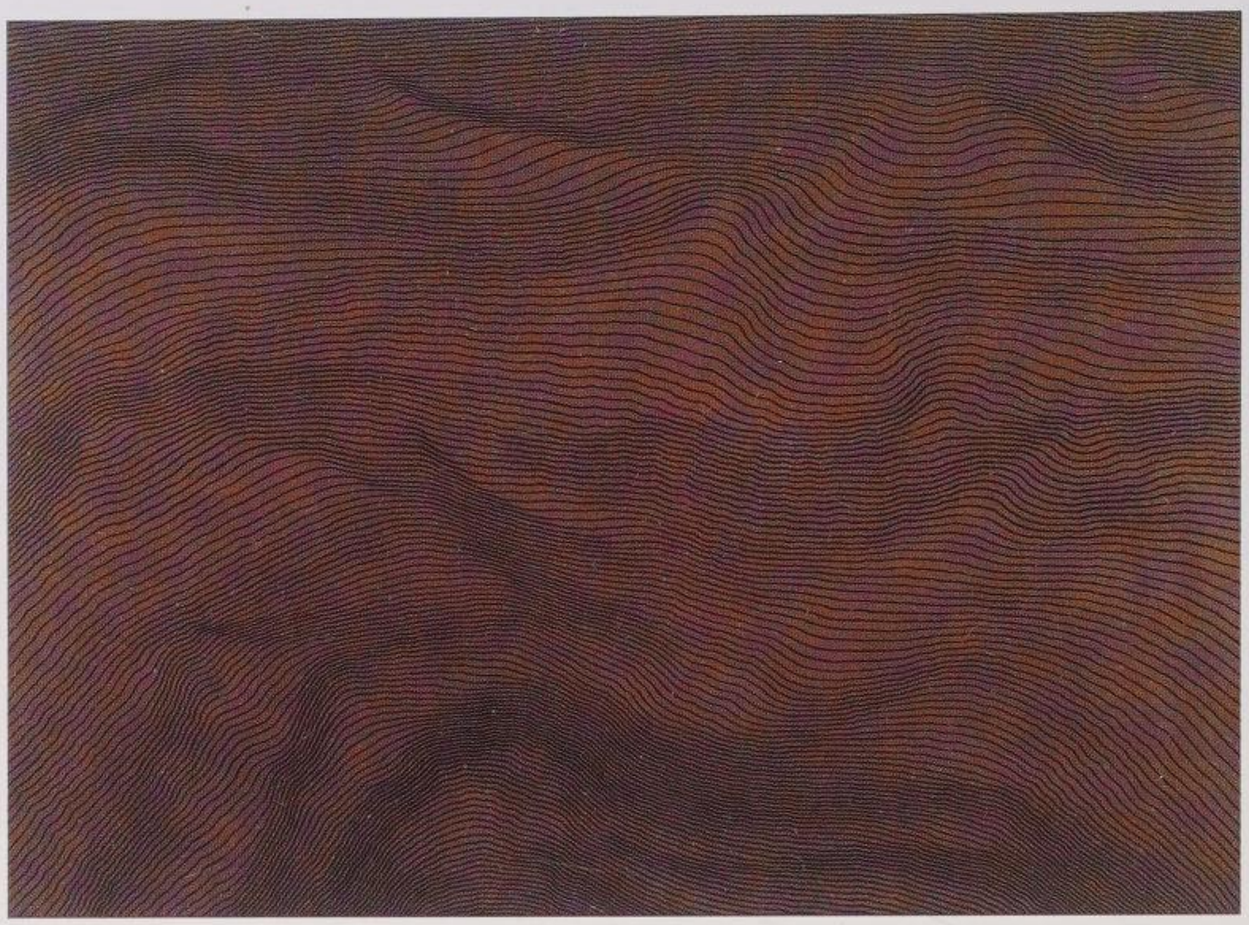


Fig. 134
Wojciech Fangor
Polish, born 1922
M16–1966
1966
Oil on canvas
36 x 36 in. (91.4 x 91.4 cm)
The JPMorgan Chase Art Collection





Above, left: Fig. 135
Luis Tomasello
Argentinean, born 1915
Atmosphere Chromoplastique No. 222
1969
Acrylic on wood relief
$47^5/_8$ x $47^5/_8$ x $2^3/_4$ in. (121 x 121 x 7 cm)
Private collection, Miami, Florida

Courtesy of Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Above, right: Fig. 136
Henry C. Pearson
American, 1914–2006
No. 5
1963
Oil on canvas
52 x 70 in. (132.1 x 177.8 cm)
Collection of Mitchell Algus and Dyanne Maue

Courtesy of Mitchell Algus Gallery, New York, New York

vibrates retinally with prolonged exposure. The pulsating sensation is energized by her tendency toward sanguine hues and such titles as *Presence of the Heart* (fig. 133). Drummond's colors are never highly saturated, thereby allowing one to maintain a focus on the painted surface without depleting visual acuity. As with the works of Reinhardt and Martin, the dimension of time becomes more crucial when other elements are elided. Monochromes are "slow" paintings, insistent on contemplation and rest. Drummond's intentions are not without a metaphysical component. She stated: "Essentially I believe that all great art is an attempt to reveal the structure, infinite and beautiful order that lies deep within all existence . . . My vision is of a painting that declares this sensed reality in the purest and simplest terms—the total painting as the image silent, emphatic, radiant."[4]

Wojciech Fangor's spectral *M16–1966* (fig. 134) evokes a similar radiance, emanating from the pure yellow of the central orb against a white expanse. The unmitigated, saturated hue over-stimulates the retina, which compensates with a ghostly violet tint around the yellow periphery. Created in the eye, this complementary violet energizes the white background. The resulting optical frisson dislocates the yellow sphere from its background, pushing it into a space outside the picture plane. This spatial dislocation becomes even more pronounced in Fangor's paintings of multi-hued concentric circles, which appear to inhabit a position simultaneously behind and in front of the picture plane, an effect heightened by their softly painted edges as much as by their color contrasts.

The spatial dynamics within a monochrome palette are articulated in the work of Hannes Beckmann and Josef Albers, both of whom hailed from the Bauhaus in the 1930s. Their geometric abstractions create subtle gradations and transparencies typical of Paul Klee's œuvre. The progression of values results in an illusory telescoping space. While such figures as Martin and Reinhardt were included in *The Responsive Eye* and other exhibitions of optical painting during the 1960s, they were not traditionally considered Op artists. However, by testing the tolerance of vision, they created similar catalysts for an experience that transcends the object of art. Exploring the physiological and emotional elements of color in its purist state, they achieved a perceptual art deeply invested in viewer response.

1 Ad Reinhardt, "Art as Art," *Art International*, December 1962, p. 37.
2 In 1925, a book on psychology in advertising detailed the "feeling-tone of colors," charted preferences of single colors and their varying hues and tints, and their relative "abstract" and "concrete" associations. A majority of subjects tested found that yellow connoted cheerfulness and denoted breakfast food, providing a scientific basis for color application in packaging and promotion (*Psychology in Advertising* by Albert T. Poffenbergerm, A.W. Shaw and Company, Chicago, and New York, 1925).
3 Ad Reinhardt in *Americans 1963*, ed. Dorothy C. Miller, New York (The Museum of Modern Art) 1963, p. 80.
4 Sally Hazelet Drummond in *Americans 1963*, *op. cit.*, p. 26.

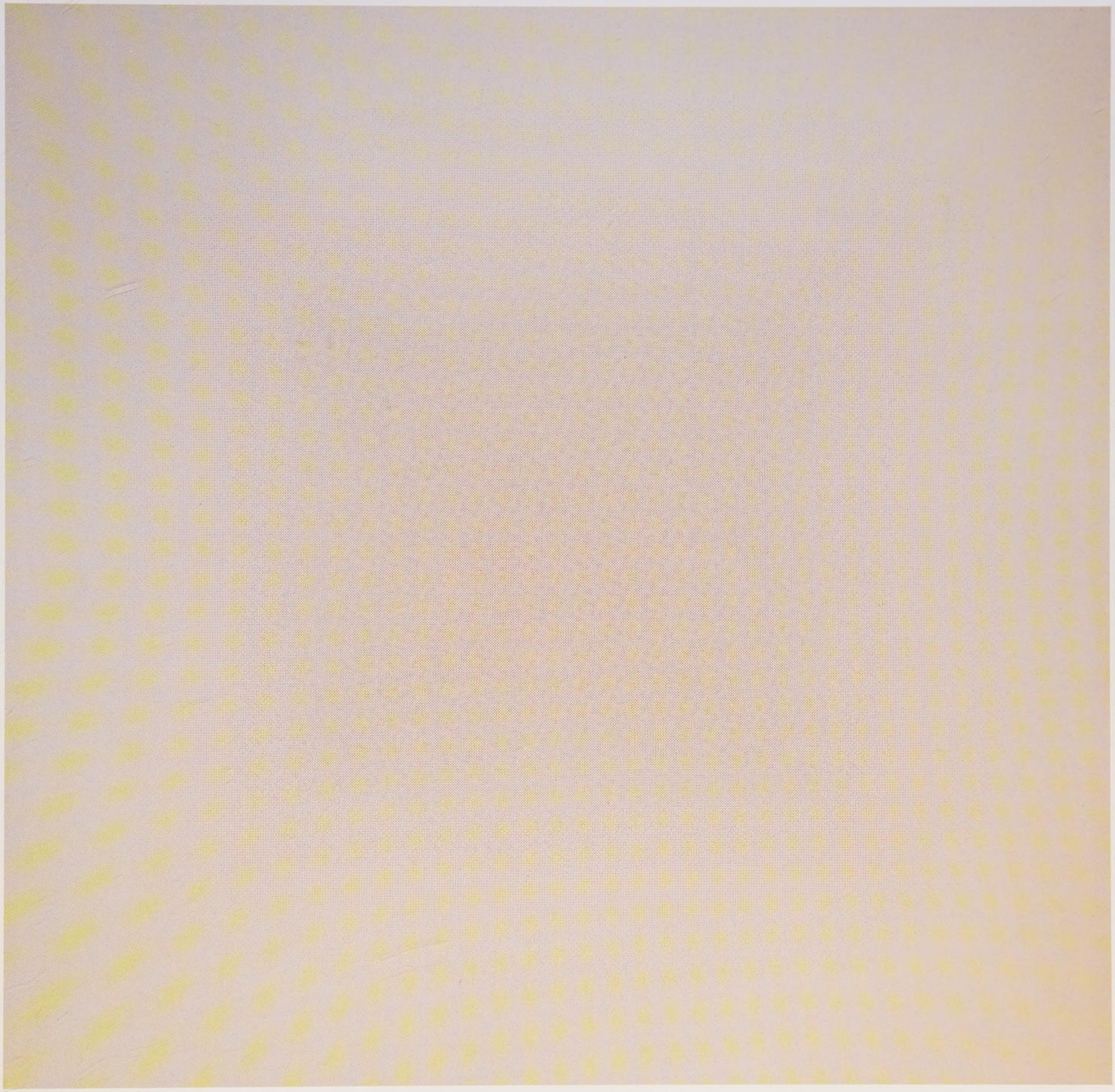


Fig. 137
Robert Irwin
American, born 1928
Untitled
1963–65
Oil on canvas on bowed wood veneer frame
84½ x 82½ in. (214.6 x 209.6 cm)
Collection Walker Art Center, Minneapolis, Minnesota: Gift of Albert A. List Family, 1972
1972.6

© 2006 Robert Irwin/Artists Rights Society (ARS), New York

FULL SPECTRUM

Despite an even and mostly opaque application, the colors will appear above or below each other, in front or behind, or side by side on the same level. They correspond in concord as well as in discord, which happens between both, groups and singles. . . .

Such color deceptions prove that we see colors almost never unrelated to each other and therefore unchanged; that color is changing continually; with changing light, with changing shape and placement, and with quantity which denotes either amount (a real extension) or number (recurrence). And just as influential are changes in perception depending on changes of mood, and consequently of receptiveness.

All this will make [one] aware of an exciting discrepancy between physical fact and psychic effect of color.[1]

Josef Albers, 1964

The principles of color that guided the vast majority of the Op artists were formalized by the Bauhaus in preliminary courses prior to World War II. Bauhaus instructors Wassily Kandinsky and Johannes Itten each wrote books on color theory that extended nineteenth-century principles of color physics into a functional system for the artist and designer. Josef Albers, who taught at the Bauhaus until its closing by the Nazi Party in 1933, published his influential *The Interaction of Color* in 1963, after training several decades of artists at Black Mountain College and Yale Graduate School of Art. The color principles of the Bauhaus, and the related Ulm design school, where Max Bill taught, established the foundation programs that are still in use in art schools internationally. Albers systematically explored the minute interactions of color in his *Homage to the Square* series beginning in 1949. The red monochrome *Homage to the Square: Sentinel* (fig. 132) and the yellow-gray *Homage to the Square: Chosen* (fig. 144) exemplify the diverse effects of



Fig. 138
Yaacov Agam
Israeli, born 1928
B/W + Color
1966–68
Agamograph
14 in. diameter (35.5 cm)
Collection of Getulio Alviani, Milan, Italy
© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

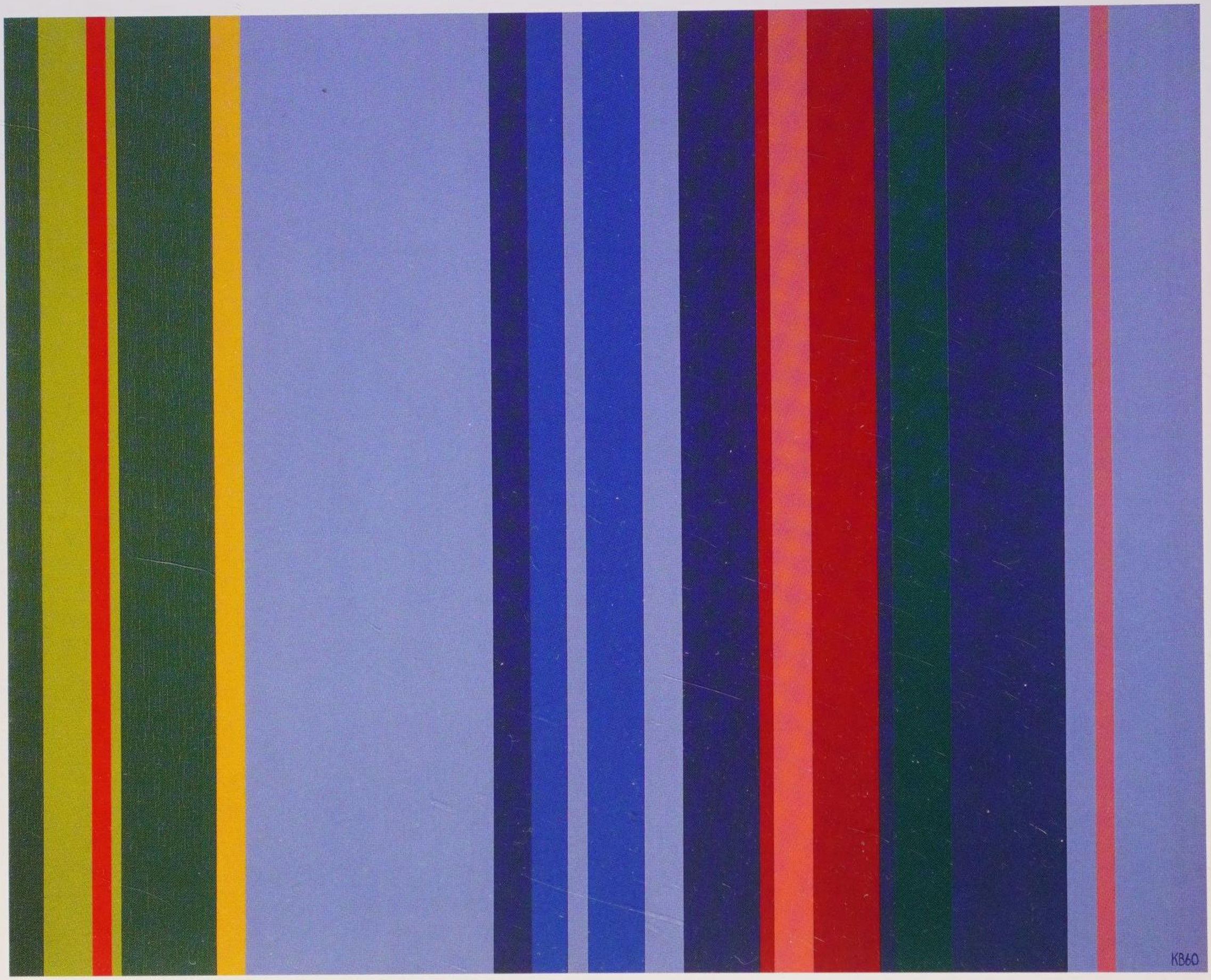


Fig. 139
Karl Benjamin
American, born 1925
VS #5
1960
Oil on canvas
34 x 42 in. (86.4 x 106.7 cm)
Collection of Neil K. Rector, Columbus, Ohio

Courtesy of Louis Stern Fine Arts, West Hollywood, California © Karl Benjamin, reproduced by permission

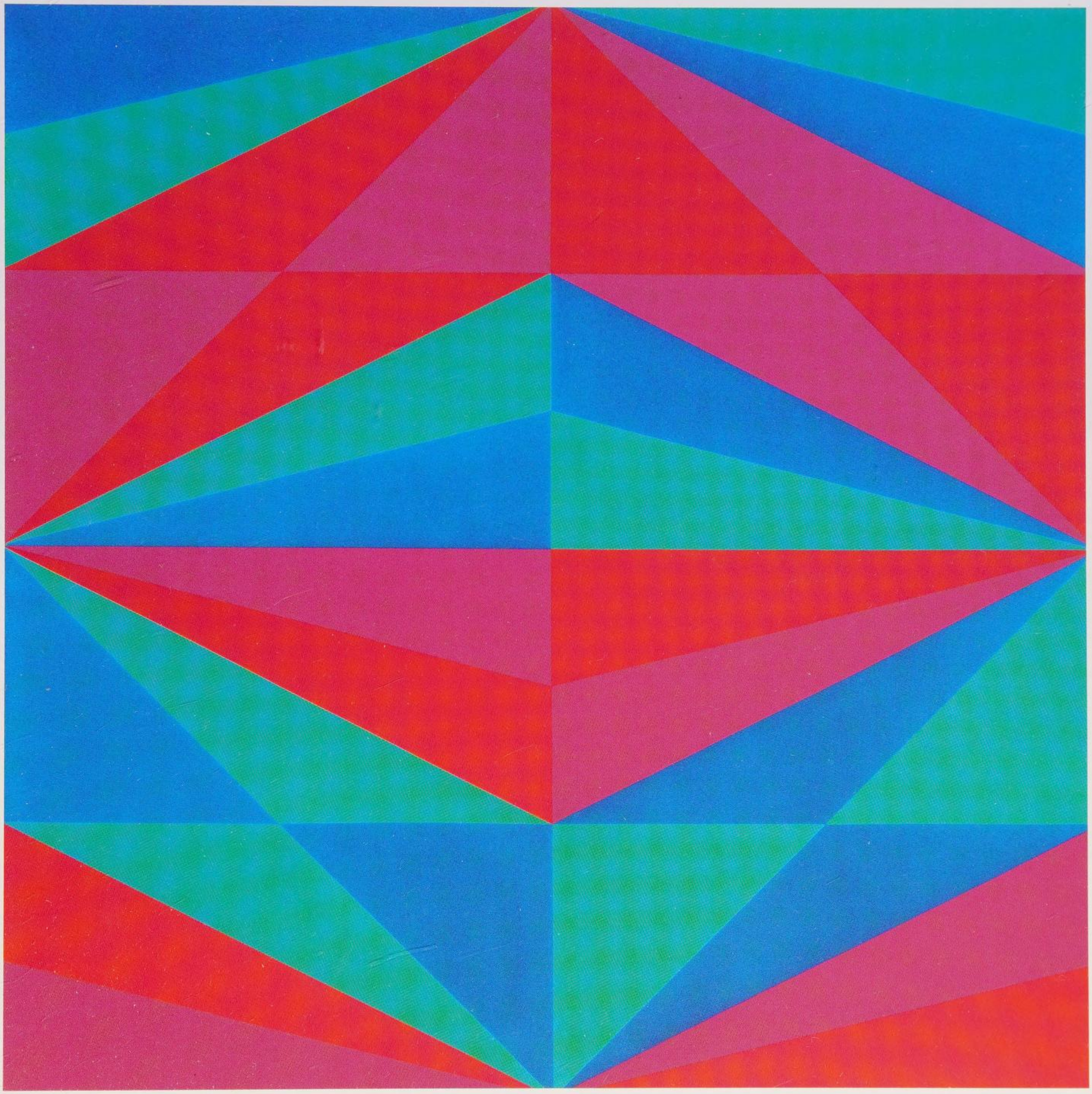
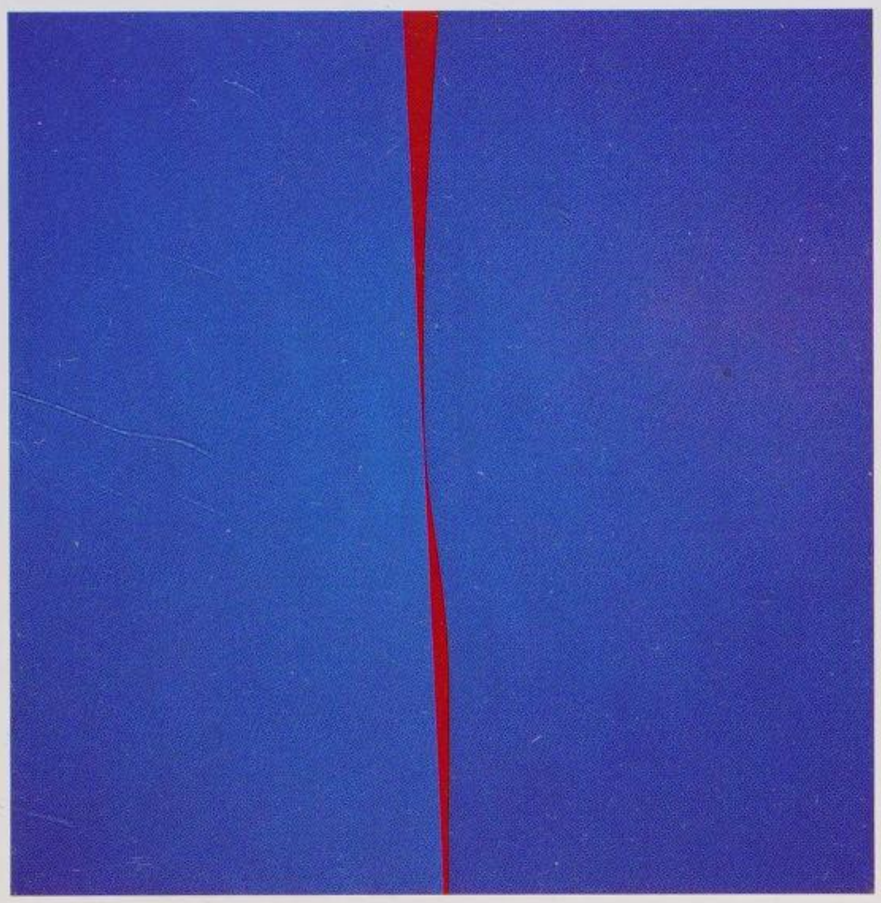
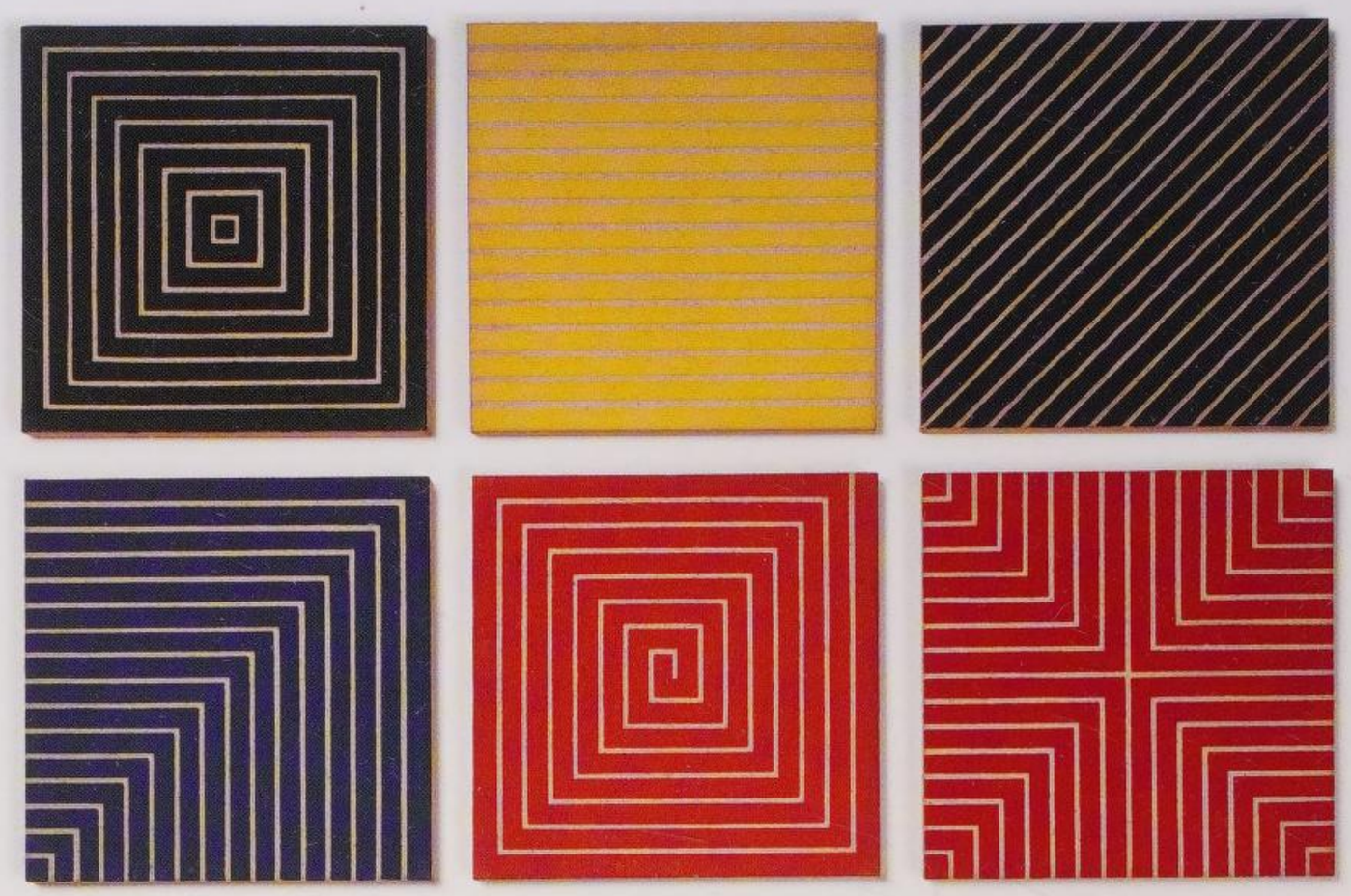


Fig. 140
Max Bill
Swiss, 1908–1994
Field of 32 Parts in 44 Colors
1965
Oil on canvas
53 x 53 in. (134.6 x 134.6 cm)
Albright-Knox Art Gallery, Buffalo, New York: Gift of Seymour H. Knox, Jr., 1968

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Above, left: Fig. 141
Lorser Feitelson
American, 1898–1978
Untitled
1968
Acrylic on canvas
36 x 36 in. (91.4 x 91.4 cm)
Collection of Nancy and Dave Gill, Columbus, Ohio

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Above, right (group): Fig. 142
Frank Stella
American, born 1936
Miniature Benjamin Moore Series: Clockwise from top left: **Island No. 1**, **Palmito Ranch**, **Sabine Pass**, **Delaware Crossing**, **New Madrid**, **Hampton Roads**
1962
Alkyd on raw canvas
12 x 12 in. each (30.5 x 30.5 cm)
Brooklyn Museum, Brooklyn, New York: Gift of Andy Warhol. 72.167.1-6

© 2006 Frank Stella/Artists Rights Society (ARS), New York

spatial depth, luminosity, and color transparency that he achieves within this iconic series. Albers's command of subtle perceptual effects, such as the illusion of a transparent gray square covering a bright white opening in *Chosen,* and his legacy as a teacher earned him the nickname "The Father of Op."

Richard Anuszkiewicz, a former student and disciple of Albers, explores the dynamics of color interaction, making those optical effects the form and subject of his painting since the mid-1950s. In *All Things Do Live in Three* (fig. 19), Anuszkiewicz utilized a precise network of pointillist dots to create the optical mixture of colors, revealing a connection to Op's roots in Seurat's pointillist innovations. Anuszkiewicz was quick to harness the power of intense color reversals gained from fully saturated complements. Polar opposites on the modern color wheel, when juxtaposed at equal value, create a distinct visual vibration as the retina attempts to compensate for, or neutralize, the opposing hue. This response generates the flickering effect found in Anuszkiewicz's *Plus Reversed* (fig. 145), a landmark painting in his œuvre that appropriately utilizes a positive/negative reversal of "plus" shapes as the formal armature for dynamic color reversal. While Anuszkiewicz has also worked with multiple color combinations and with analogous as well as complementary interactions, his work of the 1960s often exploits dominant contrasts, particularly that of orange/red against blue/green, as seen in the vibrant *Luminous* (fig. 78). These contrasting colors produce a pronounced vibration, a neurological conflict caused by opposing channels of information being received by the brain via the optic nerve. The same hue contrast was used to great effect by other artists, including Edna Andrade and Julian Stanczak.

Larry Poons also exploits the concept of complementary color contrast to stunning effect. He first explored this phenomenon in *Cripple Creek* (fig. 143) with viridian green dots scattered on a deep rust-red background of equal value. The colors vibrate intensely, causing the green dots to appear to flicker and float above the picture plane. In *Northeast Grave* (fig. 73), painted two years later, Poons combines several layers of ovoid patterns of various colors against a bright red expanse. With prolonged viewing, the ovals generate complementary colors that seem to dance around the space of the canvas, amounting to a kinetic composition of colorful after-images. This after-image effect, due to retinal fatigue from the saturation of photochemical receptors for a given color, is the subject of Jasper Johns's *Flags* (fig. 152). In a humorous revision of his iconic paintings, Johns paints an American flag in the complementary colors that yield the after-images of red, white, and blue, a sort of vision test. Although Johns was never part of the Op movement, his painting, and his subsequent lithograph of the subject, indicate the pervasive influence of Op's perceptual experiments.

Another painter directly influenced by Albers's

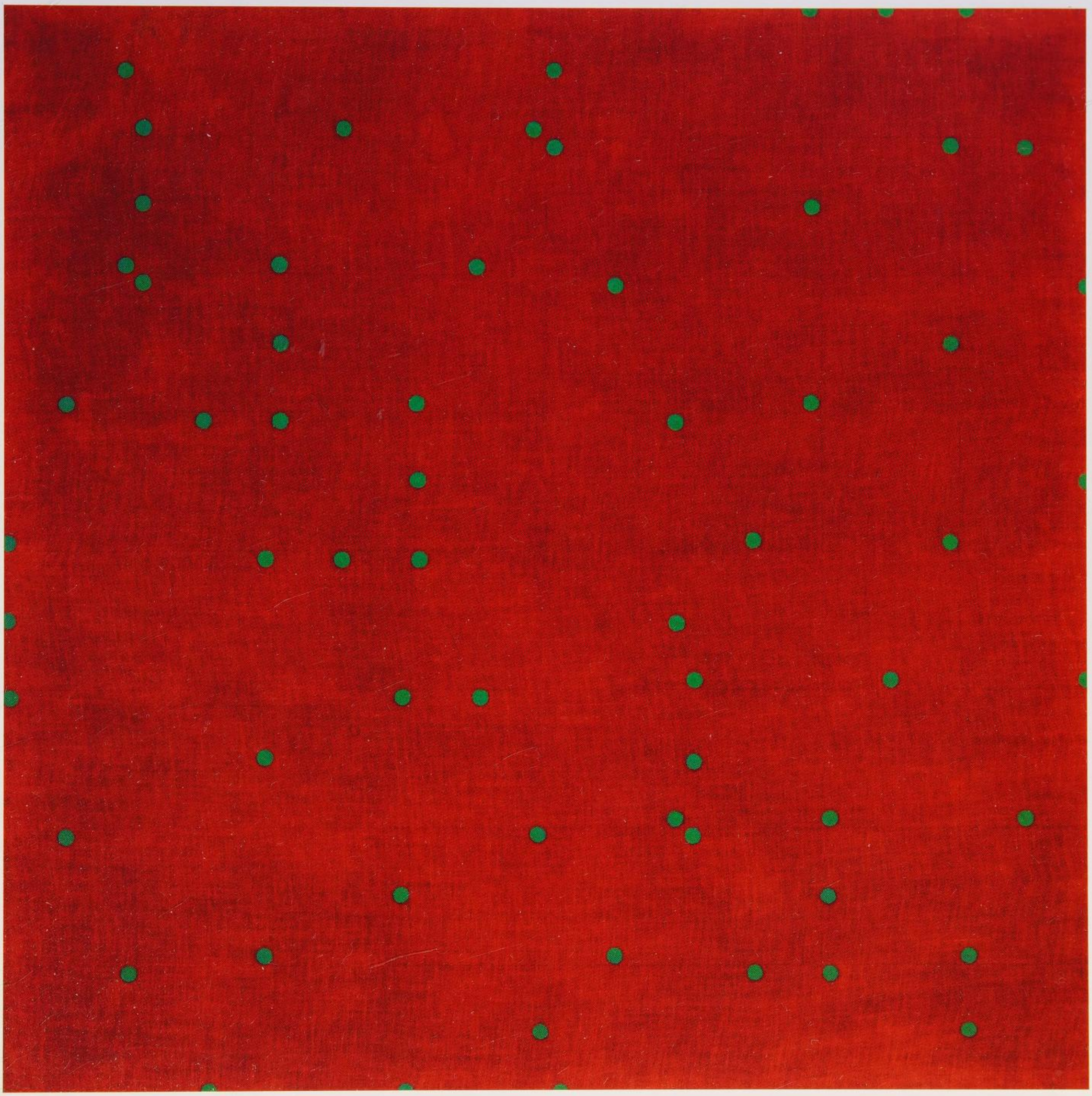


Fig. 143
Larry Poons
American, born Japan 1937
Cripple Creek
1962
Oil, Fabspray, and pencil on canvas
56 x 56 in. (142.2 x 142.2 cm)
Miami University Art Museum, Oxford, Ohio:
Gift of Walter A. and Dawn Clark Netsch.
1986.4

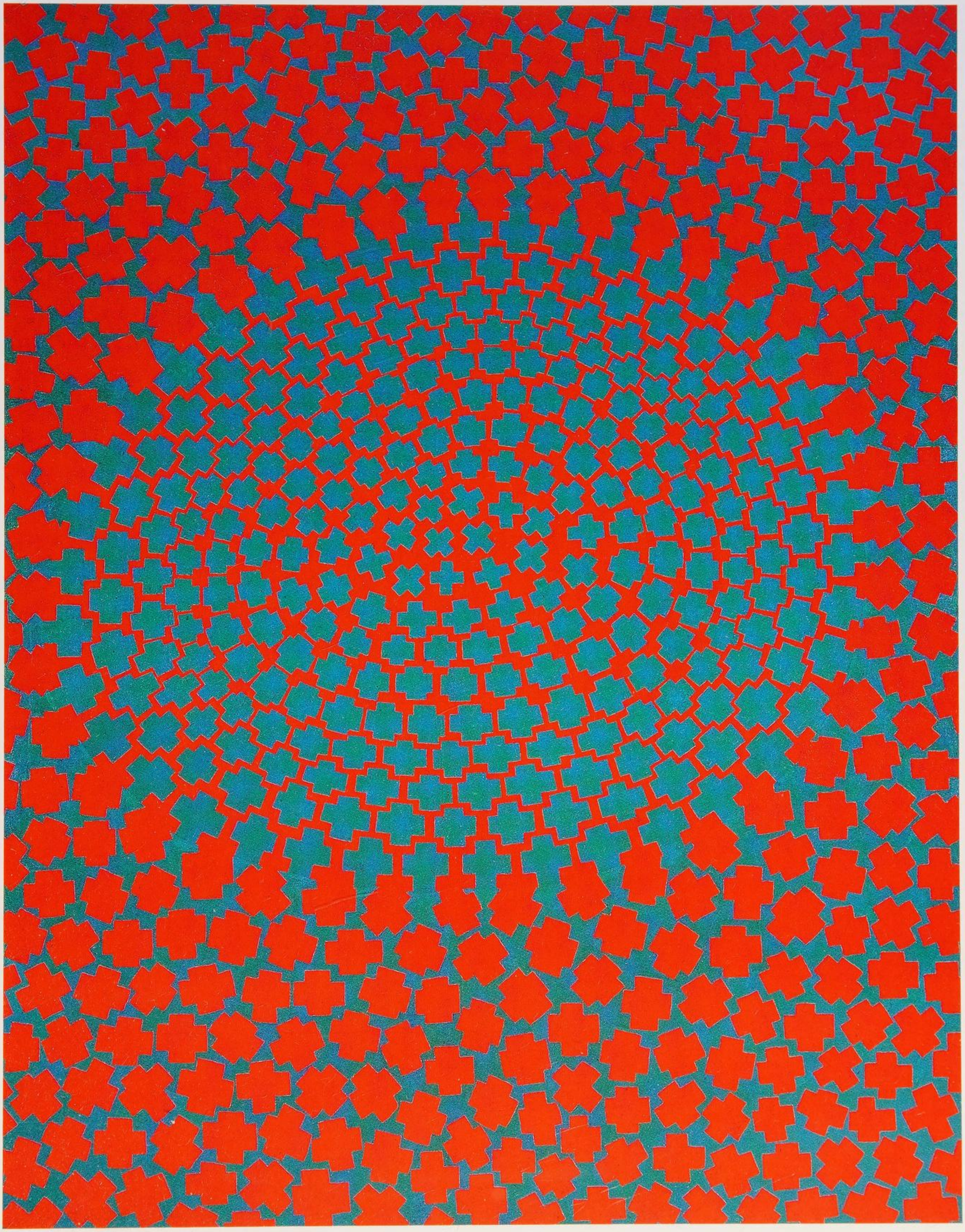
© Larry Poons/Licensed by VAGA, New York, New York

Above: Fig. 144
Josef Albers
American, born Germany, 1888–1976
Homage to the Square: Chosen
1966
Acrylic on masonite
48 x 48 in. (121.9 x 121.9 cm)
Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C.: Gift of Joseph H. Hirshhorn, 1972. HMSG 72.2

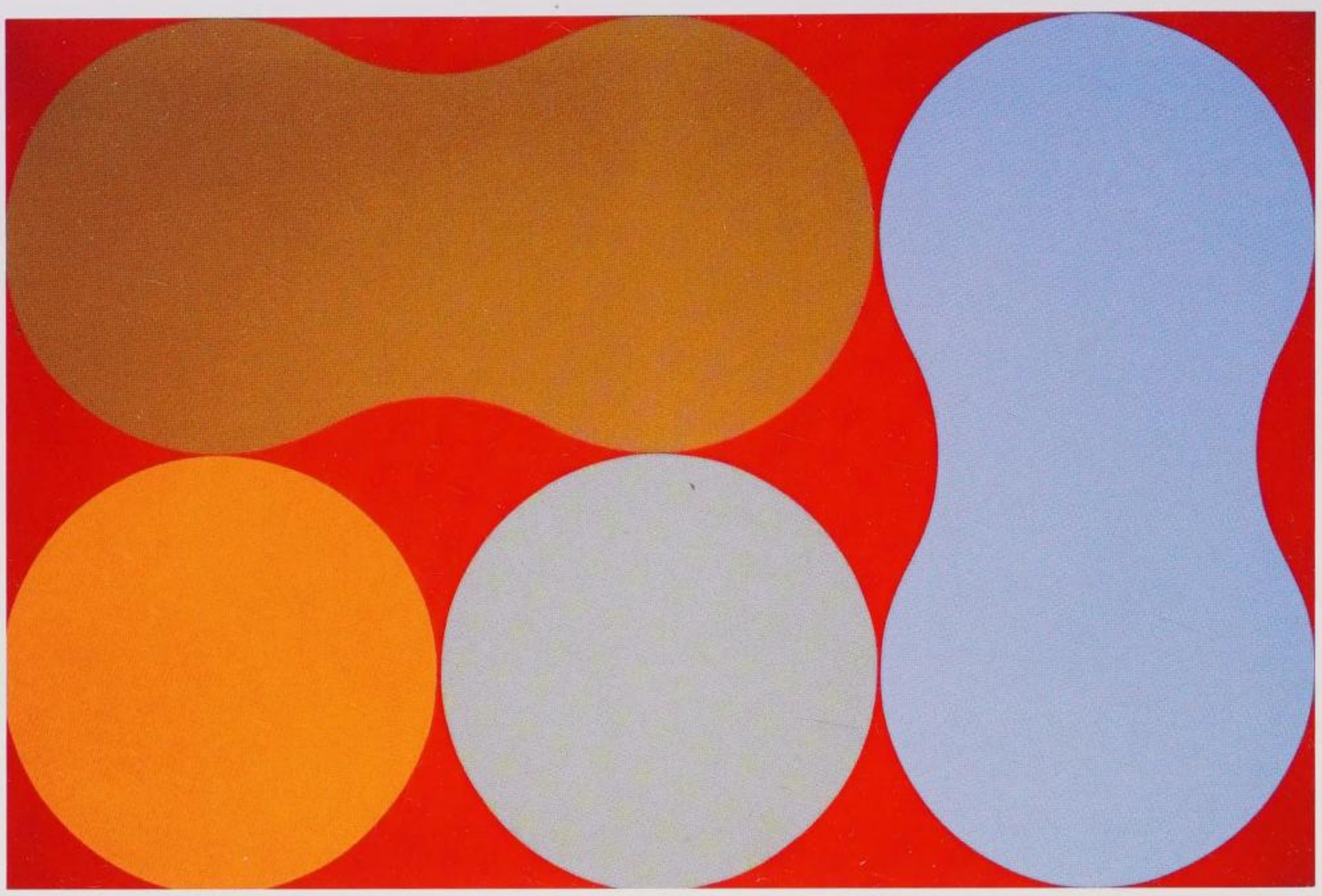
Photography by Lee Stalsworth © 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

Opposite: Fig. 145
Richard Anuszkiewicz
American, born 1930
Plus Reversed
1960
Oil on canvas
74 5/8 x 58 1/4 in. (189.6 x 148 cm)
Blanton Museum of Art, Austin, Texas: Gift of Mari and James A. Michener, 1991
1991.177

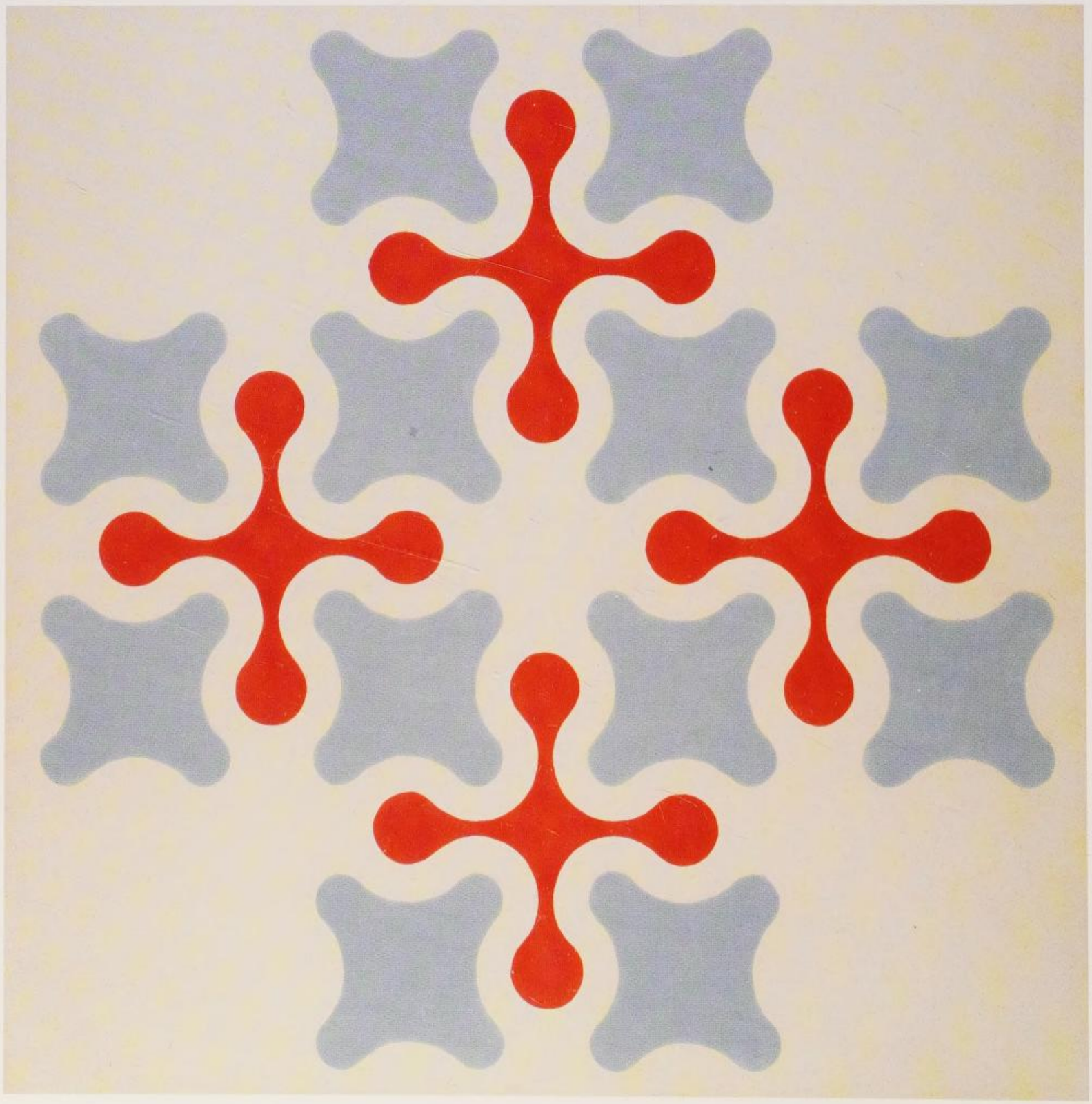
© Richard Anuszkiewicz/Licensed by VAGA, New York, New York



Right: Fig. 146
Tony Smith
American, 1912–1980
Untitled (from the Louisenberg Series)
1953–54/68
Acrylic on canvas
40 x 60 in. (101.6 x 152.4 cm)
Collection of Annette and Robert Swain
© 2006 Estate of Tony Smith/Artists Rights Society (ARS), New York



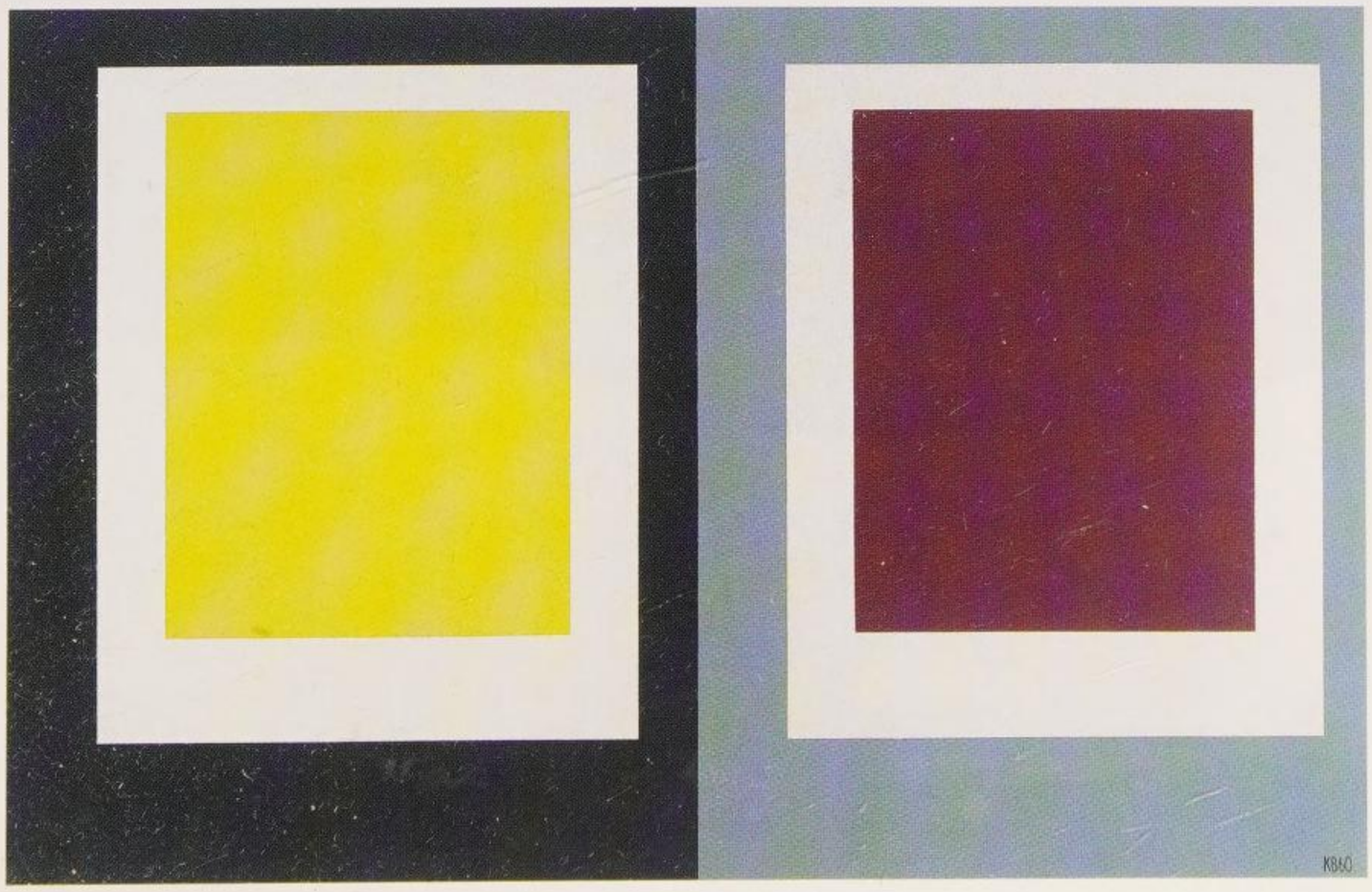
Right: Fig. 147
Paul Feeley
American, 1910–1966
Gomelza
1965
Synthetic polymer on canvas
80 x 80 in. (203.2 x 203.2 cm)
Whitney Museum of American Art, New York, New York: Purchase, with funds from the Friends of the Whitney Museum of American Art. 67.28
Photography by Matt Flynn





Left: Fig. 148
Lorser Feitelson
American, 1898–1978
Magical Space Forms
1962
Oil and enamel on canvas
60 x 50 in. (152.4 x 127 cm)
Columbus Museum of Art, Columbus, Ohio:
Museum Purchase, Derby Fund. 2005.027

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Left: Fig. 149
Karl Benjamin
American, born 1925
Untitled
1960
Oil on canvas
30 x 50 in. (76.2 x 127 cm)
Private collection, Columbus, Ohio

Courtesy of Louis Stern Fine Arts, West Hollywood, California © Karl Benjamin, reproduced by permission

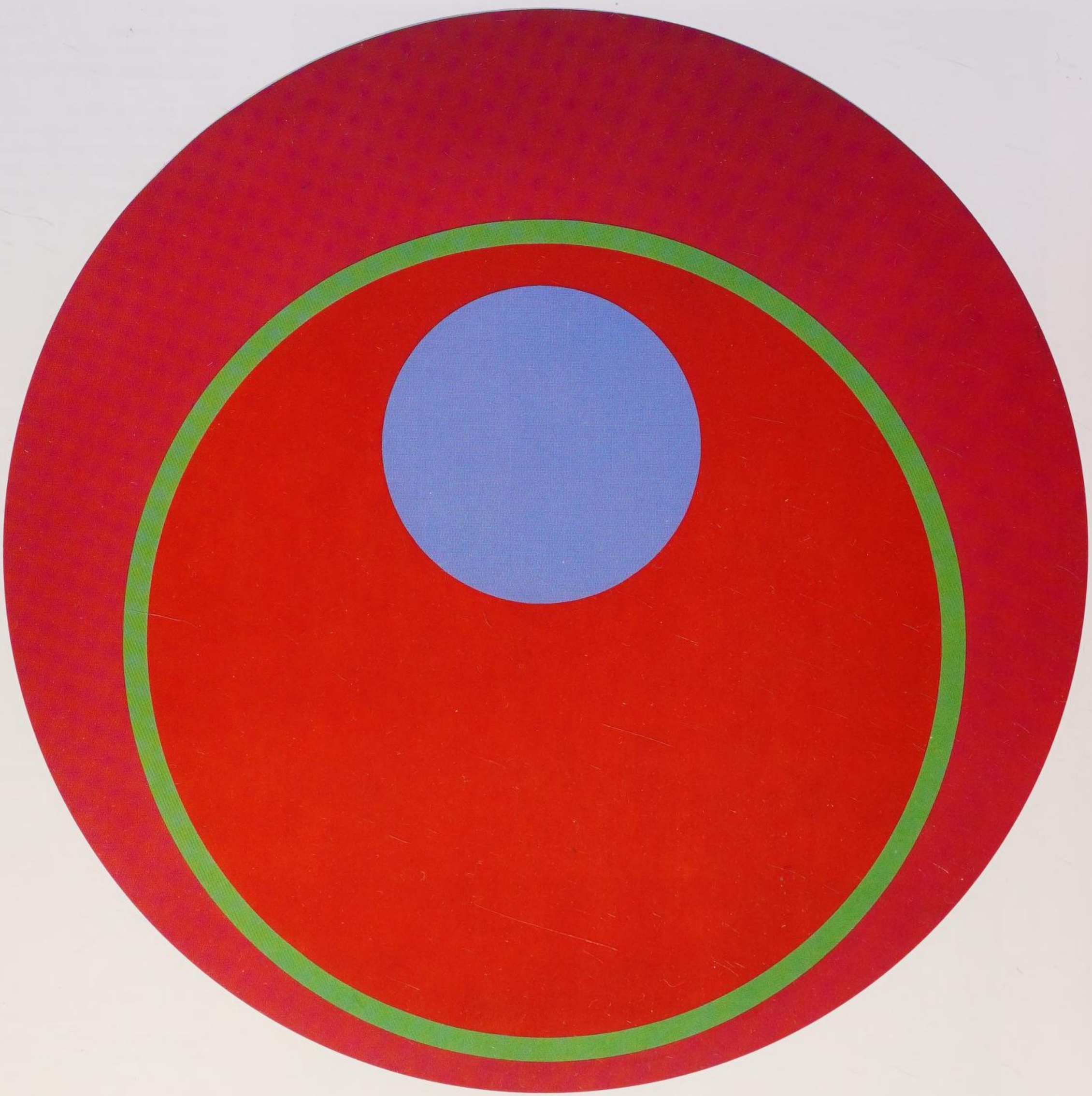


Fig. 150
Alexander Liberman
American, born Russia, 1912–1999
Sun II
1962
Acrylic on canvas
79¼ in. diameter (201.3 cm)
Private collection, Columbus, Ohio

© The Alexander Liberman Trust and Courtesy of Mitchell-Innes & Nash, New York, New York

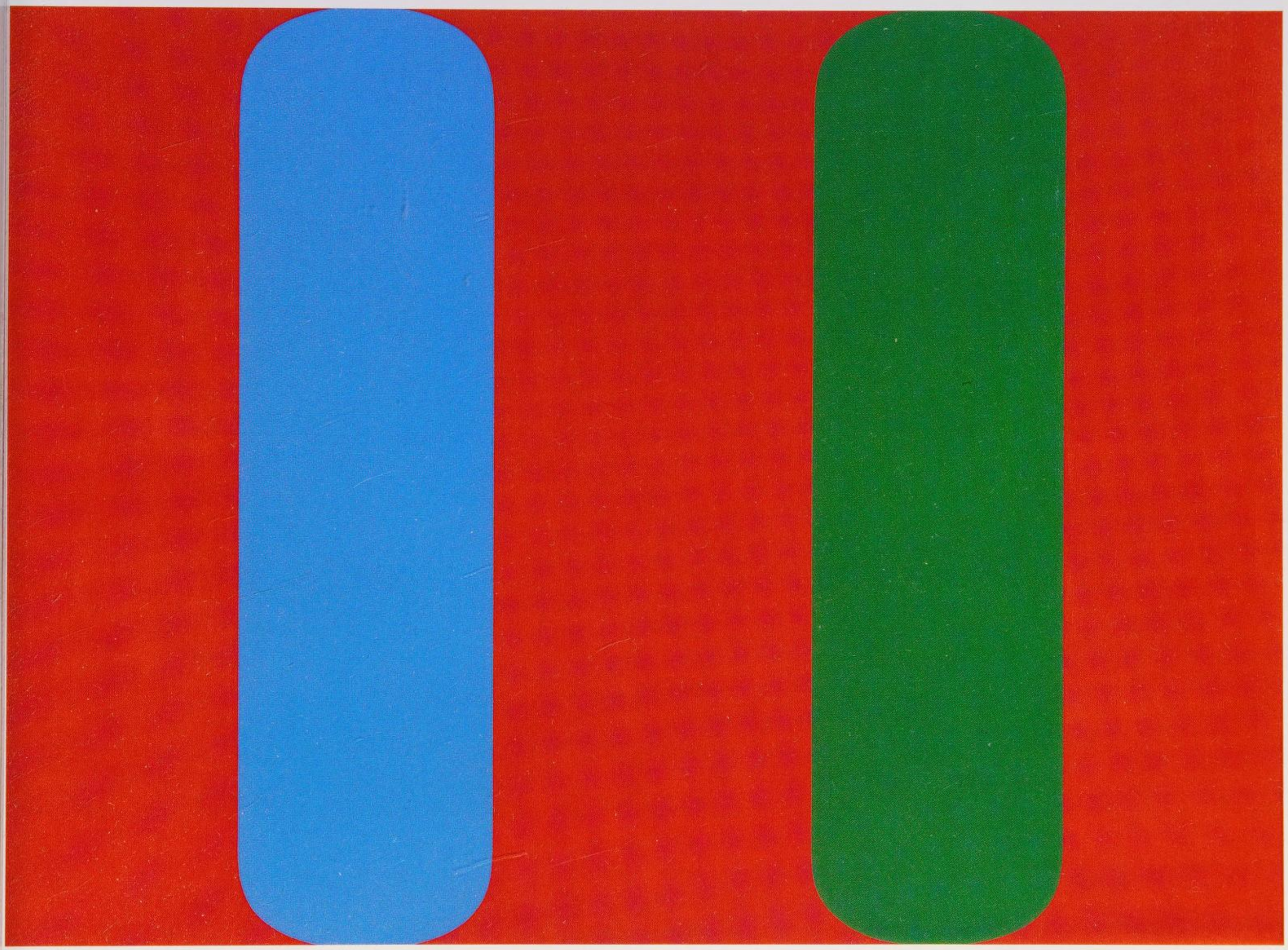
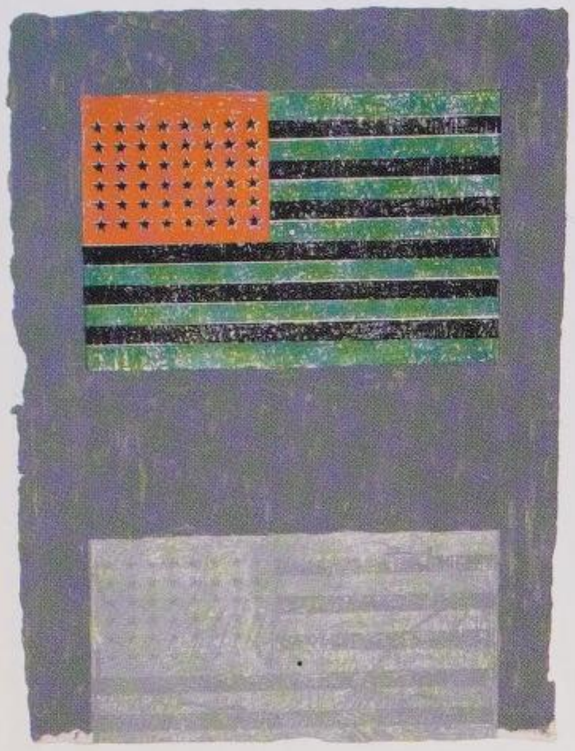


Fig. 151
Ellsworth Kelly
American, born 1923
Blue Green Red
1964
Oil on canvas
73 x 100 in. (185.4 x 254 cm)
Whitney Museum of American Art,
New York, New York: Purchase, with funds
from the Friends of the Whitney Museum
of American Art. 66.80

Photography by Jerry L. Thompson © Ellsworth Kelly



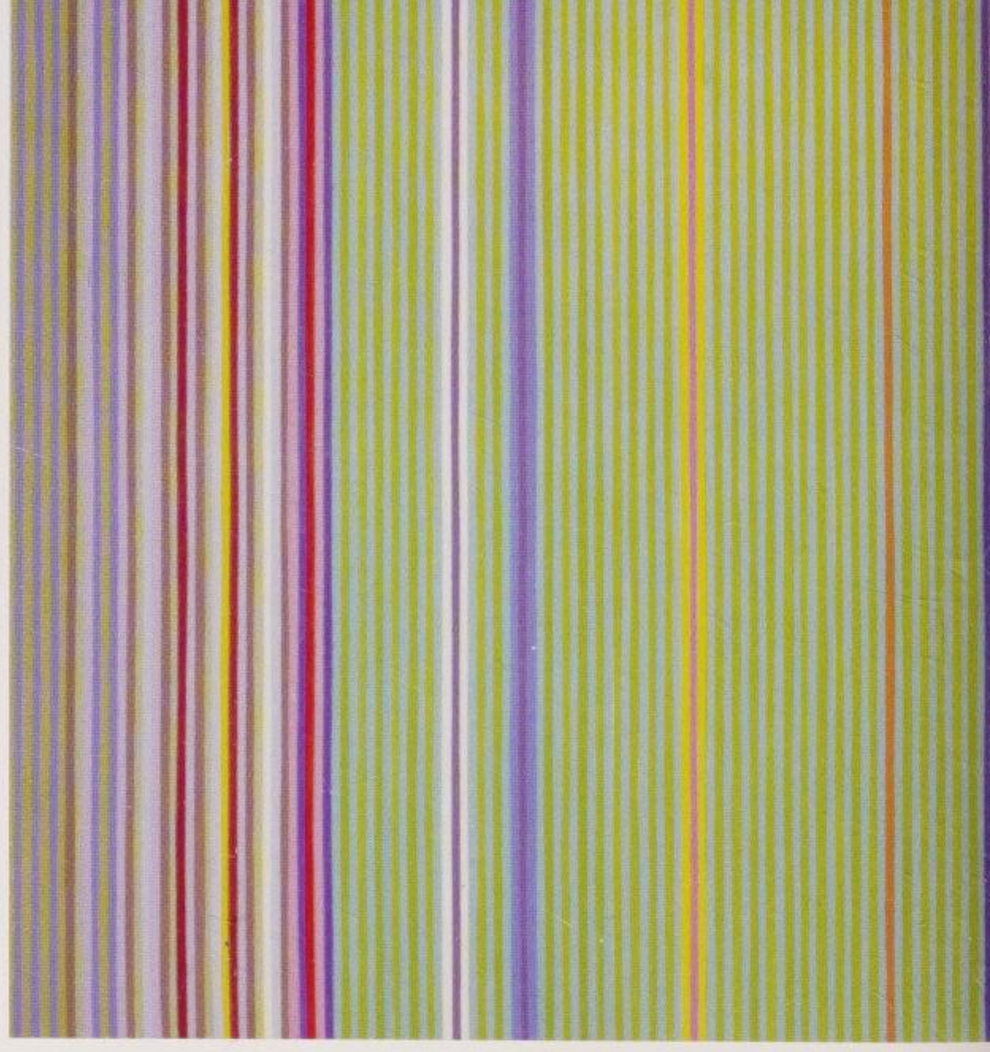
Above: Fig. 152
Jasper Johns
American, born 1930
Flags
1967–68
Lithograph, edn 34/43
34½ x 25 in. (87.6 x 63.5 cm)
Wake Forest University Student Union Collection of Contemporary Art, Winston-Salem, North Carolina

© Jasper Johns/Licensed by VAGA, New York, New York

tutelage, Julian Stanczak, made color his primary field of research after an early focus on perceptual effects in black and white. *Remnants of Late Color* (fig. 76), shows the interlacing effect of rhythmic linear contours derived from the landscape. Painted in similar values of red and gray, the contours seem to shimmer, evoking the living force of nature. In a further distillation of the landscape into a schematic wave pattern, *Concurrent Colours* (fig. 156) interweaves red and blue of equal chromatic intensity to stimulate further an already dynamic periodic structure of arabesque contours. In this case, the chromatic spatial difference between the two hues of red and blue, which indicate extremes of warm and cool that normally advance and recede, are held in deliberate tension by their equivalent intensity, heightening and sustaining visual excitement.

In the hard-edged formalism of Ellsworth Kelly and Alexander Liberman, broad shapes of saturated color are positioned in dramatic tension. Liberman's *Sun II* (fig. 150) and Kelly's *Blue Green Red* (fig. 151) both employ the hues corresponding to the three cone receptors for the distinction of color in daylight. Kelly's composition, which divides the canvas into two halves, challenges each eye with conflicting combinations, an effect that exploits the need to reconcile binocular vision into a single coherent image. Such perceptual effects are also enhanced by the scale of the color interaction. Liberman and Kelly envelop the viewer within a visual field equal to or greater than the height of the human body. Having emerged from the Washington, D.C., based school of color field painting, along with his colleague Kenneth Noland, painter Gene Davis also exploits the visceral effects of scale with large striped canvases. Vertical color bands unfold at calculated intervals as one passes in front of such architecturally scaled works as *Raspberry Icicle* (fig. 154). The temporal aspect involved in viewing such paintings creates an effect analogous to music, including chromatic harmony and dissonance, that relies on the viewer's physical interaction. Ironically, Davis has pushed our reception to the opposite extreme with *Micropaintings* often less than an inch high, which challenge us to perceive color contrast in minute form, and by extension to notice the art at all within the larger environment (see fig. 153).

Japanese-born Tadasky has used concentric circles consistently throughout his career to generate similar





Right: Fig. 153
Gene Davis
American, 1920–1985
Micropainting
c. 1966–68
Acrylic on canvas
5/8 x ½ in. (1.6 x 1.3 cm) (picture actual size)
Smithsonian American Art Museum, Washington, D.C.: Bequest of Florence Coulson Davis. 1996.104.83

Photography by Smithsonian American Art Museum, Washington, D.C./Art Resource, New York

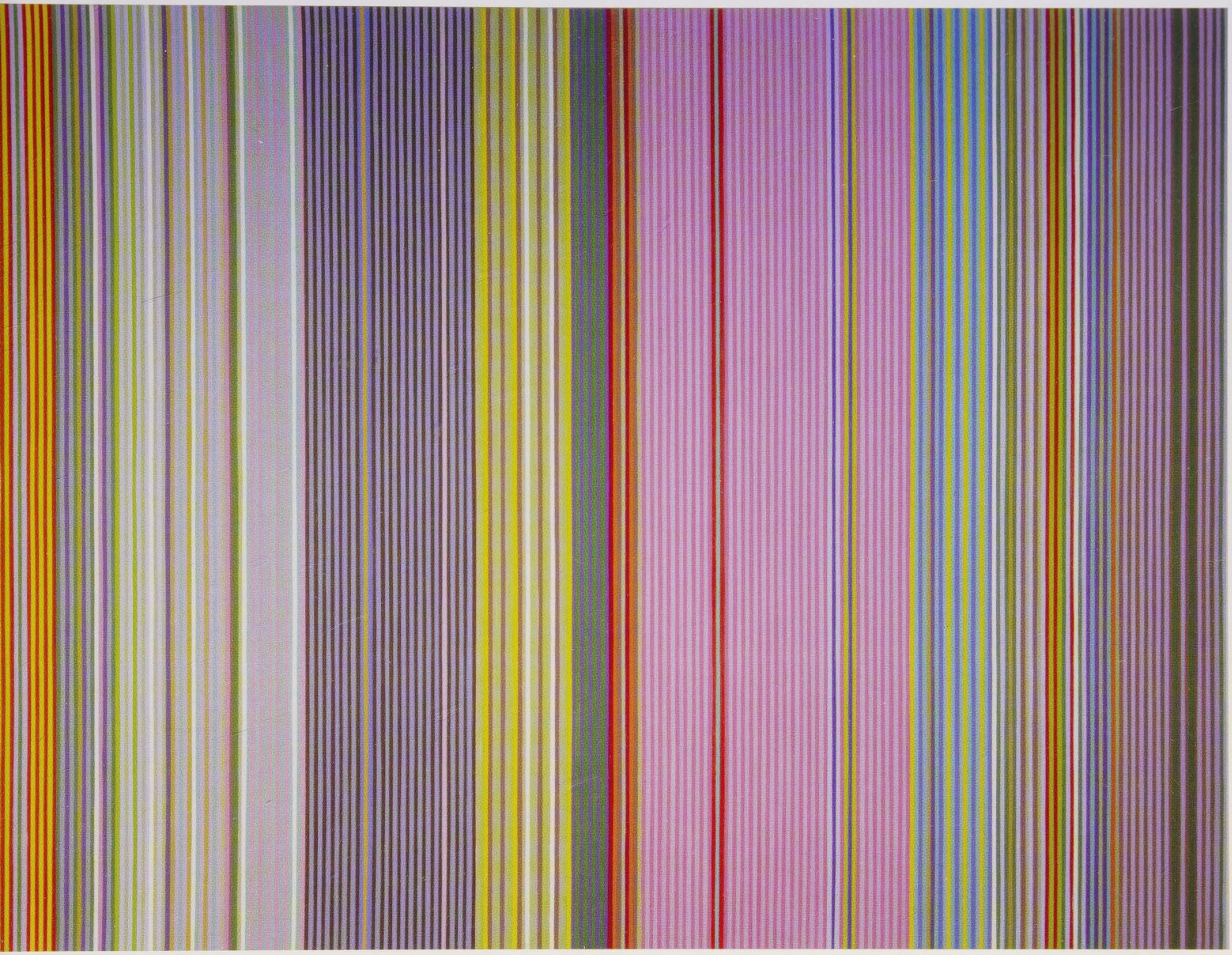


Fig. 154
Gene Davis
American, 1920–1985
Raspberry Icicle
1967
Acrylic on canvas
116 x 219$^{5}/_{8}$ in. (294.6 x 557.9 cm)
Smithsonian American Art Museum,
Washington, D.C.: Museum purchase.
1971.77

Photography by Smithsonian American Art Museum,
Washington, D.C./Art Resource, New York

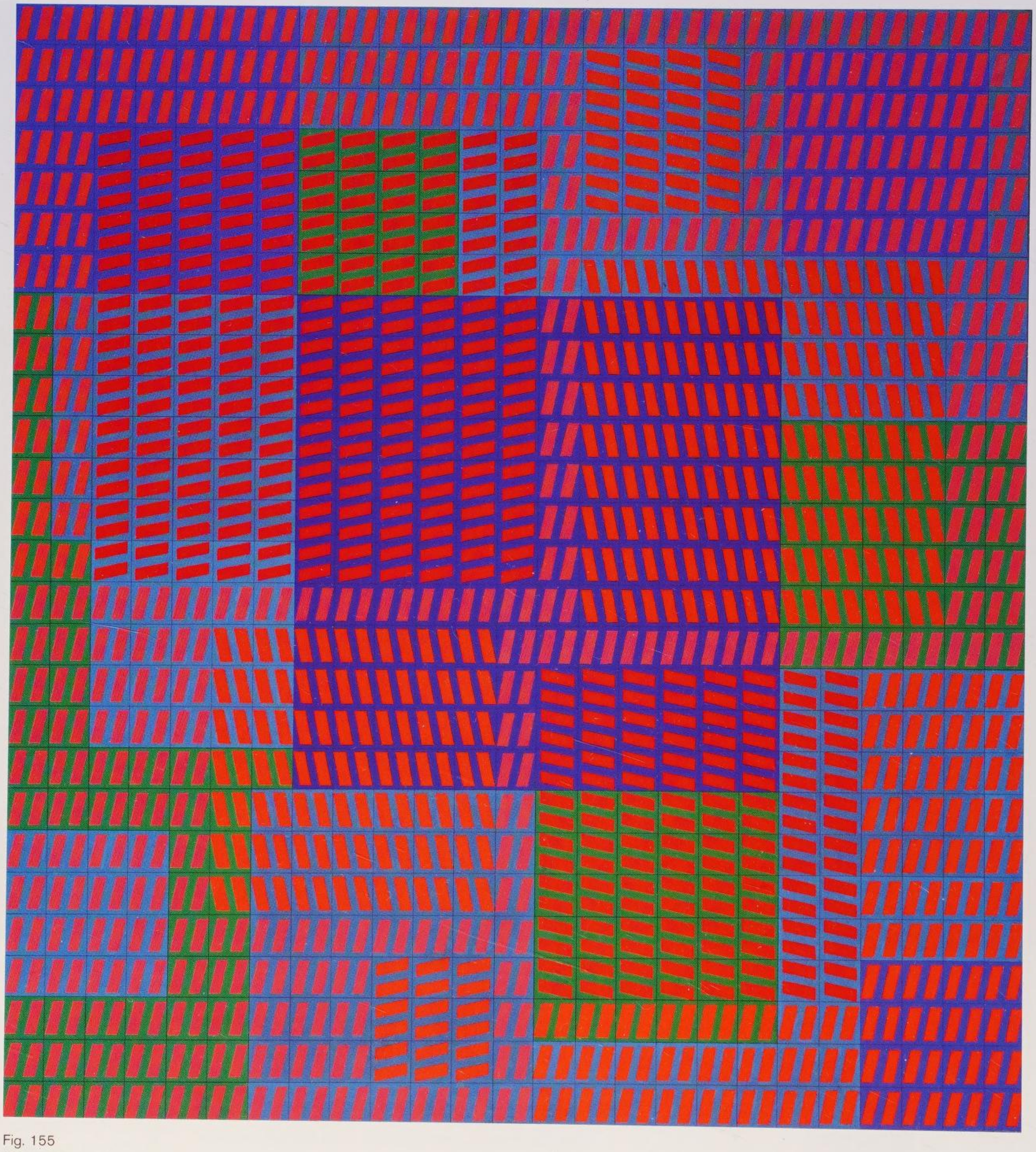


Fig. 155
Victor Vasarely
French, born Hungary, 1906–1997
KEIHO-C_2
1963
Casein on masonite mounted on panel
32 x 29½ in. (81.3 x 74.9 cm)
Collection of Neil K. Rector, Columbus, Ohio

© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

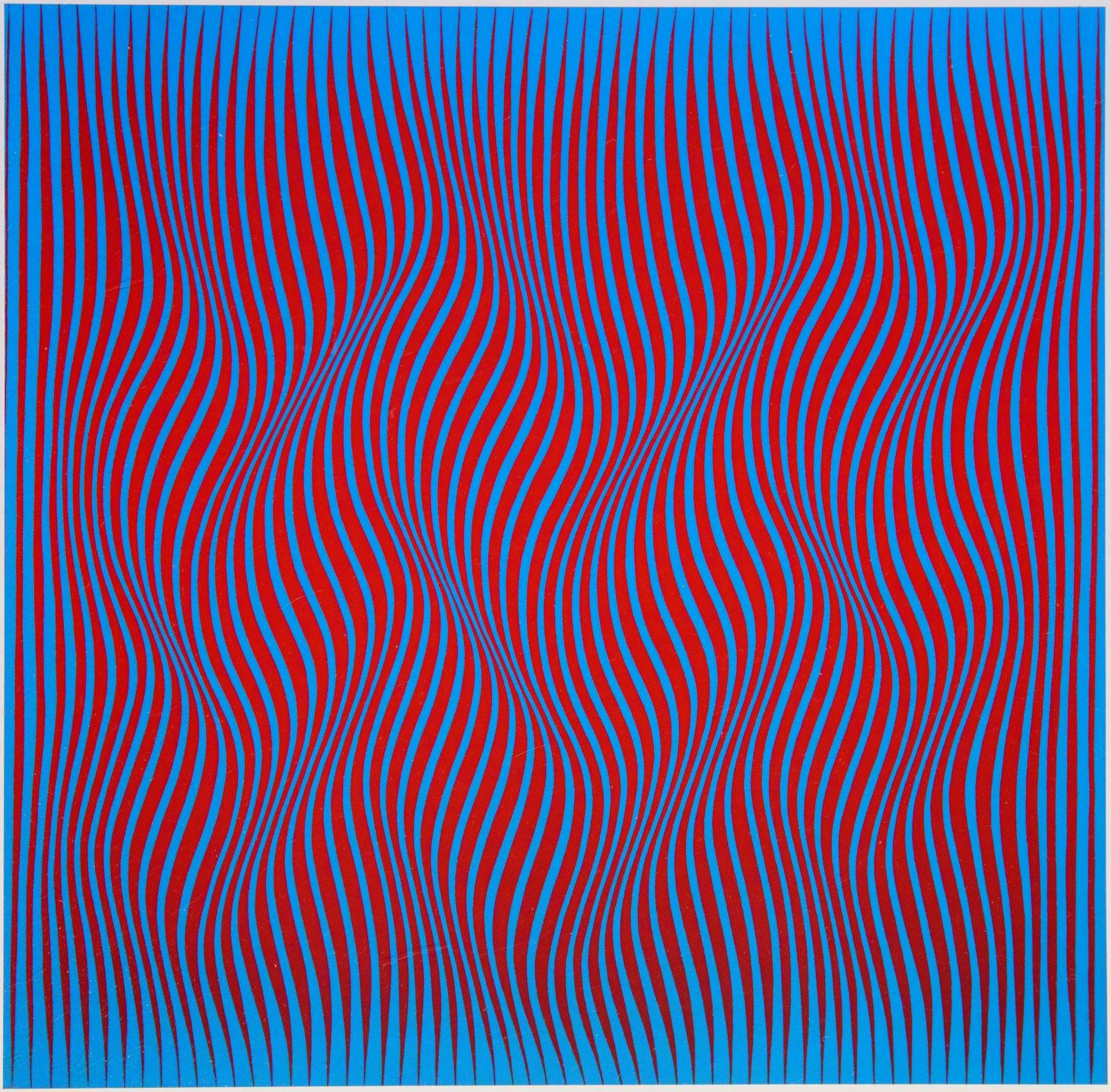
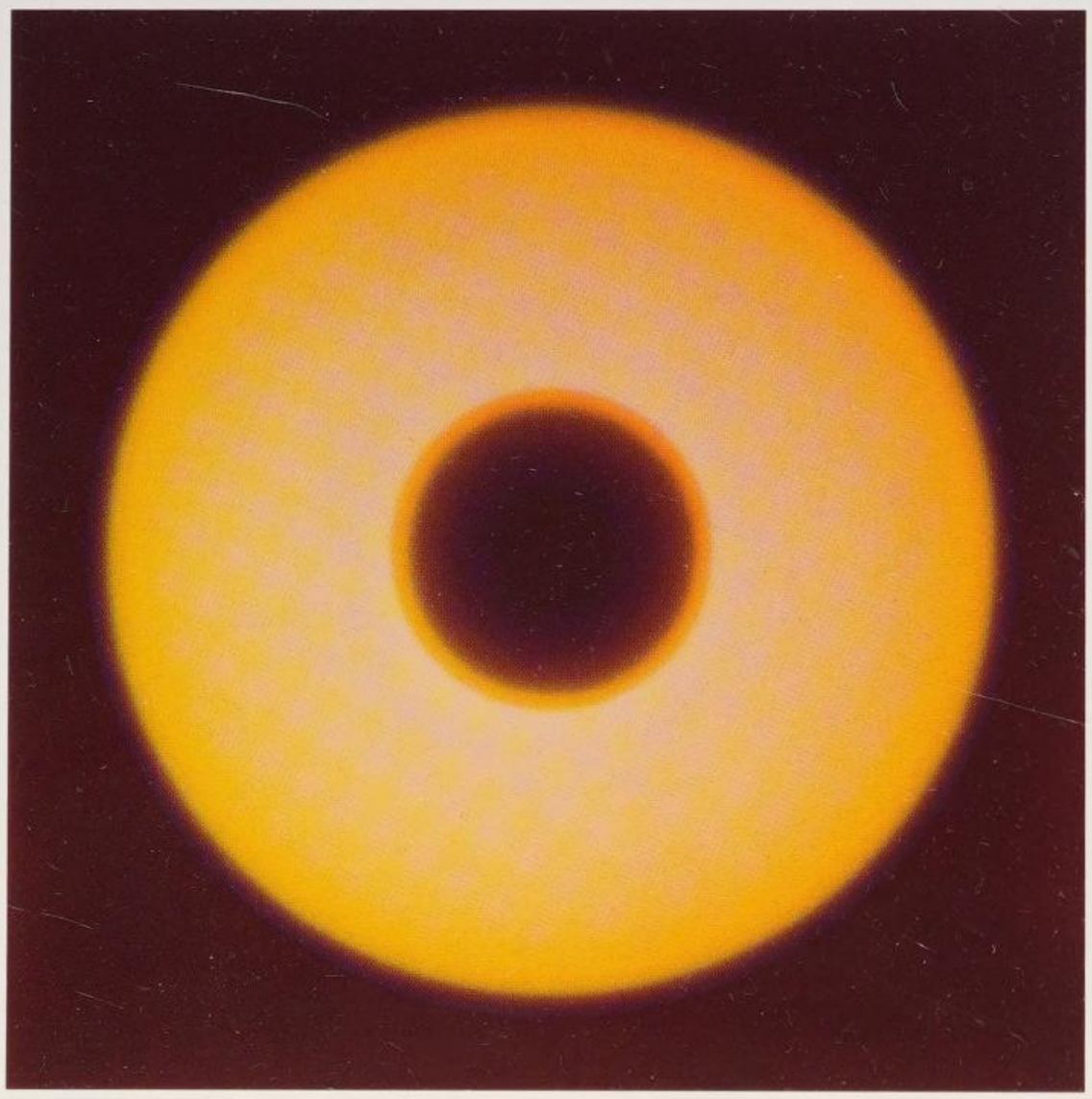


Fig. 156
Julian Stanczak
American, born Poland 1928
Concurrent Colours
1965
Acrylic on canvas
45 x 46 in. (114.3 x 116.8 cm)
Collection of Neil K. Rector, Columbus, Ohio





Top: Fig. 157
Tadasky (Tadasuke Kuwayama)
American, born Japan 1935
C 120
1965
Acrylic on canvas
30 x 30 in. (76.2 x 76.2 cm)
Private collection, Columbus, Ohio
Courtesy of the Artist

Above: Fig. 158
Peter Sedgley
British, born 1930
Oracle
1966
Emulsion on canvas
60 x 60 in. (152.4 x 152.4 cm)
The JPMorgan Chase Art Collection

intervals of chromatic interplay. Paintings such as *B 116* (1966) seem to pulse around the circular pattern, an effect caused and heightened by intervals of color that optically mix and contrast to create a dynamic radiance within the mesmerizing periodic structure. The target format, which offers a focal point to anchor a range of visual oscillations, had wide currency among Op artists. Wojciech Fangor, Claude Tousignant, and Peter Sedgley also used this circular, periodic structure but to dramatically different effect. Sedgley paints diffused circular bands of varying width, color, and value, organized to elicit slow pulsations of radiant color from the composition. In such works as *Oracle* (fig. 158) this creates also a deep illusion of space, which portends the dematerialization of the art object into a metaphysical experience of light. In *Pulse*, he projected programmed sequences of light on to the surfaces of his paintings to add a real shift in color to the already implied color motion. These led Sedgley to even more complex multimedia works incorporating ultraviolet and stroboscopic lights in interaction with motorized video rotors. These works hark back to Maxwell's nineteenth-century "rotating discs" that inspired the modernist revolution in color.

1 Josef Albers, "The Color in My Paintings," *Josef Albers: Homage to the Square*, New York (The Museum of Modern Art) 1964, p. 14.

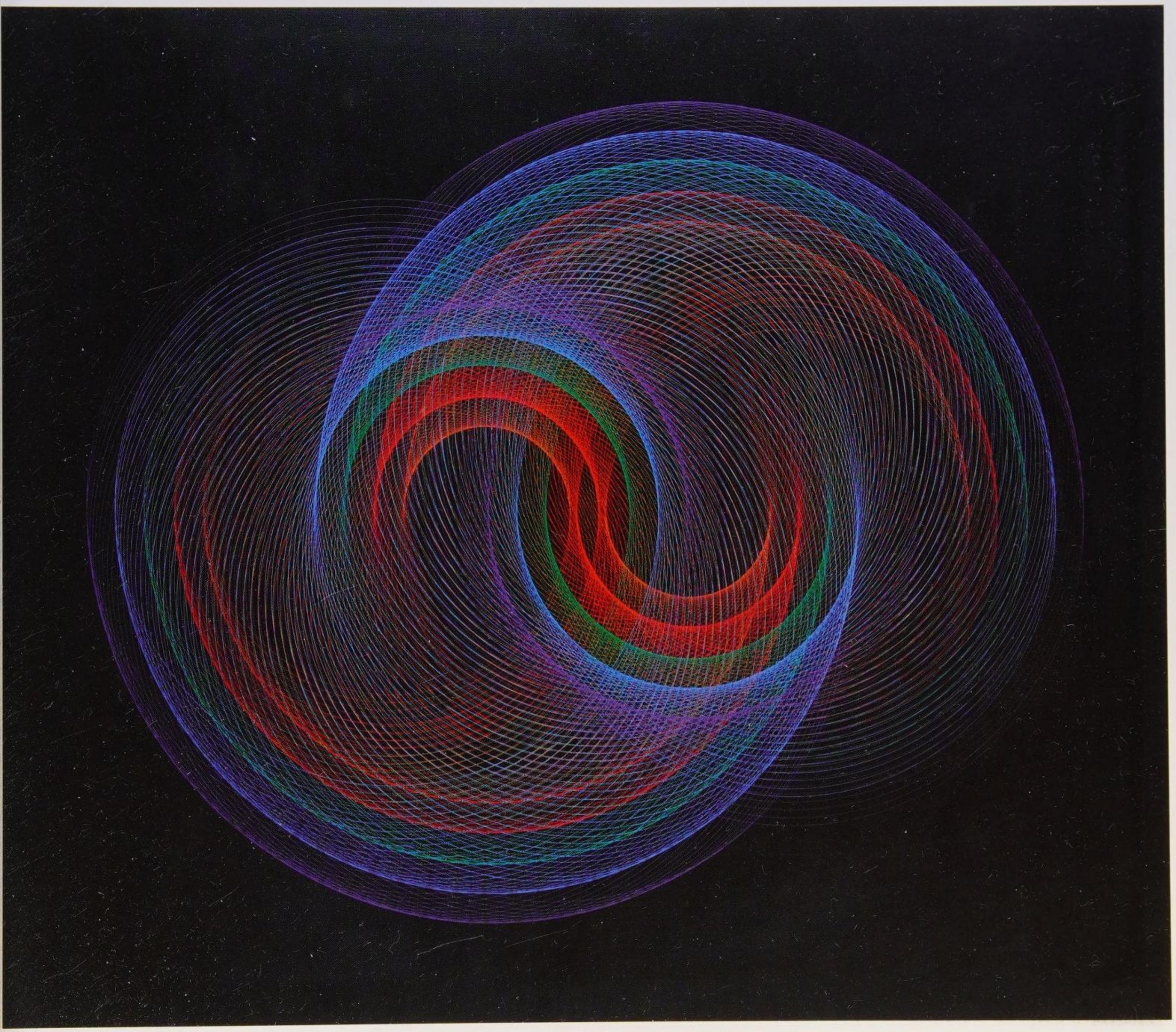


Fig. 159
Eduardo Mac Entyre
Argentinean, born 1929
Generative Painting
(Pintura Generative)
1966
Acrylic on canvas
63½ x 73½ in. (161.3 x 186.7 cm)
Miami University Art Museum, Oxford,
Ohio: Gift of Beatrice Cummings Mayer.
1991.524
Courtesy of the Artist



Fig. 160
Claude Tousignant
Canadian, born 1932
Chromatic Accelerator
(Accélérateur chromatique)
1968
Acrylic on canvas
84 in. diameter (213.4 cm)
Collection of the artist, Quebec, Canada
© Claude Tousignant 2006

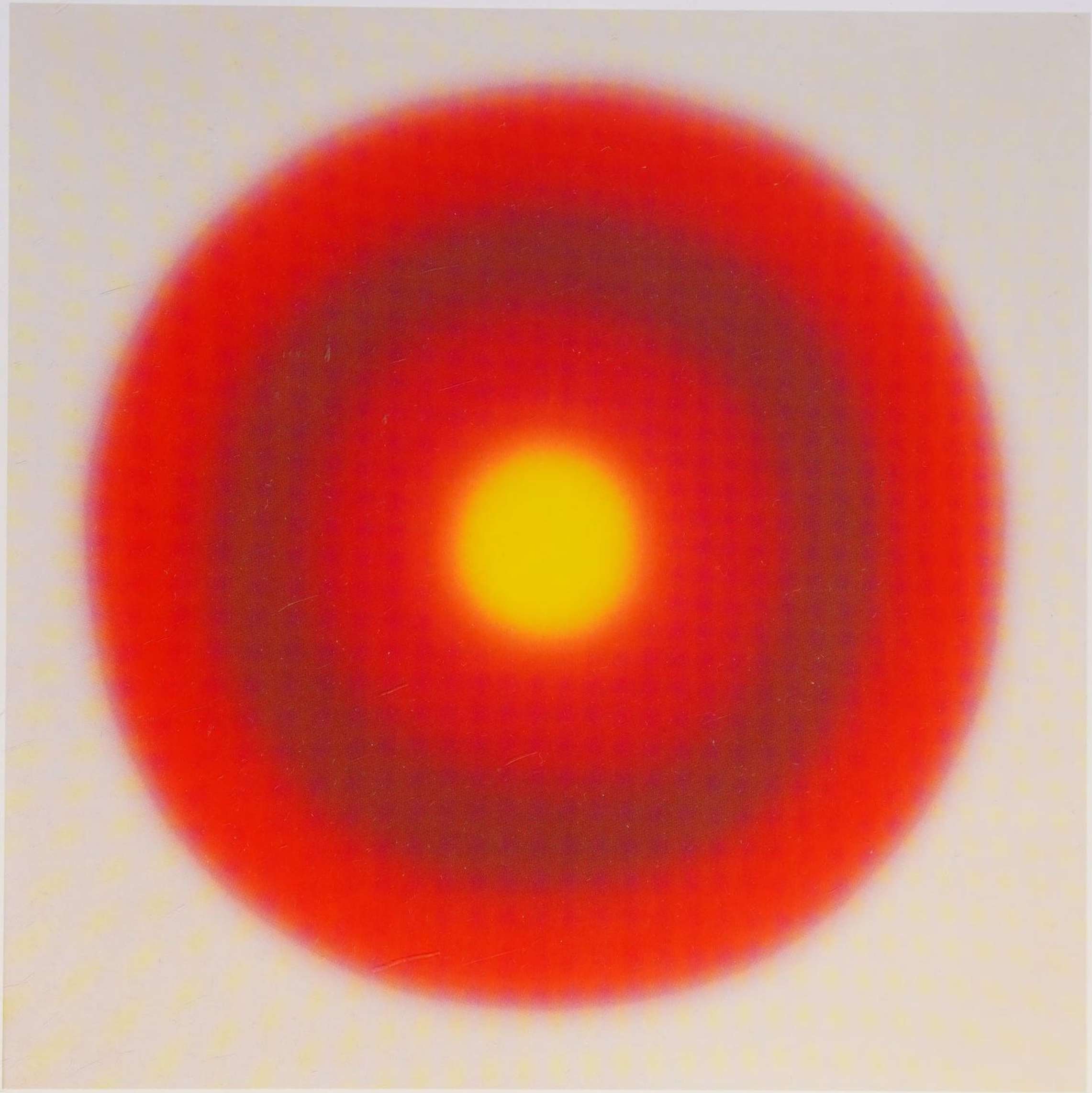
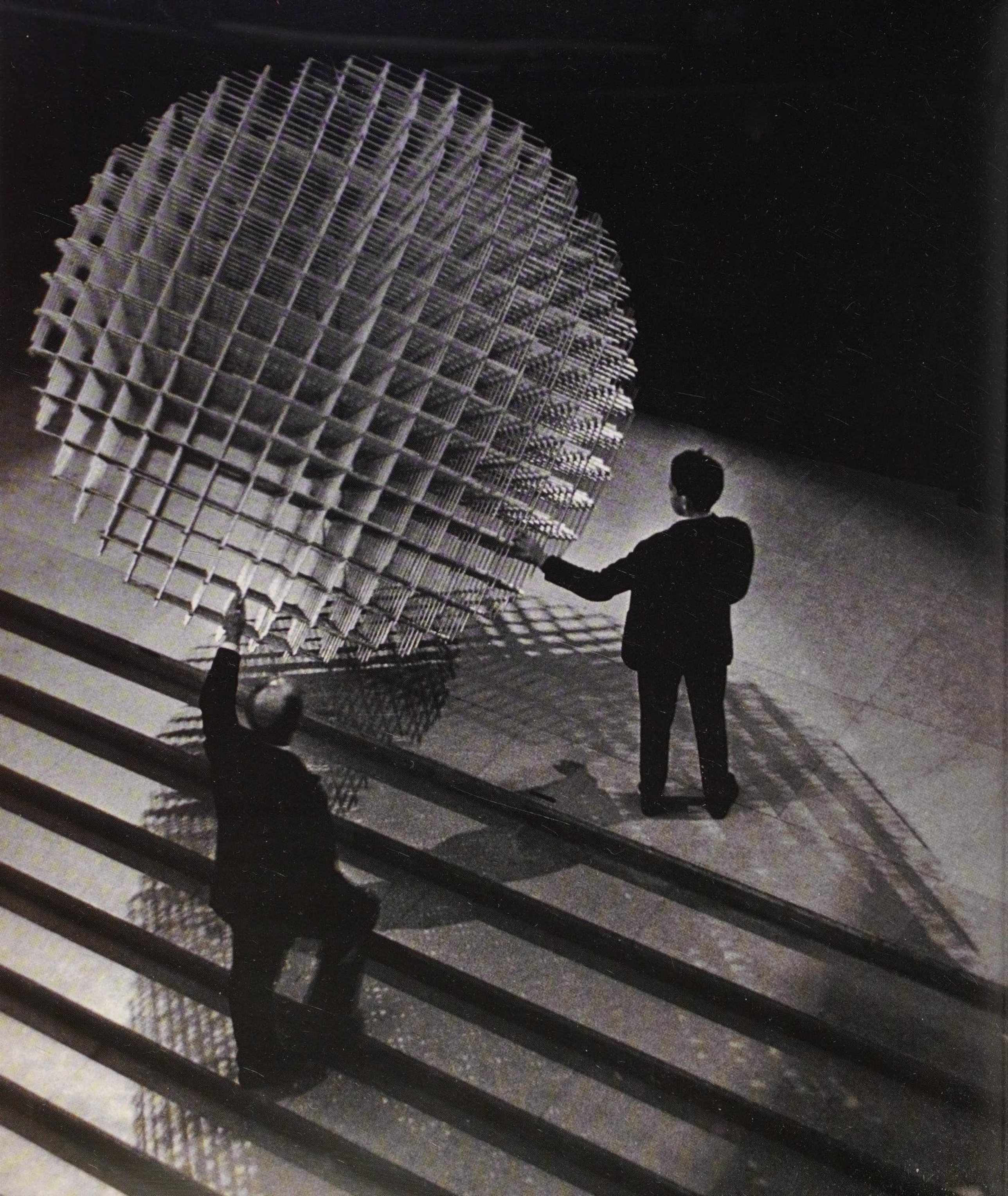


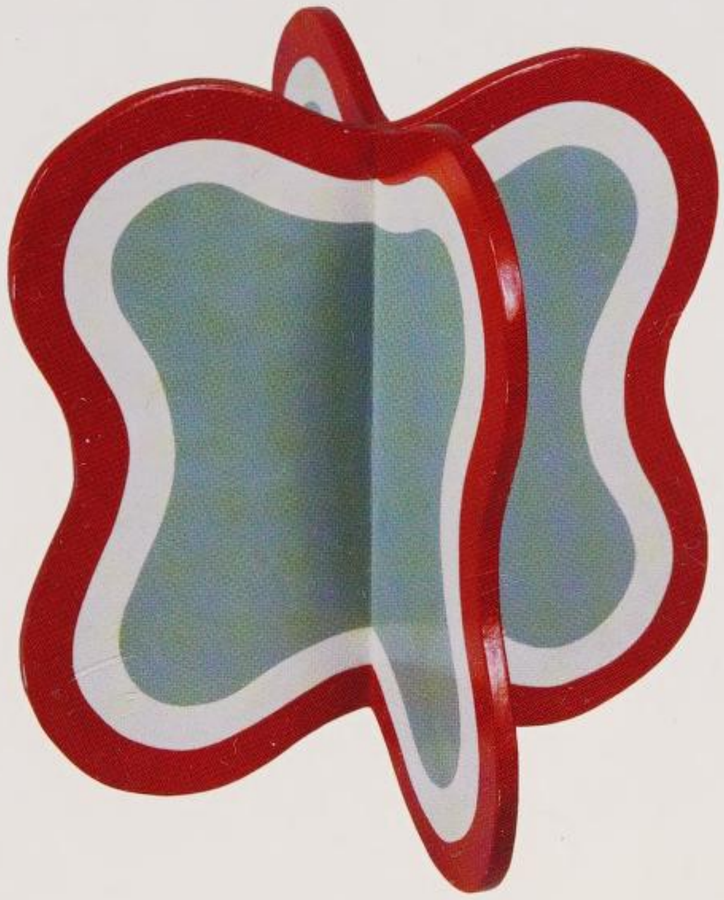
Fig. 161
Wojciech Fangor
Polish, born 1922
M13
1968
Oil on canvas
56 x 56 in. (142.2 x 142.2 cm)
The JPMorgan Chase Art Collection



THE IMMERSIVE EXPERIENCE

The movement of Op Art was dominated by painting and characterized by an innovative use of pattern, structure and color, which transfigured and transcended the two-dimensional plane. The validity of painting as a medium was under critical debate at precisely the moment of Op's arrival, leading its staunchest detractors to dismiss optical painting, and the movement as a whole, as an inherently conservative, and outdated, tool for illusionism. The genre of kinetic sculpture, with which it was often grouped, emerged concurrently, but evinced a distinct sensibility. Unlike kinetic art, Op called on the viewer to enact the potential movement within the art object. Standing in front of the two-dimensional plane of painting, or the three-dimensional surfaces of sculpture and reliefs, the viewer must engage body and mind in a dynamic perceptual process. This kinesthetic component motivated unconventional art forms that elude easy classification. The use of moiré patterns in the work of Mon Levinson, Ludwig Wilding, and Yvaral, for instance, engenders both real and imagined spatial effects. Neither sculpture nor painting, the constructions activate the mind while remaining still. In another merger of painting and sculpture, Heinz Mack and Gerhard von Graevenitz produced a form of "kinetic painting," employing electronic rotation that subverts the traditional function of the planar surface. The mechanical nature of such work positions it curiously between kinetic art and Op, an art of potential motion.

Not surprisingly, many Op painters went beyond

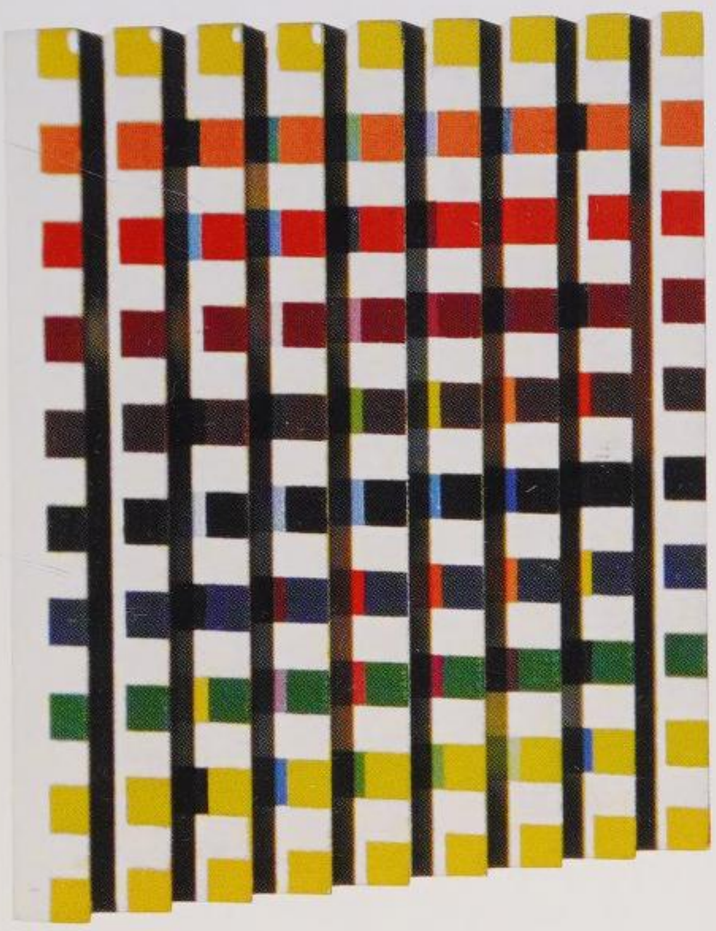


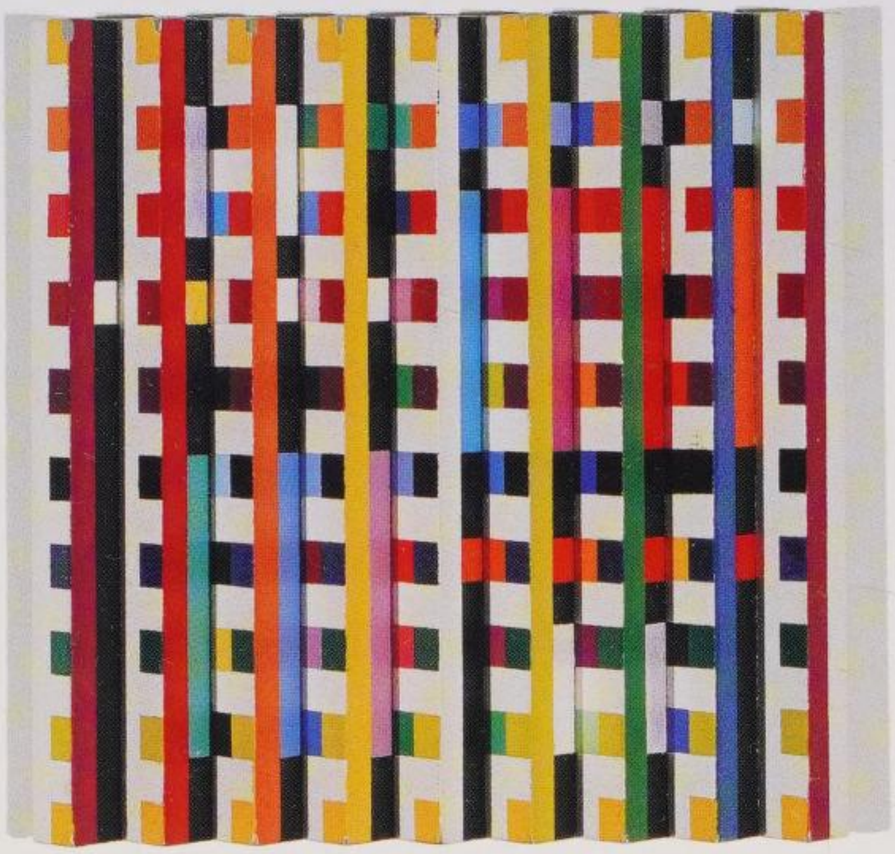
Opposite: Fig. 162
François Morellet
French, born 1926
Grid Sphere
1962
Stainless steel
Installation view at the Third Paris Biennale, Musée d'Art Moderne de la Ville de Paris, Paris, 1963

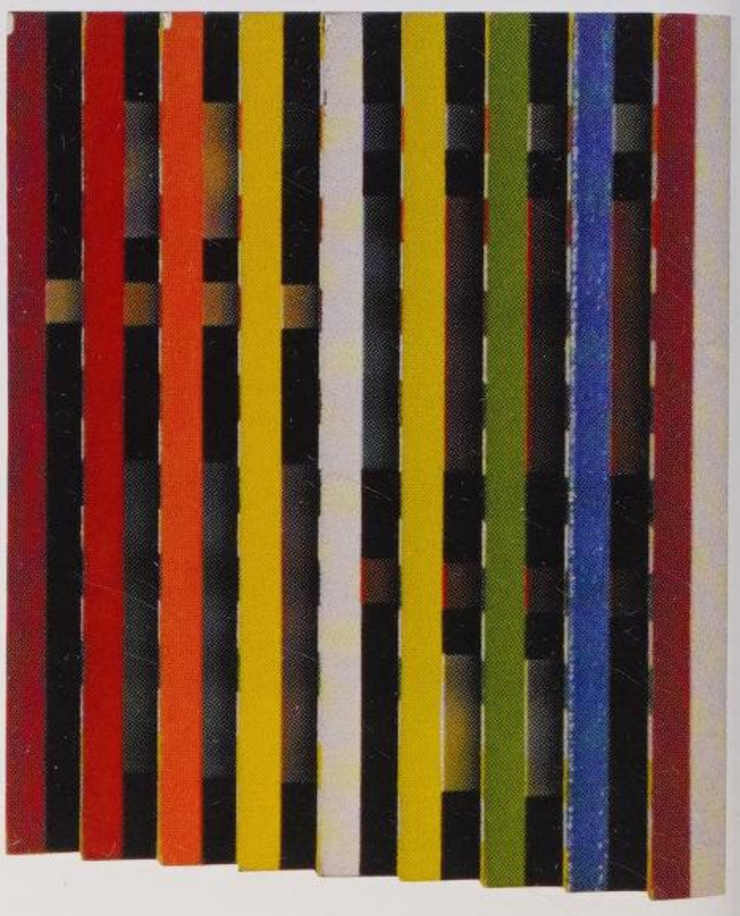
Courtesy of the Artist © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

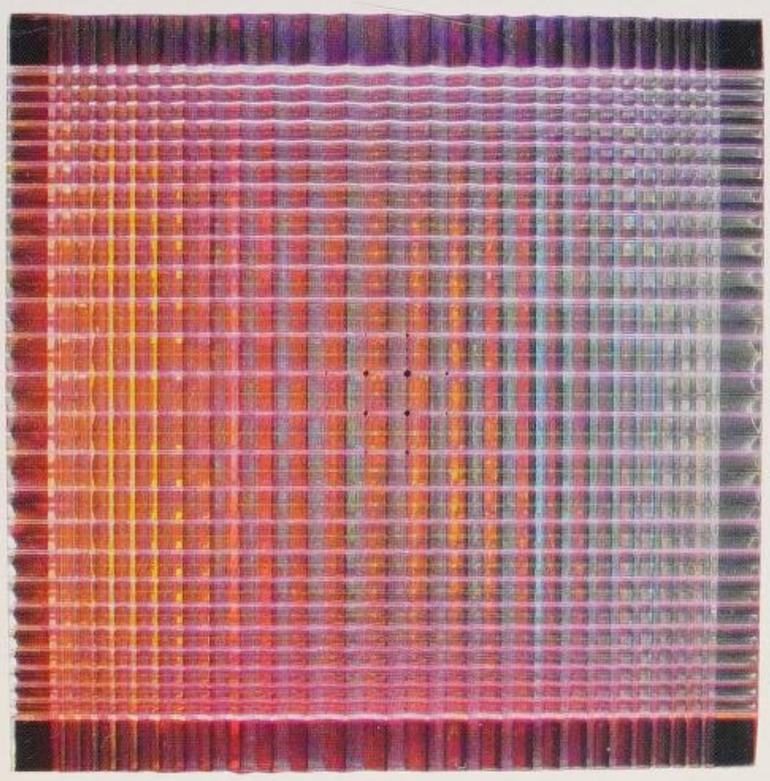
Left, top: Fig. 163
Paul Feeley
American, 1910–1966
EL 20
1965
Painted wood
8 x 8 x 8 in. (20.3 x 20.3 x 20.3 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of the Betty Parsons Foundation. 1985.024.005

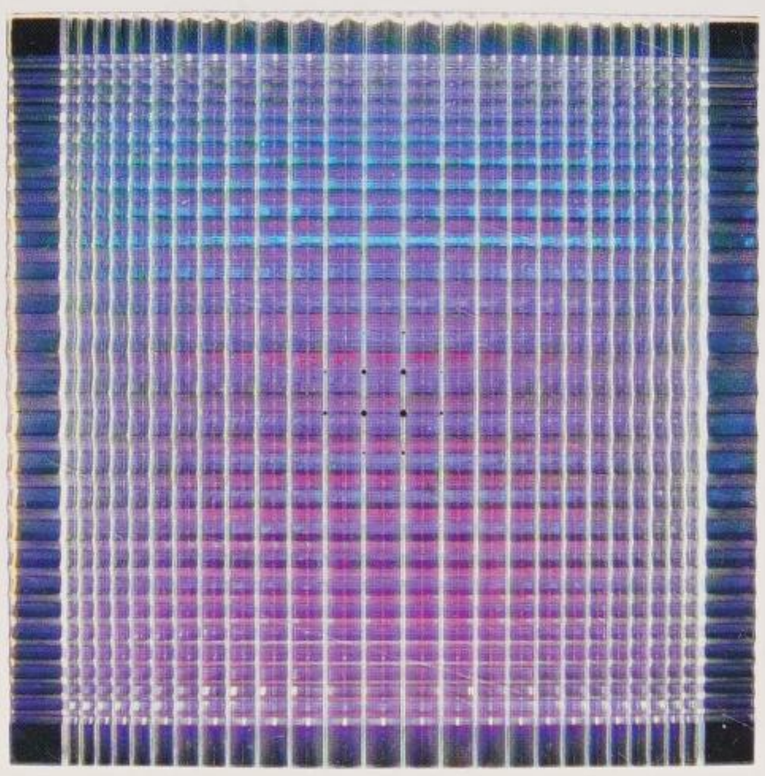
Left, bottom: Fig. 164
Henry C. Pearson
American, 1914–2006
Continuum
1965
Acrylic on paper on aluminum sphere
20 in. diameter (50.8 cm)
Collection Tweed Museum of Art, University of Minnesota, Duluth, Minnesota: Gift of the artist

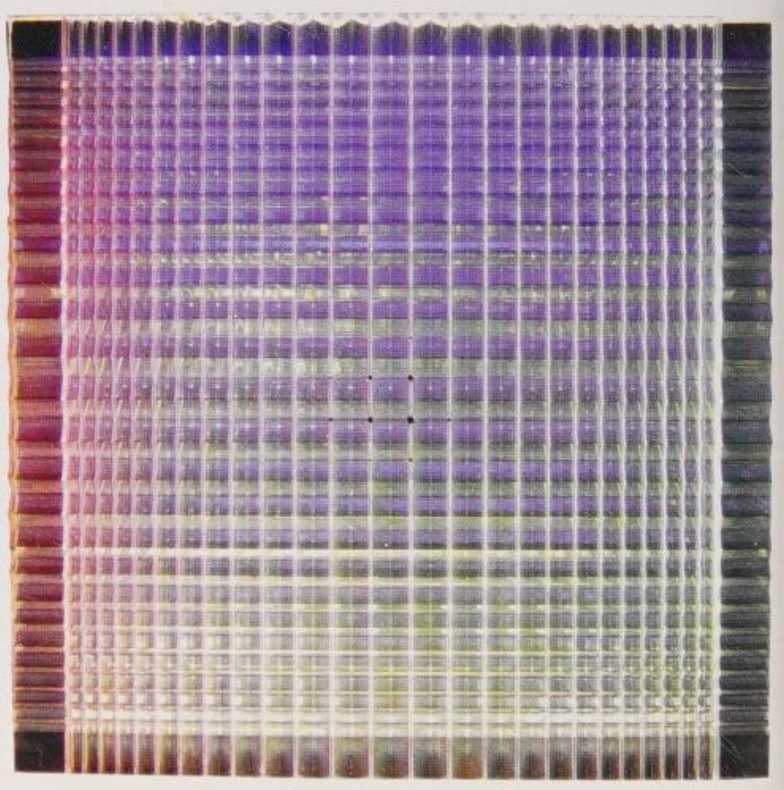












Top: Fig. 165
Yaacov Agam
Israeli, born 1928
Structure IV
1967
Acrylic on board mounted on painted fiberboard (three views)
4¼ x 4¼ x ¾ in. (10.8 x 10.8 x 1.9 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of Mr. and Mrs. Robert McLaughlin.
1993.010.001

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Above: Fig. 166
Karl Gerstner
Swiss, born 1930
Prism Picture #7
1958/62
Mixed media construction with Plexiglas prism, fluorescent lights, and maneuverable color filters (three views)
28 x 28 x 4½ in. (71.1 x 71.1 x 11.4 cm)
Private collection



Fig. 167
Francis Celentano
American, born 1928
Kinetic Painting III
1967
Lacquer on masonite, motorized
48 in. diameter (121.9 cm)
Albright-Knox Art Gallery, Buffalo, New York: Gift of Seymour H. Knox, Jr., 1968

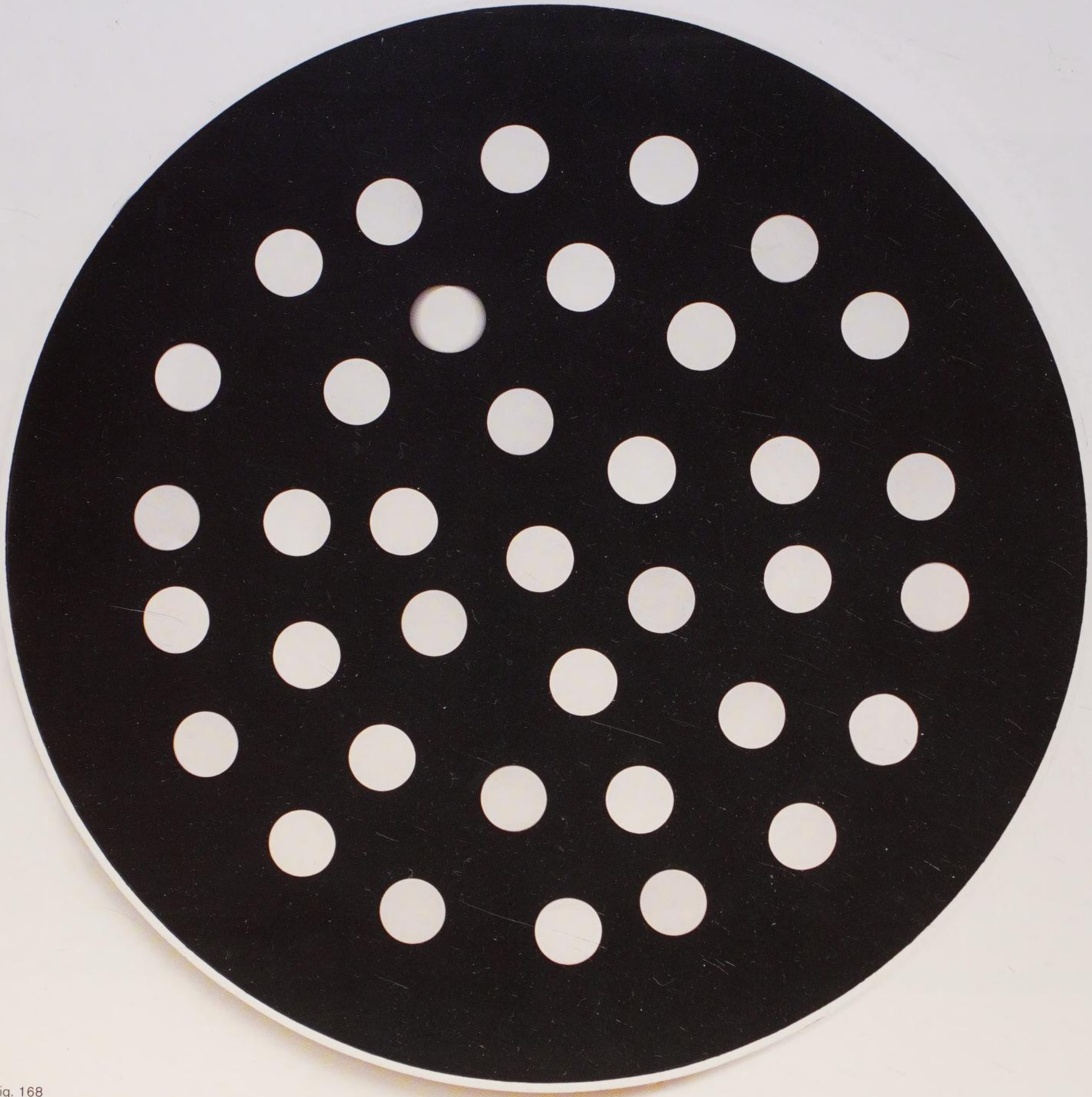
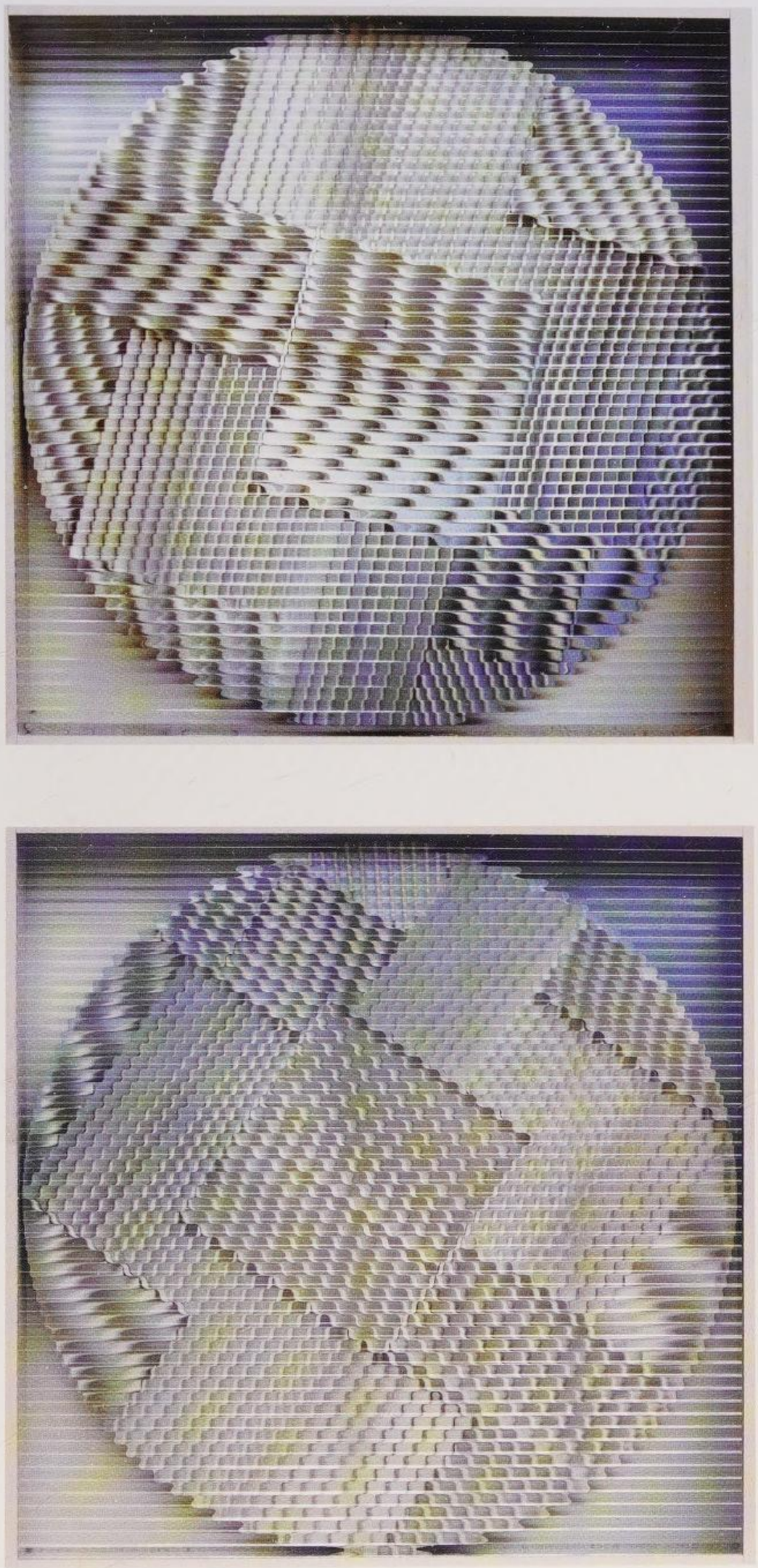


Fig. 168
Gerhard von Graevenitz
German, 1934–1983
Untitled
1964
Wood, plastic, and motor
32½ in. diameter x 3 in. (82.6 x 7.6 cm)
Miami University Art Museum, Oxford, Ohio:
Gift of Debra and Robert Mayer from the
Robert B. Mayer Memorial Loan Collection.
1984.9

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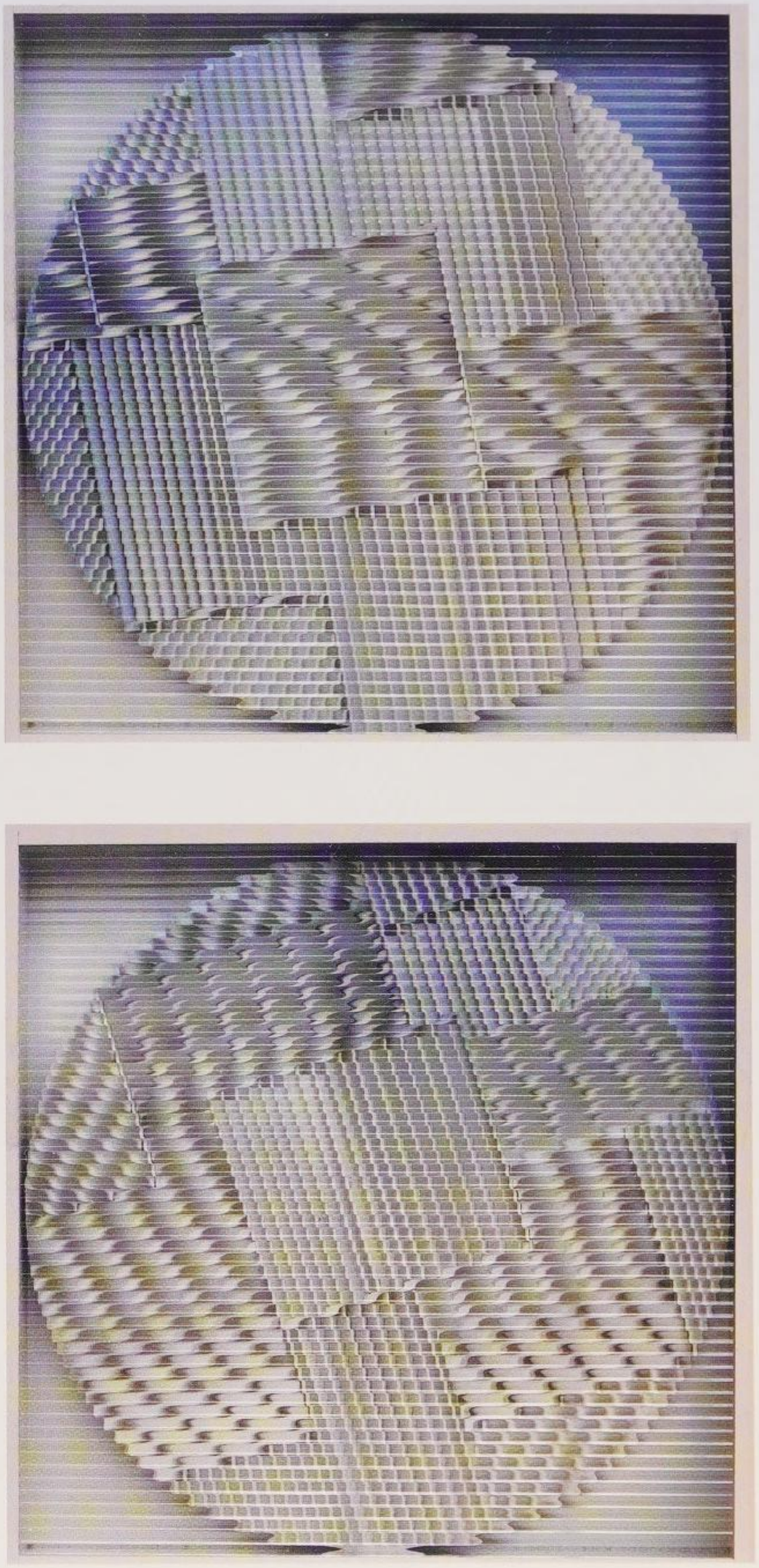


Fig. 169
Heinz Mack
German, born 1931
Sun of Antarctica
1965
Wood, glass, and motor (four views)
58 x 58 x 14 in. (147.3 x 147.3 x 35.6 cm)
Miami University Art Museum, Oxford, Ohio:
Gift of Beatrice Cummings Mayer.
1991.525

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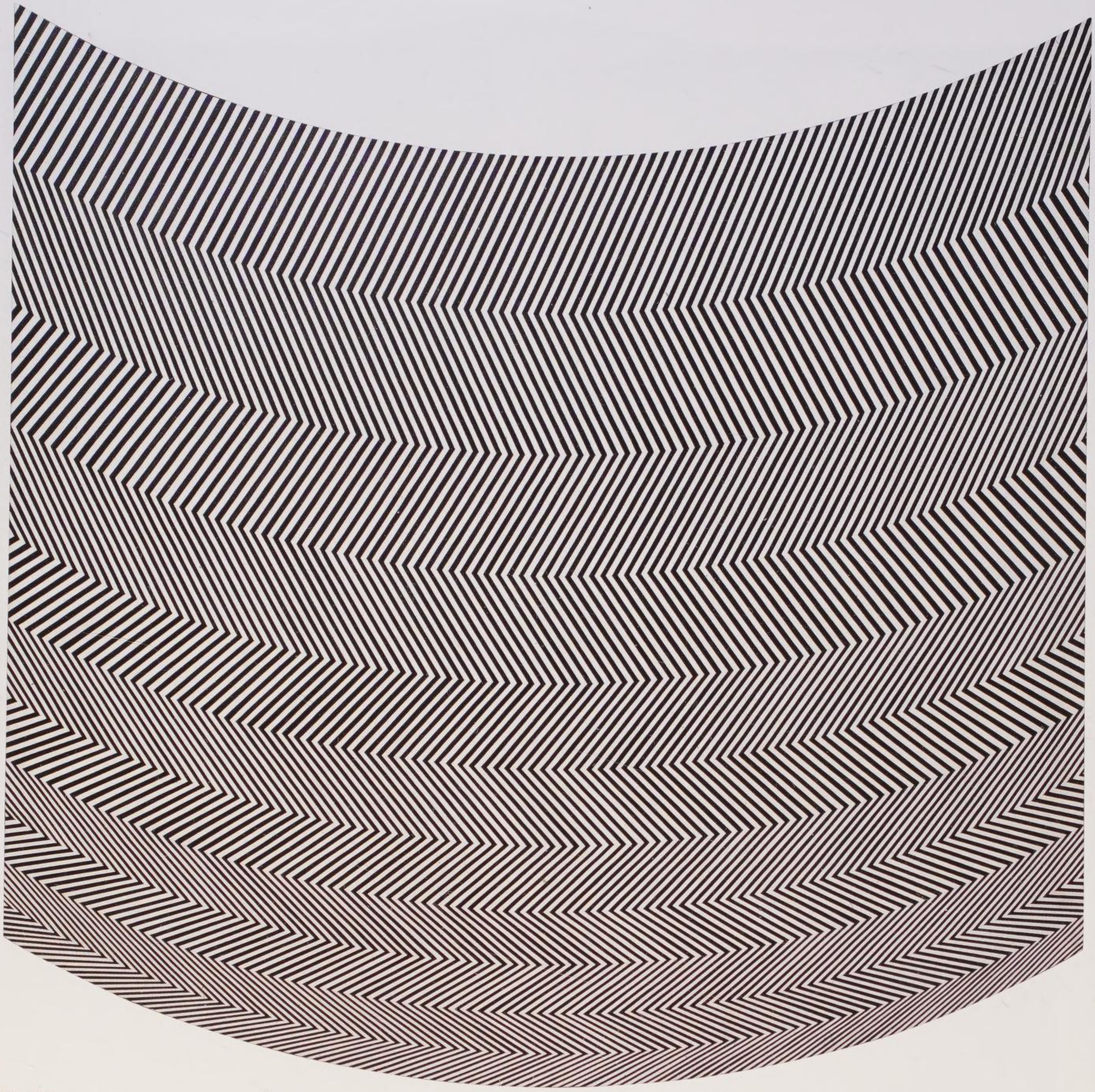
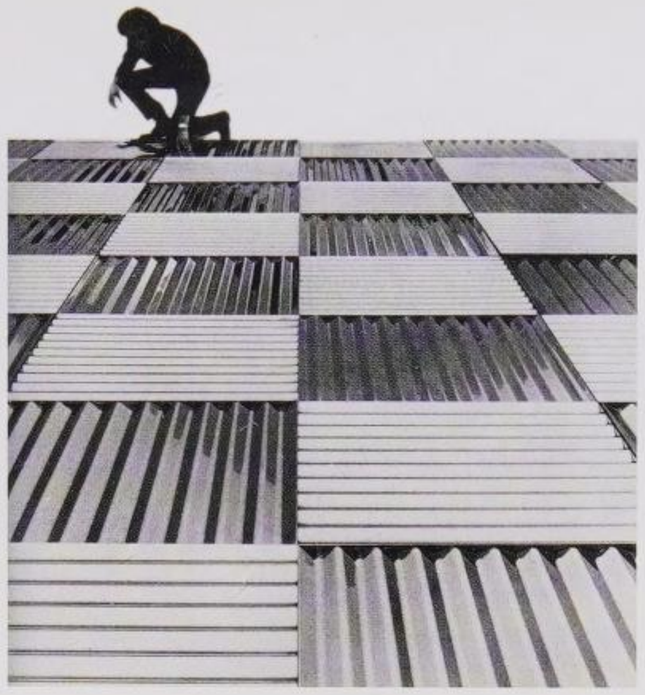


Fig. 170
Bridget Riley
British, born 1931
Suspension
1964
Emulsion on wood
45 3/4 x 45 7/8 in. (116.2 x 116.5 cm)
Collection Walker Art Center, Minneapolis, Minnesota: Gift of Mr. and Mrs. Julius E. Davis, 1981 1981.50

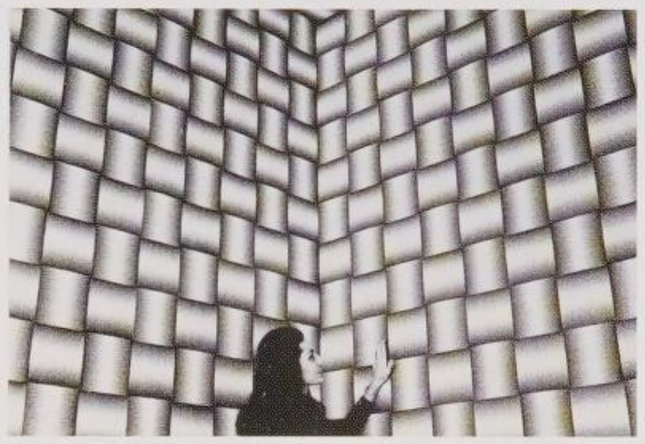
© 2006 Bridget Riley, All Rights Reserved

the traditional limits of their medium. A number of artists experimented with the rudimentary but subversive gesture of tilting the canvas on its axis, an action with roots in the Constructivist and Futurist search for dynamism. Countering expectation, the diamond or rhomboid format provides an immediate sense of instability against the verticality of the human body and the horizontality of the landscape. Kenneth Noland, Bridget Riley, and Frank Stella are among the Op painters who capitalized on this tension, creating a new category of "shaped paintings" that could conform to, or contradict, the painted surface. Such works, particularly when viewed with more traditional art, create a dynamic contrast to the surrounding architectural environment. Going one step further, Richard Anuszkiewicz created a series of three-dimensional grid paintings that, taking their cue from Albers's classic *Structural Constellations* (see fig. 99), turn ambiguous linear perspective into three-dimensional spatial paradox. Jesús Rafaël Soto likewise extends the moiré effects of his paintings into architectural space in such installations as *Cube of Ambiguous Space* (fig. 177). Such formal inventions are just one small aspect of Op's broader heritage of innovation that transgresses traditional boundaries.

Further realizing the physical and psychological impact of three-dimensional optical patterns, Bridget Riley, Carlos Cruz-Diez, François Morellet, and Getulio Alviani each created environmental extensions of their paintings. Riley's spiral installation *Continuum* (1965) invited spectators into a small central space surrounded by a panoramic shifting pattern, inducing an unrelenting sense of claustrophobia and vertigo. The corporeal dislocation caused by this illusory warping of space is paralleled in Marina Apollonio's floor design, which appears to warp the very ground below into a swirling vortex. Ironically, this visual "assault," which contemporary critics often ascribed to the work of Riley in particular, inspired popular motifs for textiles, wallpaper, and carpeting. Such dynamic patterns also provided the backdrop for discotheques, concert light shows, and theatrical performances, including Riley's own light projections for the London stage revival of T.S. Eliot's experimental drama *Sweeney Agonistes* (1965). Carlos Cruz-Diez successfully translated the principles of his lenticular *Physichromie* paintings (see fig. 55) into spaces of



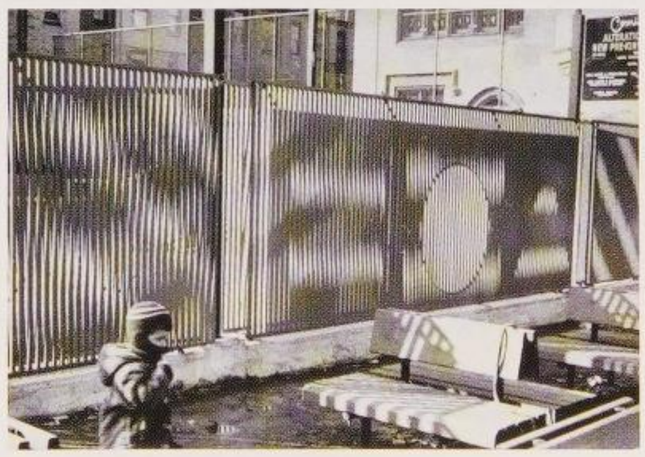
Left, top: Fig. 171
Getulio Alviani
Italian, born 1939
Reflective Relief with Perpendicular Incidence (Rilievo a Riflessione Con Incidenza Ortogonale)
1967
Steel
Dimensions variable
Courtesy of the Artist



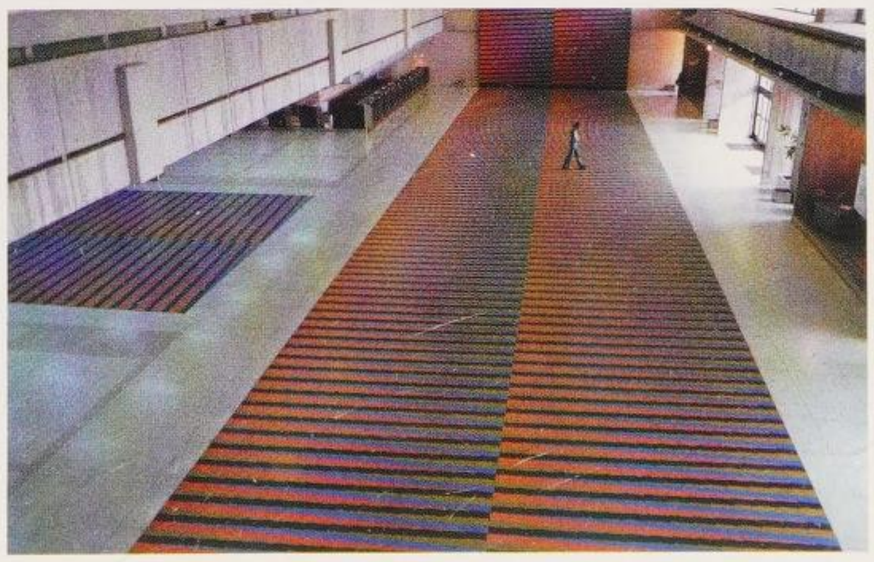
Left, second from top: Fig. 172
Getulio Alviani
Italian, born 1939
Cube of Graphic Textures (Cubo a Testura Grafica)
1964
Sheets of opalescent pvc, silk-screens and light
130 x 130 x 130 in. (330 x 330 x 330 cm)
Installation of environment at Konstruktive Kunst Element und Prinzipiem, Nüremburg, Germany, 1969
Courtesy of the Artist



Left, third from top: Fig. 173
Installation view of the Kenneth Noland exhibition, André Emmerich Gallery, New York, 1964
From *Kenneth Noland* by Kenworth Moffett, New York (Harry N. Abrams, Inc.) 1977
© Kenneth Noland/Licensed by VAGA, New York, New York



Left, fourth from top: Fig. 174
Mon Levinson
American, born 1926
Sculptural Fence
1967
Painted tubular steel
72 x 360 x 144 in. (182.9 x 914.4 x 365.8 cm)
Installation at P.S. 166, New York, New York
Courtesy of the Artist



Left, bottom: Fig. 175
Carlos Cruz-Diez
Venezuelan, born 1923
Chromatic Environment
1974
Ceramic tiles
885.8 x 29.5 feet (270 x 9 m)
Installation in the central hall at Simon Bolivar International Airport, Maiquetia, Venezuela, with Architects Montemayor and Sully
Courtesy of Atelier Cruz-Diez and Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Right: Fig. 176
Marina Apollonio
Italian, born 1940
Installation proposal
1967/71
From *Marina Apollonio: Werke 1964–1973*, exhib. cat., Neue Galerie am Landesmuseum Joanneum, Graz, Austria, April 13 – May 6, 1973
Courtesy of the Artist



Right: Fig. 177
Jesús Rafaël Soto
Venezuelan, 1923–2005
Cube of Ambiguous Space (Le Cube à Espace Ambigu)
1969
Acrylic paint on Plexiglas on wood base
98½ x 98½ x 98½ in.
(250 x 250 x 250 cm)
Installation view at Stedelijk Museum, Amsterdam, The Netherlands, from *Soto* by Gérard-Georges Lemaire, Paris (Editions de la Différence) 1997
Photography by André Morain © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris



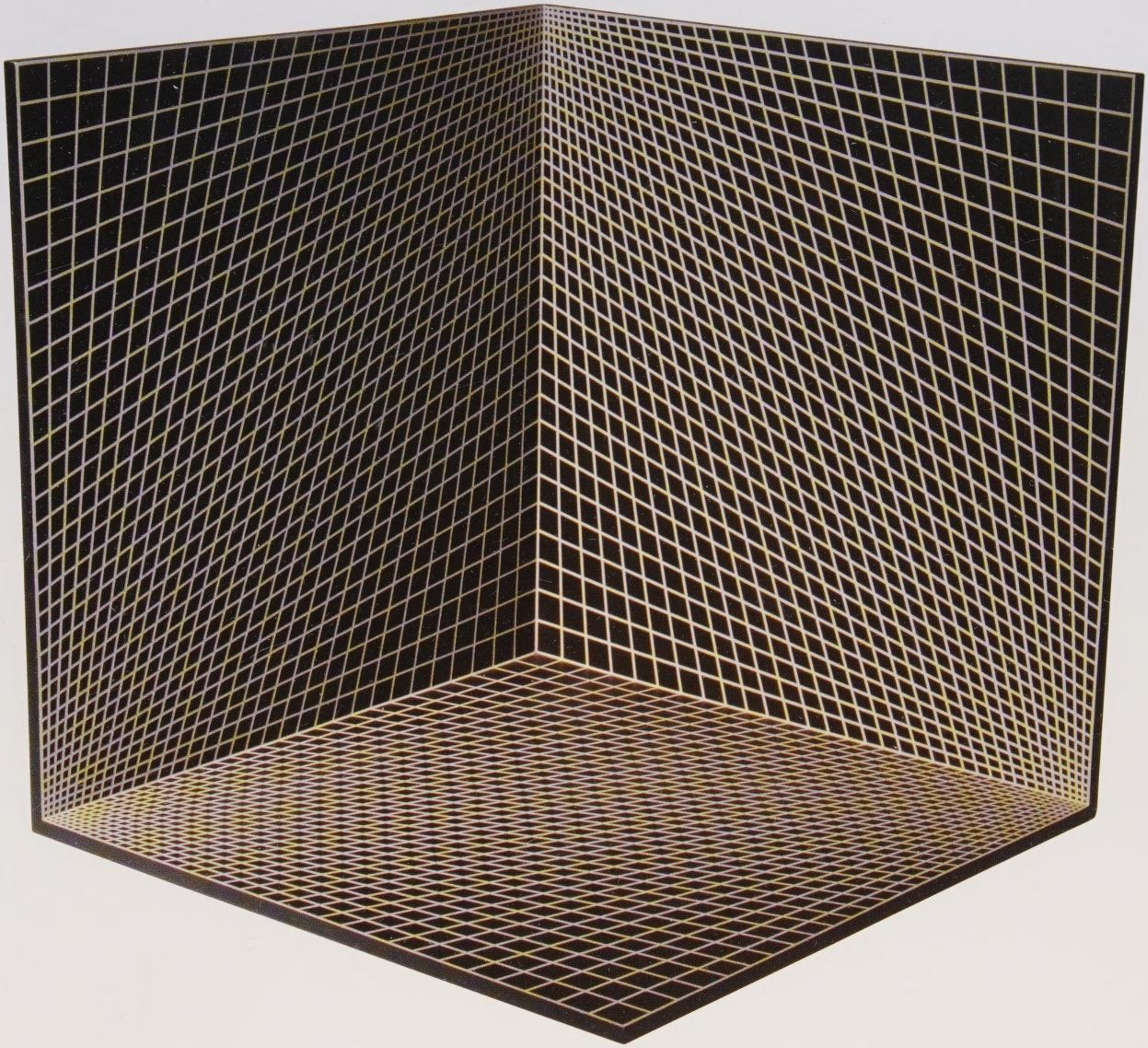
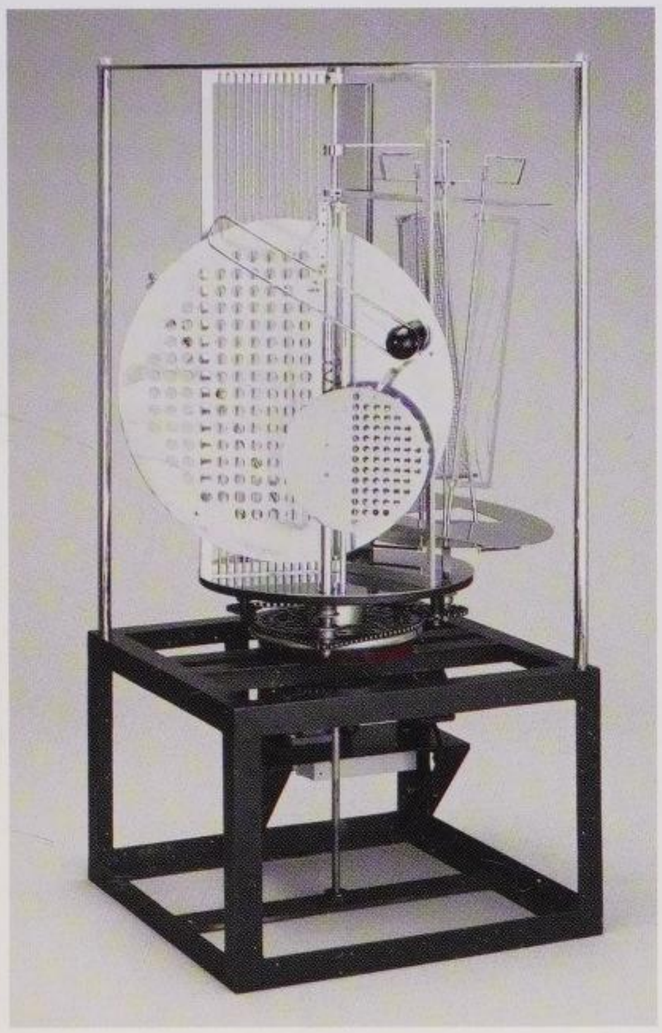
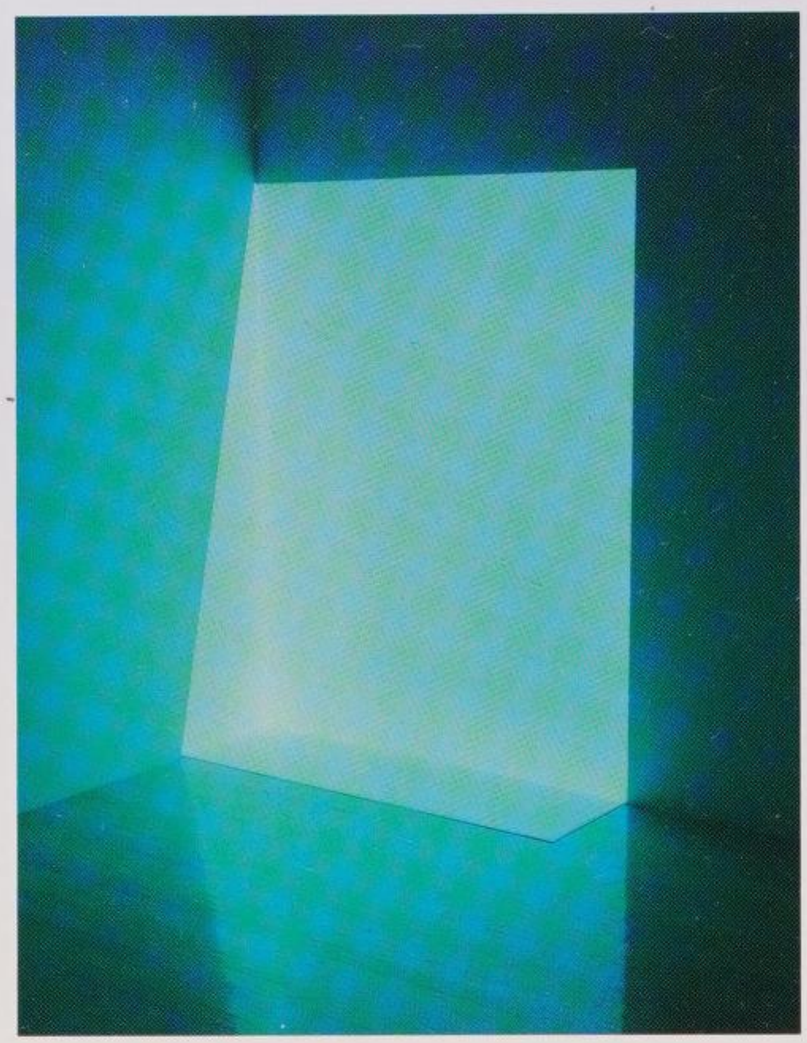


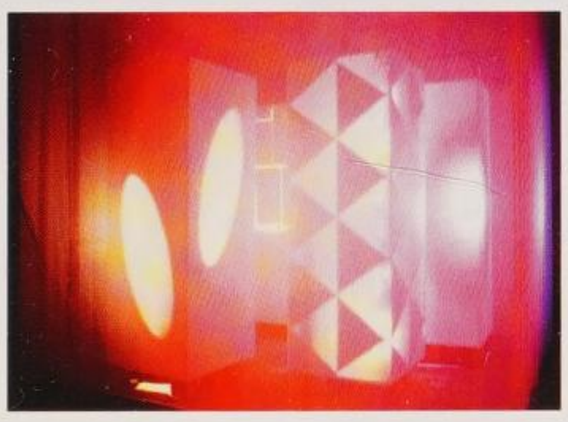
Fig. 178
Richard Anuszkiewicz
American, born 1930
Concave and Convex: Three Unit Dimensional
1967
Enamel on plywood
$32^3/_4$ x $32^3/_4$ x $32^3/_4$ in.
(83.2 x 83.2 x 83.2 cm)
Private collection

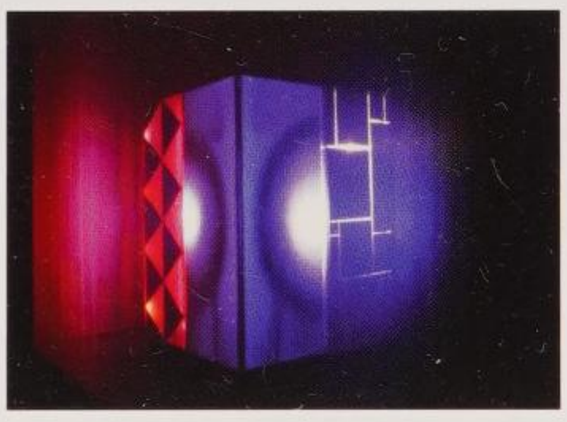
© Richard Anuszkiewicz/Licensed by VAGA, New York, New York



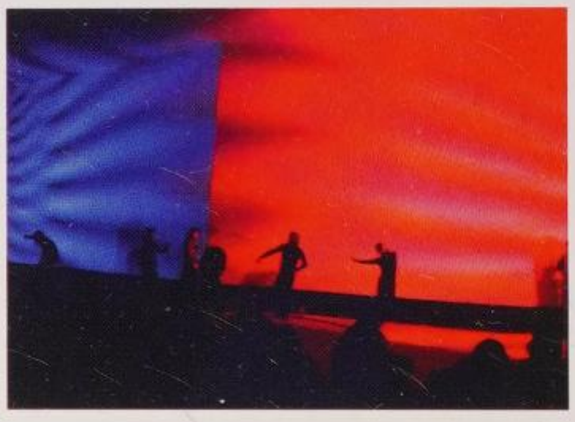












Top, left: Fig. 179
László Moholy-Nagy
Hungarian, 1895–1946
Light Prop for an Electric Stage (Light-Space Modulator), 1930
Aluminum, steel, nickel-plated brass, other metals, plastic, wood, and electric motor
59½ x 27½ x 27½ in.
(151.1 x 69.9 x 69.9 cm)
Busch-Reisinger Museum, Harvard University, Cambridge, Massachusetts: Gift of Sibyl Moholy-Nagy, BR56.5

© 2006 President and Fellows of Harvard College Photographic Services © 2006 Artist Rights Society (ARS), New York/VG Bild-Kunst, Bonn

Top, center: Fig. 180
James Turrell
American, born 1943
Juke Green, 1968
Cross corner light projection
Dimensions variable

Courtesy of PaceWildenstein, New York, New York and © James Turrell. Photography by Kerry Ryan McFate

Top, right: Fig. 181
Larry Bell
American, born 1939
Untitled
1964
Glass, bismuth, chromium, gold, and rhodium on gold-plated brass
54¼ x 16⅜ x 14¼ in.
(137.9 x 41.5 x 36.4 cm)
Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C.: The Joseph H. Hirshhorn Bequest, 1981. HMSG 86.294

Photography by Lee Stalsworth

Above, far left and left: Figs. 182a, 182b
Peter Sedgley
British, born 1930
Colori (open and closed)
1979
Mixed media construction with sequenced light and sound, designed by Forunato Depero 1917
Four vertical cubicles, each
72 x 36 in.
(182.9 x 91.4 cm)
Installation view at Studio K19, Berlin, 1979

Courtesy of the Artist

Above, right and far right: Figs. 183a, 183b
Peter Sedgley
British, born 1930
Light Sound/Sound Light
1972
Audiovisual collaboration with composer York Höller.
Performance view, Donaueschinger Musiktage, Germany, 1972

Courtesy of the Artist

enormous scale, including airports and hydroelectric plants, in which optical color mixtures unfold for the viewer across great expanses. Taking the experience of color to its most extreme state, he constructed *Chromosaturation* chambers that assaulted the retina with a succession of saturated colors, eliciting unforeseen perceptual disturbances (see fig. 54). Public spaces, which lie physically and ideologically outside the institutional frame of the gallery or museum, became the preferred arena for the socially concerned members of GRAV to construct their multifaceted *Labyrinths* and *Game Rooms* in which viewers participate in kinesthetic play.

Concurrent with the expanding interest in architectural space, light emerged in the 1960s as a medium in its own right, giving rise to a number of other art movements in the process. Robert Irwin, who earlier had painted monochromes of just-noticeable fluctuations of color and surface, became associated with James Turrell and other Light and Space artists

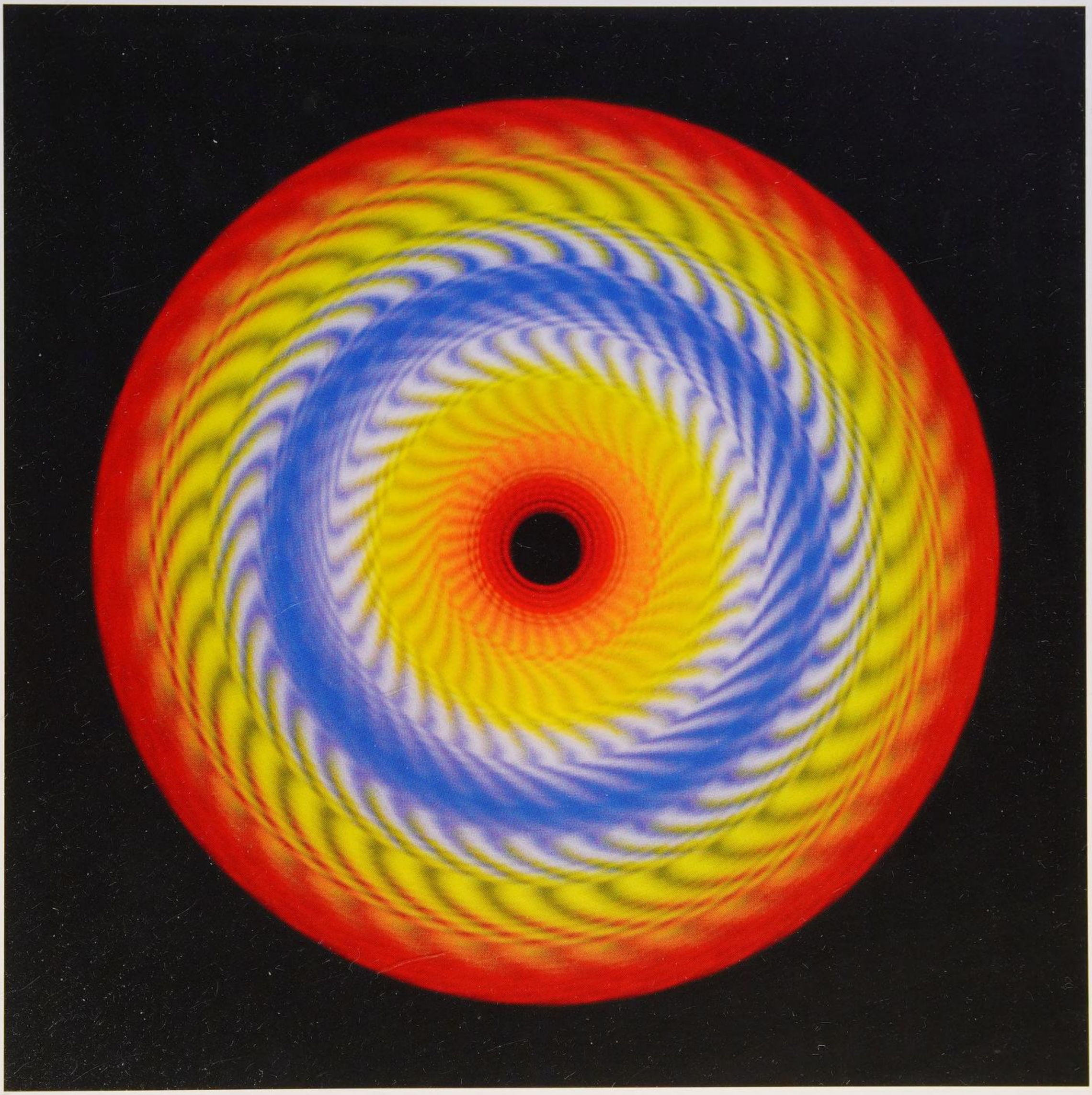


Fig. 184
Peter Sedgley
British, born 1930
Video Disque ROB
1969
Fluorescent Sericol paint screenpainted on rotating aluminum disc and ultra-violet illumination
$29^{15}/_{16}$ in. diameter (76 cm)
Courtesy of the Artist

Fig. 185

Victor Moscoso

American, born 1936

Poster for the Miller Blues Band concert, Matrix, San Francisco, California, January 10–15, 1967

Silkscreen on paper

20 x 14 in. (50.8 x 35.6 cm)

© 1967 Neon Rose

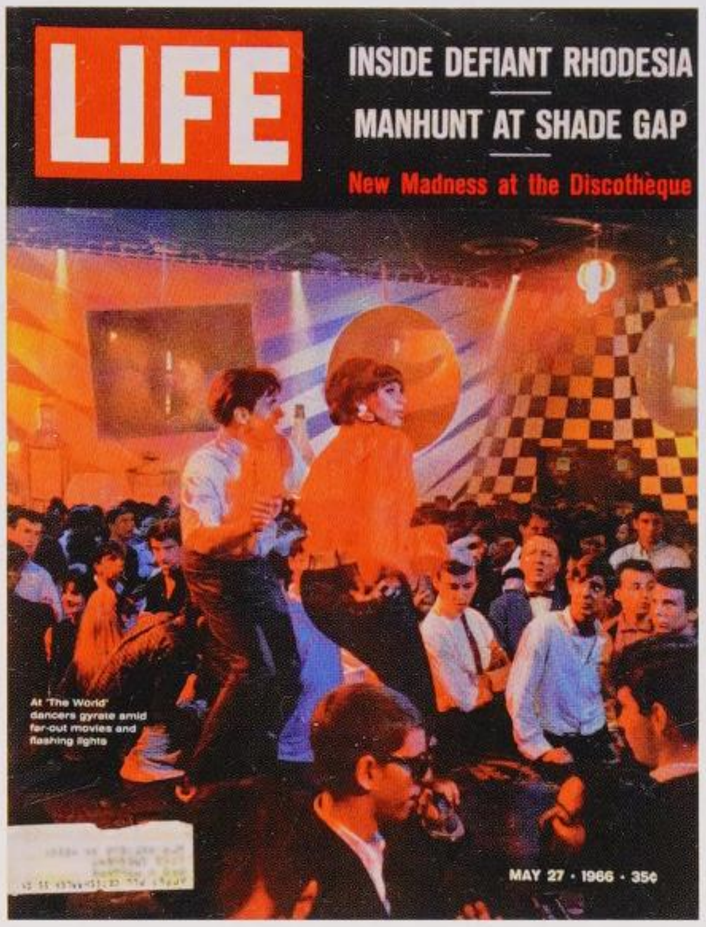


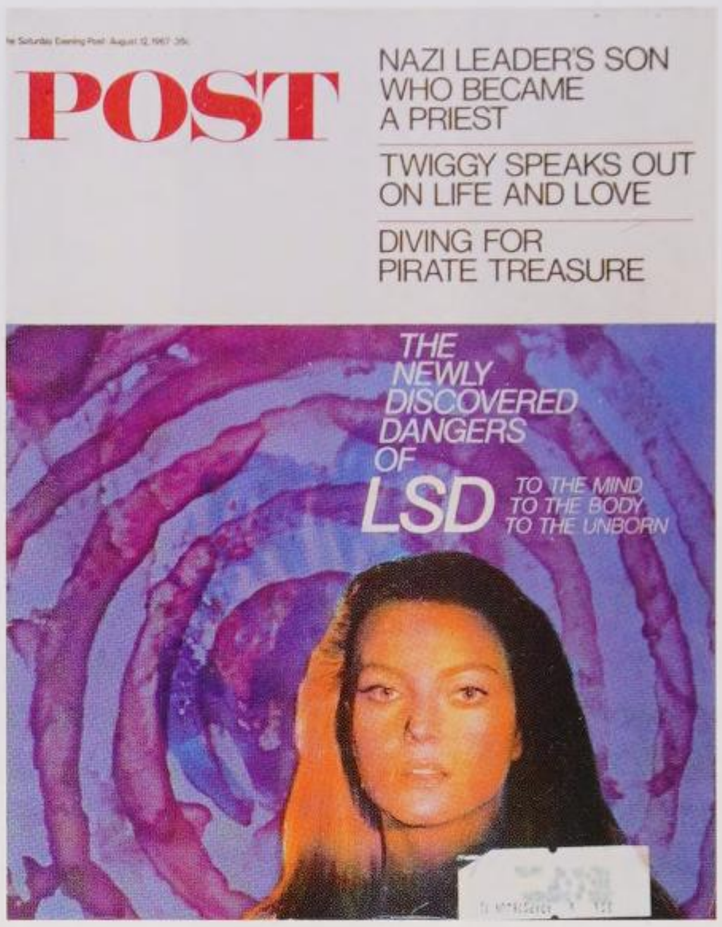
who took the perception of light and color as their central subject. In Britain, Peter Sedgley also adopted the medium of light, experimenting with the effects of programmed sequences of multi-hued lights on his target paintings. His interest in the implied "tempo" of color led to his *Video Rotors*, motorized disks that change appearance under stroboscopic and ultraviolet light. Sedgley became loosely allied with a growing group of Light and Movement artists, some of whom were connected to the Op movement.

The union of color and motion dates back to early in the century. The Constructivist László Moholy-Nagy created early examples of mechanical light sculptures in the 1920s and 1930s, and prior to that, the Futurists had devised chromophonic experiments in film and theater, which also introduced the element of sound. Sedgley paid tribute to this legacy in 1980, when he realized a multimedia installation proposed in 1917 by Fortunato Depero titled *Colori* (figs. 182a, 182b). By the late 1960s, Sedgley had begun to collaborate with composers and dancers in multimedia performances, further engaging the senses in his perceptual art.

In a fusion of theater, performance, and music, a new genre of light projection exploited the effects of abstract and stroboscopic imagery for mass entertainment. Filmmaker Jud Yalkut became associated with perceptual artists through the burgeoning New York gallery scene and was influenced by *The Responsive Eye*. In addition to becoming Nam June Paik's primary video collaborator, Yalkut created films with Yayoi Kusama and other artists in the 1960s, and formed the interdisciplinary group USCO in 1964 for the production of multimedia works. USCO became a leader in the emerging genre of the light show, finding a receptive audience in the East Coast concert halls. USCO, and fellow groups Pablo Lights, The Joshua Light Show (see fig. 189), Addled Cromish, and Andy Warhol's Exploding Plastic Inevitable, provided the visual environment for the music of Jefferson Airplane, Jimi Hendrix, and The Who. These multimedia presentations fused with programmed sequences of colored lights, slide projections, film, and liquid crystals into a vivid and all-encompassing sensory experience. Visually analogous to an LSD trip, the light shows became a popular symbol of the emerging drug culture.

Op also had much in common with the parallel movements of serial music and experimental film, genres that tested the perceptual threshold through analogous methods. In their exploration of visual and psychophysical response, such filmmakers as Paul Sharits, Tony Conrad, and Ernie Gehr employed stroboscopic exposures, complementary color contrasts, and spatial ambiguity. For his landmark film *Turn, Turn, Turn* (figs. 192a, 192b), Jud Yalkut used reflective sculptures by Julio Le Parc as the basis for complex abstract sequences. Stan Vanderbeek focused his lens on Op paintings by Reginald Neal, Karl Gerstner, and Gerald Oster to create his enervating *Moirage* (1966–68). Periodic structures, caused by the variable repetition of elements, had equal currency in art, music, and film. Time, a fundamental aspect of medium, prompted the exploration of the visual velocity of filmed image.





Above, left: Fig. 186
Cover from *Life*, Vol. 60, No. 21, May 27, 1966, featuring the article: "New Madness at the Discothèque."

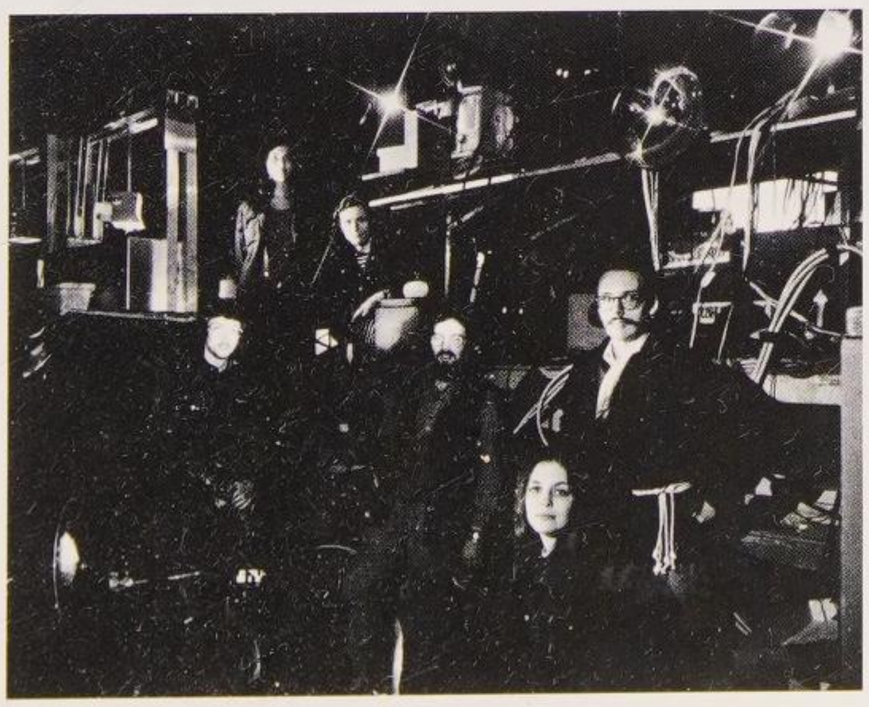
Above: Fig. 187
Cover from *The Saturday Evening Post*, No. 16 August 12, 1967, featuring the article: "The Newly Discovered Dangers of LSD: to the Mind, to the Body, to the Unborn."

Below: Fig. 188
Exhibition catalogue for *Lights in Orbit*, New York, New York, The Howard Wise Gallery, February 4 – March 4, 1967

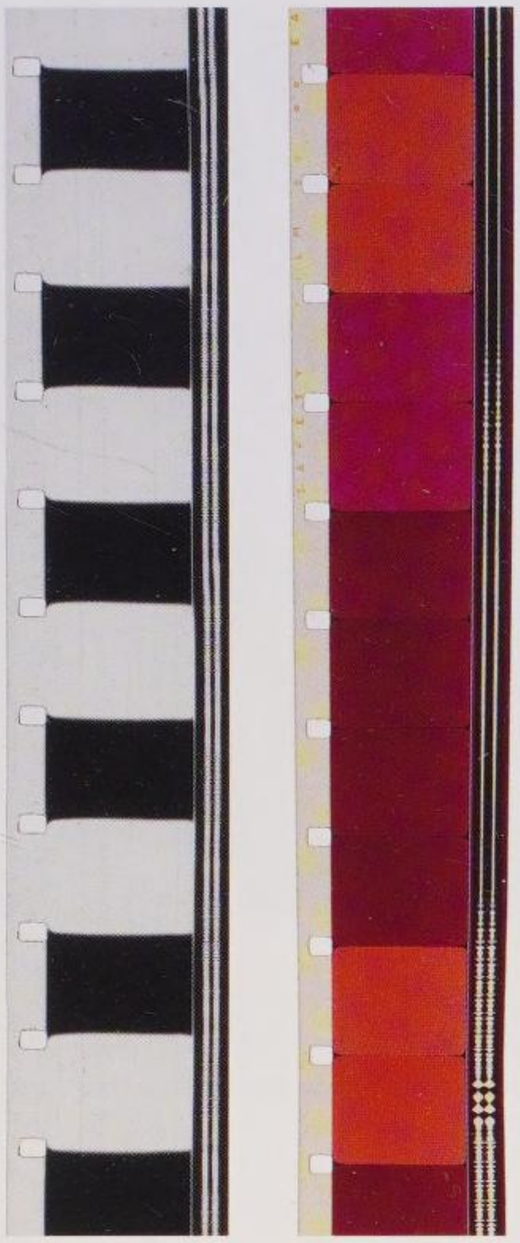
Courtesy of Jud Yalkut

Below, left: Fig. 189
Photograph of The Joshua Light Show with their equipment, *c.* 1968

Courtesy of Jud Yalkut







Above, left: Fig. 190
Tony Conrad
American, born 1940
The Flicker
1965
16mm film
Courtesy of The Ohio State University, Columbus, Ohio

Above, right: Fig. 191
Paul Sharits
American, 1943–1993
T,O,U,C,H,I,N,G
1969
16mm film
Courtesy of The Ohio State University, Columbus, Ohio © Paul J. Sharits Estate; Christopher Sharits

One extraordinary example of perceptual exploration, Tony Conrad's *The Flicker* (fig. 190) challenges our ability to perceive a holistic image from a sum of parts. Film projectors employ a shutter to hide the motion of the film at a "flicker rate" imperceptible compared to the slower frame rate of the projected image. Conrad turns this mechanical process into the visual narrative of the film, blackening every other frame to generate equal flicker and frame rates. The stroboscopic effect of the rapid sequence of light and dark generates a sustained state of sensory arousal. In essence, *The Flicker* achieves an effect similar to Riley's *Tremor* (fig. 107) and Reginald Neal's *Square of Two* (fig. 125), substituting the temporal dimension of film for the spatial dimension of the canvas. Within the film medium, Conrad achieves an explicit rupture between fragmentation and cohesion. The eye is able to merge twenty-four frames per second without effort when they comprise a moving image. But the perceptual tug-of-war between black and white—or light and dark—yields a perceptual crisis, which has psychic and physiological implications. Conrad begins the film with the disclaimer, hand-painted like a silent film title:

WARNING.

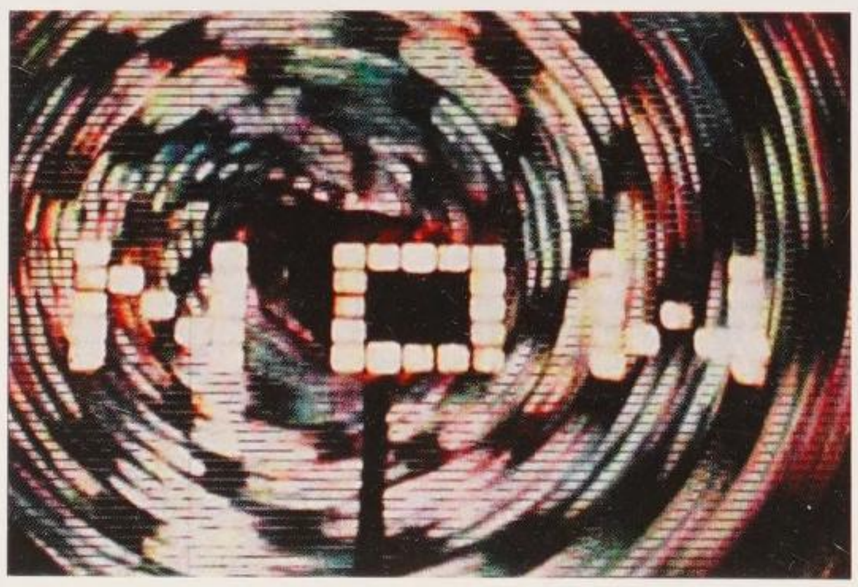
The producer, distributor, & exhibitors waive all liability for physical or mental injury possibly caused by the motion picture The Flicker.

Since this film may induce epileptic seizures or produce mild symptoms of shock treatment in certain persons, you are cautioned to remain in the theater only at your own risk. A physician should be in attendance.[1]

Conrad's melodramatic caution acknowledges the very real danger posed by the brain's limited capacity to reconcile discordant stimuli, a psychophysical discomfort that compelled museum guards to wear sunglasses in Op Art exhibitions. The stroboscopic effect of *The Flicker* is mitigated, and complicated, by the random sequence of color in the frames of films by Paul Sharits, for example *T,O,U,C,H,I,N,G* (fig. 191). Sharits's abstract films provide a sensorial cocktail of alternating frames of geometric form, color, and filmed imagery to jolt the viewer into an alternate state of consciousness. Sharits scored his films with abstract color compositions, revealing a functional relationship between film and painting. Structuralist filmmakers Michael Snow and Ernie Gehr also rely on the cumulative effects of the filmed image in various rates of motion, using techniques analogous to the serial and looped sonic structures of minimalist composers like Philip Glass and Steve Reich. Gehr's *Serene Velocity* (1970) centers on an institutional corridor, which recalls Albers's *Homage to the Square* (see figs. 132, 144). As the camera pans erratically in and out of the shot, the structure of the composition becomes dominant, creating bewildering spatial experience. The medium of film emphasizes the primacy of viewer reception and dematerializes the passive object into active and fleeting experience. The tension between systemic structure and random incident has its definite counterpart in Op paintings and sculpture, producing a visual and psychic agitation of similar consequence.

1 Tony Conrad, *The Flicker,* 16mm black-and-white film, 30 minutes.

Right and far right: Figs. 192a, 192b
Jud Yalkut
American, born 1938
Turn, Turn, Turn
1965–66
Still images from 16mm film
Courtesy of Jud Yalkut/USCO





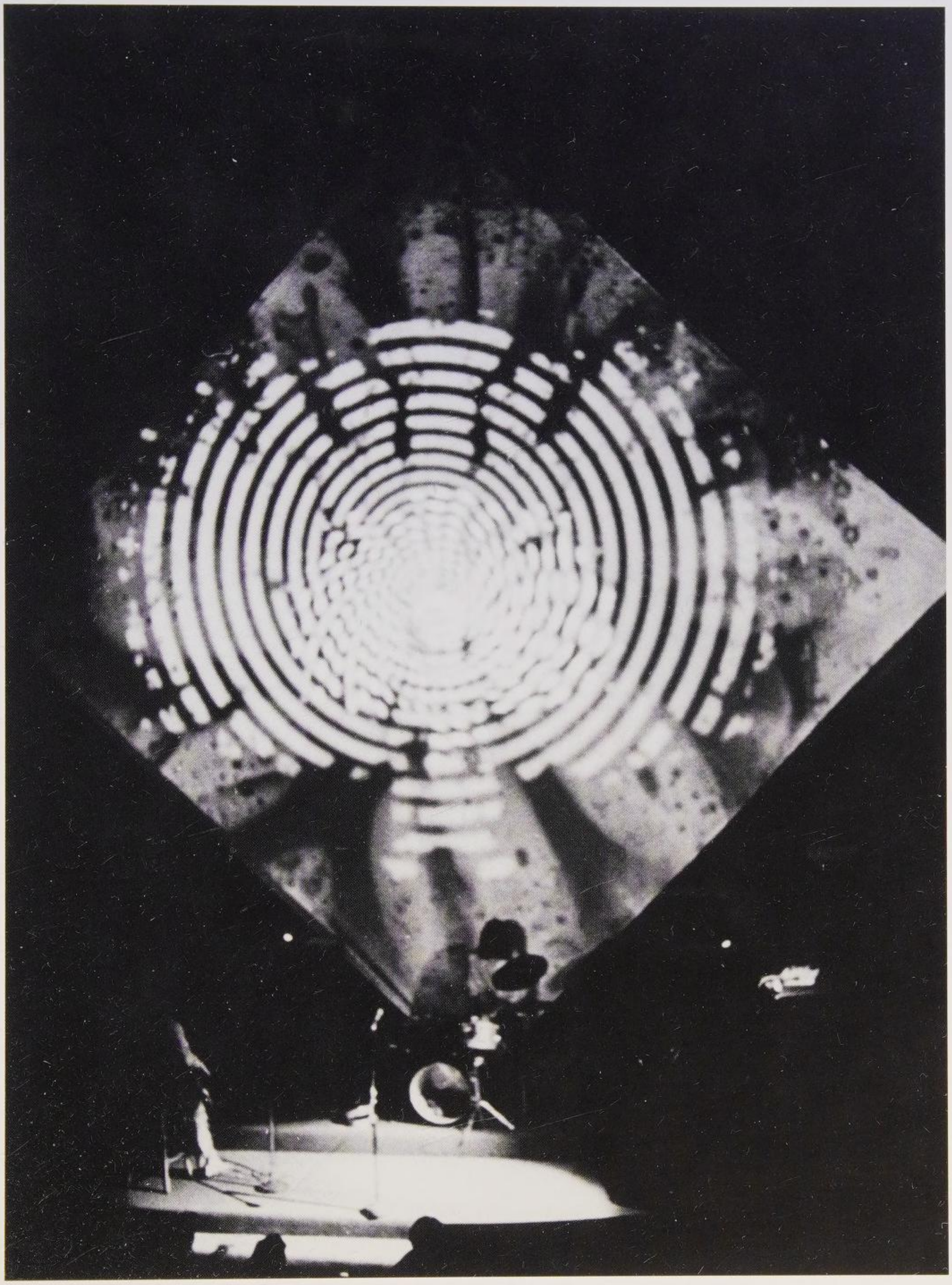


Fig. 193
Photograph from *Changes Newspaper*, Vol. 1, No. 4, 1969, featuring a performance view of "Pablo's Magic Theater"
Courtesy of Jud Yalkut/USCO



OP CULTURE

Moving beyond the traditional constraints of painting and sculpture, Op artists proved that perceptual effects could be applied to the surrounding environment with spectacular results. Without the promise of visual and psychic relief, the architectural installations of François Morellet, Bridget Riley, and Getulio Alviani, induced an interactive "event" verging on theater. As Riley noted, "I feel that my paintings have some affinity with happenings where the disturbance precipitated is latent in the sociological and psychological situation."[1] The physical engagement central to the experience of Op could be intensified through direct contact with the body itself.

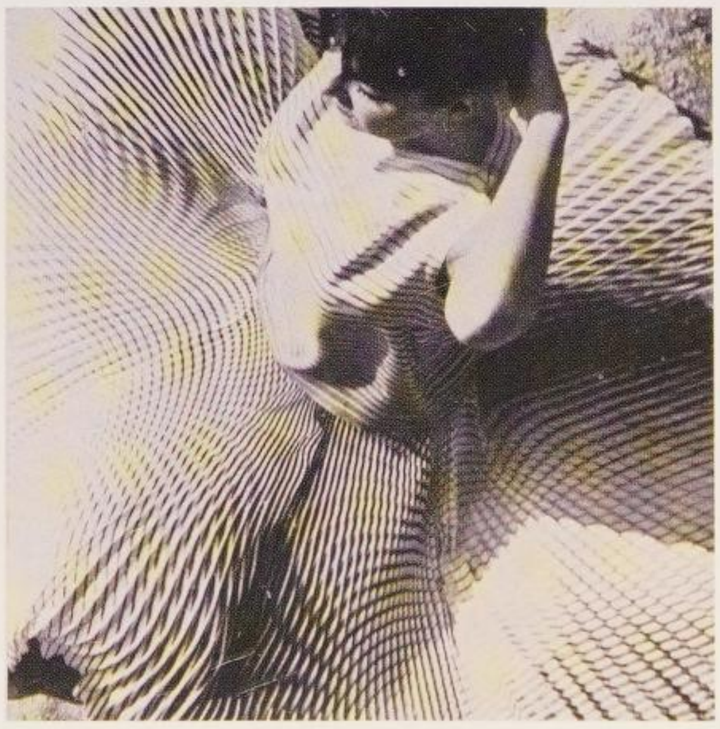
It was only natural that artists would turn to the human subject as a site of creative activity. Sculptor Getulio Alviani transposed the brushed aluminum disks of his installations into armorial adornments for the female form and designed garments with illusory patterns. The bold linear patterns and evanescent moiré effects simultaneously emphasized and distorted a woman's anatomy. The provocative implications of Alviani's designs are most apparent in his wedding dress of 1964, which featured a single spiral motif—similar to Duchamp's hypnotic *Roto-reliefs*—centered directly on the pubic region (fig. 196). Alviani's interest in applied design, which extended to furniture, interiors, and typography, reflects the constructivist integration of art into society. The democratic and interdisciplinary ideology of the Bauhaus had already been demonstrated by Josef and Anni Albers, who produced designs for mass production with seriousness of



Left: Fig. 194
Marcel Duchamp
American, born France, 1887–1968
Discs Bearing Spirals
1923
Ink and pencil on paper
$46^5/_8$ x $46^5/_8$ in. (118.4 x 118.4 cm)
Seattle Art Museum, Seattle, Washington. Eugene Fuller Memorial Collection. 63.22

Photography by Paul Macapia © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris/Succession Marcel Duchamp



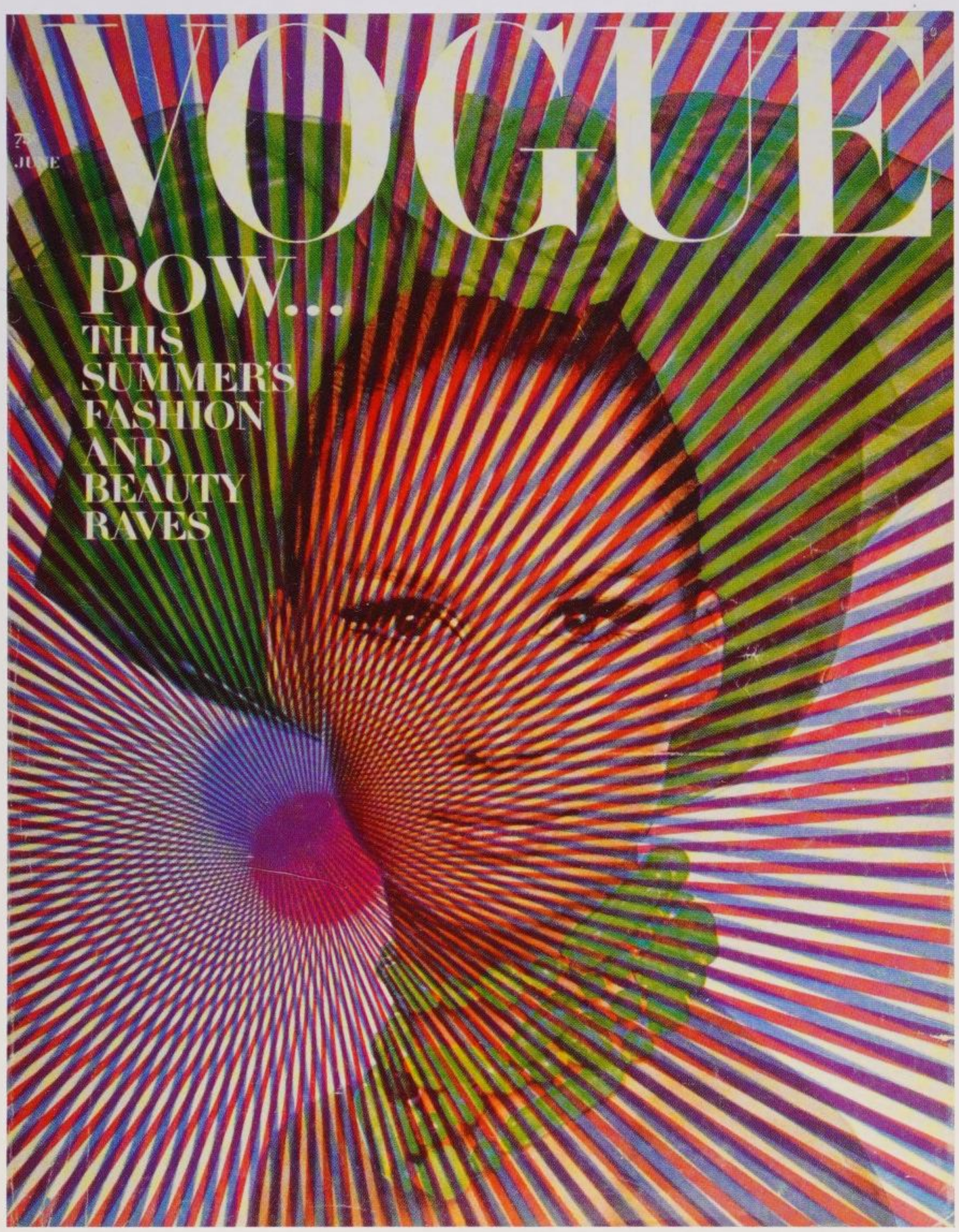


Left: Fig. 195
Getulio Alviani
Italian, born 1939
Negative Positive fabric for Germana Marucelli
1964

Courtesy of the Artist

Far left: Fig. 196
Getulio Alviani
Italian, born 1939
Wedding dress
1964

Courtesy of the Artist



Above: Fig. 197
Cover from *Vogue*, Vol. 145, No. 10, June 1965, featuring the article: "Pow! Op goes the Art. Op goes the Fashion. Now, Op goes the makeup"
Montage with photograph by Irvine Penn and serigraph construction by Gerald Oster

Courtesy of The June F. Mohler Fashion Library, Kent State University, Kent, Ohio



Right: Fig. 198
"It's OP from Toe to Top" illustration from fashion article from *Life* magazine, Vol. 58, No. 15 April 16, 1965



Far right: Fig. 199
Getulio Alviani
Italian, born 1939
Positive Negative Dress
1964

Courtesy of the Artist

intent equal to their paintings and prints. Richard Anuszkiewicz, a direct heir to this egalitarian tradition, painted coats for furrier Jacques Kaplan (see fig. 202), and designed a variety of limited-edition jewelry, scarves, and household products.

Such notable fashion designers as André Courrèges, Geoffrey Beene, James Galanos, Merrimeko, and Rudi Gernreich (who collaborated with Alviani) engaged the Op aesthetic in innovative ways. Paco Rabanne moved beyond the application of color and pattern with his multihued disk dresses that physically tremor on the body's surface, sometimes using mirrored surfaces to reflect light like a Julio Le Parc mobile. The bold, visually disturbing adornment of the female form by illusory pattern, periodic structures, and complementary color contrasts carried an undercurrent of aggression that reflected the social and sexual unrest of the moment. The body itself had become a politically contested site in 1965, centered on legislation over reproductive rights, and the National Organization for Women formed shortly thereafter. The complex and aggressive stance of Op fashion, equally seductive and repellent, resonated in this climate of women's self-empowerment. Capitalizing on the desire of women to assert a new bold identity, Fabergé marketed its brand of Make-OP, which included "never-before shades" of color in 1965.[2]

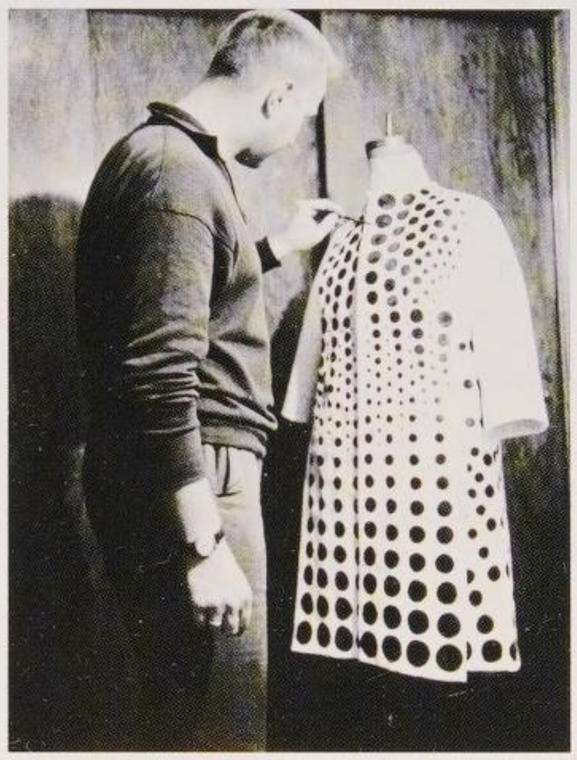
A week before *The Responsive Eye* opened, the *New York Times* announced that the new Op fashion was "being paraded this week in the Seventh Avenue showroom of Young Elegante in dresses that will sell for $60 to $110 (considerably lower than an op art painting, where the price tags can run in four figures)."[3] Art collector and dress manufacturer Larry Aldrich, who owned the Young Elegante line, exploited the Op aesthetic most famously. He had purchased works by a number of Op artists, and was inspired to create fabrics with designs taken from paintings by Riley, Stanczak, Vasarely, and Anuszkiewicz. Aldrich used the fabrics in his upscale women's wear line and distributed them for use by other designers, without the artists' knowledge. Bridget Riley recalled: "I had absolutely no idea of what lay ahead when I arrived. I was driven from the airport down Madison Avenue, and to my amazement I saw windows full of versions of my paintings on dresses, in window displays, everywhere. My heart sank."[4] At the MoMA opening, a number of

patrons arrived in the ready-to-wear fashions that Aldrich had instigated. One woman, dressed head to toe in matching black and white stripes, noted: "I got my shoes from Orbach's and the tights at Macy's and the dress at Bloomingdales."[5] Riley returned to Britain several weeks later feeling "violated" as copyright law had not yet been established to protect artists from infringement. Aldrich, who insisted that it was Seitz's idea to use her paintings for fabric designs, retired the following year to devote himself to philanthropic pursuits.[6]

The eye-catching patterns of Op proved well suited to home furnishings too, and Op motifs were extended to lamps, upholstery, and wallpaper. Vernor Panton was among the earliest designers prominently to evoke the Op aesthetic in his progressive, space-age interiors (see figs. 213, 214, 215). His 1960 pattern of Vasarely-inspired figure/ground reversals, *Geometri*, was used in drapes, upholstery, and carpeting to stunning effect. Panton's architectural interiors amount to total environments, designed for emotional and psychic impact, often intensified by saturated hues and color lights, revealing his understanding of advanced color theory. The cutting-edge aesthetic infiltrated all segments of consumer culture. Sears department stores even marketed their own Op wallpaper, patterned after Edna Andrade's dizzying *Color Motion 4-64* (fig. 6), to feed the public's newfound appetite for visual over-stimulation.

By 1966, Op motifs decorated all manner of consumer goods, from book jackets and album covers (see figs. 209, 210), to lunchboxes and games. Springbok manufactured an entire line of Op Art puzzles beginning in 1966. Works by Ben Cunningham, Anuszkiewicz, Tadasky, and Claude Tousignant were among those applied to the popular Springbok line, available in department stores across the United States (see figs. 204, 205, 206, 207). Andrade's work proved especially challenging for puzzle-solvers, and at least five of her paintings were utilized, including *Color Motion 4-64.* Advertisers also harnessed the potential of Op's eye-catching appeal, and its progressive and technocratic connotations. European artists Almir da Silva Mavignier and Franco Grignani gained notoriety as graphic designers, lending their commercial work in print media the visual dynamics of their paintings. Grignani's internationally recognized Woolmark logo, devised from interconnecting stripes,







Top left: Fig. 200
Adele Simpson
American, 1903–1995
Polychrome Stripe Coat
1965–69
Wool
The Ohio State University, Geraldine Schottenstein Wing for the Historic Costume and Textiles Collection: Gift of the Estate of L. Corinne Babbert

Top right: Fig. 201
Paco Rabanne
Spanish, born 1934
Pink, Green, and White Disk Dress and Necklace
1967–68
Plastic disks
The Ohio State University, Geraldine Schottenstein Wing for the Historic Costume and Textiles Collection: Gift of Frederick and Isabel Eberstadt

Left: Fig. 202
Richard Anuszkiewicz
American, born 1930
Painting an Op Art coat for furrier Jacques Kaplan
1963

Courtesy of the Artist © Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Below: Fig. 203
Richard Anuszkiewicz
American, born 1930
Coaster tray
1971
Nine coasters in a plastic tray manufactured by Art in America
4½ x 4½ in. coasters in 14 x 14 in. tray (11.4 x 11.4 cm coasters in 35.6 x 35.6 cm tray)
Private collection

© Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Top right: Fig. 204
Edna Andrade
American, born 1917
Color Motion
1966
450 piece jigsaw puzzle, manufactured by Springbok Editions Inc., SQ58
Private collection, Columbus, Ohio

Top left: Fig. 205
Richard Anuszkiewicz
American, born 1930
Splendor of Red
1969
450 piece jigsaw puzzle, manufactured by Springbok Editions Inc., PZL2020
Private collection, Columbus, Ohio

© Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Bottom right: Fig. 206
Tadasky (Tadasuke Kuwayama)
American, born Japan 1935
Whirling Discs
1968
500 piece jigsaw puzzle, manufactured by Springbok Editions Inc., PZL6017
Courtesy of the artist

Bottom left: Fig. 207
Ben Cunningham
American, 1904–1975
Equivocation II
1965
450 piece jigsaw puzzle, manufactured by Springbok Editions Inc., SQ50
Private collection, Columbus, Ohio

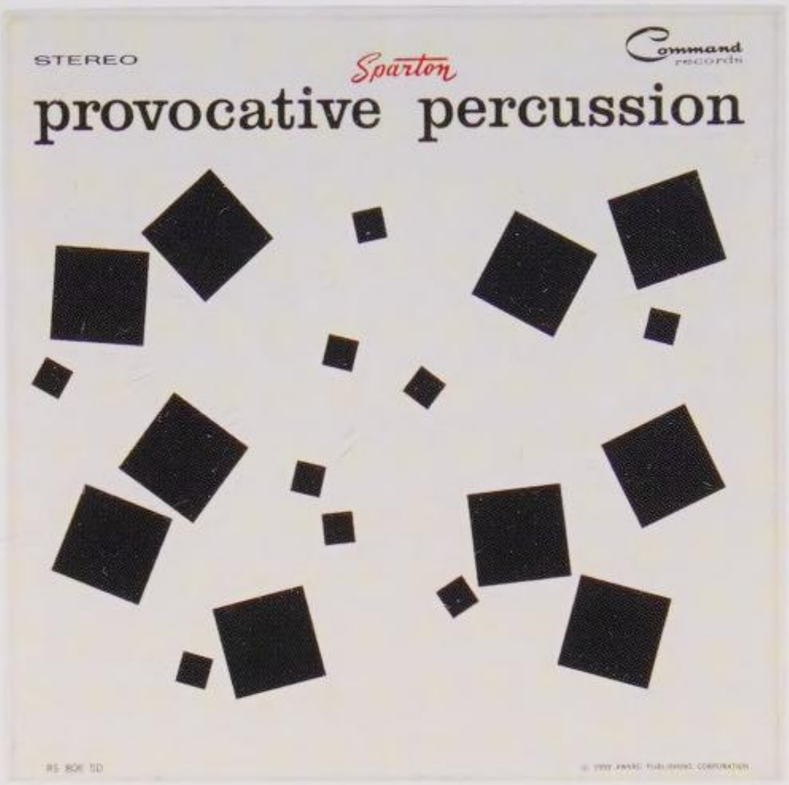
Below: Fig. 208
Cover from *Josie*, No. 18, February 1966, featuring a cartoon set in a Pop and Op Art studio
Library of Barbara Zollinger Sweney, Columbus, Ohio

TM& © 2006 Archie Comics Publications, Inc. Used with permission

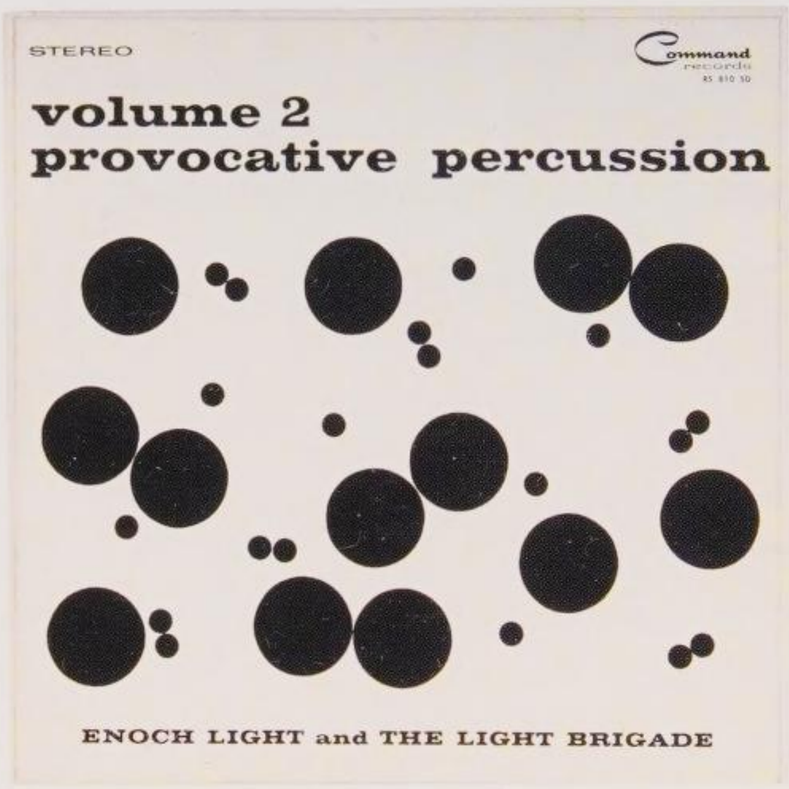


displays the same spatial tension that characterizes his black-and-white paintings.

Film and television appropriated Op designs, often to underscore themes of illusion, instability, and madness. In Stanley Donen's *Arabesque*, cinematographer Christopher Challin shot through transparent Op sculptures to emphasize the layers of deceit between Gregory Peck's and Sophia Loren's disingenuous characters. Joseph Losey's *Modesty Blaise* (see fig. 211) directly transposed Riley's painting *Straight Curve* (fig. 212) on the ceiling, walls, and floor of a dungeon in which Monica Vitti's secret agent is condemned to torture. The scene recalls one viewer's response at the opening reception for *The Responsive Eye*, who likened the art to "the kind of thing a madman might put on a cell wall to drive someone crazy."[7] The visual equivalent to the, then legal, psychedelic experience, Op motifs derived from artists like Riley and Vasarely proved a provocative complement to rock and roll as well, becoming linked in the mass media to the emerging counter-culture revolution in the process. The confluence of Op Art and psychedelic music gave birth to the new genre of the art rock poster. Some of the most innovative and prolific graphic designers, including Victor Moscoso, William Henry, and Wes Wilson, used undulating and geometric periodic structures with simultaneous color vibrations, fluorescent inks, and other Op methods. Describing social transformation as the



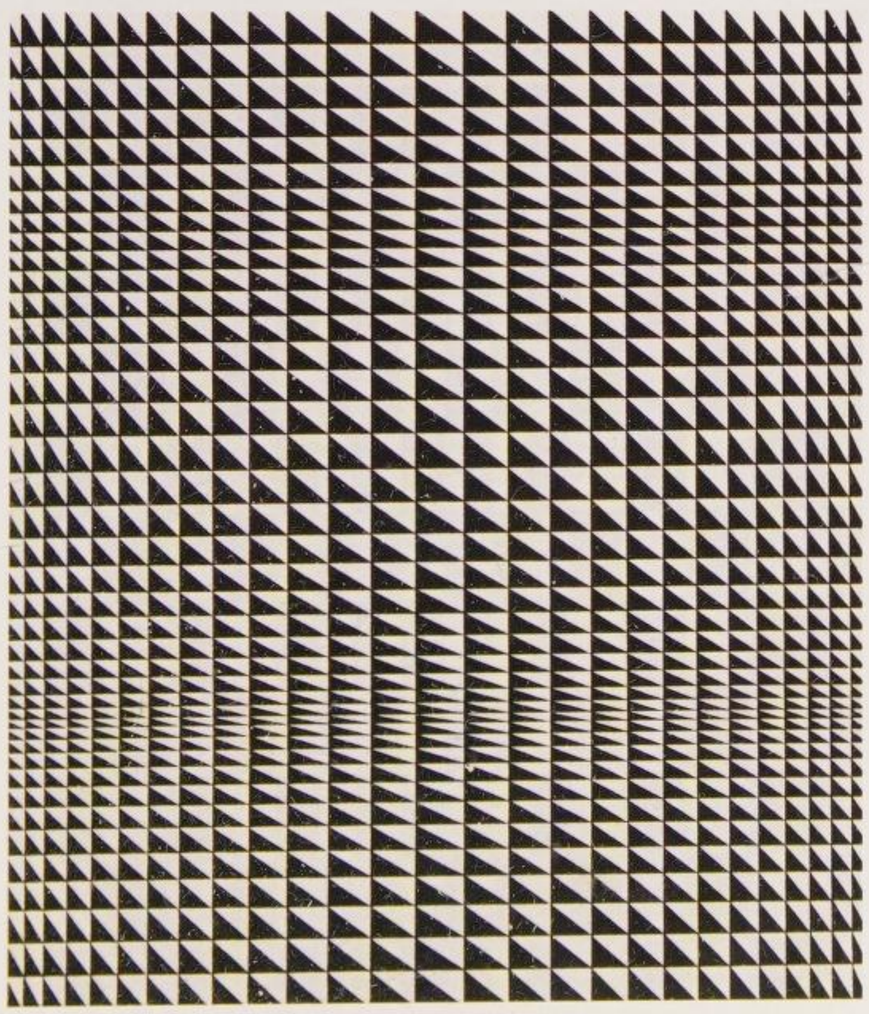
Left: Fig. 209
Josef Albers
American, born Germany, 1888–1976
Provocative Percussion
1950s
Record sleeve
12 x 12 in. (30.5 x 30.5 cm)
Enoch Light and the Light Brigade, Command Records
Private collection, Columbus, Ohio
© 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York



Left: Fig. 210
Josef Albers
American, born Germany, 1888–1976
Provocative Percussion, Vol. 2
1950s
Record sleeve
12¼ x 12¼ in. (31.1 x 31.1 cm)
Enoch Light and the Light Brigade, Command Records
Private collection, Columbus, Ohio
© 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York



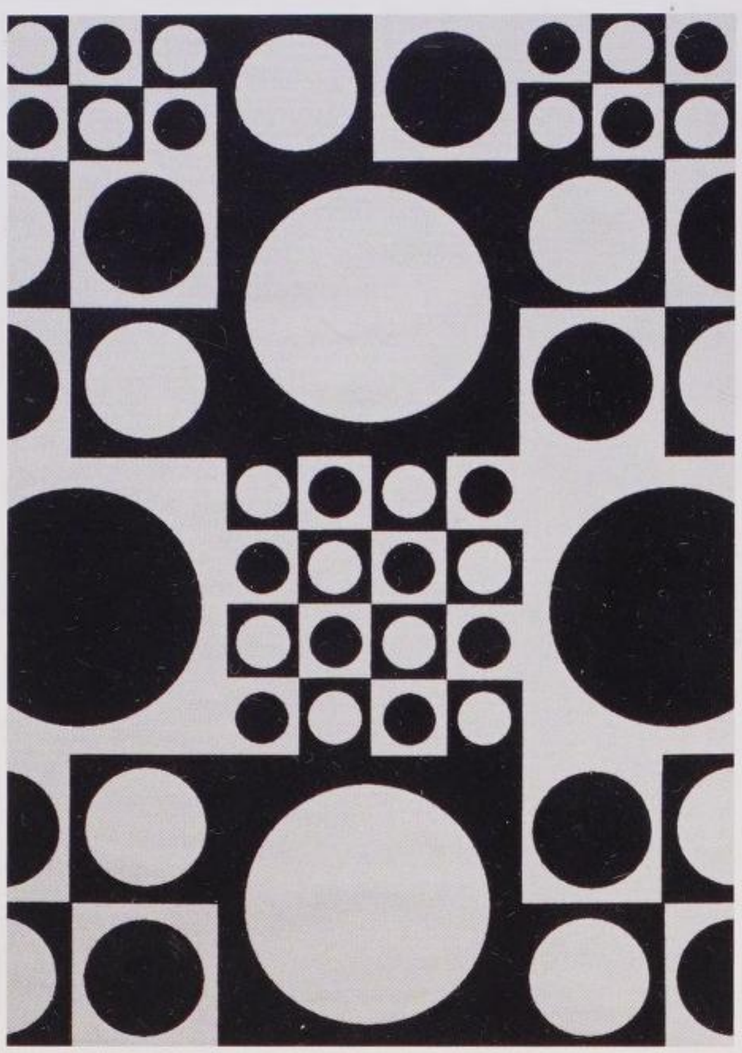
Left: Fig. 211
Still from the film *Modesty Blaise*, directed by Joseph Losey, 1966
© 1966 Twentieth Century Fox. All Rights Reserved



Far left: Fig. 212
Bridget Riley
British, born 1931
Straight Curve
1963
Emulsion on board
28 x 24¼ in. (71.1 x 61.6 cm)
DIA Art Foundation, New York, New York
© 2006 Bridget Riley, All Rights Reserved

Right: Fig. 213
Verner Panton
Danish, 1926–1998
Geometri Furnishing Fabric
1960

Courtesy of Maharam Marketing, New York, New York.
Image by Philippe Regard



Far right: Fig. 214
Verner Panton
Danish, 1926–1998
Interior design, Hotel Astoria, Trondheim, Norway
1960

Courtesy of Verner Panton Design, Basel, Switzerland



Right: Fig. 215
Verner Panton
Danish, 1926–1998
Swimming Pool, Spiegel Publishing House, Hamburg, Germany
1969

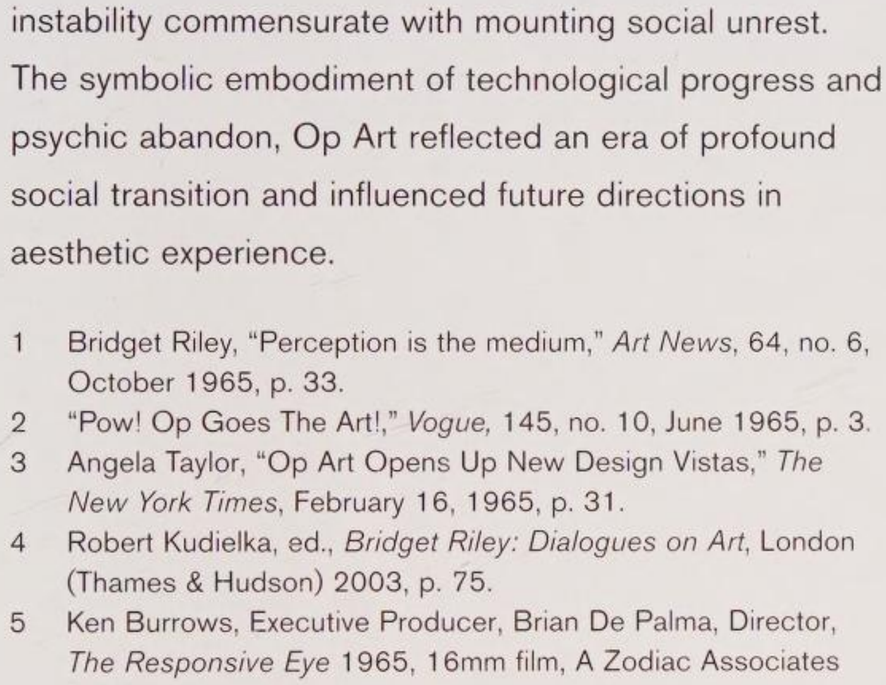
Courtesy of Verner Panton Design, Basel, Switzerland

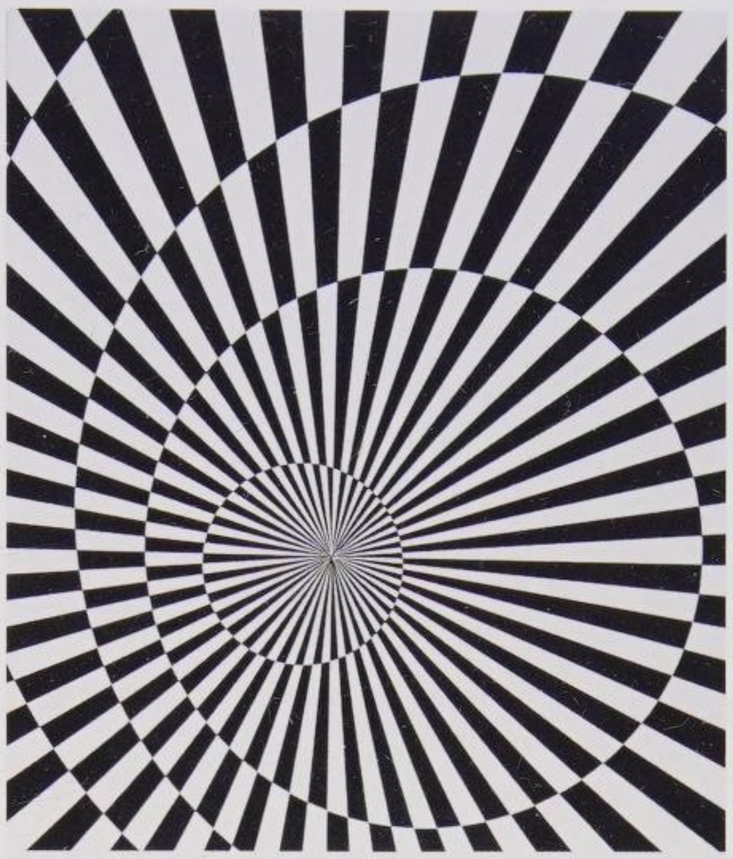


ultimate goal, one writer noted at the time, "Whether it is expressed through a painting or a poster, the flashing colors, the shapes which melt and change before your eyes, the lettering which isn't lettering demand attention, cannot be ignored. The message, though, comes through despite the viewer."[8]

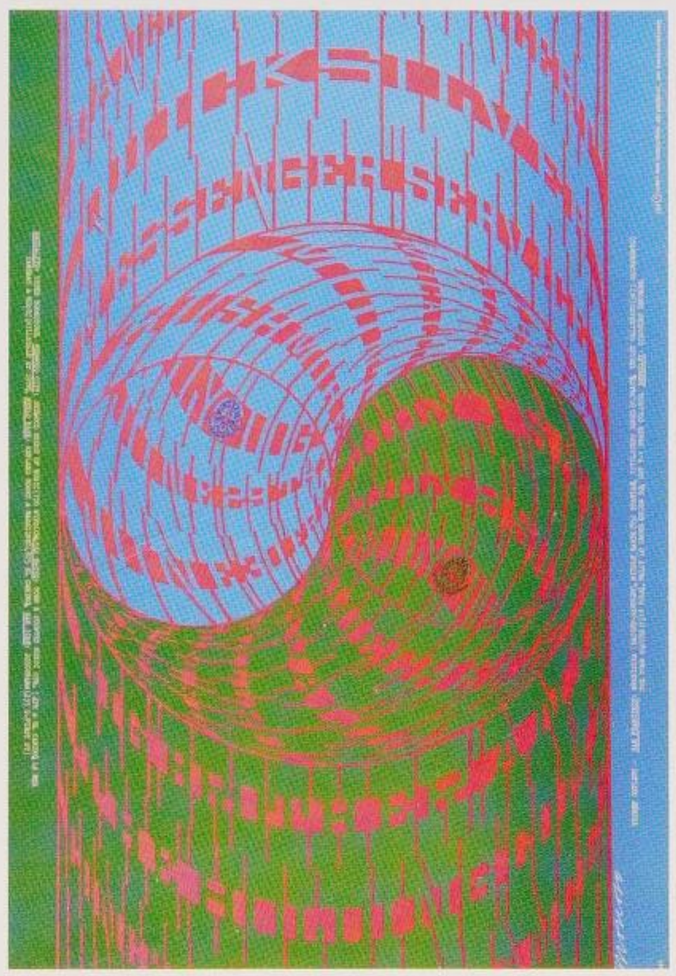
As both a commodity and a marketing tool, Op Art was absorbed quickly into the cultural landscape of America, Britain, and continental Europe, becoming the ultimate expression of the era. It supplied the graphic backdrop to the coming psychedelic generation. Pharmaceutical companies took note of the resonance between drugs and perceptual art. Smith Kline commissioned Edna Andrade to paint a series of chemical abstractions of antipsychotic medications for its Pennsylvania headquarters (see fig. 220). Op's disruptive patterns, unstable color vibrations, and paradoxical perspective mirrored the tension and instability commensurate with mounting social unrest. The symbolic embodiment of technological progress and psychic abandon, Op Art reflected an era of profound social transition and influenced future directions in aesthetic experience.

1 Bridget Riley, "Perception is the medium," *Art News*, 64, no. 6, October 1965, p. 33.
2 "Pow! Op Goes The Art!," *Vogue,* 145, no. 10, June 1965, p. 3.
3 Angela Taylor, "Op Art Opens Up New Design Vistas," *The New York Times*, February 16, 1965, p. 31.
4 Robert Kudielka, ed., *Bridget Riley: Dialogues on Art*, London (Thames & Hudson) 2003, p. 75.
5 Ken Burrows, Executive Producer, Brian De Palma, Director, *The Responsive Eye* 1965, 16mm film, A Zodiac Associates Production.
6 Paul Cumming, "Oral History Interview with Larry Aldrich," *Smithsonian Archives of American Art*, transcript of 1972 interview (www.aaa.si.edu).
7 *The Responsive Eye* 1965, *op. cit.*
8 Cummings G. Walker, ed., *The Great Poster Trip: Art Eureka*, Palo Alto (Coyne and Blanchard, Inc.) 1968, p. 4.











Top left: Fig. 216
Retail catalogue for Rickenbacker Transonic Sound Systems, Santa Ana, California, 1968

Top right: Fig. 217
Cooking pamphlet, prepared by the Food Information Centre, Britain, late 1960s

Bottom right: Fig. 218
William Henry
American, twentieth century
Poster for the Youngbloods, Mt. Rushmore and Phoenix concert, Avalon Ballroom, San Francisco, California, February 16–18, 1968
Silkscreen on paper
20 x 14 in. (50.8 x 35.6 cm)
© 1968 Family Dog Productions

Bottom left: Fig. 219
Victor Moscoso
American, born 1936
Poster for the Quicksilver Messenger Service, Mt. Rushmore, Big Brother and the Holding Company concert, Avalon Ballroom, San Francisco, California, June 29, 1967
Silkscreen on paper
20 x 14 in. (50.8 x 35.6 cm)
© 1967 Family Dog Productions

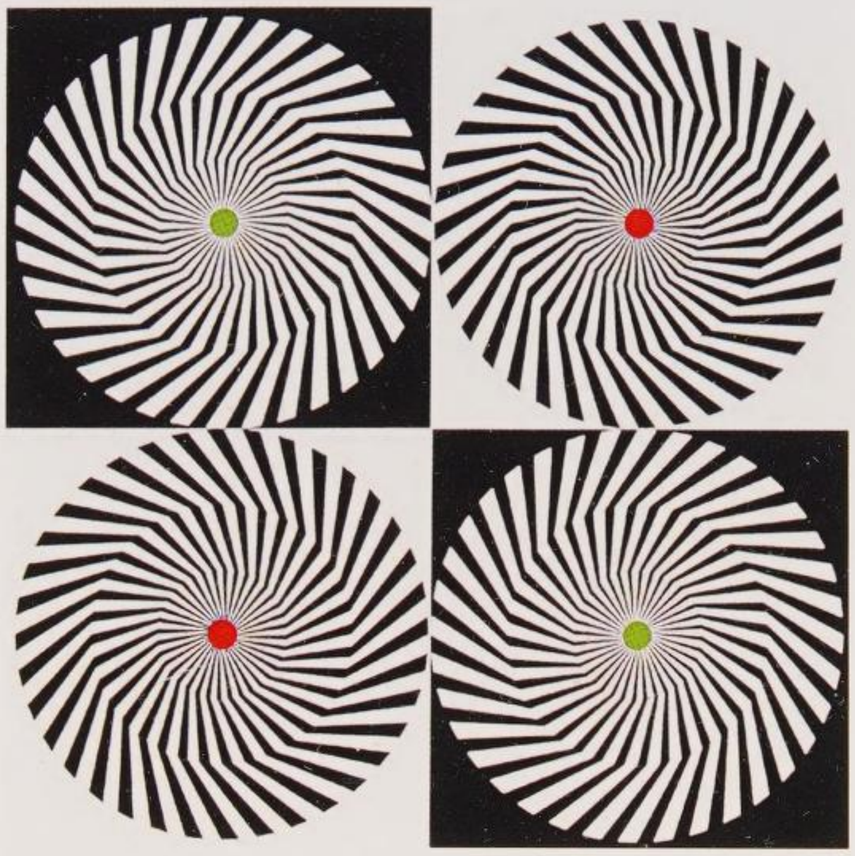
Left: Fig. 220
Packaging for Antivertigo medication (Antivert), manufactured by Pfizer Company Ltd, *c.* 1970
Private collection, Columbus, Ohio



AFTER-IMAGE

The historical boundaries of Op Art are not easily traced, but the movement clearly reached its zenith in 1965, the year of *The Responsive Eye* exhibition. Numerous other exhibitions of optical and "retinal" art appeared internationally that year, and the cultural record reflects Op's brief ascendancy over Pop, Minimalism, and other movements. As an aesthetic ideology centered on direct perceptual participation, Op maintained currency long after the heyday of the 1960s, and its key figures continued to explore new aspects of perceptual art. Some Op artists changed the course of their conceptual and stylistic paths; others disavowed their ties to the movement, or returned to it later in life. Building on their early innovations, Anuszkiewicz, Riley, and Stanczak continued to explore new perceptual boundaries into the twenty-first century.

By the end of the 1960s, new modes of minimal, conceptual, and hyperrealist art asserted dominance, and, in time, Op abstraction was, for some of its critics, rendered nostalgic, its motifs emblematic of the failed promise of modernism. Hindsight has clarified our view of its art-historical significance, a legacy that lies not in any pictorial "style," but in its emphatic shift from object to experience. The relocation of the aesthetic experience to the eye/body of the viewer inspired unconventional forms of viewer-centered art, including light projection, multimedia, installation, and video. The disappearance of Op from the public consciousness, a natural course for any movement, was attended by broader cultural changes at odds with the art's progressive demeanor and its connotations of technocratic salvation. By 1970, global events engendered distrust of the existing structures in which Op had placed hope. Somewhere between Woodstock and Altamont, the cosmic computational logic of the mid-1960s was replaced by distrust, and modernism lost its space-age luster to a Postmodern culture of doubt.



Opposite: Fig. 221
Jennifer Steinkamp
American, born 1958
Loom
2003
Digital video projection
132 x 132 in. (335.3 x 335.3 cm)
Installation view at the Art Gallery of Ontario, Toronto, Canada, 2005

Courtesy of the Artist, ACME, Los Angeles, California, Lehmann Maupin, New York, New York, and greengrassi, London

Left: Fig. 222
Edna Andrade
American, born 1917
Gemini 66
1966
Serigraph
29 x 29 in. (73.7 x 73.7 cm)

Courtesy of Locks Gallery, Philadelphia, Pennsylvania

Alma Thomas underscored this crucial moment of historical and philosophical transition in *Splash Down Apollo 13* (fig. 223). Painted the year of the ill-fated NASA mission, her abstraction imbues a classic Op compositional form with frenetic energy. Although recalling the periodic structures of Claude Tousignant and Tadasky, *Splash Down*'s concentric circular

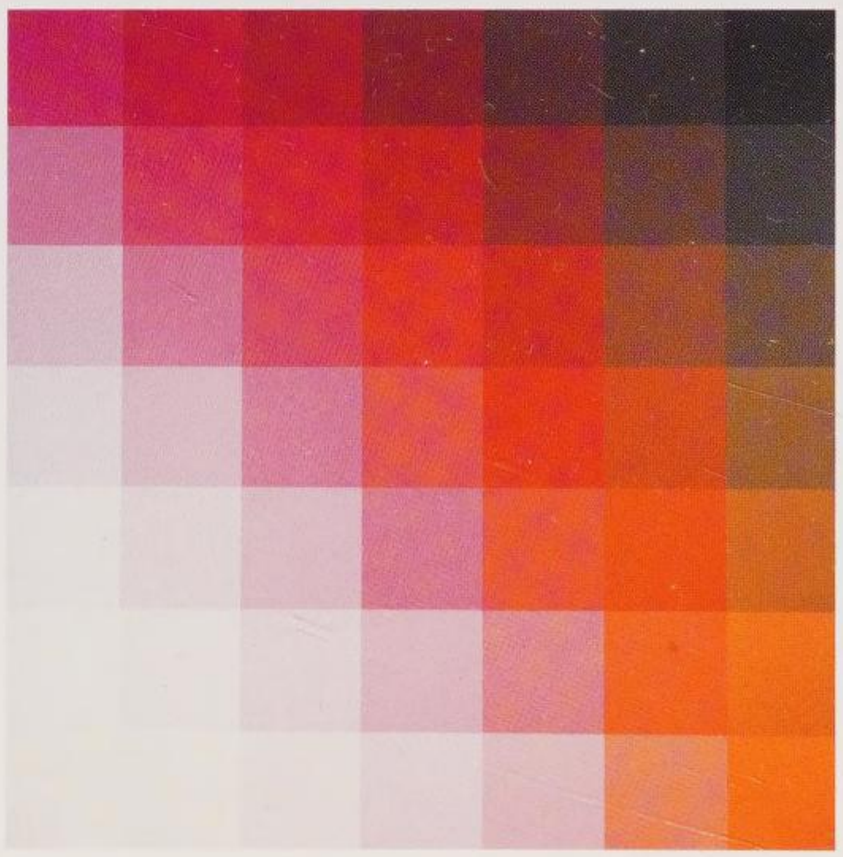
Right: Fig. 223
Alma Thomas
American, 1891–1978
Splash Down Apollo 13
1970
Acrylic on canvas
61 7/8 x 52 in. (157.2 x 132.1 cm)
Private collection

Courtesy of Michael Rosenfeld Gallery, LLC, New York, New York



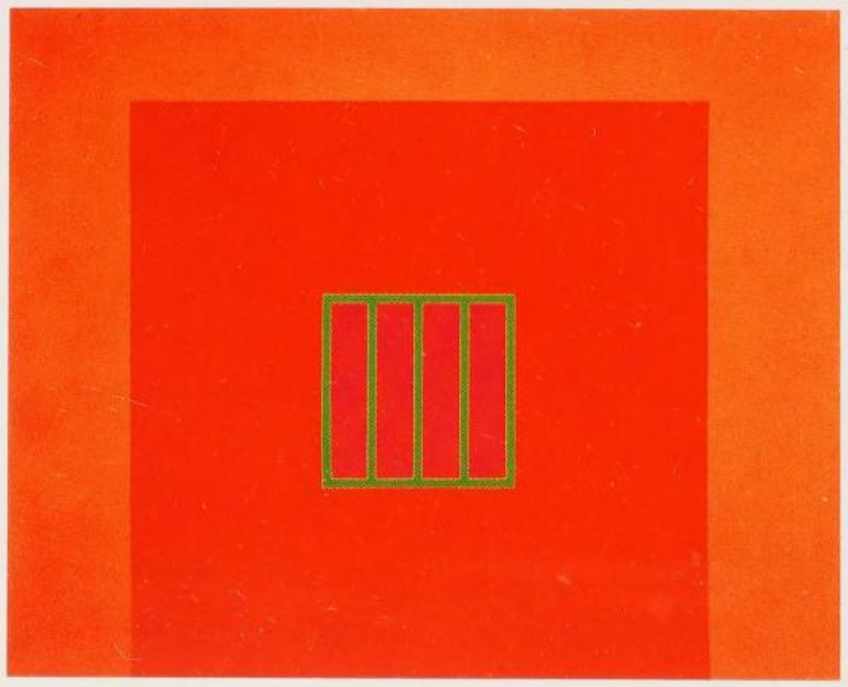
Right: Fig. 224
Robert Swain
American, born 1940
Untitled
1975
Acrylic on canvas
84 x 84 in. (213.4 x 213.4 cm)
Columbus Museum of Art, Columbus, Ohio: Museum Purchase, Howald Fund.
1976.001

Courtesy of the Artist



Right: Fig. 225
Peter Halley
American, born 1953
Day Glo Prison
1982
Acrylic, Day-Glo acrylic, and Roll-a-Tex on canvas
63 x 78 in. (160 x 198.1 cm)

Courtesy of the Artist and Baldwin Gallery, Aspen, Colorado



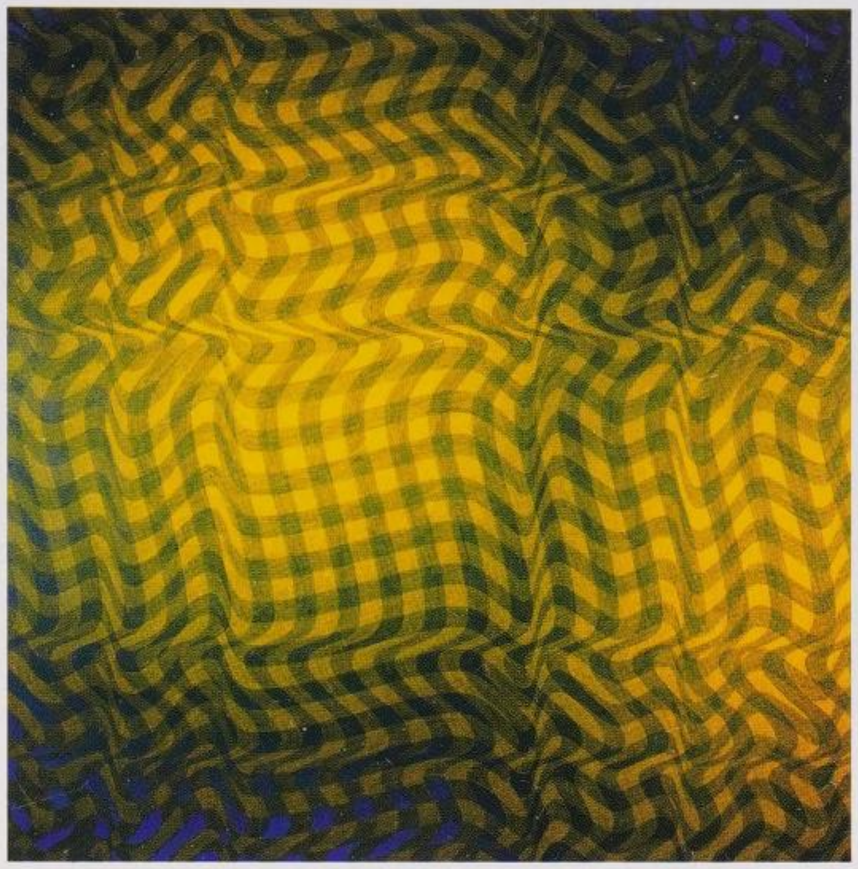
pattern of color is executed in a staccato mosaic of brushstrokes, lending an expressive element not found in Op's anonymous technique. Thomas, who emerged in the late 1960s as part of the Washington Color School that included Gene Davis and Kenneth Noland, imbues formalist abstraction with natural references. The symbolic and representational potential of her paintings indicates the re-emergence of figurative and narrative tendencies in the pluralistic art scene of the 1970s. A more analytical approach to color is seen in the systematic compositions of Robert Swain, who has devoted his career to an investigation of its inherent properties. One of an informal group of Hunter College Color Painters in New York, Swain was previously an assistant to Tony Smith, the minimalist sculptor and hard-edged painter. Swain's paintings share affinities with both Minimalism and Op, combining the primary structure of the grid with an investigation of perception (see fig. 224). In his carefully calculated paintings, Swain creates shimmering chromatic spectra of gradated hues. Mixed with precision at exacting intervals, the squares provide multiple transparencies that create illusions of space and light, an effect enhanced by the overwhelming scale of his canvases. An avid student of the nineteenth-century theories of Chevreul and Rood as well as of Bauhaus color principles, Swain has spent years devising his own color system of 20,000 hues that tests the full range of our perceptual threshold.

A Postmodern perspective on the Op lexicon can be seen in the work of Peter Halley, who took on a position at Yale once held by Josef Albers. Halley's paintings transform the basic geometric vocabulary of Op into universal symbols of modernity. In his "Neo-Geo" compositions, the square to which Albers paid "homage" becomes a prison cell, at times connected, at times isolated from its surroundings. Halley, who grew up in a Manhattan high-rise, was affected by both the promise and the failure of the global modernist experiment of the 1950s and 1960s, which yielded salient architectural and social disasters, perhaps most emblematically portrayed by the fate of the city of Brasilia. Within the guise of formalist abstraction, he summons schematic representations of the urban environment and, by extension, the social order. The geometric forms and vibrant color interactions, as well as his use of fluorescent and metallic pigments

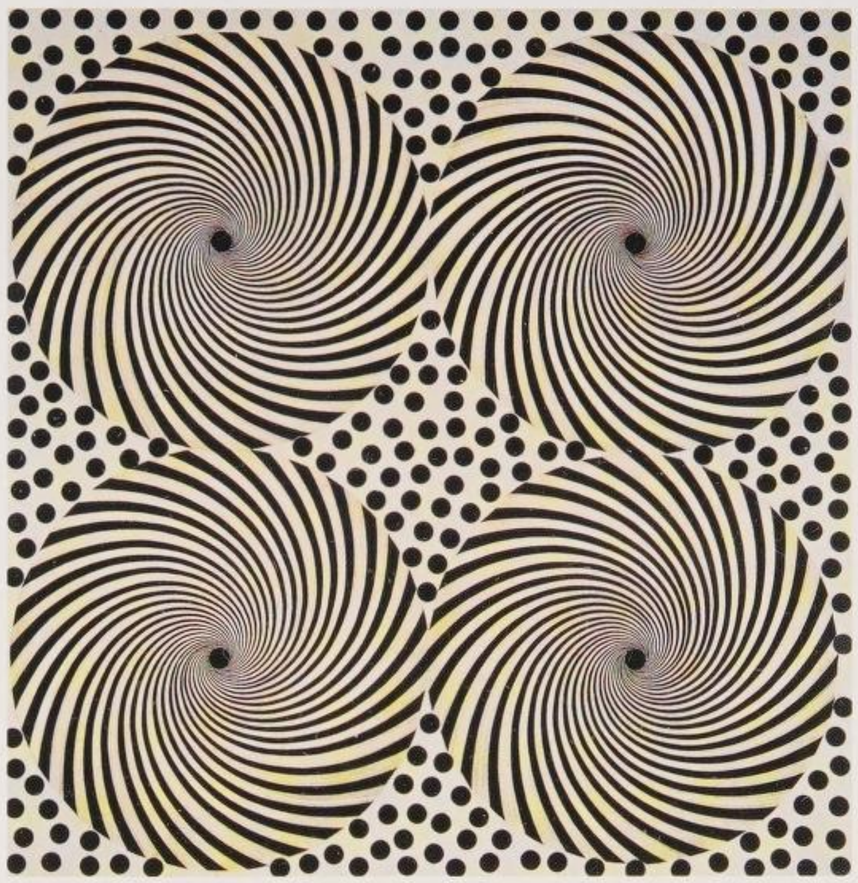
characteristic of Op painting, give Halley with a versatile vocabulary infused with late modernist connotations.

Peter Schuyff and Philip Taaffe also approach Op from a self-conscious vantagepoint, but their criticism is mitigated by the sheer visual pleasure afforded by bold optical patterns. Taaffe's nostalgic *Quad Cinema* (fig. 227), created with a combination of printmaking, collage, and painting techniques, amounts to a twice-removed copy of the prototypical Op compositions of Edna Andrade and Wolfgang Ludwig, yet engages on its own terms. Its title, a reference to a popular New York movie theater, pays homage to Ludwig's *Cinematic Paintings* and acknowledges film as the dominant visual medium of the late twentieth century. Schuyff, a Canadian artist who found early success in New York in the 1980s, also acknowledges the sensual potential of Op motifs, seeing them as "characters" in his repertoire. His works include patterns inspired by artists like Bridget Riley and Ben Cunningham, elements of an eclectic art-historical vocabulary. However, unlike the formalists who preceded him, Schuyff draws attention to the fiction of painting by including the illusion of uneven lighting in his work, giving credence to Peter Halley's statement at the time that "Artists today paint the '50s the way the Impressionists painted haystacks at sunset."[1] As with his Neo-Geo colleagues, Schuyff questions the distinction between abstraction and representation in his ironic recycling of Op.

Jim Isermann and Susie Rosmarin embrace the visual splendor of Op without hidden commentary. In his paintings, sculpture, and architectural embellishments, Isermann celebrates the decorative potential of geometric abstraction and reveals the symbiotic relationship between fine and applied art. In his user-friendly room installations, Isermann bridges high and low tastes by merging "art" with furniture and carpet, finding potential in modernist abstraction to connect art and life. Typical of his approach are his "Shag Paintings," which depict vibrant Op patterns bisected into sections painted and carpeted as one continuous design (see fig. 228). His more recent architectural facades and modular wall units, recalling the fluctuating structures of Vasarely and Riley, create a kinesthetic experience of an unstable morphing matrix, actualizing the warped space of virtual reality. Susie Rosmarin creates a similarly vertiginous



Left: Fig. 226
Peter Schuyff
American, born Holland 1958
Untitled
1988–89
Acrylic on linen
120 x 120 in. (304.8 x 304.8 cm)
Courtesy of the Artist



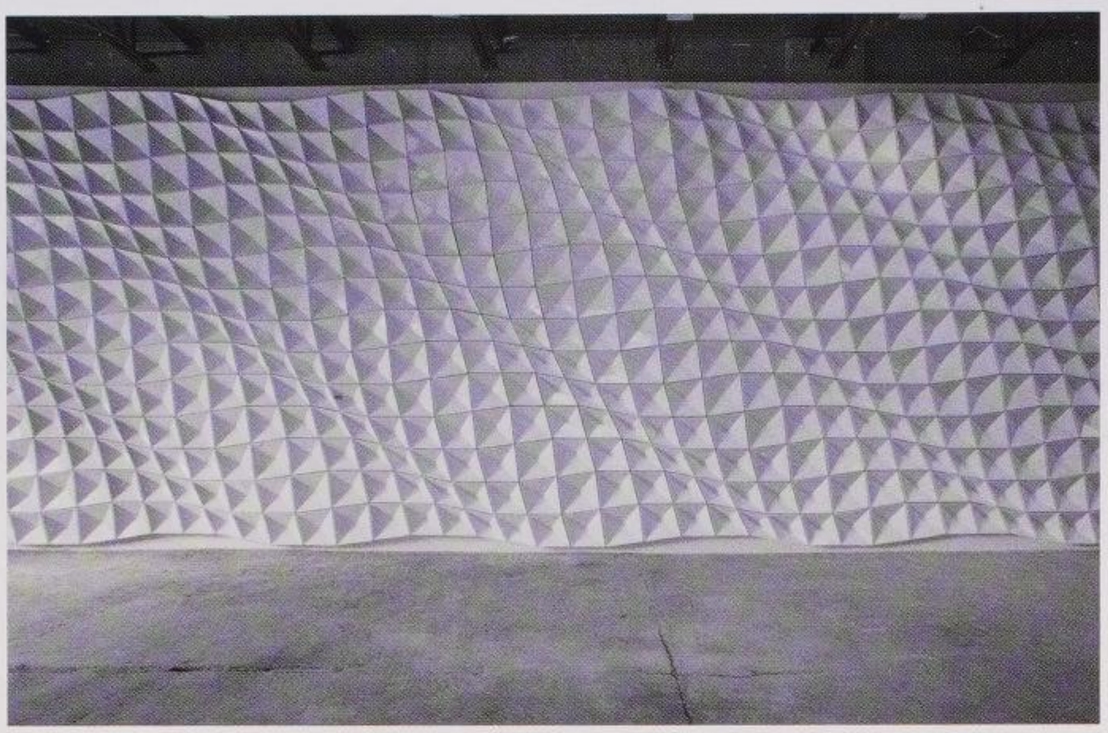
Left: Fig. 227
Philip Taaffe
American, born 1955
Quad Cinema
1986
Linoprint collage on canvas
85¾ x 83½ in. (218 x 212 cm)
Private collection
Courtesy of Raymond Foye Ltd., New York, New York



Left: Fig. 228
Jim Isermann
American, born 1955
Untitled (0589)
1989
Enamel paint, Orlon acrylic yarn on wood panels
96 x 96 x 2 in. (243.8 x 243.8 x 5.1 cm)
Courtesy of Jim Isermann and Richard Telles Fine Art, Los Angeles, California. Photography by David Familian

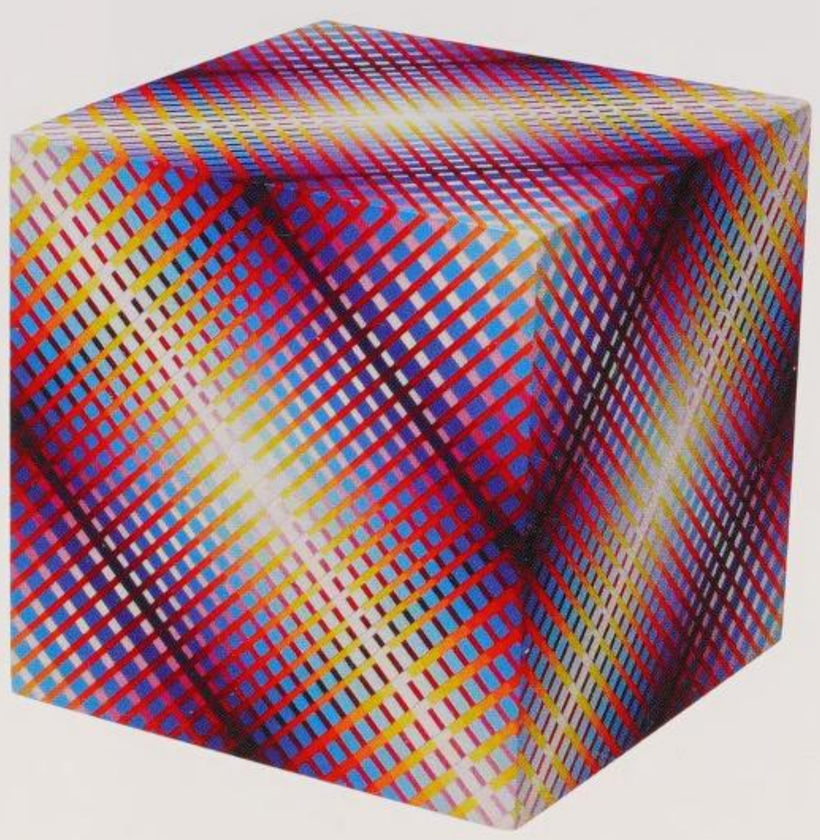
Right: Fig. 229
Jim Isermann
American, born 1955
Untitled (0205)
2005
Vacuum formed polystyrene
Dimensions variable

Courtesy of Jim Isermann and Deitch Projects, New York, New York. Photography by Tom Powel Imaging



Right: Fig. 230
Susie Rosmarin
American, born 1955
Cube #3
2006
Acrylic paint on MDF
10 x 10 x 10 in. (25.4 x 25.4 x 25.4 cm)

Courtesy of the Artist and Danese Gallery, New York, New York



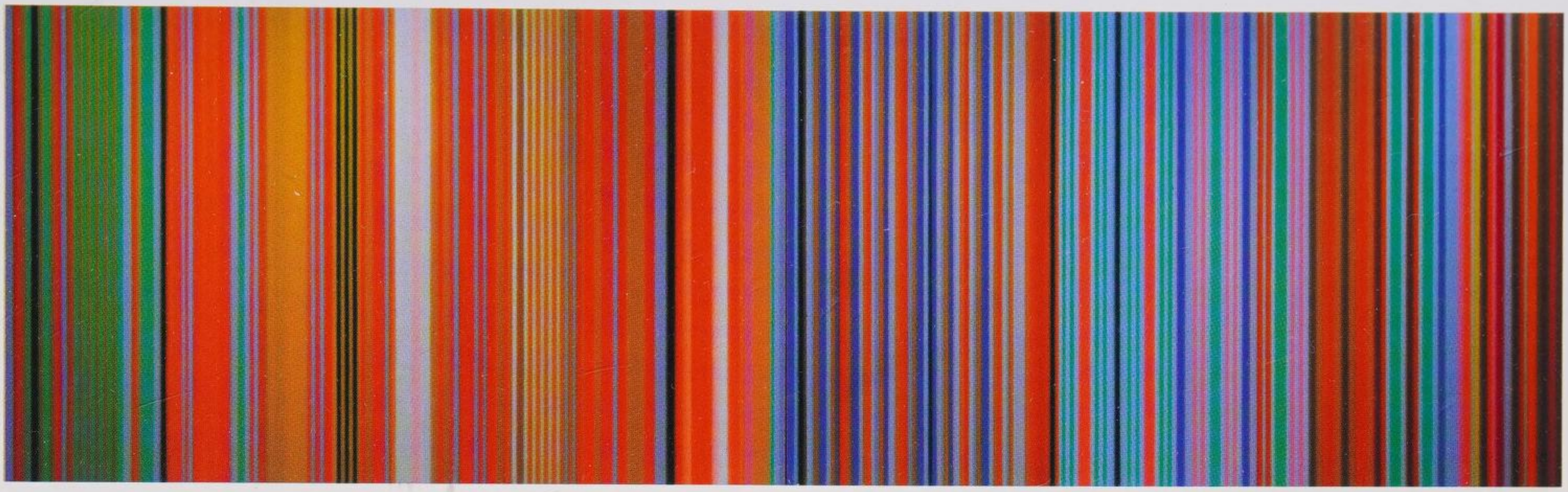
Right: Fig. 231
Gabriele Evertz
American, born Germany 1945
Motion Parallax
1998
Acrylic on shaped canvas
72 x 72 in. (182.9 x 182.9 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of the artist, dedicated to Neil Rector in recognition of his valuable contribution to the arts. 2006.020

Courtesy of the Artist. Photography by Gil and Stephen AMIAGA



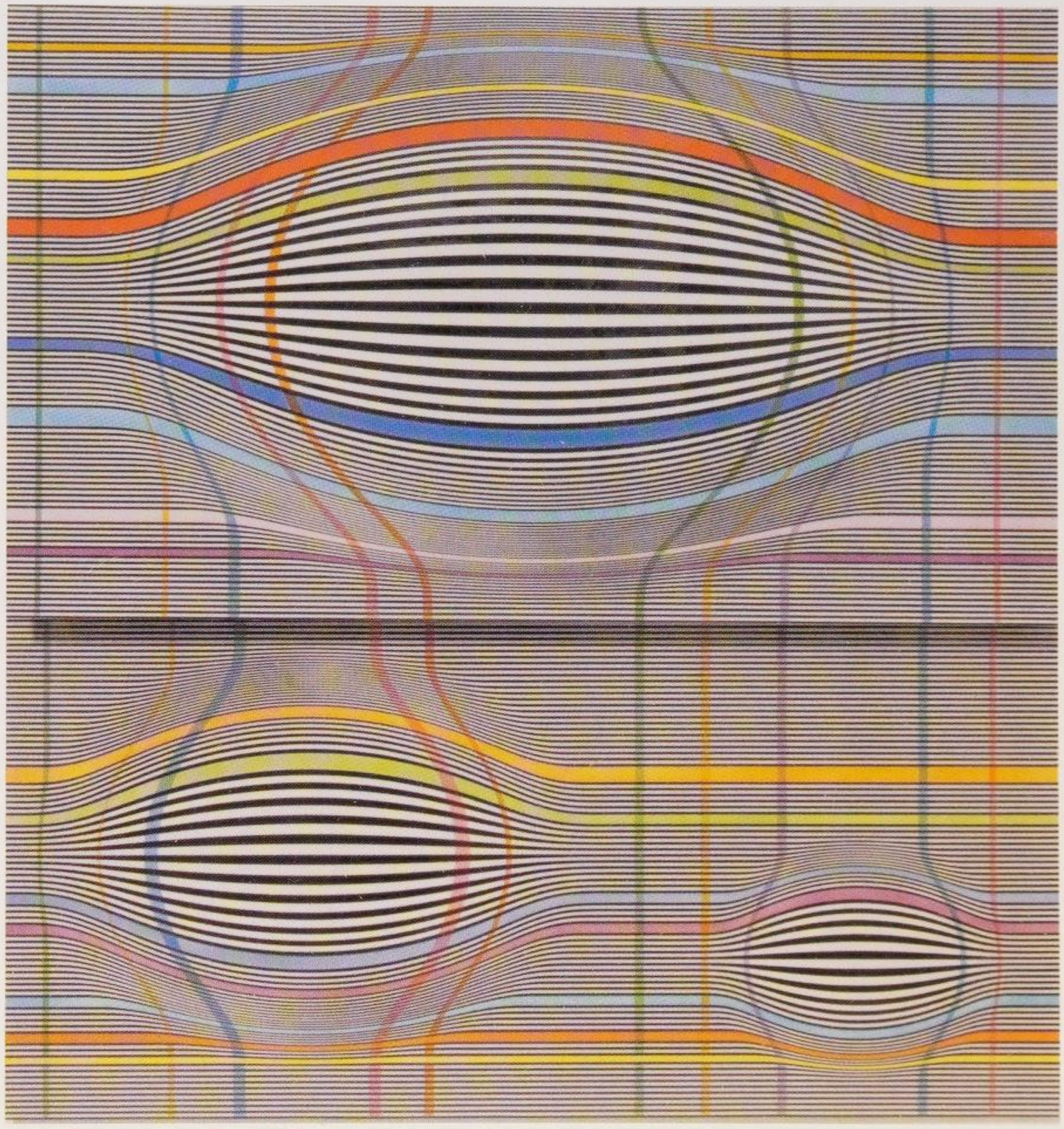
sensation with her paintings and sculptures, which weave multiple linear patterns into dense visual experiences. In her spellbinding canvases, tiny, meticulously painted segments mix optically to summon "virtual" colors and confounding moiré effects. Her sophisticated technique creates the illusion of fluctuating hues and paradoxical space within the flat surface of the picture plane. In a strategy reminiscent of Anuszkiewicz's cubes and corner paintings, Rosmarin also paints these designs onto sculptural constructions, adding a physical dimension to the illusory experience.

Since first invoked by Karl Benjamin and Lorser Feitelson in the 1950s, the stripe painting has remained a staple in perceptual abstraction and gains new associations in the spectral compositions of Tim Bavington and Gabriele Evertz. The British-born Bavington devised a chromatic system that keys color to notes on the twelve-tone scale, with which he "scores" his vibrant abstractions. This Postmodern reinvention of the Orphist endeavor results in a visual equivalent of rock and roll. Bavington eschews the presumed emotional connotations of color dating back to Goethe and instead conveys pitch, timbre, tone, and tempo through analogous alterations in the hue, intensity, value, and width of his stripes. The glissando of juxtaposed notes is also mimicked in the relative softness of his airbrushed edges. The grand scale of paintings like *Little x Little* (fig. 232)[2] heightens spatial and temporal experience, in which the "music" unfolds in time as the viewer walks in front of the canvas, invoking Gene Davis's music-inspired notion of "an art of space intervals."[3] Gabriele Evertz, one of a younger generation associated with the Hunter College colorists, uses the periodic structure of the stripe as her primary vehicle as well. In her paintings, linear bands of color intersect at carefully calibrated intervals to create shifting and vibrating optical mixtures. In *Motion Parallax* (fig. 231), two opposing stripe patterns, one vertical, and the other horizontal, meet at a diagonal "seam" of the composition. The resulting, subtle misalignment of color produces a spatial ambiguity that holds both halves in delicate tension. This unsettling sensation is amplified by the unusual rhomboid format of the painting. Evertz's shaped canvas, a direct link to her Op forebears Noland and Riley, skews our sense of the surrounding space, and



by extension of our body, creating an optical experience with corporeal reverberations.

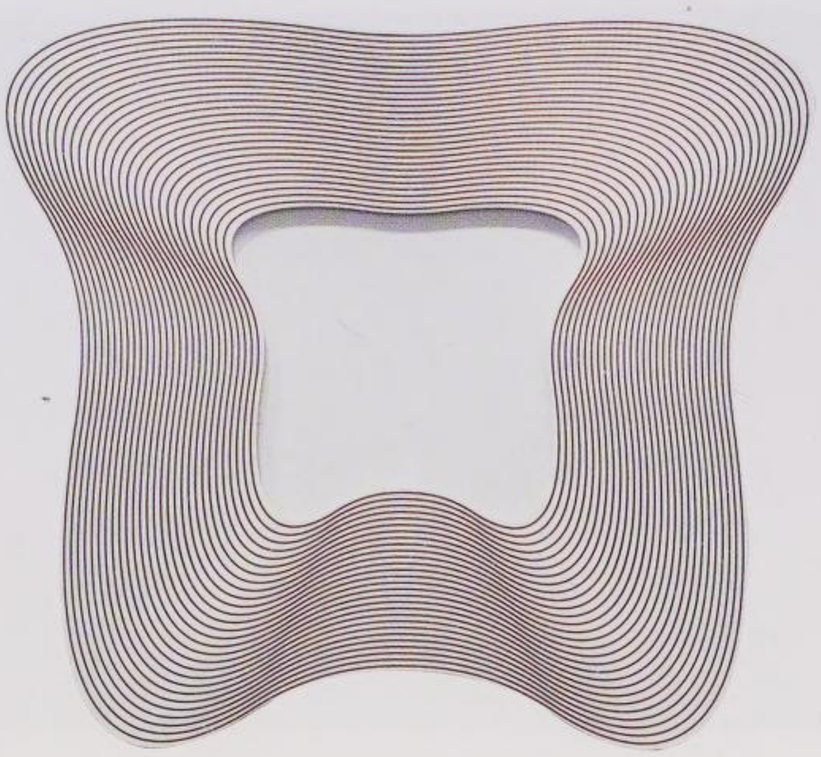
Capitalizing on the tension inherent in periodic structures, Linda Besemer and Philippe Decrauzat create unconventional works that bridge the virtual world of painting and its larger physical and cultural context. In a very precise adjustment of linear structures, Linda Besemer's plaid abstractions, reminiscent of Vasarely's signature *Vega* series (see fig. 47), appear to swell three-dimensionally despite their emphatically flat surfaces (see fig. 233). In a subtle yet subversive commentary on heroic abstraction, historically a male dominion, she "weaves" her paintings from fine strands of acrylic paint, invoking a traditionally feminine craft (even at the egalitarian Bauhaus, Anni Albers was relegated to the weaving department). Created without the traditional canvas support, the resulting paintings hang limply on rods in a dual act of emasculation and domestication. Besemer's pregnant bulges anthropomorphize abstraction while engaging a gendered history of abstraction. A similar analogy between abstraction and the human body is evoked in the paintings of Swiss artist Philippe Decrauzat. In such paintings as *Mae West* (fig. 234), he imbues the Op innovation of the shaped canvas with decidedly erotic overtones. Unlike the rigid structures of Stella and Riley, Decrauzat's shapely paintings appear to bend and sway organically, an optical illusion generated by the sensual contours of his patterns. He exploits Op's ability to engage the eye and enthrall the body, a feat further evidenced by his architectural installations. In the remarkable *Can I Crash Here* (fig. 235), Decrauzat betrays our senses



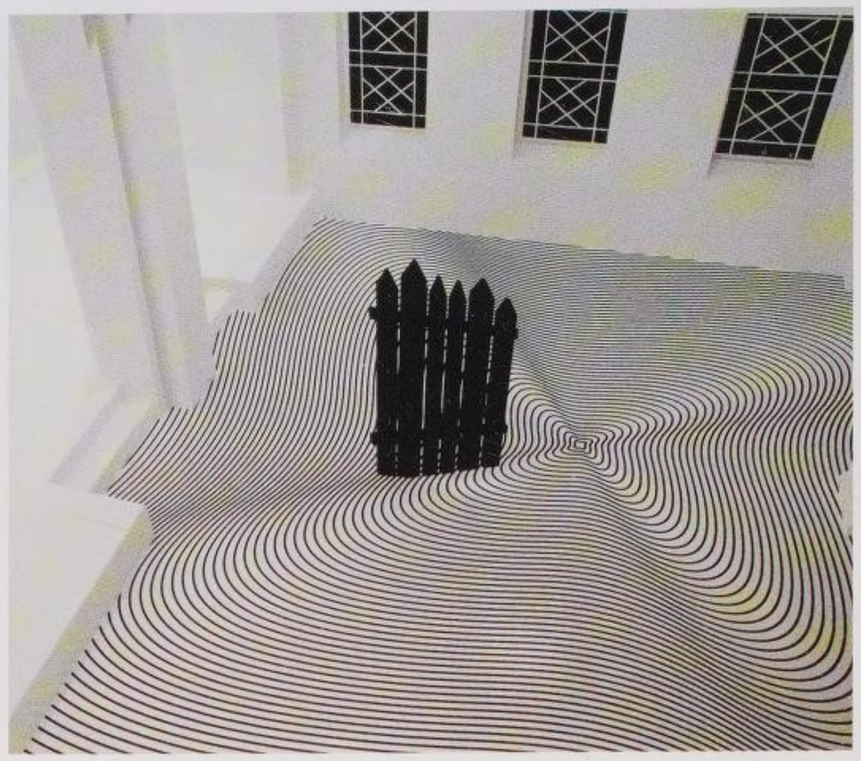
Top: Fig. 232
Tim Bavington
American, born England 1966
Little x Little
2003
Diptych, acrylic on canvas on panel
60 x 192 in. (152.4 x 487.7 cm)
© Courtesy of Tim Bavington. Photography by Greg Preston

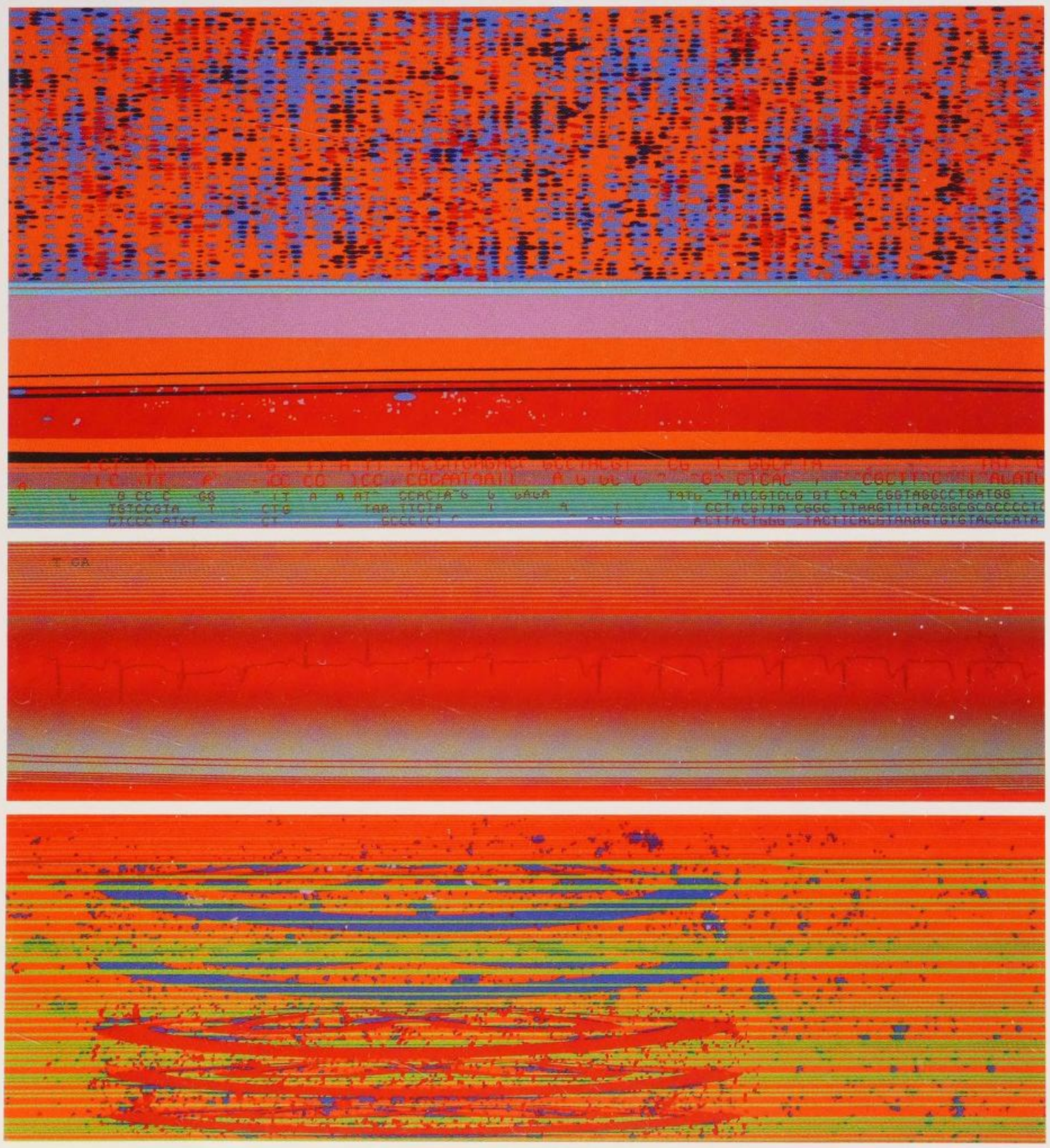
Above: Fig. 233
Linda Besemer
American, born 1957
Multibulge Fold #4
2005
Acrylic paint over aluminum rod
48 x 48 in. (121.9 x 121.9 cm)
Courtesy of the Artist and Angles Gallery, Santa Monica, California

Right: Fig. 234
Philippe Decrauzat
Swiss, born 1974
Mae West
2005
Acrylic on shaped canvas
94 1/2 x 86 5/8 in. (240 x 220 cm)
Courtesy of Gallery Praz-Delavallade, Paris, France. Photography by Marc Dommage



Far right: Fig. 235
Philippe Decrauzat
Swiss, born 1974
Can I Crash Here
2005
Decals on floor
Dimensions variable
Installation view at Synagogue de Delme, Centre d'Art Contemporain, Delme, France, 2005
Courtesy of Gallery Praz-Delavallade, Paris, France. Photography by O.H. Dancy





with an unstable linear structure that appears to twist and fold the ground underfoot. The visual, spatial, and psychological disturbance of Decrauzat's floor is the symbolic transcription of a drug-induced hallucination, an analogy given added meaning by his invocation of Op, with its historical ties to the 1960s counterculture.

Embracing the visual and psychic potential of Op for the post-digital age, Beverly Fishman's stimulating abstractions embody the multiple signals—cultural, chemical, and psychological—that dwell within us. She represents the body with an assortment of its abstract traces: EKG patterns, DNA molecules, pharmaceutical logos, and other biochemical symbols indicative of the transformative influence of medical science and technology on the corporeal body. Layered into dense visual fields, alternately ecstatic and traumatic, these patterns produce anomalous visual effects equivalent to psychic moiré fringes. Executed on powder-coated aluminum panels with computer-cut vinyl and screenprinted colors, including metallic and fluorescent hues, Fishman's paintings evoke a technological aura in their material and process. When arranged in the stacked format of her polyptychs, for example, *Dividose: B.R.H.* (fig. 236), her Op-infused compositions vividly underscore the psychic disconnection and fractured identity of a multi-tasking, hypertextual, overmedicated generation.

New media and cutting-edge techniques have opened up other options for artists to explore in the quest for an active and immersive viewer experience. Video and light projection, innovations pioneered in the mid-1960s by electronic artists such as Peter Sedgley, Jud Yalkut, and Joshua White, now provide the tools

for a new generation of such multimedia artists as Jennifer Steinkamp and Jason Salavon. Steinkamp, who uses computer animation and video projection, creates enchanting installations that shift and morph in our presence. Her digital video projection *Loom* (fig. 221) presents white and yellow stripes that converge into a schematic rendering of three-dimensional cube-like space. The animated linear pattern fluctuates and writhes, enveloping the viewer in an unstable vision suggestive of the warping fabric of space and time. Technology provides the tools and subject for Jason Salavon's video projections that translate all manner of data into abstract form, a sort of Orphisme for the information age. In *Everything, All at Once (Part III)* (fig. 237), a customized computer program translates signals from random television transmissions into infinitely radiating concentric circles of color. The resulting projection, accompanied by a real-time soundtrack, has ties to the periodic circular paintings of Tadasky and Fangor and the seminal *Pulse* paintings of Peter Sedgley. In Salavon's hands, the motif of the periodic structure takes on a new luster in our daily lives in the new electronically saturated millennium, in which channel surfing serves as a form of self-hypnosis. Engaging the senses in a dramatic and overwhelming manner, Steinkamp and Salavon convey the spectacular experience of electronic mass media, and the transformative influence they exert on us daily. Fifty years after exploding on the scene, the formal and conceptual innovations of Op Art still provide vibrant tools for artists to manipulate to new ends.

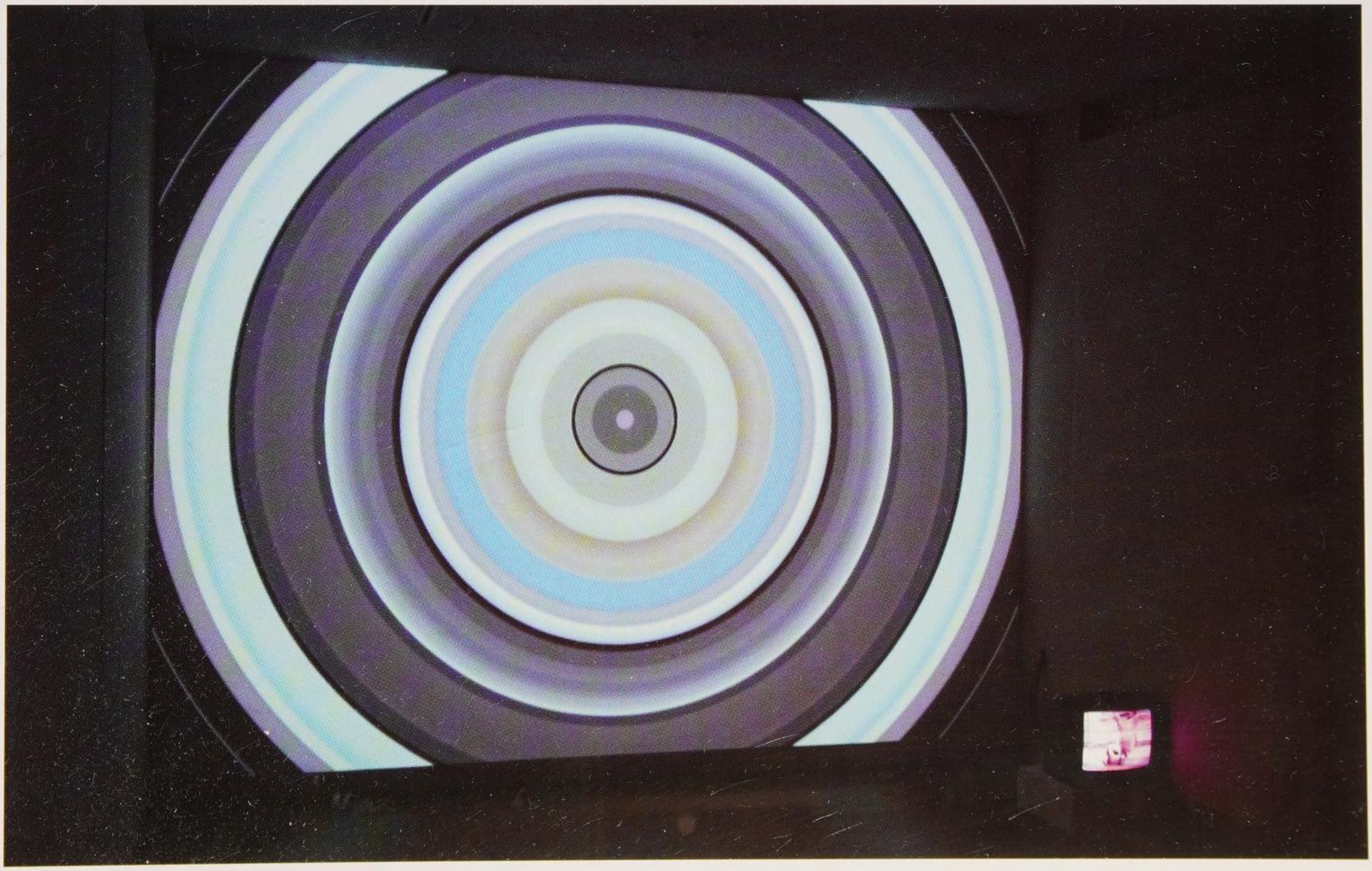
1 Peter Halley, *Collected Essays: 1981–87*, Zurich (Bruno Bischofberger Gallery) and New York (Sonnabend Gallery), 3rd printing, 1991, p. 134 (1st edn. 1988).

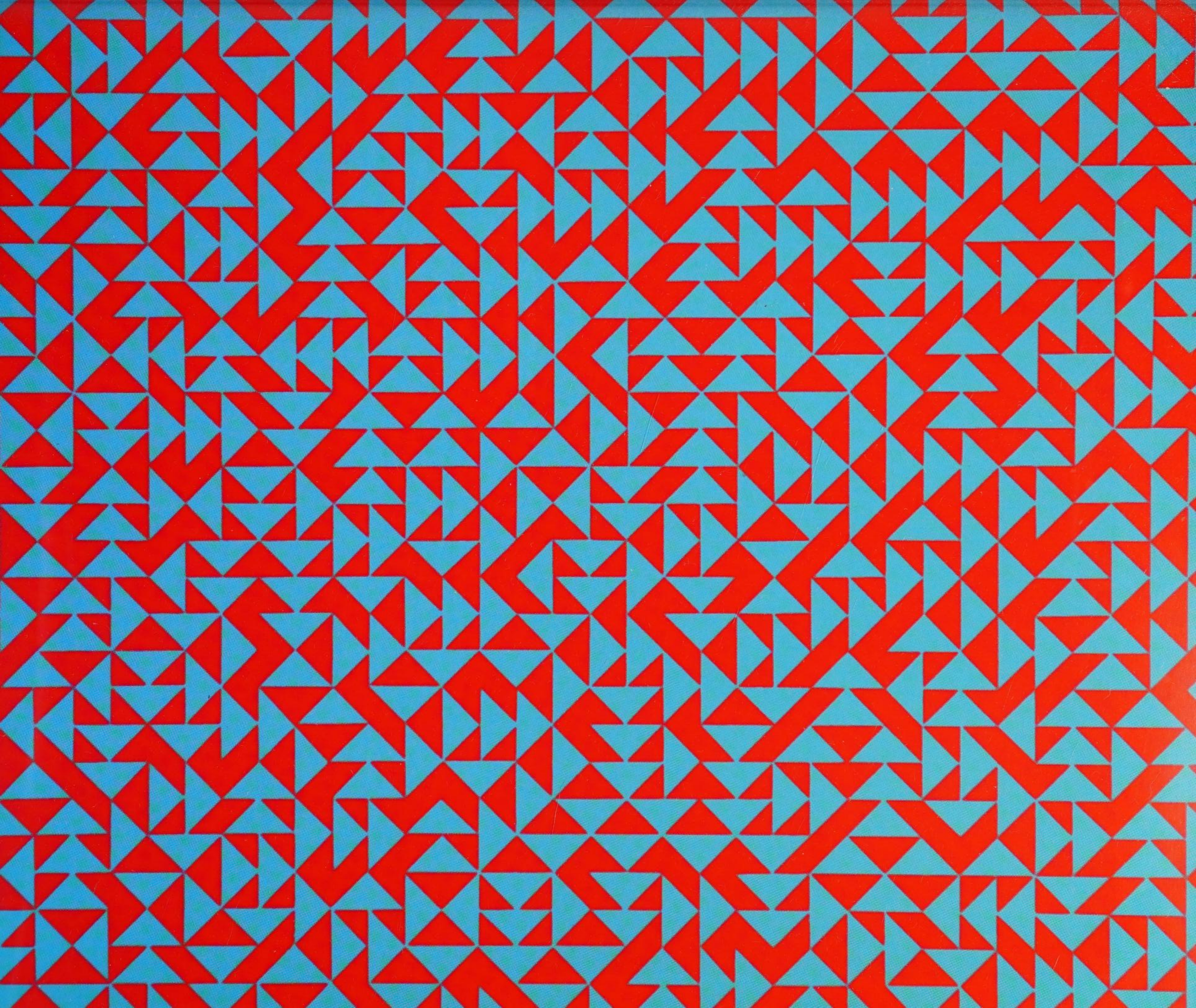
2 Based on a song by British band Oasis.

3 Gene Davis, Interview with Buck Pennington: "Like in music. Music is an art of sound interval, time interval, and painting—my painting—is an art of space intervals," *Smithsonian Archives of American Art*, April 23, 1981 (www.aaa.si.edu).

Opposite, bottom: Fig. 236
Beverly Fishman
American, born 1955
Dividose: B.R.H.
2006
Silkscreened vinyl collage on powder-coated metal, in three parts
53 x 48 in. (134.6 x 121.9 cm)
Courtesy of the Artist, Bernard Jacobson Gallery, London

Below: Fig. 237
Jason Salavon
American, born 1970
Everything, All at Once (Part III)
2005
Custom software, workstation, real-time audio/video input, video projector and monitor, edn 3
Dimensions variable
Courtesy of the Artist and Ronald Feldman Fine Arts, New York, New York





MANIFESTOS

Documents of Op Art

Perceptual art emerged in a postwar climate of art-historical and social transition. Among the earliest to articulate a philosophy that would characterize the Op movement were Max Bill and Victor Vasarely, who wrote of the democratic promise of a union between science, technology, and art. Vasarely's journals and essays indicate a growing discomfort with the heroic and individualist stance of Abstract Expressionism, or Art Informel, its European counterpart. This reaction was shared internationally by a rising generation of abstractionists concerned with the viewer's sensory experience, a desire which came to full fruition in interactive installations. Such artists as Yvaral, Julio Le Parc, and Bruno Munari promoted a role for art at the service of society, an ideal that echoes the Bauhaus integration of art, design, and everyday living, as well as the Futurists' belief in art as an agent for social transformation. This egalitarian and progressive philosophy was given new momentum by such artists' collaboratives as Equipo 57 and Groupe de Recherche d'Art Visuel (GRAV), whose members, both individually and as a group, issued statements outlining their strategies for change. The Op-related collaboratives were often strident in their pronouncements, and at times claimed artistic anonymity to underscore their social ideals. Anonima Group, the last surviving collaborative of the Op movement, even published a journal in support of their visual research. Theirs was one of a number of journals, including *Spirale* and *Signals*, distributed by artists and galleries during the 1950s and 1960s. The following writings, selected from exhibition statements, lectures, and published essays, document a variety of positions on the power and promise of art and its interaction with the modern world.

VICTOR VASARELY

Notes for a manifesto

These are the determining factors of the past which link us to it and which are of most interest to us: the triumph of painting over anecdote (Manet)—the first geometrisation of the external world (Cézanne)—mastery of pure colour (Matisse)—breakdown of figuration (Picasso)—the transformation of exterior vision into interior vision (Kandinsky)—one branch of painting merging into architecture, which in its turn becomes polychromatic (Mondrian)—the beginning of a great plastic synthesis (Le Corbusier)—new plastic alphabets (Arp—Taeuber—Magnelli—Herbin)—abandonment of volume for **space** (Calder). The desire for new knowledge has been affirmed in the recent past through the invention of **pure composition** and by the choice of the **unit**, of which we speak later. Parallel with the decline of the traditional techniques of painting go experiments in new materials (applied chemistry) and the adoption of new tools (the discoveries of physics). At present we are moving towards the total abandonment of the routine, towards the establishment of new functions and the basic mastery of **greater dimensions**.

From the beginning, abstraction stripped and enlarged its compositional elements. Soon form-colour invaded all two-dimensional surfaces. The picture-object lent itself to this metamorphosis, which led it by way of architecture to the spatial world of polychromatic colour. However, an extra-architectural solution has already presented itself and we break deliberately with neoplastic law. **Pure composition** is still a plastic plane with rigorous abstract elements, small in number and expressed in few colours (flatly applied, matte or glossy), possessing over the whole surface the same unified plastic quality: **positive–negative.** But through the effect of opposing perspective, these elements can create or deny alternately a 'spatial sensation', the illusion of movement and of duration. **Form and colour make one unit**. Form can only exist when it has been defined. The line (drawing, outline) is a fiction which belongs not to one, but to two form-colours at the same time. It does not engender the form-colours, it is a result of their meeting. Two necessarily contrasted colours make up a **plastic unit**, consequently a unit of creation: the eternal duality of all things, recognised at last as inseparable. It is the linking of affirmation and negation. Measurable and not measurable, the unit is at the same time physical and psychical. Through it material structure is comprehended; the mathematics of the universe, everything in its intellectual superstructure. The unit is the abstract essence of the **beautiful**, the basic form of sensibility. Conceived with art, it makes a work, a poetic equivalent of the world it signifies. The simplest example of the plastic unit is the square (or rectangle) with its complement 'contrast', or the two-dimensional plane with its complement of 'surrounding space'.

After these few brief explanations, we propose the following definition: on the straight line—horizontal and vertical—rests all creative speculation. Two parallels, forming the frame, define the plane or cut off part of space. **To frame is to create anew and to recreate all art of the past**. In the technique of the plastic artist, from now on

considerably enlarged, the plane remains the area of initial conception. The small format in pure composition marks the beginning of a recreation of multiple two-dimensional functions (large formats, frescos, tapestry, art books). But already we are finding a new orientation. **The diaspositive** will be to painting what the record is to music: easy to handle, faithful, complex; in other words a document, a working tool, a production. It will constitute a new transitory function between the fixed image and the future moving image. **The screen is flat, but in allowing movement it is also space**. Thus it has not two, but four dimensions. 'Time-movement', illusory in pure composition, in the new dimension offered by the screen, and thanks to the unit, becomes real movement. The lozenge, another expression of 'the square-plane unit', equals square + space + movement + duration. The ellipse, another expression of 'the circle-plane unit', equals circle + space + movement + duration. Innumerable other units, multiform and multicoloured, give an infinite range of formal expression. 'Depth' gives us a relative scale. 'Distance' contracts, 'nearness' expands, thus reacting on the **colour-light** quality. So we have the tool and the technique and at last the science, in order to attempt the plastic-cinetic venture. Geometry (square, circle, triangle), chemistry (cadmium, chrome, cobalt) and physics (co-ordinates, the spectrum, the measurement of colour) represent constants. We think of them as so many quantities; our standards, our sensibility, our art make qualities out of them. (This has nothing to do with Euclid or Einstein, but it is the natural geometry of the artist, who miraculously functions without exact knowledge.) The animation of plasticism is developing at the moment in three distinct ways: 1. movement in an architectural synthesis, in which a spatial, monumental plastic work is conceived in such a way that a change of form can come about through the shifting of the spectator's point of vision; 2. motor-driven plastic objects which—besides possessing an intrinsic quality—are primarily used as the content during animation; lastly 3. the methodical employment of the **cinematographic domain** by means of abstract discipline. We are at the dawn of a great epoch. **The era of plastic projections on the screen, two-dimensional and in depth, in daylight or darkness, is beginning**.

The product of art has been extended from being 'the useful, agreeable object' to 'art for art's sake', from the 'pleasant' to the 'transcendent'. The set of plastic functions becomes established, therefore, in a vast panorama: decorative arts, fashion, publicity and visual propaganda, décor for industrial exhibitions, festivals, sport, theatre design, model polychromatic factories, signs and urbanism, documentary art-film, museum display, art publications, synthesis of the plastic arts, and lastly, research by the authentic avant-garde. In all these diverse disciplines, the personal accent does not necessarily imply authenticity. We are not qualified to decide in our own time, the major or minor character of these different manifestations in plastic art. Talent exists in the old guard as much as lack of talent in the avant-garde. But neither the worthwhile work—if it is inflexible or reactionary—nor the advanced work—if it is mediocre—will count for posterity. The effect that a work of art has on us (with differences of intensity and quality) ranges from a small thrill to the impact of **beauty**. These sensations are first registered by our emotions, and they engender a feeling of well-being or excitement. In this way the aim of art is almost fulfilled. The analysis, the understanding of a message depends on our knowledge and our degree of culture. Since only the values of the art of the past are intelligible, and since it is not possible for everyone to study modern art seriously, in place of its 'comprehension' we advocate its 'presence'. Sensibility being essentially a human faculty, our message will certainly reach the ordinary man through the normal course of his emotive receptivity. In fact, we need not leave the enjoyment of a work of art indefinitely to an élite of connoisseurs; present-day art is moving towards more generous forms, which are recreatable at will. The art of tomorrow will be a treasure common to all, or it will be nothing. Traditions will degenerate, common forms of painting will wither away into abandoned byways. Time judges and eliminates; renewals from old stock and the authentic fresh manifestations come sporadically and unexpectedly. It is sad, but essential, to abandon ancient values in order to be assured of the acquisition of new ones. Our condition has changed; our ethic, our aesthetic, must change in their turn. If the idea of the plastic work has belonged up to now more to artisan procedure and the myth of the 'unique piece', it can be found today in the possibility of **recreation**, of **multiplication** and of **expansion**. Has the wide dissemination of literature and music had a detrimental effect on their unity and quality? The noble chain of the image, fixed in two dimensions, unfolds from Lascaux to the abstracts. The future holds happiness for us in the new plastic beauty, mobile and emotive.

1954

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Towards the democratisation of art

The beginning of the century saw the explosion of plastic figuration. Its debris has been taken up—wrongly—by the painters of our generation as the new material for composition. In this way nonfigurative and pseudo-abstract artists have produced a satiated, facile and decadent art.

True abstraction, existing in promiscuity with traditional painting, is submerged for the moment in the enormous contemporary production. Although conscious that it cannot continue with the traditional easel, it nevertheless hesitates before the unpardonable step—a break with the old routine—because it fears losing its habitual resources. Nor is it yet able to set out its principles and rules clearly. Meanwhile, old ideas—**taboo**—remain strong and we must combat them! One of them, the 'human scale', is only relevant to the figurative object. Thus, while it may be evident that the still-life cannot be treated on a colossal scale, it is also inherently clear that abstract forms have no scale. The 'size' attributed to a canvas of small format (whether moral or spiritual) is equally a figurative survival, a survival of the anecdote, of the symbol of the time. Abstraction **must abandon the principle of inflexibility of format**, allowing only the optical scale of distance.

Geometry (square, circle, triangle), chemistry (cadmium, chrome, cobalt) and physics (co-ordinates, spectrum, colourmetrics) represent **constants**. We will handle them as **quantities**; our standard, our art, our sensibility will make **qualities** out of them. Henceforth the initial creative object will be of 'small format' made up of constants, epitomised in the **diaspositive**; an expandable medium, doubling as a sort of 'partition-scenario' which will enable the artist to recreate a canvas, a tapestry, a fresco, an **album** of prints, or a plastic cinetic synthesis, or even a filmed abstract symphony.

For while art yesterday sought to **feel** and **make**, today it can **conceive** and **bring about**. Yesterday the preservation of the work of art depended on the excellence of the materials employed, on perfection of technique and handcraft. Today we are aware of the possibility of **recreation**, **multiplication** and **expansion**. Thus, together with craftsmanship, the myth of the unique work of art will disappear, and the multipliable work of art will triumph at last through the benefit of the **machine**.

Let us not fear the new tools which technique has given us. We can only live authentically in our own time. Achieving large-scale distribution is necessary to answer the vast demand which comes to us from the world.

1954

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EQUIPO 57

Founded: Paris 1957
Founding Members: José Duarte, Angel Duarte, Juan Serrano Muñoz, Agustín Ibarrola, Jorge de Oteiza (left after one year). Additional Members: Juan Cuenca, Néstor Basterretxea, Francesco Marino di Teana, Francisco Aguilera Amate, Luis Aguilera Bernier, Thorkild Hansen
Disbanded: 1961 (exhibited until 1966)

Notes for a Manifesto

A new epic is to be written, is being written, by electric light, in the splendour of an interchanging universe.

We are moving quickly forward. In this civilization, where each man is entitled to his vote, analysis is difficult and therefore more necessary. Events spur us on and make us all responsible in the march that began with history itself, with the men that shouldered it, repeating the eternal issue—man changes, evolves; art changes.

They don't paint now like they used to. Why be surprised? Why protest and call those who obey this law of existence insane innovators of things? Why demand a more common—a more vulgar—language as if a work of art had to obey the canon dictated by the majority, as if their criterion, through being more social, had more constructive value?

If in the world of the Greeks, the concept of the cosmos—an immobile earth in the centre of the universe—was what ruled their aesthetics, why is it that even in the 20th century, the Greek idea lives on in us?

Theories about painting have until now been ruled by a strict law of compensation, with a Newtonian gravitational character that is only valid for a world expressed by a mechanics of low velocities, for a macroscopic world that tends toward the static. Whether we like it or not, neither the philosopher not the artist is able to think in the same way before as after Einstein. Physical geometry linking man directly with the living law of the cosmos is opposed to the construction of a geometry of a mental kind.

Every aesthetic system should have its age and there is no art without an aesthetic system. At present, we see a need to introduce scientific rationalism in art in order to create a unity of style that will be the true quotient of our age. This quotient creates determinants that require more effort and channelized personality of man. Art ceases to be parochial, translating private feelings, and enters the broader conscience of a universal world. This new aesthetic method is based on the physical concept of a universe in disequilibrium where each element, through its own momentum, can create energy capable of translating the plastic feeling of a mobile world directly. In a picture, Euclidean geometry—the Golden Rule etc.—will be replaced by a new mechanism, since we are thinking—and there is no contradiction—of the vigorous power of both mass and colour free in space. The static belongs to a macroscopic world of simple perception but the law interests the artist more than nature itself. Progress comes as man gradually reduces his anthropomorphic side, relegating the concepts drawn directly from his physiology, and little by little slips from the concrete to the abstract. It is a difficult task for the spectator to approach this art when thought is unable to nourish him with familiar analogies. Nor is he able to lean on concepts drawn from everyday life.

Challenging Cubism, which bestowed a new tendency on painting, although still with a classical yardstick—Juan Gris claimed to be a classical artist—Malevitch appeared and freed forms in space ushering in dynamics and leaving the interval as the only means of uniting all spatial and temporal measurement that possessed intrinsic value, an individuality of its own. In this new concept, it is thought that the real way of measuring space is by velocity.

In art, all relationships must be constant, every idea of mobility being expressed by the energy-giving capacity of mass and colour. The mobile constructed with mechanical means—Calder, Munari, etc.—reaches a physical naturalism in which the driving force is not a plastic element and it is thus divided, destroying itself in its own nature as a work of art.

In Spain, we need to create Museums of Modern Art where all the masters who have brought about the great aesthetic revolution of our time are represented. The youth of today asks for an explanation of this history which is denied him. The history of art does not end in the Prado Museum; this same museum demands a logical continuity. Let us hope that art does not have to be taught through manifestos, when the works—which do the talking—are out there, in the world, in other museums. We also feel we must insist on the founding of experimental schools where the artists of the future can learn according to untarnished, up-to-date conceptions. It is not right to hold back a generation that asks to live out its historical moment in universal history.

Published on the occasion of the *Exposición de Pintura Abstracta* held at the Asociación Artistica Vizaina, Bilbao, from 1957 signed by J. Duarte and J. Serrano Muñoz

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Text for the Thorvaldsens Museum

Equipo 57 (Team 57) was formed in May 1957 based on a manifesto published in Paris. They have developed their own work method, based on Interactivity in the Plastic Space (Inter-actividad en el Espacio Plástico), a theory which became official in Madrid in November 1957. The group's work is built upon a common effort and a rational system within art. This includes: A—discussion; B—research on the problem posed; C—development; D—performance.

A: Discussion is possible in relation to dynamic space (l'espace dynamique). Each element has its justification and its logical base, i.e. a value in itself.

B: Each element is defined for a dynamic operation, and the purpose of conscientious research is to give this operation the greatest development possibilities.

C: Development is in line with the system's own capacity for movement.

D: By means of its logical construction, work refers directly and exclusively to the physical world of the person. It is constant dynamism, present in the culture and philosophy of our time, which determines the new system of conception, performance and understanding of art.

Interactivity is the plastic expression of the continuity of space. The geometrical value of space and form, in the free movement of the body in space, here rests on the physical value of dynamic space together with dimensional globality-color space (espace couleur) and the permeability of three-dimensional space, as an expression through its contour properties, proves that the contrasts established are mechanical and not determined by the color's conditions. It is the dynamic situation which is determining.

Plastic space does not exist before it has acquired a dynamic expression. The activity of space is conceived through dynamic contrasts which are expressed by means of angle of incidence areas and flection points. In a space made up of angles, dynamism grows in the direction of these angles; amplitude is expressed within curved space by different flection areas. Continuity is always made up of incidence angle areas. The space formed by angles, which join at the tips, eliminates the relation between these angles and creates a point, which is "non-space". Dynamism eliminates all concepts of compensations. Here the conception of distance and magnitude, a result of the Euclidean view of space, is made up of areas with more or less activity, relations and movement.

In order for a unit of space to be made up, it is necessary that at least two color spaces touch the outer edges of the paintings. In order to accomplish interactivity—mutual operation—at least three color spaces are required.

A: When three color spaces touch

the edge of the painting, there must be at least one incidence angle and, in relation to the third color space, only one inflexion area.

B: When there are only two color spaces in contact with the edge of the painting, there must be two incidence angles and two inflexion areas.

Nowadays when the artist is dedicated to multiplicity in the environment and when this multiplicity in turn requires an understandable language, how can his environment be? May he become the man with mysterious forms, the loner, unaffected by any social responsibility? May he settle for the role he himself has conferred upon himself? The role which places him outside the community of humankind, denies his capacity of analysis and makes him a kind of intellectual annihilation, something inevitable because he is an "artist"?

This situation corresponds to a world of disheartening materialism, a world that alleges other states in order to disguise commercial interests. The time has come for the serious and hardworking artist to take upon himself the role of constructor of the man of today. It is time to admit this yearning of the new artist in order to understand its true meaning. The artist can not only stand upon his personal and unorganized effort to reach the exact and general solutions that our time demands. The establishment of experimental school groups, contact between them, discussion of work methods and their future possibilities in local or international meetings—all this will help facilitate giving form to the structure of our truth.

Published in Copenhagen, March 1958. On the occasion of the exhibition at the Thorvaldsens Museum. Signed by: Equipo 57

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ANONIMA

Founded: Cleveland 1960
Members: Ernst Benkert, Francis Hewitt, Ed Mieczkowski
Disbanded: 1971

ViBrAtIoNs eleven
Martha Jackson Gallery, January 6 – January 31, 1965

Don't Confuse:
- art and life
- geometry and art
- perception and optics

Don't Equate:
- hands with brains
- tools with machines
- anonymity with conformity

Additional Confusions (Equations):
- illusions and unreality
- reality and nature
- construction and abstraction
- repetition and decoration
- complexity and disorder (profundity)
- simplicity and originality
- artists and movie stars
- formalism and repression
- informalism and freedom
- responsive and responsible
- publicity and fame
- exposure and acceptance

Anonima Statement, November, 1964

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1 + 1 = 3

An Exhibition of Retinal and Perceptual Art
April 11 – May 9
The University Art Museum of the University of Texas

1: Although the term "optical" has been used in the past in a general way to refer to vision in all its aspects, it does have a specific designation; namely to that branch of physical science which treats of the nature and properties of lights and lenses and other optical instruments. Any book that used the works "Optics" or "optical" in its title today would be a highly technical and mathematical study of the geometrical projection of light and its effect on lenses. This would indicate an exclusive use of the terms "optical" and "Optics" outside of the realm of general visual experience.

2: Since as painters we do not study or employ any of the theories or data of optics as defined above, it would be misleading to use this term to describe our work

3: We have studied and employed the theory and data of perceptual psychology and have found it relevant and useful in the construction of visual schemes. If we have to refer our work to any field outside of the history of painting, we would prefer that it be to the psychology of perception. But we are reluctant to employ any name or suggestion of a name which so limits the description of our work that its persistent connection with the history of painting is lost sight of . . .

Anonima Statement: February 1965

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ANONIMA GROUP
U.S.A. Galeria Foksal PSP Warszawa, Pipiec, 1966

An Anonima Idea (within the group):

Anonima does not mean anonymity within the group. It means, on the contrary, the recognition of individual differences (temperamental as well as ideological) among its members. At the same time it provides a basis for a program of group cooperation, and a way of exploiting these individual differences for larger purposes, without denying their force. Any program (or plan for work shared by the group) which hopes to be fruitful must be flexible enough to accommodate each member's contributions, while maintaining the original, agreed upon limitations. These limitations, which outline the scope of any program undertaken, are not just arbitrarily arrived at, but are suggested by commonly shared experiences within the group, and are the result of information given by the success or failure of previous work carried out within and outside the group.

Anonima's "program of agreed upon limitations" is based upon the study of the psychology of visual perception and its application to stabile two-dimensional schemes. The group, working as a team, is investigating one aspect at a time of visual experience. Using a four-year plan as an outline (control), its goal is a series, not necessarily limited, of two-dimensional examples embodying this study. The plan will focus on certain definite features of visual structures: the obvious two-dimensional monocular cues of an implied three-dimensional experience, listed (and to be examined) in order of their psychologically tested validity and reliability. These cues are: 1) overlap (or interference phenomena); 2) relative size changes; 3) brightness ratio (or relative contrast phenomena); and 4) light and shade. The four-year plan will make possible a sustained pursuit of goals by individual artists working as a group. It will free the artists from the structure given by the Art World and replace it with a structure put together by the artists themselves. The relevance or irrelevance of the work done will be determined by its contribution to the growth and elaboration of the investigation, and not by any other criteria. The plan demands the long-range commitment of the artists to their individual ideas as they relate to the plan, and demands that each be responsible for the way it develops.

An Anonima Idea (within the world):

Anonima means anonymity for its members in regard to the world. Anonymity is not necessarily a virtue in itself, an ideal state to be achieved. It is the basis of any group which values the results of collaboration more than the individual distinction of the collaborators.

Anonima has as a purpose within the world, the frustration of any attempts to misdirect, misrepresent, or misinterpret its activities. Anonima thus means no to Commercial Galleries, Biennales, Competitions, Prizes, Commissions, Mass Media Publicity, Critics, and Architects. At stake is the freedom to make the work, to exhibit the work, in whatever form and

whenever it seems necessary, or simply to withhold it, following the rhythm of the artist and the development of his work, rather than the market of any of its more subtle extensions.

The members of Anonima have agreed to exhibit only as a group. In order to do this, and to carry out their group projects, they have established a gallery and workshop in New York. Although it is primarily for its own use, Anonima offers the gallery as a potential exhibition space for other groups, or for work done in cooperation with other groups. The confrontation of artists, the comparison of results of individual or group projects, and the free discussion of ideas relating to such work is not possible in the present gallery-museum exhibition system. Anonima publishes its own magazine. This provides a means for the members of the group to present their ideas, make their proposals, and explain their projects. It also offers space to other artists who want to discuss things publicly, as artists. The magazine is not necessarily limited to a single viewpoint, nor does it have any publicity value, or carry any advertising.

Anonima has begun its own four-year plan. This program would move further and more quickly if other groups, or individuals who might have ideas in common with Anonima would participate in it, even in part. Such research on an agreed upon problem would provide a concentration of many resources in ideas, materials and techniques that are obviously not available to the Anonima Group. Even more important, an exploration of a limited area of visual experience carried out by a variety of widely scattered groups (and individuals) would put the ideas to a more critical and thorough examination than would otherwise be possible.

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LUIS TOMASELLO

Atmosphere, movement and colour

In the development of concrete art the main event has been, and still is, that of fixing a colour upon a real plane. We know that our perception of colours for physical reasons causes them to appear to detach themselves from the picture plane and to move in opposite directions: in depth with the limits of the picture surface, and from this surface towards the spectator.

No doubt the structural black rules in the painting of Mondrian when his work was predominately in static equilibrium, were used to balance the values and fix the position of the colours on the surface of the picture.

It is understood therefore that painting on a plane surface is invariably based upon illusive effects. I have decided that the illusory separation shall become a reality, and consequently have chosen to work in three dimensions.

I attempt to make the jump not only for the reasons I give above but also because I am convinced that the possibility for new developments in the picture plane has been used up, and it is my belief that the geometry of painting now comes into play in problems of movement and in kinetic art.

The forms I use are therefore spatial, but they are subordinated to the plane upon which they are located and from which they operate in the direction of the spectator (anti-perspective). The repetition of forms or other elements which I use, whether they be cubes, solids, cylinders and so forth, disposed in series, add up to the **spatial surface**.

Before working in three dimensions I executed in 1957 some works which were in two dimensions and kinetic, and in which I used the square as the usual element in the compositions. Now this square within the space has become a cube. The harmonic properties of the cube lead me into composition of a purely mathematical nature. They lead also toward an understanding of the problem of light which I am investigating. Joined to a surface by one edge, six sides of the cube are free. According to the incidence of light, one face of the cube reflects it with a greater intensity than three others which have varying reduced values, and the colour is placed on the two faces directed towards the plane. The colour on the internal face of the cube, attached to the plane, creates reflections on its surface and radiates an atmosphere of chromatic luminosity. Colour is projected by form and **vision** becomes sensation.

After the first objects in white and black with external facets of colour, I arrived at an extensive simplification in which I used white upon white. These objects without any black or colour which is directly visible operate in a climate of spirituality generated by the colour which is reflected.

The impressionists captured an atmosphere by transposing it on to the canvas. In the objects with which I work an equivalent effect is produced in concrete terms.

The function of light is resolved into a fundamental aspect of the work and this makes it an ever-changing object. According to the time of day, the incidence of light and the spectator's changing viewpoint, the objects are transformed. The sun, or a natural light, gives the ideal illumination to appreciate the endless variations of these dimensional objects. The shadows projected by the elements appear to have colour, translucence and movement. **Movement** originates not only in the changing viewpoint of the spectator but more particularly in the intensity and movement of light itself. My investigations are carried out within the field of concrete art. My point of departure is to be found within the work of Mondrian in particular, a master whom I admire and who toward the end of his life opened up new directions.

When he replaced the black rules on his canvases with lines of colour, later broken into parts and loosened, as in the Boogie-Woogie series, did not this also imply a kinetic use of the picture plane?

My **objects** unite within a single **plastic** expression both sculpture and painting, and leave open their eventual integration with the architectural environment.

1965

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MAX BILL

Structure as Art? Art as Structure?

One can consider art to be essentially identifiable as invention. The invention of means of expression: the first thrust into realms which contain as yet unknown aesthetic and formal possibilities.

That is the sense in which art presupposes something novel. The newness of the idea, newness of the themes, newness of the form. This kind of newness can be achieved in two ways: (a) in an individual way—which has its origin in the intellectual and psychological make-up of the artist; (b) in a more general way—which bases itself on experimenting with objective possibilities of form. In an extreme case (a) will lead to << art informel >> or to a neo-dadaistic combination of materials; (b) leads to structure. On the one hand: materials in their <<natural>> condition, individually interpreted. On the other: tectonic laws which ultimately are schematically applied in a uniform distribution.

Even though amorphous material can be considered to posses an inner configuration—a structure of its own—in its natural condition, we can eliminate this kind of structure from our consideration, for as an inherent structure it is not accessible to aesthetic or visual arguments, either in painting or in sculpture.

Tectonic laws are altogether different. They are accessible to aesthetic arguments for they are principally laws of order, and in the end art = order. In other words, art is neither a surrogate for nature, nor for individuality, nor for spontaneity. And where it appears as such, it is art only insofar as it informs the surrogate with order and form. Because order is so characteristic of art, art begins to rely for order on the tectonic laws.

Now the question arises as to what a tectonic law, a law of order, as we know it in science, means with respect to art. That is, where does structure end and art begin?

Let us start with the extreme case: a plane is covered with a uniform distribution in the sense in which this is understood in statistics; or a uniform network extends into space. This is an order which could be uniformly extended without end. Such an order we here call a structure. In a work of art, however, this structure has its limits, either in space or on the plane. Here we have the basis for an aesthetic argument in the sense that a choice has to be made: the possible, aesthetic feasible extension of the structure. Actually, it is only through this choice to limit the arbitrarily extensible structure on the basis of verifiable arguments that a discernible principle of order becomes comprehensible.

But is a choice, or the setting of limits, sufficient for the creation of a work of art? This question arises mainly because, since the radical attempt to dispense with all individualistic stylistic expression beginning with Mondrian, no reduction can be extreme enough. This also arises because the aesthetic information offered by the means of expression is dwindling sharply: *neither locatable nor measurable, neither expressing nor indicating an order:* producing a neuter with aesthetic pretensions. The aesthetic quality is beginning to withdraw into the most extreme reductions, into the most extreme objectivity, culminating ultimately in the negation of newness and of invention.

But invention always presupposes the discovery of new problems. The discovery of these new problems is individually determined. Art is unthinkable without the effort of the individual. Order on the other hand is impossible without an objectifying structure.

This means that art can originate only when and because individual expression and personal invention subsume themselves under the principle of order of the structure and derive from it a new lawfulness and new formal possibilities.

Such lawfulness and such inventions manifest themselves as rhythm in an individual case. Rhythm transforms the structure into form; i.e. the special form of a work of art grows out of the general structure by means of a rhythmic order.

1965

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FRANÇOIS MORELLET

Groupe de Recherche d'Art Visuel
(The Visual Art Research Group)
Founded: Paris 1960
Members: Hugo Rudolfo Demarco, Francisco García Miranda, Horacio García Rossi, Julio Le Parc, Francis Molnar, François Morellet, Sergio Moyana Serrantes, Francisco Sobrino, Joel Stein, Jean-Pierre Yvaral
Disbanded: 1968

The choice in present-day art

It is said that the photographers came just in time to replace the painters who no longer 'wished' to represent nature. If this isn't really correct, one can nevertheless say that photography has certainly hastened the progress of artists towards a non-naturalistic art.

The same process is going on at the present moment vis-à-vis choice. One sees more and more artists who, in making works of art, refuse this arbitrary choice every time, when there are increasingly improved machines and electronic brains appearing which could replace a great part of the artist's work.

How is it one has sought to reduce this free choice which was looked upon as the greatness of modern art? Also, how has one arrived at this idea of the free artist who chooses the place and colour of each brush-stroke in order to obtain a definitive work where nothing could be added or taken away?

To answer these questions, let us try to distinguish the different categories of choice. One can, quite arbitrarily, distinguish three of them.

1. Deliberate and conscious choice. The decision follows a period of reflection where possible developments of actions are imagined, which will follow this decision. This choice corresponds to the classic idea of rational intelligence.

2. Unconscious and intuitive choice. The decision is taken without the subject's consciousness operating. This unconscious decision will not be the outcome of chance but will answer the subject's profound inclinations. This ability to take decisions, to choose without being aware of it, would be the main quality of great artists and even great scientists, according to the traditional conception springing from romanticism.

3. The cybernetic choice. Machines, thanks to their memory and their ability to face up to different possibilities, determine the choice. This choice, then, needs nothing further for its fulfillment than supplying the machines (programming) in a theoretically objective manner.

One can roughly recognise these three categories in the historical evolution of the plastic arts from the end of the eighteenth century to the present-day.

The naturalistic painters, in order to achieve an objective vision of reality and to reach a more and more perfect imaginary state, owed it to themselves to achieve a considered and conscious choice in their means of creation. They tried different methods, rejecting the least effective.

At the end of the nineteenth century the best artists abandoned their social role as narrators, chroniclers, and reporters to the photographers. In doing this they abandoned all the technical constraints that reproducing nature made necessary. Thus they took the path which opened into unlimited freedom. Little by little each brush-stroke was made only through the artists' choice, and with no other constraints.

But can this choice really be made with each brush-stroke?

a. Some artists have believed so. Abstract painting, which could be said to have begun in a pure state

with Kandinsky's first watercolour, was called in the following epochs 'automatic writing', 'action painting', etc. – each gesture resulting in a colour was decided by intuition, the unconscious justifying everything. Today, this way looks rather worn out.

b. Others have tried to replace the old constraints by pseudo-constraints considered more modern. At different times they have tried to reproduce the look of 'Negro masks', graffiti, children's drawings, commercial posters; not to mention the fake landscape or unrecognisable still-lives. These artists have regained their equilibrium.

On the one hand, the image of the free artist, the all-powerful creator-artisan was saved, and on the other, by specialising in a set of images they avoided being overcome by the vertigo of free creation in the making of their works of art.

This category of art will last for some time yet, since there is no precise limit to imagery and since it renews itself in making poetic images out of fashionable subjects.

c. At the present time, however, one senses a revulsion among certain artists from choosing one way rather than another in the development of their work. They themselves no longer subscribe to this religion which believes in the infallibility of arbitrary choice.

The meaning of Marcel Duchamp's ready-mades is a striking example of the reaction against the artist's conception of an arbitrary artisan-creator. In his discs or his urinal he has reduced the artisan element in manufacture to zero, and the range of choice in the realisation to one only (the choice of object). The hitherto little-known work of Duchamp, which was rare and precocious, partly 6accounts for the existence and success of pop art.

d. At the moment there is another reaction against this traditional conception of the artist, and particularly against works in which each detail had been finally fixed by a choice which denies all justification other than intuition.

Artists in this category refuse to repeat Duchamp's negation: but they obviously do not yet posses 'machines' allowing them to eliminate this arbitrary choice to any great extent.

They know that they are still working in a primitive way because they find themselves at the beginning of an epoch where an entirely new conception of the artist is appearing.

The four points characteristic of artists of this tendency seem to me to be:

Impersonal realisation: During the realisation of a work of art the arbitrary decisions are reduced to the minimum. For this, machines are best used. Straight away machines serving current industrial production make possible the manufacture of identical elements, which are sometimes the very basis of the work. In the distribution of these elements, as with their choice, electronic brains could in the future replace the artist's decisions, it remaining for the artist to programme the machines and fix their tasks.

Movement: Real movement does away with the fixed, immovable character of the work of art. The artist no longer imposes a right moment that he has arbitrarily chosen. Instead he suggests a series of situations which develop outside himself.

Programmed series: The same attitude but without actual movement. Each experience shows one of the possibilities of a system which is developable of itself. If a choice can be made, it will be made by the spectator.

The game: Active participation by the spectator in the creation or transformation of a work of art is the conception of 'the artist' far removed from that of the all-powerful romantic creator. The arbitrary geniuses about whom the nineteenth century created legends fade away before the active spectator.

Thus, a profound gulf now exists between the 'inspired artists' who produce works where each detail is finally fixed by a choice which denies all justification other than intuition, and the 'experimental artists' who suggest situations which become modified in space and time for the spectator and even by the spectator.

1965

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JEAN-PIERRE YVARAL

Groupe de Recherche d'Art Visuel
(The Visual Art Research Group)
Founded: Paris 1960
Members: Hugo Rudolfo Demarco, Francisco García Miranda, Horacio García Rossi, Julio Le Parc, Francis Molnar, François Morellet, Sergio Moyana Serrantes, Francisco Sobrino, Joel Stein, Jean-Pierre Yvaral
Disbanded: 1968

Aims

Our aim is to restore the primal quality of vision, by eliminating from our works all meaning foreign to them and for which they would be merely the token. This meaning can exist as a simple reality, a 'state of mind', a poetical or metaphysical message, or as the factors that contribute to a working subjectivity.

In fact it is a question of desanctifying the artist's gesture. We would like to replace those works in which creation makes itself out to be magic, for works whose essence relies on the exercise of visual perception, and the awareness of vision that the plastic artist as well as the spectator can have.

In short, it is up to us to free 'the eye from the spirit', by eliminating all extra plastic criteria.

For some of us, the work constitutes the substance of a game which abides by its own rules. The spectator is drawn into an active participation, whether he has to shift his position or manipulate the work.

This call for the positive participation of the spectator shows among other things our deliberate refusal to impose an unequivocal and definitive meaning on a work. This is a way of de-mystifying the traditional idea of creation. The artist supplies nothing but the rules and the substance of the 'game', taking for granted that the spectator can always improvise new rules.

For those like myself who are more concerned with research into structure, the aim is not directly to invite the spectator to play. It is a question of enriching the awareness the spectator may have of the real nature of visual perception. In fact what I myself hope for is that when confronted with a work whose meaning remains ambiguous, the spectator should analyse the relation between reality and what is seen, in all its diversity, and arrive at a more complete control over the workings of his own vision. This 'possibility' of determining at the same time the theoretical and technical processes of visual effects is, in my opinion, of prime importance. This double process is usually only made possible by the relative simplicity of the problem's particulars, and the economy of means with which we are able to solve them. This seems to me to be the main condition through which the spectator comes in contact with the domination of the sense of visual effect which originally fascinated him. My aim is therefore experimental and pedagogic in the widest sense. However, this does not exclude recourse to the game, whenever this sharpens visual awareness.

The result of all this seems to me to be an education in visual perception itself. Separated from the work, the spectator can see in the natural as well as in the cultural environment visual effects that have previously remained unobserved.

The world is an open system of natural phenomena, and yet a system with cultural meaning. Until now it has been thought of, especially by artists, as functioning with a relatively congealed and immobile power of perception, as if man was already, and for eternity, all that he could ever become. This idea of man derives from Protagoras, who said that

'man is the measure of all things—of what is, that it is, and what is not, that it is not'.

What I attempt personally is a sort of decentralisation, by playing on the scale of variations and structural permutations in order to open out perception into new fields of investigation. This exploration, which aims to be methodical and strict, seeks to show the continuity of visual structures by turning to the different procedures that take account of the methods and techniques offered by modern scientific research. These include topology, the theory of probability, statistics, the theory of information, even cybernetics. And we can see that this research is not without analogies and affinities with modern physics, especially when it tries to prove the unity and continuity of the structure of matter.

In conclusion, we can say that the aim of our present work is to allow man not only to augment or bring out powers of perception not yet realised, but also to equip himself with the means of transforming his environment (as well as his leisure) by the different uses of the results of our research.

1965

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BRUNO MUNARI

Italian, 1907–1988

Member of the Futurist group in its latter days, and co-founder in 1948 of Arte Concreta with Gillo Dorfles, Gianni Monnet, and Atanasio Soldati

Programmed Art

The artist's job is to help his fellow men develop their understanding of the world we live in. In all the art of the past we saw a rich variety of static forms springing from the expression of nature in two or three-dimensional images. Today, however, we know that this expression of nature is not a natural convention; we realize that the world is continually being transformed by kinetic energy, that there is a structural arrangement of things that is continually modified by changes in the environment.

It is these messages, I believe, that today's artist ought to be passing on so as to increase our knowledge of the world, and make us understand certain facts which traditional artistic techniques were in no position to show us. But many avant-garde artists cling romantically to the technical preconceptions of static art, and still concern themselves with making personal demonstrations, with polemics between paintings and anti-painting, or about sculpture in motion or sculpture made of found objects. They care about the uniqueness of the work of art and its corresponding value, about personal style, as a commercial investment, about gestures, chance discoveries and artistic scandals.

All this is on the way out; it belongs to a vanished world and no longer has any prospect of establishing genuine communication with the public. In my view we now need to conduct researches with a view to re-founding a true, objective visual language, free from any personal element and aesthetic prejudice, a visual language which can naturally and intuitively communicate the dynamic factors determining our new knowledge of the world. A true visual language, that is, comparable with that which characterized old-fashioned static art in the days when it was thought of as a craft.

My own researches lie in the direction of experiment and the mastering of these new dynamic, multi-dimensional visual means of expression. Conducted as objectively as possible, they set out from scientifically established facts and from technical and psychological data concerning creation and perception. One such line of research which I began in 1954 deals with the possibility of visual communication and expression by means of polarized light, with a view to securing images whose colour transformations are according to nature and not according to somebody's personal tastes. The technical answer is to use polarizing filters, introducing colourless materials of varying stratifications between the two filters. These stratifications and thicknesses determine and define the areas of colour, while the rotation of one of the filters allows the colours themselves to be varied over the full range. Such experiments have been demonstrated in several cities, most recently in Tokyo, where they were shown at the Museum of Modern Art in 1960 to the accompaniment of specially prepared electronic music by Toru Takemitzu (the electronic sound corresponded to the colour derived from the light). A film about this experiment was made a short time ago in the Monte Olimpino studio in Milan.

Another piece of research, begun in 1959, deals with "continuous structures": objects made up of an undefined number of modular elements set in a common framework and able to fit together. The form of these objects has some affinities with concrete sculpture, but they remain fragments of an infinitely extendable scale; they can be taken to pieces, recomposed and changed, subject each time to modification by the conditions of the environment.

More complex researches began in 1945 with the creation of kinetic objects whose make-up could be varied, driven by small clockwork motors. This led to the study of artistic programming, from which the current examples of programmed art result. Such objects have no connection with other forms of kinetic art that still make use of surrealist or neo-dada effects; they are rather the result of rigorous programming, which defines their materials, form and mathematical kinetic combinations. Generally they take the shape of small viewing screens, where formal and chromatic changes can be seen as un-stable images against a neutral field, or one subject to quantitative, but not formally specified, limitations.

A work of static art calls first for a scheme, a design, a technical preparation which may be either conventional or unconventional. A work of programmed art demands an actual programme of its own, consisting first of all in the exact establishment of the message to be communicated and in the choice of means of expression, uninfluenced by aesthetic, anti-aesthetic or stylistic preconceptions; (thus use is often made of technical, scientific, physical or optical principles such as magnetic fields, optical effects, the limits of perception, colour change by addition or subtraction, virtual volumes, and so on). The motive forces – mechanical, electrical, electronic – are taken into account, and the cyclical or infinite kinetic combinations. This is where computers can be of use to predict or establish possibilities. Computers have been used in the arts in Italy (a) by Nanni Balestrini to compose the poem entitled "Tape Mark I" which was published (with technical explanations) in the *Almanacco Bompiani* for 1962; (b) by Pietro Grossi in Florence to compose algorithmic music. Such music was used for the film *Moire* which Piccardo and I made at the Monte Olimpino studio this year.

Finally comes what we may call "good design" i.e., the projection of the object, the apparatus itself or its container. The aim here is to construct an object capable of communicating visually the intuitively-perceived kinetic message. Often the object is a natural incorporation of the same idea (as good design demands); at other times it is a neutral container. The forms, colours and transformations will vary according to the selection and programming of means and materials. Thus it is not just a form or a "composition" undergoing changes (as with Calder, Tinguely, and co.) but a continual series of formal transformations. Imagine an iron sculpture being destroyed, then reduced to dust and sprinkled evenly over an aluminum surface under which magnets are agitated . . . .

Enzo Mari and I belong to no group. Group T in Milan directs its researches to constructing objects which give the spectator visual information about the continual development of forms, as seen through their transformation. Those of Group N in Padua are concerned more with objects that produce variable optical effects according to where the spectator stands. Group N goes in for

collective work, and all its objects are signed collectively with the "Group N" stamp. The "Nouvelles Tendances" movement is a mixture of more or less neo-Dada or Surrealist kinetic art (moving objects made from found elements; mechanical and casual movements) and the researches of the Paris Groupe de Recherche d'Art Visuel.

Works of programmed art have nothing in common with other forms of kinetic art where a given composition, whether strictly geometrical or strictly casual and made up from found objects, moves through space changing position but remaining a composition none the less. Programmed art of more or less purity (purity being distinguished by the absence of stylistic preconceptions, as in good design) is now being created in several parts of the world.

1966

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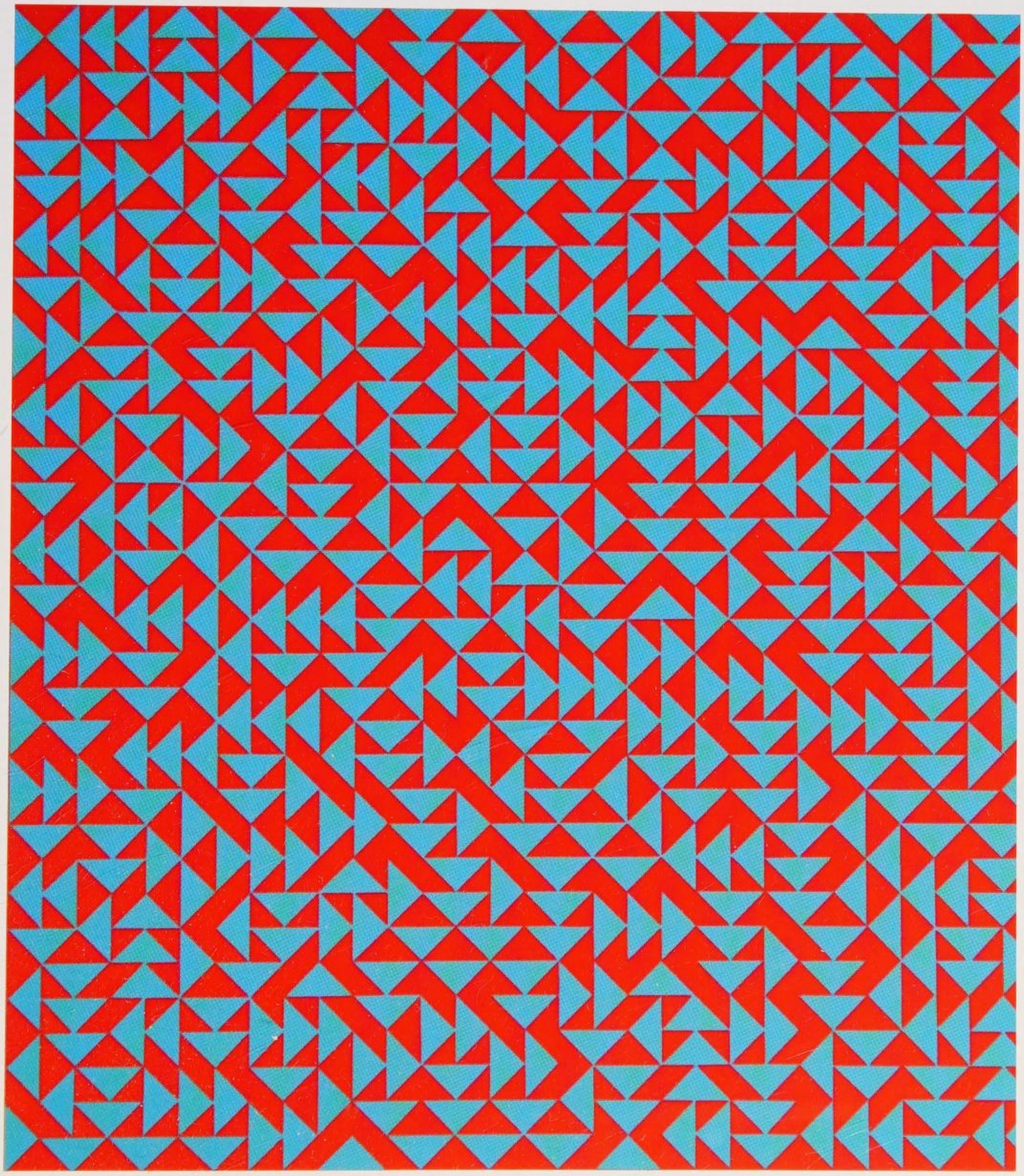
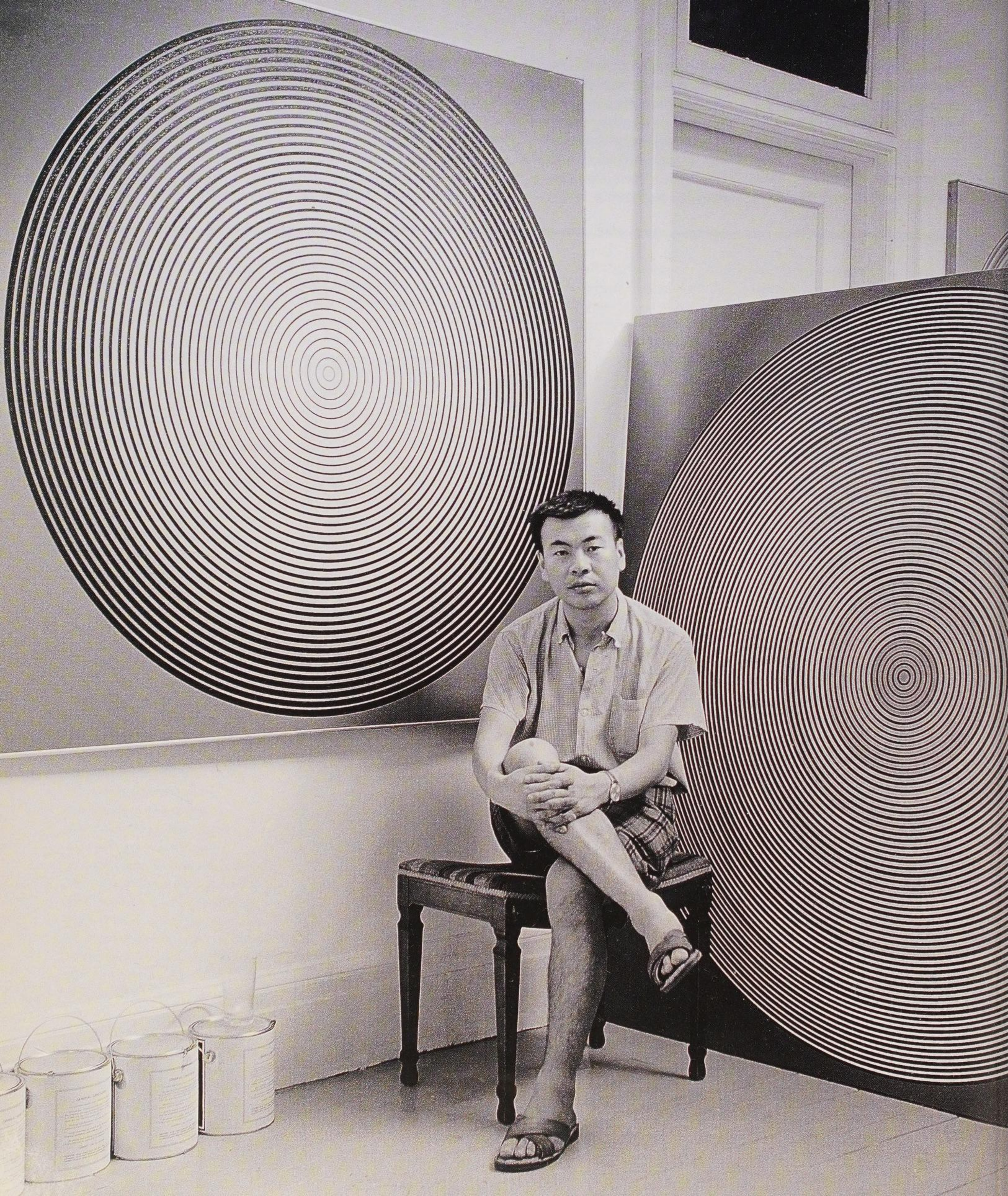


Fig. 238
Anni Albers
German, 1899–1994
C
1969
Screenprint, edn 14/15
24 x 20 in. (61 x 50.8 cm)
Private collection

© 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

(Detail on p. 164)



ARTISTS' BIOGRAPHIES

The artist biographies in this section were researched and written by Emily Allen (**EA**), Elizabeth Page Auer (**EPA**), Kellie M. Morgan (**KM**), Janelle M. Hallett (**JMH**), Joe Houston (**JH**), and Karli R. Wurzelbacher (**KW**).

YAACOV AGAM

1928–

Yaacov Agam (Gibstein) was born in Rishon LeZion, Israel (then Palestine), a southern suburb of Tel Aviv, the son of an orthodox rabbi and scholar. Growing up without any formal education and with little contact with children his age, he often turned to art for recreation. His Israeli heritage was the vessel for much of his artistic expression. Agam was primarily self-taught until he enrolled in the Bezalel Academy of Art, Israel's national art school. In 1949, he left Bezalel and moved to Zurich, Switzerland, where he interacted with important artists who would shape his aesthetic approach. He studied under Johannes Itten, a former teacher at the Weimar Bauhaus, and met Max Bill, whose theories on relationships between mathematics and aesthetics would later influence him. In 1951, he settled in Paris. During the 1950s, Agam moved away from his geometric abstract style and became a pioneer of kinetic art. In the early part of the decade, he created "polyphonic paintings," in which he experimented with multiplicity of form and content. This style made its debut at the Parisian Galerie Craven in 1953, at Agam's first one-man show.

In the 1960s, Agam experimented with applying his theories of multiplicity and endless transformation to other realms, including sculpture, theater, and writing. In the 1970s, he focused on geometric abstraction and introduced religious symbolism in his work. Agam had one-man shows at the Solomon R. Guggenheim Museum, New York; Tel Aviv Art Museum, Israel; and Centre Georges Pompidou, Paris. Museums including the Museum of Modern Art, New York; The Metropolitan Museum of Art, New York; Hirshhorn Museum and Sculpture Garden, Washington, D.C.; and Columbus Museum of Art, Ohio, hold Agam's work in their permanent collections. **KM**

JOSEF ALBERS

1888–1976

Josef Albers was born in Bottrop, Germany. In 1908, he earned his teaching certificate. After studying lithography, drawing, and stained-glass making from several instructors, in 1920 Albers enrolled in the Weimar Bauhaus and studied under color theorist Johannes Itten. Two years later, he joined the faculty to teach an introductory course, and in 1925 he married artist Annaliese Fleischmann. In 1930, he became assistant director of the Dessau Bauhaus. Albers moved to the United States in 1933 and became head of the art department at Black Mountain College, in North Carolina, where he taught for sixteen years. He accepted a position at Yale University, serving as the chairman of the Department of Design from 1950 to 1958, and remained as a visiting professor until 1960. He also taught at a number of other universities, including the University of Mexico, Pratt Institute, Cincinnati Art Academy, and Harvard University.

A designer, painter, and writer, Albers produced a varied body of work early in his career. In 1949, he began the series *Homage to a Square* (figs. 132, 144), which vigorously explores the perceptual effects of color relationships. His first one-man exhibition in the United States took place at the Sidney Janis Gallery in New York in 1952. Yale University Art Gallery held a retrospective of his work in 1956, and the Stedelijk Museum in Amsterdam mounted one in 1962. In 1963, Albers published a work on color theory, *Interactions of Color.* Two years later, he participated in *The Responsive Eye* (The Museum of Modern Art, New York, 1965).

In 1971, Albers became the first living artist to have a retrospective at the Metropolitan Museum of Art, New York. He received thirteen honorary degrees. His works can be found in museums around the world, including the Hirshhorn Museum and Sculpture Garden, Washington, D.C.; Solomon R. Guggenheim Museum, New York; The British Museum, London; and Museo de Arte Contemporaneo de Caracas, Venezuela. Josef Albers died in New Haven, Connecticut. **KW**



ANNI ALBERS

1899–1994

Anni Albers (née Annaliese Fleischmann) was born in Berlin, Germany. From 1916 to 1919, she studied painting with Martin Brandenburg and then attended the School of Applied Arts in Hamburg. In 1922, she enrolled at the Weimar Bauhaus where she joined the weaving workshop, and in 1925 she married fellow Bauhuas artist Josef Albers. In 1929, she received her Bauhaus diploma for designing a sound-absorbing, reflecting cellophane wall covering. She moved to the United States in 1933 and began teaching at Black Mountain College, North Carolina, where she remained for sixteen years. *On Design,* a compilation of her writings, was published in 1959, and *On Weaving* followed, in 1965.

Her œuvre consists of wall hangings and wall coverings, weavings, and tapestries that highlight the structure, texture, and surface qualities of her chosen materials. In 1947, she began integrating representational elements into her pieces. Primarily known for her

work with textiles, Albers experimented with lithography and jewelry-making and completed diverse commissions, including a curtain for a theater, ark panels for synagogues, and bedspreads and room dividers for Harvard dormitories. In 1970, she abandoned weaving to focus on printmaking.

Albers was the first weaver to have a solo exhibition at the Museum of Modern Art in New York with the exhibition *Anni Albers Textiles* (1949), organized by Philip Johnson. Her work was also shown at the Kunstmuseum, Düsseldorf (1975); Bauhaus Archiv, Berlin (1975); and Brooklyn Museum of Art, New York (1977).

Her work is represented in the permanent collections of the Museum of Modern Art, New York; National Gallery of Art, Washington, D.C.; Cooper Hewitt National Design Museum, New York; Tate, London; and Smithsonian American Art Museum, Washington, D.C. In 1961, she received the American Institute of Architects' Craftsmanship Medal, and in 1981 the American Craft Council's gold medal. The Renwick Gallery, Washington, D.C., mounted her retrospective in 1985. Anni Albers died in Orange, Connecticut.

KW

GETULIO ALVIANI

1939–

Getulio Alviani was born in Udine, Italy. At an early age, he became interested in art and fascinated by problems of perception and construction. In 1954, he apprenticed in a sculptor's studio. He then worked in architecture and engineering offices. In 1961, the Mala Galerija in Ljubljana held his first one-man exhibition. The following year, Alviani created black-and-white designs for silkscreen prints that were used to produce Op fabrics for fashion design.



He participated in *Mouvement* (Galerie Denise René, Paris, 1964), *Art Today* (Albright-Knox Art Gallery, Buffalo, New York, 1965), *Lumière, Mouvement, Optique* (Palais des Beaux Arts, Brussels, 1965), *The Responsive Eye* (The Museum of Modern Art, New York, 1965), *Art of the Space Age* (Peter Stuyvesant Art Foundation, Art Center, Johannesburg, 1966), and *Mouvement* (Museum of Contemporary Art, Montreal, 1967).

Alviani bases his work on the ideas of perceptual refinement and scientific precision. In the 1950s, he created surfaces with seemingly vibrating textures that continuously change in relation to the viewer's position. In the late 1960s, the artist explored wall constructions and their relationship to architecture and space. In 1967, his work was concerned with atmospheric elements, including humidity and vapor, that affect perception. Since the 1970s, he has been experimenting with color and chromatic phenomena.

Alviani was instrumental in promoting Constructivist art when he served as the director of the Museum of Modern Art in Ciudad Bolivar, Venezuela, from 1981 to 1985, where he advanced the work of experimental artists and promoted concrete art. His work is represented in collections worldwide, including the Albright-Knox Art Gallery, Buffalo; Muzeum Sztuki, Łódź, Poland; Victoria and Albert Museum, London; The Museum of Modern Art, New York; Museum of Modern Art, Montreal; Museum of Modern and Contemporary Art, Zagreb; and Columbus Museum of Art, Ohio. Getulio Alviani currently focuses on architectural projects and curates exhibitions of visual and concrete art.

KW

EDNA ANDRADE

1917–

Edna Andrade was born in Portsmouth, Virginia. She received her BFA from the Pennsylvania Academy of the Fine Arts and the University of Pennsylvania in 1937, and pursued post-graduate study at the Pennsylvania Academy of the Fine Arts until 1938. Influenced by Paul Klee,



Josef Albers, and Piet Mondrian, and inspired by Michel-Eugène Chevreul's color theory, Andrade created works featuring hard-edged geometric and illusionary patterns. She worked under Eero Saarinen for the Office of Strategic Services in the Visual Presentation Division during World War II designing charts, maps, and graphs. In addition to painting, Andrade undertook a variety of projects, including assisting in the renovation and redesign of three restaurants, creating designs for jigsaw puzzles, and designing pavement patterns for the Philadelphia Free Library. From 1957 to 1972, she was a professor of art at the Philadelphia College of Art, and also taught at Temple University. The Op Art shows that Andrade participated in include *The Deceived Eye* (Fort Worth Art Center, Texas, 1965), *Art with Optical Reaction* (Des Moines Art Center, Iowa, 1965), and *Optical Painting* (Philadelphia Art Alliance, Pennsylvania, 1965).

Her later work demonstrates her ongoing interest in color interaction and perception. Most recently she has focused on delicate graphite drawings of the rocky coast of Maine, harkening back to her prewar figurative work. Retrospective surveys of her œuvre were held in 1993 at the Pennsylvania Academy of the Fine Arts, Philadelphia, and in 2003 at the Institute of Contemporary Art in Philadelphia, Pennsylvania. Edna Andrade's work is represented in such collections as the Albright-Knox Art Gallery, Buffalo; Baltimore Museum of Art, Maryland; Chrysler Museum of Art, Norfolk, Virginia; Philadelphia Museum of Art, Pennsylvania; and Columbus Museum of Art, Ohio. She resides in Philadelphia, Pennsylvania.

KW

RICHARD ANUSZKIEWICZ

1930–

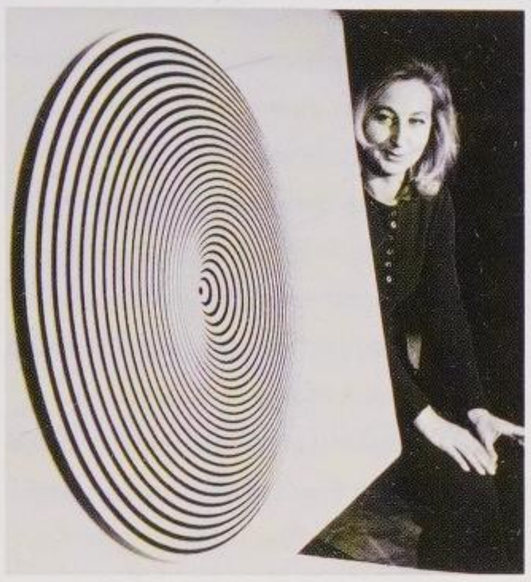
Richard Anuszkiewicz was born in Erie, Pennsylvania. In 1948, he began five years of study at the Cleveland Institute of Art. Following graduation, he attended Yale University School of Art and Architecture, where he studied under Josef Albers. In addition to the impact of Albers, Anuszkiewicz was influenced by the work of Paul Klee and psychological perception theorists. After gaining his master's degree from Yale University in 1955, Anuszkiewicz obtained a degree in education from Kent State University and started teaching at Cooper Union in New York in 1963. He was later artist in residence at Dartmouth College and Cornell University, among other institutions.

Anuszkiewicz is known for his paintings that stress sensation over expression, incorporate mathematics and science, and explore the effects of complementary colors and juxtapositions. In addition to painting, Anuszkiewicz has worked on designs for objects as varied as fur coats, gift wrapping, and rugs. His work was featured in *Geometric Abstraction in America* (Whitney Museum of American Art, New York, 1962). He participated in *The Responsive Eye* (The Museum of Modern Art, New York, 1965), *Kinetic and Optic Art Today* (Albright-Knox Art Gallery, Buffalo, New York, 1965), and *Art and Movement: Optical Art and Kinetics* (Museum of Tel Aviv, Israel, 1965).

Anuszkiewicz's first major solo exhibition was organized in 1966 by the Cleveland Museum of Art, Ohio. His work is represented in the collections of



the National Gallery of Art, Washington, D.C.; Hirshhorn Museum and Sculpture Garden, Washington, D.C.; Tate, London; and Columbus Museum of Art, Ohio. In 1977, he had one-man shows at the Berkeley Art Museum, California, and the Columbus Museum of Art, Ohio. Richard Anuszkiewicz resides in Englewood, New Jersey. **KW**



MARINA APOLLONIO

1940–

Marina Apollonio was born in Trieste, Italy. The daughter of art critic Umbro Apollonio, she grew up in a stimulating artistic environment. After studying at the Accademia di Belle Arti in Venice under Giuseppe Santomaso, Apollonio became particularly interested in kinetic art and the visualization of objects that appear to be in motion. She was also influenced by the aesthetic of the Bauhaus. Apollonio's work is often executed in black and white, and features grids, swirling lines, and concentric circles that create illusions and optical distortions. She became involved with the New Tendency group in Zagreb in 1965. Her works were featured in numerous shows, including *Aktuell 65* (Galerie Aktuell, Bern, 1965), *Op – Pop* (Galerie D, Frankfurt, 1966), and *Public Eye* (Kunsthaus, Hamburg, 1968). Recently, she has participated in *Il mito della velocità. L'art del movimento* (Casa del Mantegna, Mantua, 2003) and *L'oeil moteur: Art optique et cinétique, 1950–1975* (Musée d'Art Moderne, Strasbourg, 2005). She has worked for architects in Venice and Paris and as a graphic designer. Her work is represented in the Solomon R. Guggenheim Foundation, Venice; The Museo d'Arte Moderna, Turin; The National Museum, Poznan; and the Progressive Museum, Basel. Marina Apollonio currently resides in Italy. **JMH**

HANNES BECKMANN

1909–1977

Hannes Beckmann was born in Stuttgart, Germany. He studied at the Dessau Bauhaus in 1928 with Vassily Kandinsky, Josef Albers, and Paul Klee. In 1932, Beckmann traveled to Vienna, where he studied photography for two years. In 1934, Beckmann relocated to Prague, serving as the director of a photography studio. At the end of World War II, he was briefly interned in a concentration camp for joining the Resistance. He immigrated to the United States in 1948 and became the director of the photographic department at the Solomon R. Guggenheim Museum, New York. In 1952, Beckmann began his teaching career at the Cooper Union in New York, where he taught until 1970, when he took a position at Dartmouth College, Hanover, New Hampshire.

In 1965, Beckmann contributed to *The Responsive Eye* (The Museum of Modern Art, New York, 1965). His work is in the collections of the Museum of Fine Arts, Boston and the Newark Museum, New Jersey. He was a professor at Cooper Union, Yale University, and Dartmouth. Hannes Beckmann died in Hannover, New Hampshire. **EA**

LARRY BELL

1939–

Larry Bell was born in Chicago, Illinois. He studied at the Chouinard Art Institute in Los Angeles from 1957 to 1959. He initially created geometric paintings, but in the mid-1960s he began making glass cube sculptures that dealt with light reflection and refraction.

Bell continues to concentrate on the effects of light on glass, but also creates mixed media and large installation pieces. He has been featured in such exhibitions as *The Responsive Eye* (The Museum of Modern Art, New York, 1965), *Contemporary Sculpture and Prints* (Whitney Museum of American Art, New York, 1966), *The 1960s* (The Museum of Modern Art, New York, 1967), *Spaces* (The Museum of Modern Art, New York, 1969), and *Geometric Abstraction and Minimalism in America* (Solomon R. Guggenheim Museum, New York, 1989). Larry Bell lives and works in Taos, New Mexico, and also maintains a studio in Venice, California. **EPA**

KARL BENJAMIN

1925–

Karl Benjamin was born in Chicago, Illinois. He began college at Northwestern University in 1943. After serving in the military, he resumed his education at the University of Redlands in 1946 and graduated in 1949. He taught in elementary public schools for more than twenty-nine years, retiring in 1977. Two years later, he became a professor at Pomona College and taught at the Claremont Graduate School until 1994.

Benjamin began painting in 1951, developing a hard-edge, systematic style that incorporated geometric forms, patterns, and intense color. The Pasadena Art Museum held a one-man exhibition of his work in 1954. He participated in *Four Abstract Classicists* (Los Angeles County Museum of Art, California, 1959) with Lorser Feitelson, Frederick Hammersley and John McLaughlin, and *Purist Painting*, organized by the American Federation of Arts, New York, in 1960, which traveled



to the Columbus Museum of Art, Ohio. His work was represented in *Geometric Abstraction* (Whitney Museum of American Art, New York, 1962) and *The Responsive Eye* (The Museum of Modern Art, New York, 1965). The National Endowment for the Arts awarded him two grants, one in 1983 and the other in 1989. Karl Benjamin's work is held in such collections as the Denver Art Museum, Colorado; Los Angeles County Museum of Art, California; Museum of Modern Art, Israel; Norton Simon Museum of Art, California; Seattle Art Museum, Washington; and Whitney Museum of American Art, New York. **KW**

ERNST BENKERT

1928–

Ernst Benkert was born in Chicago, Illinois. In 1948, after his discharge from the army, he entered Harvard College and earned his degree in art history. In 1958, Benkert began a teaching fellowship at Oberlin College, where he met Francis Hewitt and Ed Mieczkowski, with whom he would later form the Anonima group in 1960. Shortly after 1959, he moved to East Hampton, New York, where he also befriended Donald Judd, a fellow teacher. In 1962, Anonima had its first group show in Cleveland, followed by shows in New York and Paris (Galerie Denise René) in 1964. The following year, the group exhibited at *The Responsive Eye* (The Museum of Modern Art, New York); *Nova Tendencija 3* (Zagreb, Croatia); and at Martha Jackson Gallery, New York. The late 1960s and early 1970s were rich with Anonima exhibitions. In 1966, Benkert began his long teaching career at the Pratt Institute in Brooklyn. Throughout the 1980s, Benkert received many fellowships and grants, including the New York State Creative Artists Public Service award for drawing, the Gramercy Foundation grant, the National Endowment for the Arts grant for drawing, and the Pollock–Krasner grant. In the late 1990s, Benkert started "Fone Art," by faxing a series of drawings to friends.

Permanent collections that include Benkert's works are the Albright-Knox

Gallery, Buffalo, New York; Fleming Art Museum, University of Vermont, Burlington, Vermont; Gray Art Gallery, New York University, New York; Tel Aviv Art Museum, Israel; and Louisana Museum, Denmark. Ernst Benkert currently resides in Brooklyn, New York.

KM

MAX BILL

1908–1994

Max Bill was born in Winterthur, Switzerland. From 1924 to 1927, he was apprenticed to a silversmith and studied at the Kunstgewerbeschule, Zurich. The following two years, he attended the Dessau Bauhaus, where he studied architecture, metalwork, stage design, and painting. He studied under Josef Albers, Wassily Kandinsky, and Paul Klee. In 1931, Bill was the co-founder and director of the College of Design in Ulm. He founded the Institute of Progressive Art in 1947 and co-founded the Hochschule für Gestaltung, Ulm, in 1950. From 1967 to 1974, he served as a professor of environmental design at the State Institute of Fine Arts, Hamburg.

Bill worked as a painter, sculptor, graphic designer, industrial designer, and architect. Because of his architectural background, his paintings feature simple planes, geometric designs, and planned color juxtapositions. His austere, geometric sculptures are characterized by an elegance of line and form. A mathematical basis underlies all of his work. He is most often associated with concrete art, and he organized the first international exhibition of concrete art in 1944 in Basel. He participated in such exhibitions as *Konkrete Kunst* (Helmhaus, Zurich, 1960), *Pittsburgh International Exhibition of Contemporary Painting and Sculpture* (Carnegie Institute, Philadelphia, 1961), *The Responsive Eye* (The Museum of Modern Art, New York, 1965), and *Weiss auf Weiss* (Kunsthalle, Bern, 1966).

His work is held in the collections of museums worldwide, including the Vancouver Art Gallery, British Columbia; Museum of Contemporary Art, Zagreb, Croatia; Kunstmuseum Basel, Switzerland; Museu de Arte Moderna, Rio de Janeiro, Brazil; The Museum of Modern Art, New York; and Columbus Museum of Art, Ohio. Max Bill died in Berlin.

JMH

FRANCIS CELENTANO

1928–

Francis Celentano was born in New York. He received his master's degree from the New York University Institute of Fine Arts in 1957. He studied at the Academy of Fine Arts in Rome in 1958 on a Fulbright Fellowship. In 1966, Celentano moved to Seattle and became a professor of painting at the University of Washington, where he developed an interest in color theory. Celentano contributed to *The Responsive Eye* (The Museum of Modern Art, New York, 1965). In 1992, the Whatcom Museum of History and Art, Bellingham, Washington, presented a retrospective of his work. Celentano's pieces are now included in a number of museum collections, including the Museum of Modern Art, New York; Seattle Art Museum, Washington; Albright-Knox Art Gallery, Buffalo, New York; and Stedelijk Museum, Amsterdam. He has received commissions from institutions throughout the United States to create murals and installations. Celetano resides in Seattle, Washington.

EA

TONI COSTA

1935–

Toni Costa was born in Padua, Italy. With ten others, he founded the Kinetic Art collective Gruppo N in 1959, and remained a member of the group until it dissolved in 1965. The group opened a gallery called Studio N in 1960 and was instrumental in the development of Op Art in Italy. As a group, they exhibited anonymously at *Nove Tendencije* (Zagreb, 1961), *Nove Tendencije 2* (Zagreb, 1963), and *Nouvelle Tendance* (Musée des Arts Décoratifs, Paris, 1964). They issued manifestos and produced immersive and interactive art concerned with optics.

KW



CARLOS CRUZ-DIEZ

1923–

Carlos Cruz-Diez was born in Caracas, Venezuela. He graduated from the School of Fine Arts, Caracas, in 1945. He was director of the Venezuelan branch of the McCann Erickson Advertising Agency from 1946 to 1951. Afterward, he taught typography and was an illustrator for *El Nacional*. He moved to Spain in 1955. On his return to Venezuela, he taught design at Central University from 1958 until he moved to Paris two years later. Cruz-Diez's work places much emphasis on color relationships; his early optical works called *Physichromies* and *Transchromies* include shifting colors and geometric forms that depend on the viewer's vantagepoint. His use of color interaction was greatly influenced by Albers and Georges Seurat.

Cruz-Diez's first solo show was held at the Museo de Bellas Artes, Caracas in 1955. He won the International Painting Prize at the São Paulo Bienalle in 1967 and showed work in numerous exhibitions around the world, including *The Responsive Eye* (The Museum of Modern Art, New York, 1965) and *Forty Years of Modern Art: 1945–1985* (Tate Gallery, London, 1985). In the 1970s Cruz-Diez began creating monumental architectural installations using the principles of his *Physichromies* as a structural element. His work is housed in the Irish Museum of Modern Art, Dublin; Museu de Arte Moderna, Rio de Janeiro; and Muzeum Sztuki, Łódź, Poland. Carlos Cruz-Diez lives in Paris.

EPA

BEN CUNNINGHAM

1904–1975

Ben Cunningham was born in Cripple Creek, Colorado, and raised in Reno, Nevada. While growing up, Cunningham played jazz trumpet and illustrated his high school yearbook. He briefly attended the University of Nevada to study architecture. In 1925, he enrolled at the California School of Fine Arts (today San Francisco Art Institute), where he studied intermittently over the course of three years. In 1934, the Works Progress Administration commissioned him to paint murals in San Francisco's Coit Tower, and he became the supervisor of mural painting for the Northern California area. In 1939, Cunningham traveled to Paris, but returned to San Francisco with the onset of World War II and worked as a naval architect. At the conclusion of the war, he moved to New York. He began a twenty-five-year teaching career at the Newark School of Fine and Industrial Arts in New Jersey. He later taught at Cooper Union with Hannes Beckmann and the Art Students League.

Stimulated by the discovery of the Wilhelm Ostwald color system, Ben Cunningham completed some of his first major pieces concerned with perception and color as early as 1948. His first one-man show was held in New York at Castellane Gallery in 1963. His work was included in *The Responsive Eye* (The Museum of Modern Art, New York, 1965), and is represented in the collections of the Smithsonian American Art Museum, Washington, D.C.; The Museum of Modern Art, New York; and Brooklyn Museum, New York. Ben Cunningham died in New York.

KW

GENE DAVIS

1920–1985

Gene Davis was born in Washington, D.C. He was a career journalist from 1939 to 1969, working as a sports reporter and then as a White House correspondent. In 1949, he pursued his interest in painting. Davis found inspiration visiting the Phillips Collection in Washington, where he encountered

works by Paul Klee, Arshile Gorky, and the Impressionists, and was fascinated by their innovative uses of color. He befriended the artist and curator Jacob Kainen and became associated with the Washington Workshop Center for the Arts. Through the organization, he met Morris Louis, Kenneth Noland, and Thomas Downing.

Davis produced paintings of colored vertical stripes arranged rhythmically and intuitively, rather than by formula or theory, to explore the effects of color interaction. His first solo exhibitions took place in 1952. In 1969, he began teaching at the Corcoran School of Art and Design, and he later taught at American University, Skidmore College, and the University of Virginia.

Davis participated in *Post Painterly Abstraction* (Los Angeles County Museum of Art, California, 1964), *The Responsive Eye* (The Museum of Modern Art, New York, 1965), *Washington Color Painters* (Washington Gallery of Modern Art, Washington, 1965), *Primacy of Color* (Portland Art Museum, Oregon, 1965), *Color, Image, and Form 1967* (Detroit Institute of the Arts, Michigan, 1967) and *The Structure of Color* (Whitney Museum of American Art, New York, 1971). Works by Davis are included in the collections of the Hirshhorn Museum and Sculpture Garden, Washington, D.C.; Smithsonian American Art Museum, Washington D.C.; National Gallery of Art, Washington, D.C.; Philips Collection, Washington D.C.; and Walker Art Center, Minneapolis, Minnesota. When Gene Davis died, the Smithsonian American Art Museum, Washington, D.C., presented a memorial exhibition in his honor. **KW**

THOMAS DOWNING

1928–1985

Thomas Downing was born in Suffolk, Virginia. In 1950, after graduating from Pratt Institute in New York, he received a grant from the Virginia Museum of Fine Art to study in Europe. Shortly after returning, he settled in Washington, D.C., to teach at Catholic University. In 1954, he met Kenneth Noland, who had a profound influence on his work. By 1956, Downing had established himself as a key member of the Washington, D.C., art community. He had his first one-man show at Washington Workshop Center for the Arts in 1959. That year, Downing, along with Howard Mehring and Betty Pajac, founded Origio, a cooperative art gallery in Washington. In the 1960s, Downing was featured in several major group exhibitions, including the famous *Post Painterly Abstraction* (Los Angeles County Museum of Art, California, 1964) curated by Clement Greenberg. From the mid-1960s to the mid-1970s, he taught at the New School of Visual Arts, New York; The Corcoran School of Art and Design, in Washington, D.C.; and briefly at the University of Houston.

Downing is most commonly associated with the Washington Color School, which included Morris Louis, Kenneth Noland, and Gene Davis. Because of his belief that color and shape (particularly the circle) were central elements of painting, he is frequently referenced in conversations about Op Art. Downing's works are housed in many collections including the Whitney Museum of Modern Art, New York; Hirshhorn Museum and Sculpture Garden, Washington, D.C.; and Norton Simon Museum, Pasadena, California. Thomas Downing died in Providencetown, Massachusetts. **KM**

SALLY HAZELET DRUMMOND

1924–

Sally Hazelet Drummond was born in Evanston, Illinois, and raised in Louisville, Kentucky. She attended Rollins College, Winter Park, Florida, from 1942 to 1944. She then enrolled at Columbia University, where professor John Heliker encouraged her to explore the work and thought of artists as diverse as Paul Klee and John Cage. She graduated from Columbia in 1948 and continued her education at the Institute of Design, Chicago, in 1949. She earned her master's degree from the University of Louisville in 1952. Drummond studied in Venice on a Fulbright fellowship in 1952 and 1953. She was the recipient of a Guggenheim Fellowship in 1967. She taught at the Skowhegan School of Painting and Sculpture, Maine, in 1973.

Since 1960, Drummond's works consist of tiny, pointillist dots, densely packed and radiating outward, to create a pulsating effect. They present the viewer with an overwhelmingly perceptual, optical experience. The artist's first solo exhibition was held at the Hadley Gallery, Louisville, in 1952. Drummond participated in *Americans '63* (The Museum of Modern Art, New York, 1963), *Point* (Philadelphia College of Art, Pennsylvania, 1977), and *175th Annual Exhibition* (National Academy of Design, New York, 2000). The Corcoran Gallery of Art, Washington, D.C., presented her retrospective in 1972. Her work is represented in the collections of the Museum of Modern Art, New York; Hirshhorn Museum and Sculpture Garden, Washington, D.C.; and Metropolitan Museum, New York. Sally Hazelet Drummond lives and works in Germantown, New York. **KW**

ANGEL DUARTE

1930–

Angel Duarte was born in Aldeanueva del Camino, Spain. In 1934, his family relocated to Madrid. During his childhood, Duarte worked with his uncle, a silversmith. He also took drawing lessons, replicating the art in the collection of the Prado, Madrid. In 1954, Duarte moved to Paris to immerse himself in the artistic community. Along with several other artists, he founded Equipo 57 in May 1957. The group was committed to creating anonymous works of experimental painting and sculpture. Duarte's œuvre consists of paintings, sculptures, and serigraphs. He bases his work on theories of space and spatial interactivity, and incorporates industrial materials. He exhibited with Equipo 57 in such group shows as *Mouvement Deux* (Galerie Denise René, Paris, 1964) and *The Responsive Eye* (The Museum of Modern Art, New York, 1965). Today Angel Duarte lives and works in Switzerland. **JMH**

WOJCIECH FANGOR

1922–

Wojciech Fangor was born in Warsaw, Poland. During World War II, Fangor studied at the private studios of Tadeusz Pruszkowski and Felicjan Kowarski. In 1946, Fangor graduated from the Academy of Fine Arts in Warsaw. Fangor's earliest works were exhibited in 1949. These included portraits of such notable figures as Lenin and Einstein, which were primitive and brutal in style. From 1950 until 1955, Fangor worked in the Social Realist style. It was through monumental, propagandist posters that he gained popularity. In 1955, Fangor designed the street decorations for the fifth International Festival of Youth in Warsaw. During the 1960s, Fangor became involved with the Op Art movement. His Op Art works are characterized by vibrating and throbbing compositions of color.

After participating in *The Responsive Eye* (The Museum of Modern Art, New York, 1965), Fangor moved to the United States in 1966. He taught at Farleigh-Dickenson University, New Jersey, for twenty years. In the 1970s, Fangor's works returned to their socio-political subject matter, based on magazine and television images. Fangor also has worked with sculpture and created masks. In 1970, he became the only Pole to have a solo exhibition at the Solomon R. Guggenheim Museum, New York. He donated one hundred of his works to the Polish state in 1989. His work is represented in the collections of the San Francisco Museum of Art, California; Solomon R. Guggenheim Museum, New York; Phillips Collection, Washington, D.C.; and Denver Art Museum, Colorado. In 1999, after living in the United States for more than three decades, Wojciech Fangor returned to Poland, where he currently resides in a suburb of Warsaw. **EA**

PAUL FEELEY

1910–1966

Paul Feeley was born in Des Moines, Iowa, and grew up in Palo Alto, California. He studied with Hobart Jacobs and attended Menlo College in Atherton, California. He moved to New York in 1931 and studied at the Art Students League under Thomas Hart Benton and George Bridgeman. He also studied privately with Cecilia Beaux and finished his art training at the Beaux Arts Institute of Design. Feeley opened a commercial art studio and began teaching at the Cooper Union Art School in 1935. From 1939 onward, he taught at Bennington College in Vermont. Feeley's paintings feature simple geometric shapes in arranged patterns of contour and color.

Feeley's artwork has been featured in many shows, including *Emerging Talent* (Kootz Gallery, New York, 1954), *The Shaped Canvas* (Solomon R. Guggenheim Museum, New York, 1964), *The Responsive Eye* (The Museum of Modern Art, New York, 1965), and *Made in the Sixties* (Whitney Museum of American Art, New York, 1988). His work is represented in the permanent collections of Columbus Museum of Art, Ohio; The Museum of Modern Art, New York; and Whitney Museum of American Art. Paul Feeley died in New York.

EPA

LORSER FEITELSON

1898–1978

Born in Savannah, Georgia, Lorser Feitelson moved to New York with his family in 1904 and was painting at age twelve. He began his formal studies at age fifteen and became acquainted with many notable European and American artists. He began making kinetic art in 1913 after seeing the work of Duchamp and the Italian Futurists at the Armory show in New York. In 1926, Feitelson moved to Los Angeles, where he was quickly recognized as an important new talent working in a regionalist figurative style. Negotiating the ambiguous spatial interplay of two-dimensional color and shape, Feitelson's mature paintings firmly established his position in the



progression of postwar American abstraction. Along with such colleagues as Helen Lundeburg and John McLaughlin, Feitelson is credited as an innovator of hard-edged abstraction. In 1948, he began his signature *Magical Space Form* paintings, a series he continued until 1963.

Feitelson enjoyed critical success on a national scale at each stage of his career. He was included in many groundbreaking exhibitions, including *Four Abstract Classicists* (Los Angeles County Museum of Art, California, 1959), which codified the California school of hard-edge painting, *Geometric Abstraction in America* (Whitney Museum of Art, New York, 1962), and *The Responsive Eye* (The Museum of Modern Art, New York, 1965). Feitelson did much to support and promote awareness of contemporary art in his lifetime. Besides being influential as a teacher, he directed the first contemporary gallery in Los Angeles and for eight years hosted the popular CBS television series *Feitelson on Art*. His work is held in the permanent collections of the San Francisco Museum of Modern Art, California; Brooklyn Museum of Art, New York; and Columbus Museum of Art, Ohio. Lorser Feitelson died in California.

KW

KARL GERSTNER

1930–

Karl Gerstner was born in Basel, Switzerland. He attended the Basel School of Arts and Crafts for a year and worked as an apprentice in the design studio of an advertising agency. He started painting in 1952, his art strongly influenced by his design background. Gerstner was influenced by the legacy of Wassily Kandinsky and Marcel Duchamp, and especially by the ideas of the Bauhaus. Through the Swiss Werkbund design group, he associated with Max Bill and Alfred Roth.

In 1959, he founded the advertising firm Gerstner + Kutter, later known as GGK, with Markus Kutter. Gerstner published his first book, *Cold Art? On the Situation of Painting*, in 1957, an analysis of Constructivism. *The Spirit of Color* followed in 1981, and *The Forms of Color* in 1986. He contributed to the abstract and constructivist art magazine *Spirale* between 1953 and 1964 and designed and edited the November 1955 issue of *Werk*.

Gerstner creates two-dimensional and three-dimensional pieces that explore tonal and chromatic scales and stress the participation of the viewer. He employs algorithms to produce works with patterns and components that are limitlessly changeable. His first exhibition was held in 1957 at Club Bel Étage in Zurich. He exhibited at Galerie Denis René in 1962, and at Galerie Staempfli, New York, in 1965. Gerstner's work was included in *Konkrete Kunst* (Helmhaus, Zurich, 1960) and *The Responsive Eye* (The Museum of Modern Art, New York, 1965). He participated in the design section at the 1973 exhibition *Think Program* at the Museum of Modern Art. The Kunstmuseum, Switzerland, presented his retrospective in 1978, and the Kunsthalle, Tübingen, showed a survey of his work in 1992. Today, Karl Gerstner lives and works in Switzerland.

KW

FRANCO GRIGNANI

1908–1999

Franco Grignani was born in Pieve Porto Morone (Pavia), Italy. After studying architecture at the Polytechnic School of Turin from 1929 to 1933, he participated in the latter part of the Italian Futurist movement. In the 1930s and 1940s, Grignani worked as a graphic designer, collaborating with many important Italian artists. By the 1950s, Grignani began to develop his interest in the visual psychology of form and perception by producing works that experimented with virtual movement. In 1958, he opened his first one-man show at Crawford Gallery, London. By the 1960s, his works, with their optical illusions, distortions, moirés, and dilations, began to be consistent with the ideals of Op Art. Geometric and monochromatic, their patterns, swirls, and recessions provide a basis for Grignani's exploration of perspective. Grignani's interest in visual perception is also evidenced in his photography. Beginning in the 1920s, he experimented with light and abstract form, creating distortion, combining negative and positive images, and overprinting.

For twenty-six years, Grignani worked as the art director for *Pubblicità in Italia*, a magazine devoted to Italian advertising and visual design. He wrote essays on the arts and lectured in Italy and the United States. His 1960s logos for Woolmark were paradigmatic examples of his approach to sign design. His works are held in the Museum of Modern Art, New York; Victoria and Albert Museum, London; and Stedelijk Museum, Amsterdam. Franco Grignani died in Milan.

KM

FREDERICK HAMMERSLEY

1919–

Frederick Hammersley was born in Salt Lake City, Utah. He attended the University of Idaho from 1936 to 1938 and then studied commercial art from 1940 to 1942 at the Chouinard School of Art in Los Angeles, California. He attended the Jepson Art School, also in Los Angeles, from 1947 to 1950 on the GI Bill. Hammersley held teaching positions at several colleges. While teaching at Pomona College in Claremont, California, Hammersley met Karl Benjamin. Along with John McLaughlin and Lorser Feitelson, they participated in *Four Abstract Classicists* (Los Angeles Museum of Art, California, 1959), which identified them as the founders of the West Coast "Hard-

Edge" style. Hammersley developed a style that broke from representational art, focusing on geometric simplicity, linear precision, and purity of form and color. Through works with witty and poetic titles, he marries visual aesthetics and verbal imagery.

His work was included in *Abstract Classicists* (Institute of Contemporary Art, London, 1959), *Geometric Abstraction in America* (Whitney Museum of American Art, New York, 1962), *The Responsive Eye* (The Museum of Modern Art, New York, 1965), and *Geometric Abstraction* (University of Nebraska, Nebraska, 1974). In 1973, he was awarded a John Simon Guggenheim Memorial Fellowship, and, in 1975, he received the National Endowment for the Arts grant. The San Francisco Museum of Modern Art, California; Santa Barbara Museum of Art, California; Albuquerque Museum, New Mexico; Los Angeles County Museum of Art, California; Corcoran Museum of Art, Washington, D.C.; and Butler Institute of American Art, Youngstown, Ohio, hold examples of his work. Frederick Hammersley resides in Albuquerque, New Mexico. **JMH**

FRANCIS HEWITT

1936–1992

Francis Hewitt was born in Rutland, Virginia. From 1948 to 1954, he studied drawing under Stuart Eldredge. From 1954 to 1958, he attended the Carnegie Institute of Technology in Pittsburgh, where he met Ed Mieczkowski. Continuing his education in studio art and art history at Oberlin College from 1958 to 1961, he met Ernst Benkert. Hewitt's Masters thesis at Oberlin in perceptual psychology provided the conceptual foundation for the Anonima group, which he formed with Benkert and Mieczkowski in 1960. The group exhibited together internationally until 1970. Hewitt's work of the 1960s unites color, geometric and grid-like structure, and rational procedure. His approach to creating, as espoused by Anonima, was to dispense with the preoccupation with individual talent, and to disdain the notion of art as commodity.

From 1960 to 1964, Hewitt taught advanced painting and drawing, and developed a dimensional drawing class at the Cleveland Institute of Art. He completed his PhD in aesthetics and art history at Case Western Reserve University in 1964. He taught at Pratt Institute from 1966 to 1967, and at Cooper Union from 1965 to 1970. The remainder of his career was spent at the University of Vermont, where he taught from 1970 to 1992. In 1978, he published *Color Sources: A Complete Color Biography*.

Hewitt's art was included in such exhibitions as *Vibrations Eleven* (Martha Jackson Gallery, New York, 1965), *The Responsive Eye* (The Museum of Modern Art, New York, 1965), and *Op Art* (University of Kansas, Lawrence, 1965). In addition, he showed regularly with the Anonima group. A retrospective of his work was presented by the Robert Hull Fleming Museum, Burlington, Vermont, in 1992. His work is held in the collections of the Museum of Modern Art, Caracas, Venezuela; Cleveland Museum of Art, Ohio; and Muzeum Sztuki, Łódź, Poland. Francis Hewitt died in Burlington, Vermont. **KW**

ROBERT IRWIN

1928–

Robert Irwin was born in Long Beach, California. He trained in Los Angeles at the Otis Art Institute and the Chouinard Art Institute, completing his studies in 1954. At Chouinard, he worked in the Abstract Expressionist style. Through his association with the Fergus Gallery in Los Angeles, Irwin had contact with such artists as Ed Moses and Billy Al Bengston. By the early 1960s, Irwin's research into perceptual psychology was evident in his work. His minimal canvases of the early to mid 1960s rely on slight color differentiation. His *Untitled* "white" paintings are created from dense networks of color dots that optically mix into monochromes at a distance, a perceptual test that is heightened by his slightly bowed canvases. In his *Disc* series of 1966–69, Irwin created illuminated pieces that appeared to flow from the wall. He contributed to *The Responsive Eye* (The Museum of Modern Art, New York, 1965).

In 1970, Irwin stopped painting and began producing sculpture and installations, exploring light and space on a larger scale. In the 1990s, Irwin created a major outdoor installation at the J. Paul Getty Center in Los Angeles, California. The Pace Gallery in New York and the San Francisco Museum of Modern Art, California, presented his retrospective in 1985, accompanied by a text he authored. The Museum of Contemporary Art, Los Angeles, also presented a retrospective that traveled throughout Europe from 1993 until 1995. A piece from Irwin's *Disc* series hangs at the Norton Simon Museum of Art, Pasadena. Other works are located at the Museum of Fine Arts, Boston; Hirshhorn Museum and Sculpture Garden, Washington, D.C.; Modern Art Museum of Fort Worth, Texas; Smithsonian American Art Museum, Washington, D.C.; and Walker Art Center, Minneapolis. Today, Robert Irwin creates architectural installations and landscape designs, and lectures nationally. **EA**

ELLSWORTH KELLY

1923–

Ellsworth Kelly was born in Newburgh, New York. He attended Pratt Institute in Brooklyn in 1941, and the School of the Museum of Fine Arts in Boston from 1946 to 1948. After graduating, he moved to Paris and attended the Académie des Beaux-Arts, and then settled in New York in 1954. Kelly has been involved in many major exhibitions, including *Sixteen Americans* (The Museum of Modern Art, New York, 1959) and *Geometric Abstraction in America* (Whitney Museum of American Art, New York, 1962). His first retrospective was held at the Museum of Modern Art in 1973. His work was also included in the 1976 group exhibition *Aspects of Postwar Painting in America,* held at Columbus Museum of Art, Ohio.

Kelly, who was influenced by Henri Matisse and Jean Arp, is recognized as one of the innovators of the hard-edge style as well as one of the first painters to use shaped canvases. He has also worked as a printmaker and sculptor, and has completed many public commissions. His work is held in the collections of the Solomon R. Guggenheim Museum, New York; Museum of Fine Arts, Houston; Museum of Fine Arts, Boston; The Museum of Modern Art, New York; Tate, London; and Columbus Museum of Art, Ohio. Ellsworth Kelly lives in Spencertown, New York. **EPA**

BILL KOMODORE

1932–

Bill Komodore was born in Athens, Greece. He attended Tulane University beginning in 1955, earning both his bachelor's and master's degrees. Seminal teachers that influenced his work include Mark Rothko, David Smith, and George Rickey. In 1961, he had his first one-man show at the Haydon Calhoun Gallery in Dallas. He was featured in *The Responsive Eye* (The Museum of Modern Art, New York, 1965), and in *Art in Motion* (Cincinnati Art Museum, Ohio, 1965), *Optical and Kinetic Show* (Albright-Knox Art Gallery, Buffalo, New York, 1965), and *Young America* (Whitney Museum of American Art, New York, 1965). In 1965, he was interviewed by Walter Cronkite for a CBS show on Op Art. His Op Art works consist of monochromatic color schemes that produce optical illusions. Permanent collections that house his work include the Whitney Museum of American Art, New York; National Gallery of Art, Washington, D.C.; and Walker Art Center, Minneapolis. Bill Komodore has been a professor of art at the Southern Methodist University, Dallas, since 1989. He resides in Dallas, Texas. **KM**

JULIO LE PARC

1928–

Julio Le Parc was born in Mendoza, Argentina. He received his artistic training in Buenos Aires at the Escuela de Bellas Artes, beginning in 1942.

Between 1954 and 1955, Le Parc returned to school and participated in student activist groups. In 1958, Le Parc joined a small group of Argentinean artists in Paris and worked for Victor Vasarely. In 1960, Le Parc was a founding member of the Groupe de Recherche d'Art Visuel (GRAV) along with such artists as Francisco Sobrino, François Morellet, Yvaral, and fellow Argentineans Hugo Demarco and Horacio Garcia-Rossi. Members of GRAV attempted to liberate art from individual conceit by creating collective pieces. During the 1960s, Le Parc became a proponent of Op and Kinetic Art. He explored the effects of light reflection and color refraction in illuminated sculptures and mobiles, often constructed of Plexiglas, aluminum and other industrial materials. Le Parc's *Labyrinthe* was a major attraction at the Paris Biennale in 1963. Also in 1963, Le Parc's *Continuel-mobile, Continuel-lumière* was exhibited at the Tate Gallery, London. Le Parc's pieces often invite spectator participation, with their adjustable parts allowing for individual manipulation. His post-Op work embraced overtly political content.

Le Parc exhibited in *The Responsive Eye* (The Museum of Modern Art, New York, 1965), individually and under the banner of GRAV. In 1966, Le Parc won the Grand Prix at the Venice Biennale. He participated in several collective exhibitions of experimental art worldwide. In 1966 and 1967, he exhibited at the Howard Wise Gallery in New York and the Denise René Gallery in Paris. Julio Le Parc's work is included in the collections of the Tate, London; Fine Arts Museum of San Francisco, California; and Museo Nacional de Bellas Artes, Buenos Aires. Julio Le Parc lives in Cachan, France. **EA**

MON LEVINSON
1926–

Mon Levinson was born in New York. He studied economics at the University of Pennsylvania and received his bachelor's degree in 1948. In the early 1960s, Levinson received recognition for cut



and layered white-board collages, which produced intricate shadow compositions. He expounded on this idea, substituting Plexiglas for white board and silkscreening linear patterns on it. These works manipulated perception by shifting according to the position of the viewer, creating dynamic moiré patterns and conveying a sense of depth. These constructions produce a disorienting effect and pronounced moiré patterns. By 1965, Levinson was acclaimed as one of the progenitors of Op Art and was included in *The Responsive Eye* (The Museum of Modern Art, New York, 1965). Throughout the 1960s and 1970s, he showed at the Kornblee Gallery in New York.

Levinson's work evolved, and, in the late 1960s, the artist created constructions with illuminated clear plastic sheets, as well as plastic wall reliefs that cast shadows of varying shapes into the gallery space. Works of this post-Op style were featured in the *Whitney Annual* of 1970, as well as in the Jewish Museum's *Plastic Presence* exhibition in 1969. Permanent collections that hold his work include Whitney Museum of American Art, New York; Albright-Knox Art Gallery, Buffalo, New York; Brooklyn Museum, New York; Malmo Art Museum, Sweden; Museo de Bellas Artes, Caracas; New York University Art Collection, New York. Mon Levinson lives and works in New York, where he now concentrates on paintings. **KM**

ALEXANDER LIBERMAN
1912–1999

Alexander Liberman was born in Kiev, Russia. When he was nine, his family fled the Soviet Union and settled in Paris, where he attended the Université Paris-Sorbonne and the École des Beaux Arts. In the 1930s, he became a stage-set designer and eventually managing director for *Vu Magazine*, establishing important contacts in both the art and fashion worlds. He left the magazine in 1936. In 1941, the Liberman family fled Paris upon its occupation. They went to Spain before finally settling in New York. Liberman began working for *Vogue* in 1941. During this time, Dali, Cornell, Picasso, Braque, Duchamp, Chagall, Rauschenberg, Johns, and Pollock collaborated on projects for the magazine. He spent fifty-eight years at Condé Nast Publications, a position that fostered his career in the art world. In the 1950s, he exhibited work in galleries around New York. His paintings, which were simple in composition, often incorporated circles and explored color relativity. By the late 1950s, Liberman had learned to weld steel and was producing monumental sculpture.

Sculptures and paintings by the artist are held in numerous museums, including the Metropolitan Museum of Art, New York; The Museum of Modern Art, New York; Solomon R. Guggenheim Museum, New York; Tate, London; Hirshhorn Museum and Sculpture Garden, Washington, D.C.; and Los Angeles County Museum of Art, California. He has public sculptures in more than forty cities worldwide. Alexander Liberman died in Miami Beach, Florida. **KM**

RICHARD PAUL LOHSE
1902–1988

Richard Paul Lohse was born in Zurich. In 1918, he began working as a graphic design apprentice at Max Dalang AG. From 1920 to 1924, he studied at Kunstgewerbeswe, Zurich. Early in his career, Lohse was influenced by the work of Paul Klee, László Moholy-Nagy, and Hans Richter. In 1930, he established his own graphic design studio in Zurich, where he worked for the next several years. During this time, he co-founded the Association of Independent Graphic Designers. In 1937, with Leo Leuppi, he founded Allianz, the Association of Modern Swiss Artists.

Lohse's graphic design work is marked by a rigorous commitment to constructivism and stimulating color. In 1953, he published *New Design in Exhibitions.* He contributed to the design and content of such magazines as *Spirale, New Graphic Design,* and *Building+Home.* In his paintings and drawings, Richard Paul Lohse employs mathematical relationships and vertical-horizontal forms to create images of vivid color and amplified layers of line. He also uses curved and diagonal elements in his work

His work has been exhibited in *Konkrete Kunst* (Kunsthalle, Basel, 1944), *Tendances de l'art abstrait* (Galerie Denise René, 1948), *Pittsburgh International Exhibition of Contemporary Painting* (Carnegie Institute, Pennsylvania, 1955), *Konkrete Kunst* (Helmhaus, Zurich, 1964), and *Art Abstrait Constructif International* (Galerie Denise René, Paris, 1961).

Lohse received the Guggenheim International Prize in 1958. A retrospective of his work was held in 1961 at the Stedelijk Museum, Amsterdam, and, in 1988, there was a survey of his work at the Musée de Grenoble, France. He established the Richard Paul Lohse Foundation in Zurich in 1987. Richard Paul Lohse died in Zurich. **JMH**

WOLFGANG LUDWIG
1923–

Wolfgang Ludwig was born in Mielesdorf, Germany. He studied at the Hochschule für Grafik und Buchkunst (Advanced School of Graphics and Book Arts) in Leipzig from 1947 to 1950, and at the Hochschule für Bildende Kunste (Advanced School for the Figurative Arts) in Berlin from 1950 to 1956. In 1955, he worked for the Foundation for the



Studies of the German People and conducted a study of architecture in Berlin. In 1963, Ludwig produced *Cinematic Discs*, a series of works that create the illusion of movement within radial compositions of black and white lines. From 1971 to 1991, Ludwig was a professor of visual communication at the Hochschule für Bildende Kunste in Berlin.

Ludwig's work has been shown in numerous exhibitions, including *The Responsive Eye* (The Museum of Modern Art, New York, 1965), *Multiples* (Reklinghausen, Germany, 1972), and *Berlin Konstructiv* (Berlin, 1981). His work is held in the collection of the Städtische Museum, Gelsenkirchen, Germany. Wolfgang Ludwig resides in Berlin. **EPA**

EDUARDO MAC ENTYRE

1929–

Eduardo Mac Entyre was born in Buenos Aires, Argentina. He studied technical drawing before becoming an artist in the late 1940s. His work is informed by the developments of Georges Seurat, Paul Cézanne, the Cubists, and Georges Vantongerloo. Mac Entyre was a pioneer of Arte Generativo, a painting style related to Op and Kinetic Art. His works explore movement and rhythm through the use of the circle, geometric patterns, and curved lines. Examples of his work are held in the collections of the The Museum of Modern Art, New York; Kennedy Center, Washington, D.C.; and Jack S. Blanton Museum of Art, University of Texas at Austin, Texas. **KW**

HEINZ MACK

1931–

Heinz Mack was born in Lollar, Germany. He studied at the National Academy of Arts in Düsseldorf from 1950 to 1953 and earned a teaching certificate from Cologne University in 1956. A year later, he founded the kinetic art group, Zero, with Otto Piene. They published an eponymous journal until 1961. In 1958, Mack abandoned painting and began working with light. He used plastic, aluminum, glass, and motors to create shifting reflections. He is famous for his *Sahara Project* (1968) in which he placed undulating rows of light in the desert.

Mack returned to painting in the 1990s, creating works that involve the color spectrum. He has also worked in set design throughout his career and has received numerous commissions for public spaces around the world. Mack lives and works in Mönchengladbach, Germany, and Ibiza, Spain. **EPA**

AGNES MARTIN

1912–2004

Agnes Martin was born in Maklin, Saskatchewan, Canada, and moved to the United States in 1931. From 1934 to 1937, she studied at Western Washington College of Education in Bellingham. She graduated from Columbia University in 1942, and returned to get her master's degree in 1952. Prior to receiving that degree, she studied and taught at the University of New Mexico for several years. She moved to Taos, New Mexico, in 1954 but returned to New York three years later to pursue painting. Robert Indiana, Ellsworth Kelly, and Jack Youngerman were among her friends and neighbors. In contrast to Abstract Expressionism, Martin produced works featuring formal squares, lines, and grids that convey a sense of purity and spirituality. In 1958, she had her first solo exhibition at the Betty Parsons Gallery. In 1967, she returned to New Mexico and abandoned painting for seven years. When she resumed, she worked in a similar style, but integrated brighter colors.

Surveys of her work have been organized by the Stedelijk Museum, Amsterdam (1991), the Whitney Museum of American Art, Washington, D.C. (1992), and the Menil Collection, Houston (2004). In 1997, she received the Golden Lion Award at the Venice Biennale, in recognition of her sixty years' contribution to contemporary art. In 1998, the National Endowment for the Arts presented her with the National Medal of Arts. Her work is included in such collections as the Solomon R. Guggenheim Museum of Art, Washington, D.C.; The Museum of Modern Art, New York; National Gallery of Art, Washington, D.C.; High Museum of Art, Atlanta; and Tate, London. Agnes Martin died in Taos, New Mexico. **KW**

ALMIR DA SILVA MAVIGNIER

1925–

Almir Mavignier was born in Rio de Janeiro, Brazil. He began painting in 1946, and moved to Paris in 1951, where he studied at the Académie de la Grande Chaumière. In 1953, he relocated to Germany and studied under Max Bill at the Hochschule für Gestaltung in Ulm until 1958. In the late 1950s, he began associating with the Zero group. He established his own studio in 1959 and worked as a painter and graphic designer. In 1965, he became a professor of painting at the Staatliche Hochschule für Kunst, Hamburg.

Initially producing abstract paintings, Mavignier progressed to concrete paintings, dot pictures, grid pictures, Op Art works, and monochromes throughout the 1950s. In 1961, he began producing additive posters. Mavignier used mathematical systems to integrate form and color. He participated in *Konkrete Kunst* (Helmhaus, Zurich, 1960) and *The Responsive Eye* (The Museum of Modern Art, New York, 1965). His work has also been exhibited in the Venice Biennale, the São Paulo Biennale, and Documenta in Kassel.

His work is held in the permanent collections of the Museu de Arte Moderna, São Paulo, Brazil; Museum of Contemporary Art, Zagreb, Croatia; Daimler Chrysler Contemporary, Berlin; and Museum Sztuki, Łódź. Almir Mavignier lives in Hamburg, Germany. **KW**

JOHN MCLAUGHLIN

1898–1976

John McLaughlin was born in Sharon, Massachusetts. Influenced by his family, he became interested in art at a young age, and was particularly fascinated by Asian art. In 1935, he moved to Japan to study art and the language. In 1938, he returned to Boston and opened The Tokaido Incorporated gallery, where he dealt in Asian artworks and also began to paint. During World War II, McLaughlin served in the army as chief of the Southeast Asian Translation and Interrogation Center.

Because of the influence of Japanese aesthetics and such artists as Piet Mondrian and Kasimir Malevich, McLaughlin's work in the 1950s and 1960s is characterized by Western non-objectivity and Eastern serenity and displays subdued color and simple geometry. Considered part of the hard-edge movement, McLaughlin stands out as an artist whose abstract style broke ground for American minimalist painters. His work interacts with the viewer and emphasizes the relationship between man and nature.

McLaughlin participated in a number of notable shows, including *Purist Painting* (Whitney Museum of American Art, New York, 1960); *Geometric Abstraction in America* (Whitney Museum of American Art, New York, 1962); and *The Responsive Eye* (The Museum of Modern Art, New York, 1965). His work is featured in the permanent collections of the Albright-Knox Art Gallery, Buffalo, New York; Corcoran Gallery of Art, Washington, D.C.; Los Angeles County Museum of Art, California; Metropolitan Museum of Art, New York; The Museum of Modern Art, New York; Whitney Museum of American Art, New York; and the San Francisco Museum of Modern Art, California. John McLaughlin died in Dana Point, California. **EPA**

ED MIECZKOWSKI

1929–

Ed Mieczkowski was born in Pittsburgh, Pennsylvania. He received his BFA from the Cleveland Institute of Art in 1957 and his MFA from Carnegie Mellon University in 1959. He maintained a studio in New York, and he taught at the Cleveland Institute of Art for thirty-nine years. He was a leader in the hard-edge movement, as well as one of the earliest proponents of Op Art. Together with Ernst Benkert and Frank Hewitt, Mieczkowski formed the collective Anonima, a group that explored effects of color, tone and shape on human visual perception. Along with Anonima, Mieczkowski's work appeared in *The Responsive Eye* (The Museum of Modern Art, New York, 1965) and other important Op exhibitions.

Throughout the 1970s and 1980s, Mieczkowski explored geometric and perceptual abstraction while teaching at the Cleveland Institiute of Art. He completed many public arts commissions, most notably *Sommer's Sun* at the Cleveland Public Library. His work is held in collections worldwide, including in Israel, Poland, and Denmark. He is featured in such Ohio museums as the Cleveland Museum of Art and the Akron Art Museum. Ed Mieczkowski currently resides in California, where he continues to paint, exploring representations of scientific concepts through geometric abstraction. **KM**

FRANÇOIS MORELLET

1926–

François Morellet was born in Cholet, France. Self-taught, he worked at his family's factory while learning to paint. In 1950, he began experimenting with abstraction, presenting his first one-man show at Gallery Creuze in Paris. During the 1950s, Morellet created complex grids using paint and wire. With Julio Le Parc, Jean-Pierre Yvaral, and Francisco Sobrino, he co-founded the Groupe de Recherche d'Art Visuel (GRAV) in 1960, a group interested in underscoring the artist-spectator relationship. Two years later, he began



making aluminum sphere webs, and, in 1963, started his creation of neon tube works, which he programmed to turn on and off automatically. His work was shown in *The Responsive Eye* (The Museum of Modern Art, New York, 1965), and other exhibitions. He also creates architectural installations and has received many commissions for work in public spaces. François Morellet lives in Cholet and Paris, France. **EPA**

SPENCER MOSELEY

1925–1998

Spencer Moseley was born in Bellingham, Washington. He attended the University of Washington, receiving his BFA in 1948 and his master's degree in 1951. Following graduation, he traveled to Paris to study with Fernand Leger. Moseley taught at the University of Washington from 1951 to 1977, serving as director of the art department and of the Henry Art Gallery from 1967 to 1977. In addition to being a painter, Moseley was a composer and a musician. He is the author of numerous books.

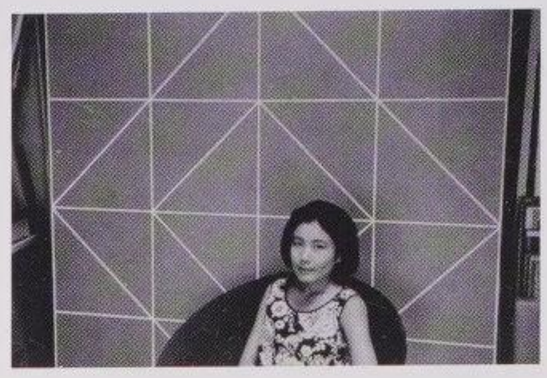
His works from the Op Art period feature crisp black-and-white geometric shapes and grids. In his later compositions, color returned, but grid-like compositions remained paramount. Moseley had one-man exhibitions at the Seattle Art Museum, Washington, in 1958, and in 1960 at the Santa Barbara Museum of Art, California. His work was reproduced in *Optical Illusions in the Visual Arts* (Reinhold Press, 1966), *The Principles of Pattern* (Reinhold Press, 1969), and *Illusions in Nature and Art* (Duckworth & Company, 1974). In 1988, the Lynn McAllister Gallery, Seattle, presented *50s–80s Spencer Moseley: A Retrospective Exhibition.* Moseley's work was included in the exhibition *Geometric Abstraction* (Tacoma Art Museum, Washington, 2002). His work also can be seen at the Seattle Art Museum, Washington. Spencer Moseley died in Washington. **KW**

RAKUKO NAITO

1935–

Rakuko Naito was born in Tokyo, Japan, and attended Ferris Girls School from 1948 to 1954. She graduated from the Tokyo National University of Art in 1958, where she majored in traditional Japanese painting. Following graduation, she moved to New York and briefly attended the Art Students League in search of a less conventional method of working. During the mid-1960s, Naito moved away from textured oil paintings. Through a friend, she met Abstract Expressionist artist Sam Francis, who introduced her to acrylic paint. Working with acrylics, spray paint, and masking tape she created work that emphasized flatness and downplayed the artist's hand. She also experimented with integrating such materials as sand, nails, and wire into her geometric, colorless works to explore texture and materiality. Her first solo exhibition was at the World House Gallery, New York, in 1965. In addition to exhibiting throughout the United States, she has shown at the Akira Ikeda Gallery, Nagoya, Japan; The Gimpel-Hanover and André Emmerich Galerien, Zurich; Renate Bender, Munich, Germany; and Denise Cade Gallery, Paris. Her work has been included in *Motion and Movement* (Contemporary Art Center, Cincinnati, Ohio, 1964) and *Black & White* (Wadsworth Athenaeum, Hartford, Connecticut, 1966).

Rakuko Naito's work is held in the Miami-Dade Community College, Miami, Florida; Kemper Art Collection, Chicago; Roland Gibson Art Foundation, State University of New York at Potsdam, New York; and Davis Museum and Cultural Center, Wellesley College, Massachusetts. She was an artist in residence at the Josef and



Anni Albers Foundation in 2003. She continues to explore the possibilities of different materials, and in her recent works she frequently uses Japanese paper. Rakuko Naito lives and works in New York. **KW**

REGINALD NEAL

1909–1992

Born in Leicester, Britain, Reginald Neal moved to Decatur, Illinois at an early age. In 1932, he received his BA from Bradley University. He continued studying art history at Chicago University, earning his master's degree in 1939. Five years later, he had his first one-man show in Chicago. His Op Art works, which were generally black-and-white, explored optical elements that produced flickering, vibrating, and pulsating effects. Equally well known as a teacher and as an art theorist, Neal taught at the Escuela de Bellas Artes, Mexico, and the Contemporaries Graphic Center, New York. In 1965, Reginald Neal's work appeared in *The Responsive Eye* (The Museum of Modern Art, New York, 1965). He also exhibited at such museums as the Houston Museum of Fine Art, Texas; Museum of Modern Art, Ljubljana, Yugoslavia; and Cincinnati Art Museum, Ohio. His works are part of the permanent collections of the Library of Congress, Washington, D.C.; Brigham Young University, Utah; Princeton University, New Jersey; and the Museum of Modern Art, New York. Reginald Neal died in 1992. **KM**

KENNETH NOLAND

1924–

Kenneth Noland was born in Asheville, North Carolina. Utilizing the GI Bill after his discharge from the air force in 1946, he studied under Josef Albers at Black Mountain College in Asheville, North Carolina. In 1948, he continued his studies with sculptor Ossip Zadkine in Paris. When Noland returned to the United States, he moved to Washington, D.C., and taught at several colleges, including the Institute of Contemporary Art in Boston, the Catholic University of America, and the Washington Workshop Center for the Arts. In Washington, D.C., Noland met fellow painter Morris Louis.

Noland, Louis and Helen Frankenthaler used the soak-stain technique to emphasize the elements of flatness and color in paintings. Noland is well known for his paintings of concentric circles, horizontal lines, ellipses, and chevrons. He experimented with after-images in the early 1960s, which further connected him to the Op Art movement.

Noland was included in *Geometric Abstraction in America* (Whitney Museum of American Art, New York, 1962), *Toward a New Abstraction* (Jewish Museum, New York, 1963), *Post Painterly Abstraction* (Los Angeles County Museum of Art, 1964), *The Responsive Eye* (The Museum of Modern Art, New York, 1965) and *Systemic Painting* (Solomon R. Guggenheim Museum, New York, 1966). Noland has also exhibited individually at the Museo de Arte Moderno, Mexico; Jewish Museum, New York; and Solomon R. Guggenheim Museum, New York. The Butler Institute of American Art, Youngstown, Ohio; Cleveland Museum of Art, Ohio; Columbus Museum of Art, Ohio; and the Museum of Modern Art, New York, all hold works by him in their permanent collections. Kenneth Noland lives in North Bennington, Vermont. **JMH**

HENRY C. PEARSON

1914–2006

Henry C. Pearson was born in Kinston, North Carolina. He graduated in 1931 from the University of North Carolina, Chapel Hill, where he studied theater design. He earned his master's degree in 1938 from the Yale University School of Drama and worked for theaters in Maryland, South Carolina, and Washington, D.C.. He was also involved in movie production for the United States army and illustrated Seamus Heaney's poetry.

Relocating to New York after living in Japan, Pearson studied at the Art Students League under Reginald Marsh from 1953 to 1956. During the 1950s, his painting evolved from traditional representation to geometric abstraction. The Workshop Gallery presented his first one-man exhibition in 1958. In the 1960s, he produced drawings, paintings, and spheres that are characterized by striated linear compositions and are black-and-white or boldly colored. He continued working in this manner through the 1970s, until his return to geometric abstraction in the 1980s. Pearson was a member of the American Abstract Artists group and was included in *The Responsive Eye* (The Museum of Modern Art, New York, 1965). He became a member of the fine art faculty of the New School for Social Research in New York, and taught there for thirty years.

The North Carolina Museum of Art presented his retrospective in 1969. Pearson's work has been exhibited at the Whitney Museum of American Art, New York; The Museum of Modern Art, New York; and Corcoran Gallery of Art, Washington, D.C.. His work is represented in the collections of the Museum of Modern Art, New York; Whitney Museum of American Art, New York, Metropolitan Museum of Art, New York; and Albright-Knox Art Gallery, Buffalo, New York. Henry C. Pearson died in Manhattan. **KW**

LARRY POONS

1937–

Larry Poons was born in Tokyo, Japan, and raised in the United States. He studied at the New England Conservatory of Music in Boston in 1955. In 1957, he attended the School of the Museum of Fine Arts in Boston for six months. He moved to New York City in 1958, where he was exposed to Jackson Pollock's drip paintings and Barnett Newman's color fields. Poons's first solo exhibition was held at the Green Gallery in New York in 1963. He also participated in *The Responsive Eye* (The Museum of Modern Art, New York, 1965). His dot paintings of the 1960s produce a sense of rhythm and musical energy through color and composition.

Poons's artwork is part of the permanent collections of the Metropolitan Museum of Art, New York; Solomon R. Guggenheim Museum, New York; Tate, London; and Whitney Museum of American Art, New York. By the end of the 1960s, he had abandoned his optical style, turning to works that employ painterly abstractions. Larry Poons currently resides in New York. **EPA**

AD REINHARDT

1913–1967

Ad Reinhardt was born in Buffalo, New York. He attended Columbia University from 1931 to 1935, where he studied art history under Meyer Schapiro. In 1936, he studied painting at the American Artists School and attended the National Academy of Design. The Works Progress Administration's Federal Art Project employed Reinhardt from 1936 to 1939. He was a navy photographer during World War II, and from 1946 to 1951 attended New York University Institute of Fine Arts. Reinhardt began teaching at Brooklyn College in 1947, where he remained for twenty years. In addition, Reinhardt lectured at other universities and published numerous criticisms of modern art in leading art journals.

Reinhardt produced large monochromes in the 1950s, initially



using red, then moving to blue, and eventually progressing to black. Beginning in 1937, and continuing for the next ten years, he aligned himself with the American Abstract Artists group. Reinhardt had his first exhibition at Teacher's College Gallery (Columbia University, New York, 1943). In 1946, he began to show regularly at Betty Parsons Gallery in New York. He was included in *Konkrete Kunst* (Helmhaus, Zurich, 1960) and *The Responsive Eye* (The Museum of Modern Art, New York, 1965).

In 1966, he exhibited at the Jewish Museum, New York, and at the Boston Museum of Art, Massachusetts. After his death in 1967, exhibitions of his work were held at the Solomon R. Guggenheim Museum, New York, and the Museum of Modern Art, New York. Ad Reinhardt's work is part of the permanent collections of the Solomon R. Guggenheim Museum, New York; The Museum of Modern Art, New York; National Gallery of Art, Washington, D.C.; National Gallery of Australia, Canberra; and Yale University Art Gallery, New Haven, Connecticut. Ad Reinhardt died in New York. **KW**

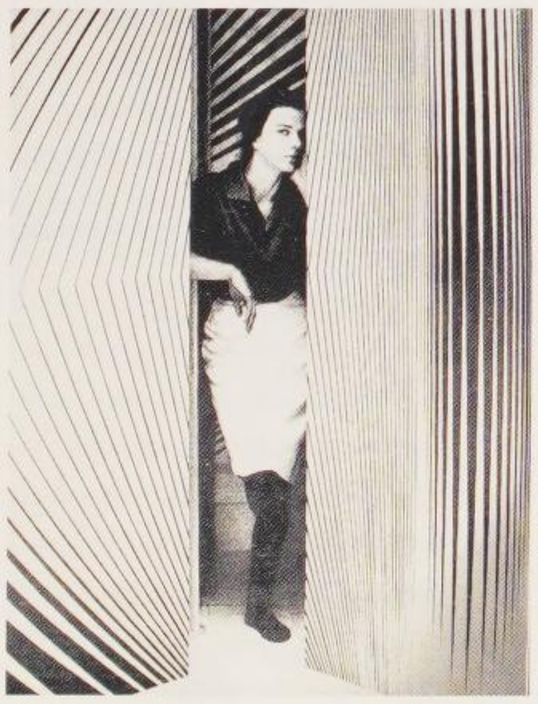
BRIDGET RILEY

1931–

Bridget Riley was born in London, Britain. She attended Goldsmiths College from 1949 to 1952 and the Royal College of Art from 1952 to 1955. She taught at Loughborough College of Art (1959–61), Hornsey College of Art

(1960), and Croydon College of Art (1962–64) and briefly worked at an advertising agency beginning in 1960. She had her first solo exhibition at Gallery One in London in 1962, which marked the beginning of a long and prolific career. In 1965, her work appeared in *The Responsive Eye* (The Museum of Modern Art, New York, 1965) as well as in a solo show at Richard Feigen, New York, which sold out before opening night. In 1968, Riley was awarded the International Prize for Painting at the Venice Biennale, becoming the first woman to receive the award.

Riley began painting in the Post-Impressionist style. By the 1960s, she worked solely in black and white and explored the effects of optical phenomena that produce a disorienting physical effect to the eye, while engaging the viewer's sensations and perceptions. Riley further developed her studies of viewer engagement and the process of looking by integrating color into her work. Her extensive study of color and contrast occurred after a trip to Egypt, and led her to create a mural for Royal Liverpool Hospital and a set for the ballet *Color Moves*. In the 1970s, the Arts Council of Great Britain organized her first retrospective (*Bridget Riley: Paintings and Drawings, 1951–1971*). She is represented in the collections of the Museum of Modern Art, New York; Tate, London; and Victoria and Albert Museum, London, as well as in numerous private collections. Bridget Riley lives and works in France and England. **KM**





PETER SEDGLEY

1930–

Peter Sedgley was born in London, England. He studied architecture at the Brixton Technical School in London from 1944 to 1946. Sedgley worked professionally in architecture for a number of years. Though he had no formal art training, he took an interest in the works of Bridget Riley and Bruce Lacey. In the 1960s, Sedgley began to experiment with Op Art, particularly through large-scale paintings. He combined an interest in light, color, and viewer participation to create works with an ambient quality.

He was included in *The Responsive Eye* (The Museum of Modern Art, New York, 1965), *Art Today* (Albright-Knox Gallery, Buffalo, New York, 1966), *Kinetic Art* (Herbert Art Gallery, Coventry, Britain, 1967), and *Nuevas Tendencias* (Mexico Museum of Modern Art, Mexico City, 1968). Along with Riley, he created the studio organization Space Provision Artistic Cultural and Educational (SPACE), in 1968. Today, Sedgley works with large installations, integrating light, form, sound, and human interaction. His work can be found in the St. Louis Museum, Missouri; Tate, London; Victoria and Albert Museum, London; and Walker Art Center, Minneapolis. Currently, Peter Sedgley lives and works in Berlin and Sussex. **JMH**

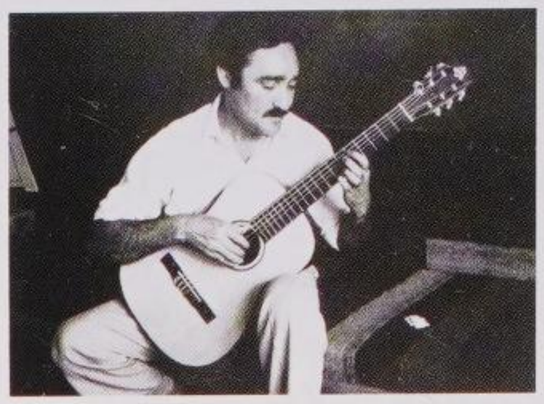
TONY SMITH

1912–1980

Tony Smith was born in South Orange, New Jersey. He attended Fordham University in 1931, Georgetown University from 1931 to 1932, and the Art Students League from 1934 to 1936. From 1937 to 1938, he attended the Institute of Design in Chicago. He supplemented his education with an apprenticeship to Frank Lloyd Wright. Working as an architectural designer from 1940 to 1961, Smith designed about twenty private homes and remodeled the Betty Parsons Gallery, New York. Beginning in 1961, he taught art at several schools, including New York University, Cooper Union, Pratt Institute of Art, the Delahanty Institute, Bennington College, and Hunter College.

Throughout the 1950s, Smith created unrealized architectural designs, grid and circle paintings, and wood-collage sculptures. In the 1960s, he developed his interest in sculpture, creating enormous, architectonic, outdoor structures that now stand in a number of cities, including Cleveland, Pittsburgh, and New York. His paintings and drawings betray his architectural training by their structured space and grid-based compositions.

He participated in *Black, White, and Gray* (Wadsworth Athenaeum, Connecticut, 1964), *Primary Structures* (Jewish Museum, New York, 1966), *Color/Form/Image* (Detroit Institute of Arts, Michigan, 1967), and *American Sculpture of the Sixties* (Los Angeles County Museum of Art, California, 1967). *Tony Smith: Two Exhibitions of Sculpture,* his first one-man exhibition, was presented at Wadsworth Athenaeum, Connecticut, and the Institute of Contemporary Art, Philadelphia. Tony Smith's work is represented in the Menil Collection, Houston; The Museum of Modern Art, New York; National Gallery of Art, Washington, D.C.; Hirshhorn Museum and Sculpture Garden, Washington, D.C.; and Nasher Sculpture Center, Dallas. **KW**



JESÚS RAFAËL SOTO

1923–2005

Jesús Rafaël Soto was born in Ciudad Bolivar, Venezuela. In 1942, he studied at the Escuelo de Artes Plasticas y Artes Aplicadas in Caracas. Five years later, he became the director of the Maracaibo Escuela de Artes Plasticas, a position he held for three years. He had his first exhibition at the Taller Libre de Arte in 1949. In 1950, he moved to Paris and exhibited with the group Réalités Nouvelles from 1952 to 1954. Soto's paintings and three-dimensional works, often employing moiré effects, examine how viewers perceive vibration and movement. In 1954, Soto met Jean Tinguely, Victor Vasarely and gallerist Denise René, who would become a lifelong supporter.

Soto participated in *Le Mouvement* (Galerie Denise René, Paris, 1955), *Konkrete kunst* (Helmhaus, Zurich, 1960), *Mouvement deux* (Galerie Denise René, Paris, 1964), and *Kinetic and Optic Art Today* (Albright-Knox Art Gallery, Buffalo, New York, 1965). He mounted solo showings at the Museo de Bellas Artes, Caracas (1967); Stedelijk Museum, Amsterdam (1968); The Museum of Contemporary Art, Chicago (1971); Solomon R. Guggenheim Museum, Washington, D.C. (1974); Hirshhorn Museum and Sculpture Garden, Washington, D.C. (1974); and the Contemporary Sculpture Center, Tokyo (1986).

He completed prestigious commissions throughout his career, including kinetic murals for the Montreal World's Fair's building in 1967, murals for UNESCO headquarters in Paris in 1969, a mural for the Museo de Arte Contemporaneo in Caracas in 1974, and La Esfera Virtual for the 1988 Olympic Sculpture Park in Seoul. In 1973, he founded the Jesús Soto Museum of Modern Art in Ciudad Bolivar with works from his collection. His pieces have entered the collections of museums throughout the world. Jesús Rafaël Soto died in Paris. **KW**

JULIAN STANCZAK

1928–

Julian Stanczak was born in Borownica, Poland. At the height of World War II, he was interned in a Siberian concentration camp, where he permanently lost the use of his right (dominant) arm. Stanczak escaped from the camp at age thirteen and traveled with the Polish army-in-exile throughout the Middle East. He ended up in a Polish refugee camp in Uganda, where he learned to use his left hand for writing and drawing, and where he received his first private art lessons. After spending several years in London, Stanczak immigrated to the United States in 1950. He settled in Cleveland and continued his studies at the Cleveland Institute of Art. He obtained an MFA at Yale University in 1956, where he studied with Josef Albers and roomed with Richard Anuszkiewicz. Influenced by Albers's approach, Stanczak's artworks moved away from the figurative and fully into the perceptual by the beginning of the 1960s. His first major show, *Optical Paintings*, from which Op Art derived its name, was in 1964 at the Martha Jackson Gallery in New York. Other major Op shows were *The Responsive Eye* (The Museum of Modern Art, New York, 1965), *Kinetic and Optical Art* (Albright-Knox Art Gallery, Buffalo, New York, 1965), and *Contemporary Painting* (Whitney Museum of American Art, New York, 1967). Stanczak retired from the Cleveland Institute of Art in 1985, after a thirty-eight-year teaching career.

Stanczak's artwork of recent years reflects his ongoing fascination with color and line, and with exploring the limits of human visual perception. In 1998, a major retrospective of his work was organized by the Youngstown Museum of Art, Ohio, and shown at the Columbus Museum of Art, Ohio. In the last ten years, Stanczak has had numerous museum exhibitions, including at the Frederick R. Weisman Museum of Art, the Cleveland Institute of Art, and the McNay Art Museum. He is represented in numerous museums worldwide, including the Metropolitan Museum of Art, New York, the Museum of Modern Art, New York, the



Smithsonian American Art Museum, Washington, D.C., and the Columbus Museum of Art, Ohio. Julian Stanczak lives in a suburb of Cleveland, Ohio.

JH

JEFFREY STEELE

1931–

Jeffrey Steele was born in Cardiff, Britain. He studied at both Cardiff University and Newport School of Art, Media and Design. As a teenager, he was expelled from art school for creating pointillist dots on graph paper. This systematic approach, however, would contribute to his later success. In the 1950s, he turned away from figurative painting to an abstract style. He is known for his mathematic black-and-white works. Steele was included in *The Responsive Eye* (The Museum of Modern Art, New York, 1965).

Steele's paintings have been exhibited at the Institute of Contemporary Art, London; McRoberts and Tunnard Gallery, London; Gabrowski Gallery, London; and others. Jeffrey Steele resides in London. EPA

FRANK STELLA

1936–

Frank Stella was born in Malden, Massachusetts. He attended Princeton University in the early 1950s, where he painted and studied history. In 1958, he moved to New York and received immediate recognition for his paintings. Before the age of twenty-five, he joined Leo Castelli's stable of artists and was included in *Sixteen Americans* (The Museum of Modern Art, New York, 1959–60). His early works were based on precision and rationality, which characterized the minimalist style. In the 1960s, he experimented with printmaking and stage design. Following this period, Stella introduced reliefs into his work, which evolved into the innovative "shaped canvases" with which his name is often associated. In the 1980s, Stella's works featured a more dynamic style, utilizing mixed media and incorporating three-dimensionality. In the 1990s, Stella worked on large-scale, freestanding sculptures, which were primarily exhibited in public spaces.

Throughout the 1960s, Stella played an integral part in the shaping of art. He participated in such key shows as *Shaped Canvas* (1964–65) and *Systemic Painting* (1966), both at Solomon R. Guggenheim Museum, New York. Stella has been the subject of numerous retrospectives and his work is held in museums worldwide and is included in the permanent collections of the Solomon R. Guggenheim Museum, New York; Museum of Fine Arts, Boston; The Museum of Modern Art, New York; Philips Collection, Washington, D.C.; and Columbus Museum of Art, Ohio. Frank Stella lives and works in New York. KM

MIROSLAV ŠUTEJ

1936–2005

Miroslav Šutej was born in Duga Resa, Yugoslavia (now Croatia). He attended the Zagreb School of Applied Arts and graduated from the Zagreb Academy of Fine Arts in 1961. He continued his education as an assistant in the workshop of Krsto Hegedušić from 1961 to 1963. In 1964, he traveled to France on a government scholarship. Šutej's Op Art drawings, prints, and sculptures test the limits of human perception and allow for viewer participation by including tactile and manipulable elements.

The Students Center in Zagreb presented Šutej's first one-man exhibition in1962. He participated in *The Responsive Eye* (The Museum of Modern Art, New York, 1965) and showed at the Museum of Contemporary Art, Zagreb (1966), and the Museum of Contemporary Art, Belgrade (1967). Throughout the 1960s and 1970s, he exhibited extensively, participating in hundreds of shows internationally.

In 1978, Šutej became a professor at the Academy of Fine Arts in Zagreb, where he taught for the remainder of his career. A film about him was produced in 1981. In the early 1990s, he designed the Croatian coat of arms and the banknotes that the newly democratic government adopted. His work has entered museums worldwide, including the Museum of Modern Art, New York; Tate, London; Solomon R. Guggenheim Museum of Art, Washington, D.C.; Victoria and Albert Museum, London; Musée de la Ville de Paris, France; Stedelijk Museum, Amsterdam; National Museum, Warsaw; and Bridgestone Museum of Art, Tokyo. Miroslav Šutej died in Krapinske Toplice, Croatia. JH

TADASKY (TADASUKE KUWAYAMA)

1935–

Tadasky (Tadasuke Kuwayama) was born in Negoya, Japan. He came to the United States to study at the Art Students League and the Brooklyn Museum Art School in New York, then a locus of study for Japanese immigrants. Philip Johnson was among his earliest supporters, introducing his work to fellow architects and curators. Beginning in 1964, he showed at the Kootz Gallery, New York; Tokyo Gallery, Tokyo; Fischbach Gallery, New York; and Gutai Pinacotheca, Osaka. His primary body of work, begun in the early 1960s, features



compositions of concentric circles that trigger optical color interaction and explore sensory stimulation. They are highly calculated and precisely created, consisting of thin, pulsating, vibrantly colored lines that seem to whirl and radiate outward from the center. Tadasky uses a special wheel that allows him to paint each ring perfectly.

Tadasky participated in seminal Op Art shows such as *The Responsive Eye* (The Museum of Modern Art, New York, 1965) and *Kinetic and Optic Art Today* (Albright-Knox Gallery, Buffalo, New York, 1965). His popular designs were co-opted for commercial usage. In 1968, Springbok Editions manufactured a circular jigsaw puzzle titled "Whirling Disks by Tadasky." Today, Tadasky's works can be found in numerous public and private collections, including the Museum of Modern Art, New York; Museum of Fine Arts, Houston; Baltimore Museum, Maryland; Museum of Contemporary Art, Nagaoka, Japan; and Albright-Knox Gallery, Buffalo, New York. Tadasky works in Ellenville, New York, and New York City. **KM**

LUIS TOMASELLO

1915–

Luis Tomasello was born in Argentina. He studied at the École des Beaux-Arts and the École Supérieure de peintre in Buenos Aires. In 1957, he moved to Paris. Like other kinetic artists, Tomasello is interested in light reflection as well as the movement of the viewer. He creates relief paintings, which are concerned with three-dimensional form.

Tomasello's first one-man show was held in 1962 at the Fine Arts Museum, Buenos Aires. He was included in *Konkrete Kunst* (Kunsthalle, Zurich, 1960), *The International Exposition of Movement* (Stedelijk Museum, Amsterdam, 1961), *Mouvement* (Cadario Gallery, Milan, 1963), *Art Today* (Albright-Knox Art Gallery, Buffalo, New York, 1965), and *The Responsive Eye* (The Museum of Modern Art, New York, 1965). His work is represented in the permanent collections of museums worldwide, including the Albright-Knox Art Gallery, Buffalo, New York; Carnegie Institute, Pittsburgh, Pennsylvania; Centre Georges Pompidou, Paris; and Museo Español de Arte Contemporaneo, Madrid. Luis Tomasello lives in Paris.

EPA

CLAUDE TOUSIGNANT

1932–

Claude Tousignant was born in Montreal, Canada. He attended the School of Art and Design at the Montreal Museum of Fine Arts from 1948 to 1952 and following graduation moved to Paris to attend the Academy Ranson. After six months, Tousignant returned to Montreal where he became a member of the Association des artistes non-figuratifs de Montréal and Les Plasticiens. An interest in early abstract artists like Malevich and Mondrian and contemporary abstract American artists, especially Barnett Newman, informed his experimentations with traditional pictorial space, form, and color. In 1956 he had his first one-man exhibition at the Galerie l'Actuelle in Montreal. His first solo showing in the US was at the East Hampton Gallery in New York in 1965. He is known for his circular paintings featuring concentric rings that create the illusion of movement. Group shows he participated in include *The Responsive Eye* (The Museum of Modern Art, New York, 1965), *The Deceived Eye* (Fort Worth Art Center, Texas, 1965), and *1 + 1 = 3* (University of Texas, Austin and Houston, 1965).

In 1973, the National Gallery of Canada organized Tousignant's retrospective, which traveled to twelve venues in Canada and then went on to Paris. Tousignant continued to pursue his fascination with color, creating monochromes in the 1980s. His work is represented in the collections of the Musée d'Art Contemporain de Montréal, Canada, and the National Gallery of Canada, Ottawa. Claude Tousignant resides in Montreal. **KW**



VICTOR VASARELY

1906–1997

Victor Vasarely was born in Pécs, Hungary, and spent his childhood and early adulthood in Budapest. In 1925, he enrolled in medical school at Budapest University, but abandoned it after two years to pursue art. He studied traditional academic style at Podolini-Volkmann and then moved toward the constructivist style at Alexander Bortynik's studio, the Budapest center for the Bauhaus. In 1930, Vasarely moved to Paris, where he worked in graphic design and as an artistic consultant for an advertising agency. By 1943, Vasarely had founded his own advertising agency and was a co-owner of Galerie Denise René. That year, he inaugurated the gallery with a body of work that gave precedent to his aesthetic development as well as pioneered Op Art. His interest in graphic design and advertising, coupled with his background with the Bauhaus aesthetic, became particularly manifest in his work.

Vasarely won the Critics' Prize in Brussels (1955), a Gold Medal at the Milan Triennial (1955), and the International Guggenheim Prize (1964). He participated in seminal Op Art exhibitions such as *The Responsive Eye* (The Museum of Modern Art, New York, 1965) and *Documenta III* (Germany, 1964), and had numerous solo shows. Currently, museums in Pécs, Hungary; Gordes, France; Zichy Palace, Budapest; and the Foundation Vasarely in Aix-en-Provence are dedicated to commemorating Vasarely's work. Victor Vasarely died in Paris.

KM

GERHARD VON GRAEVENITZ

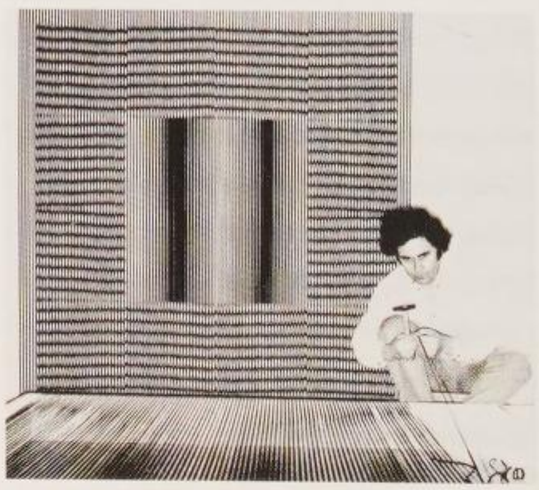
1934–1983

Gerhard von Graevenitz was born in Schilde, Germany. He studied economics briefly at the University of Frankfurt before attending the Akademie der Bildenden Künste, Munich, in the late 1950s. Graevenitz co-produced the journal *Nota* and was director of the Nota gallery in Munich where he showed works by Otto Piene and Heinz Mack in the early 1960s. At this time his sculptures became increasingly kinetic when he began adding motors to make them move continuously. He participated in such exhibitions as *Art Abstrait Constructif International* (Galerie Denise René, Paris, 1961), *Licht und Bewegung* (Kunsthalle, Bern, 1965), *Mouvement Deux* (Galerie Denise René, Paris, 1964), and *The Responsive Eye* (The Museum of Modern Art, New York, 1965). His work is generally black and white and features simple dots, lines, and shapes. He produced relief structures and objects with engine-operated elements. The artist investigated relationships of light, movement, space, structure, time, and progression in his work. Gerhard von Graevenitz died in Switzerland. **KW**

LUDWIG WILDING

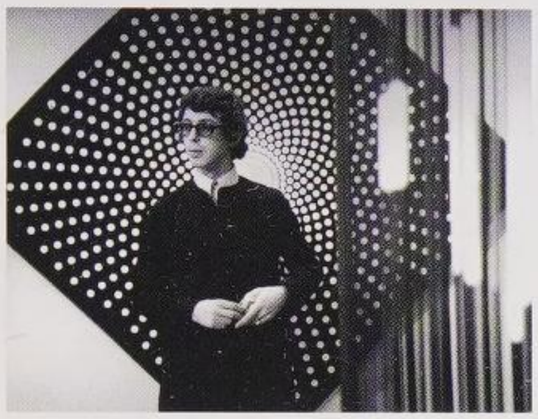
1927–

Ludwig Wilding was born in Grunstädt, Germany. He studied at the University of Mainz Art School. Associated with the Kinetic Art movement, Wilding's works are three-dimensional structures that create shifting moiré patterns through their black and white designs. Wilding has shown at the Museum Leverkusen, Germany (1953); Zimmergallery,



Frankfurt (1958), and Studio F, Ulm (1965). His work was included in *The Responsive Eye* (The Museum of Modern Art, New York, 1965), *Eyes, Lies, and Illusions* (Hayward Gallery, London, 2004). Wilding retired from the Hichschüle für Bildende Kunste, Hamburg, in 1993, after teaching there for thirty-four years. Ludwig Wilding lives in Westheim, near Augsburg, Germany.

EPA



JEAN-PIERRE YVARAL
1934–2002

Jean-Pierre Yvaral was born in Paris. As artist Victor Vasarely's son, he was immersed in the art world from birth. Yvaral studied graphic arts and publicity at the School of Applied Arts in Paris in the 1950s and, along with Julio Le Parc, François Morollet, Francis Molnar, and Francisco Sobrino, later founded the Groupe de Recherche d'Art Visuel (GRAV). With the group, he exhibited in *The Responsive Eye* (The Museum of Modern Art, New York, 1965), *Art Today* (Albright-Knox Gallery, Buffalo, 1965), and *Licht und Bewegung* (Kunsthalle, Bern, 1965). In 1966, the Howard Wise Gallery in New York held his first one-man show. A painter and kinetic sculptor, Yvaral juxtaposed bright, saturated colors to simulate motion, recession, and protrusion of three-dimensional forms that shifted with the changing position of the viewer. In the 1960s, he generally worked in black and white, using repetitive patterns to lead the viewer's eye through the canvas. Yvaral died in Paris.

KM

Page 174: Fig. 239
Tadasky (Tadasuke Kuwayama) in his New York studio
c. 1966
Courtesy of the Artist

Page 175: Fig. 240
Josef and Anni Albers at Black Mountain College
1949
The Josef and Anni Albers Foundation, Bethany, Connecticut
Photography by Theodore Dreier. Courtesy of the Josef and Anni Albers Foundation

Page 176: Fig. 241
Getulio Alviani in his studio
1960s
Courtesy of the Artist

Page 176: Fig. 242
Edna Andrade in front of *Emergence I*
1969
Courtesy of the Artist

Page 176: Fig. 243
Richard Anuszkiewicz in his studio
c. 1965
Courtesy of the Artist

Page 177: Fig. 244
Marina Apollonio with a Circular Dynamics painting
1960s
Courtesy of the Artist

Page 177: Fig. 245
Karl Benjamin in his studio
c. 1960
Courtesy of Louis Stern Fine Arts, West Hollywood, California

Page 178: Fig. 246
Carlos Cruz-Diez in his studio
1966
Courtesy of the Artist

Page 180: Fig. 247
Lorser Feitelson at the Pasadena Art Museum
1952
Courtesy of Louis Stern Fine Arts, West Hollywood, California

Page 182: Fig. 248
Mon Levinson
c. 1965
Courtesy of the Artist

Page 183: Fig. 249
Wolfgang Ludwig with a Cinematic Painting
Late 1960s
Courtesy of the Artist. Photography by Jürgen Graaff

Page 184: Fig. 250
François Morellet at the Biennale de Nuremberg, Germany
1969
Courtesy of the Artist

Page 184: Fig. 251
Rakuko Naito in her New York studio
1965
Courtesy of the Artist

Page 185: Fig. 252
Ad Reinhardt, New York 4/1
1961
Albright-Knox Art Gallery, Buffalo, New York: Gift of Seymour H. Knox, Jr., 1962
Photography by Fred W. McDarrah

Page 186: Fig. 253
Bridget Riley in her painting *Continuum* from *Vogue* magazine, Vol. 146, No. 9, November 15, 1965
Photography by Lord Snowdon

Page 186: Fig. 254
Peter Sedgley in his studio with a Video Rotor painting
c. 1968
Courtesy of the Artist

Page 186: Fig. 255
Jesús Rafaël Soto playing guitar in Caracas, Venezuela
1961
From *Soto* by Gérard-Georges Lemaire, Paris (Editions de la Différence) 1997

Page 187: Fig. 256
Julian Stanczak in front of *Provocative Current*
1965
Courtesy of the Artist

Page 187: Fig. 257
Tadasky (Tadasuke Kuwayama) in his New York studio
1966
Courtesy of the Artist. Photography by Tatsuo Kondo

Page 188: Fig. 258
Victor Vasarely in his studio
1966
Courtesy of the Vasarely Estate

Page 188: Fig. 259
Ludwig Wilding at work in his studio
1967
Courtesy of the Artist. Photography by Ingeborg Wilding-König

Left: Fig. 260
Jean-Pierre Yvaral with *Structure Cinétique*
1966
Courtesy of Michèle Vasarely

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LARRY BELL

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KARL BENJAMIN

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JULIO LE PARC

Le Parc, exhib. cat., Paris, Galerie Denise René, November–December 1966

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MON LEVINSON

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ALMIR DA SILVA MAVIGNIER

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ED MIECZKOWSKI

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FRANÇOIS MORELLET

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LARRY POONS

Larry Poons: Paintings 1963–1990, exhib. cat. by Daniel Robbins, New York, Salander-O'Reilly Galleries, Inc., April 1990

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Ad Reinhardt: Early Works, exhib. cat. by Robert T. Buck, New York, Marlborough Gallery, February–March 1999

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TONY SMITH

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Tony Smith: Painting and Sculpture, exhib. cat. by Eleanor Green, College Park, Maryland, University of Maryland Art Gallery, February–March 1974

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Tony Smith: Selected Sculptures, 1961–1973, exhib. cat., New York, Paula Cooper Gallery and Margo Leavin Gallery, October–November 1985

Tony Smith: Two Exhibitions of Sculpture, exhib. cat. by Samuel Wagstaff and Tony Smith, Hartford, Connecticut and Philadelphia, Pennsylvania, November 1966 – January 1967

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CLAUDE TOUSIGNANT

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Claude Tousignant: Monochromes, 1978–1993, exhib. cat. by James D. Campbell, Quebec, Musée du Québec, June–October 1994

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Recent Paintings by Vasarely, exhib. cat. by Victor Vasarely, New York, Sidney Janis Gallery, January–February 1966

Werner Spies, *Vasarely*, New York (Harry N. Abrams, Inc.) 1969

Vasarely, exhib. cat. by Victor Vasarely, trans. by Richard Rand, London, Hanover Gallery, May–June 1965

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GERHARD VON GRAEVENITZ

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JEAN-PIERRE YVARAL

Otto Hahn, *Yvaral-collection le Musée de Poche*, Alfortville, France (H. Piazza) 1974



Fig. 261
Gene Davis
American, 1920–1985
Untitled
c. 1961
Magna on canvas
93½ x 77¾ in. (237.5 x 197.5 cm)
Courtesy of Charles Cowles Gallery, New York, New York

(Detail on p. 190)

LIST OF WORKS

YAACOV AGAM

Israeli, born 1928

Fig. 138
B/W + Color
1966–68
Agamograph
14 in. diameter (35.5 cm)
Collection of Getulio Alviani, Milan, Italy
© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Fig. 165
Structure IV
1967
Acrylic on board mounted on painted fiberboard (three views)
4¼ x 4¼ x ¾ in. (10.8 x 10.8 x 1.9 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of Mr. and Mrs. Robert McLaughlin. 1993.010.001
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JOSEF ALBERS

American, born Germany, 1888–1976

Fig. 40
Photograph by UMBO (Otto Umbehr) of Josef Albers teaching at the Bauhaus, Dessau, Germany, 1928
Courtesy of The Josef and Anni Albers Foundation. Bethany, Connecticut and Phyllis Umbehr/Gallery Kicken, Berlin, Germany © 2006 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn

Fig. 45
Goldrosa
c. 1926
Sand-blasted flashed glass with black paint
17¾ x 12¾ in. (45.1 x 32.4 cm)
The Josef and Anni Albers Foundation, Bethany, Connecticut. JAAF#1976.6.1
Photography by Tim Nighswander © 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

Fig. 99
Structural Constellation
c. 1950
Machine engraving on black vinylite
17 x 22½ in. (43.2 x 57.2 cm)
The Josef and Anni Albers Foundation, Bethany, Connecticut.
JAAF#1976.8.1751
Photography by Tim Nighswander © 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

Fig. 132
Homage to the Square: Sentinel
1968
Oil on canvas mounted on masonite
48 x 48 in. (121.9 x 121.9 cm)
The Dayton Art Institute, Dayton, Ohio: Gift of Society Bank 1986.15
© 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

Fig. 144
Homage to the Square: Chosen
1966
Acrylic on masonite
48 x 48 in. (121.9 x 121.9 cm)
Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C.: Gift of Joseph H. Hirshhorn, 1972. HMSG 72.2
Photography by Lee Stalsworth © 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

Fig. 209
Provocative Percussion
1950s
Record sleeve
12 x 12 in. (30.5 x 30.5 cm)
Enoch Light and the Light Brigade, Command Records
Private collection, Columbus, Ohio
© 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

Fig. 210
Provocative Percussion, Vol. 2
1950s
Record sleeve
12¼ x 12¼ in. (31.1 x 31.1 cm)
Enoch Light and the Light Brigade, Command Records
Private collection, Columbus, Ohio
© 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

ANNI ALBERS

German, 1899–1994

Fig. 238
C
1969
Screenprint, edn 14/15
24 x 20 in. (61 x 50.8 cm)
Private collection
© 2006 The Josef and Anni Albers Foundation/Artists Rights Society (ARS), New York

GETULIO ALVIANI

Italian, born 1939

Fig. 18
Photograph by Getulio Alviani of a woman wearing a Positive Negative dress at an exhibition of his works, Milan, Italy
1960s
Courtesy of the Artist

Fig. 81
Surface of Vibrating Textures (Superficie a Testura Vibratile)
1963
Metal, aluminum, and wood
38½ x 37 in. (97.8 x 96.5 cm)
Miami University Art Museum, Oxford, Ohio: Gift of Mrs. Robert B. Mayer and Children in Memory of Robert B. Mayer. 1979.S.8.1

Fig. 171
Reflective Relief with Perpendicular Incidence (Rilievo a Riflessione Con Incidenza Ortogonale)
1967
Steel
Dimensions variable
Courtesy of the Artist

Fig. 172
Cube of Graphic Textures (Cubo a Testura Grafica)
1964
Sheets of opalescent pvc, silk-screens and light
130 x 130 x 130 in.
(330 x 330 x 330 cm)
Installation of environment at Konstruktive Kunst Element und Prinzipiem, Nüremburg, Germany, 1969
Courtesy of the Artist

Fig. 196
Wedding dress
1964
Courtesy of the artist

Fig. 195
Negative Positive fabric for Germana Marucelli
1964
Courtesy of the Artist

Fig. 199
Positive Negative Dress
1964
Courtesy of the Artist

EDNA ANDRADE
American, born 1917

Fig. 6
Color Motion 4-64
1964
Oil on canvas
48 x 48 in. (121.9 x 121.9 cm)
Philadelphia Museum of Art, Philadelphia, Pennsylvania: Gift of Frederick R. McBrien III, 2003. 2003-94-1
Courtesy of Locks Gallery, Philadelphia, Pennsylvania

Fig. 7
Interchange
1967
Acrylic on canvas
40¾ x 40¾ in. (103.7 x 103.7 cm)
Private collection, Columbus, Ohio
Courtesy of Locks Gallery, Philadelphia, Pennsylvania

Fig. 25
Turbo 2
1966
Oil on canvas
72 x 48 in. (182.9 x 121.9 cm)
Collection of the Montclair Art Museum, Montclair, New Jersey: Gift of the American Academy of Arts and Letters, Childe Hassam Fund. 1969.3
Photography by Peters S. Jacobs, 1999. Courtesy of Locks Gallery, Philadelphia, Pennsylvania

Fig. 72
Turbo 1
1965
Oil on canvas
50 x 50 in. (127 x 127 cm)
Columbus Museum of Art, Columbus, Ohio: Museum Purchase, Derby Fund. 2006.015
Courtesy of Locks Gallery, Philadelphia, Pennsylvania. Photography by Aaron Igler

Fig. 204
Color Motion
1966
450 piece jigsaw puzzle, manufactured by Springbok Editions Inc., SQ58
Private collection, Columbus, Ohio

Fig. 222
Gemini 66
1966
Serigraph
29 x 29 in. (73.7 x 73.7 cm)
Courtesy of Locks Gallery, Philadelphia, Pennsylvania

RICHARD ANUSZKIEWICZ
American, born 1930

Fig. 19
All Things Do Live in Three
1963
Acrylic on masonite
21⅞ x 35⅞ in. (55.6 x 91.1 cm)
Collection of Neil K. Rector, Columbus, Ohio
© Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Fig. 57
Untitled
1961
Oil on canvas
54 x 52 in. (137.2 x 132.1 cm)
Private collection, Columbus, Ohio
© Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Fig. 59
Untitled sketch
Undated
Acrylic and pencil on paper
18 x 13½ in. (45.7 x 34.3 cm)
Private collection
© Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Fig. 77
Complementary Fission
1964
Acrylic on panel
48 x 48 in. (121.9 x 121.9 cm)
Private collection, Columbus, Ohio
Courtesy of Charles Foley Gallery, Columbus, Ohio © Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Fig. 78
Luminous
1964
Acrylic on board
24 x 24 in. (61 x 61 cm)
Collection of George Nauyok and Joseph Pritchard, San Francisco, California
Photography by Ian Reeves © Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Fig. 145
Plus Reversed
1960
Oil on canvas
74⅝ x 58¼ in. (189.6 x 148 cm)
Blanton Museum of Art, Austin, Texas: Gift of Mari and James A. Michener, 1991 1991.177
© Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Fig. 178
Concave and Convex: Three Unit Dimensional
1967
Enamel on plywood
32¾ x 32¾ x 32¾ in.
(83.2 x 83.2 x 83.2 cm)
Private collection
© Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Fig. 202
Painting an Op Art coat for furrier Jacques Kaplan
1963
Courtesy of the Artist © Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Fig. 203
Coaster tray
1971
Nine coasters in a plastic tray manufactured by Art in America
4½ x 4½ in. coasters in 14 x 14 in. tray
(11.4 x 11.4 cm coasters in 35.6 x 35.6 cm tray)
Private collection
© Richard Anuszkiewicz/Licensed by VAGA, New York, New York

Fig. 205
Splendor of Red
1969
450 piece jigsaw puzzle, manufactured by Springbok Editions Inc., PZL2020
Private collection, Columbus, Ohio
© Richard Anuszkiewicz/Licensed by VAGA, New York, New York

MARINA APOLLONIO
Italian, born 1940

Fig. 101
Circular Dynamics (Dinamica circolare)
1968
Painted wood disk, motorized
15¾ in. diameter on square base of 23⅝ x 23⅝ in. (40 cm on square base of 60 x 60 cm)
Collection of Getulio Alviani, Milan, Italy

Fig. 176
Installation proposal
1967/71
From *Marina Apollonio: Werke 1964–1973*, exhib. cat., Neue Galerie am Landesmuseum Joanneum, Graz, Austria, April 13 – May 6, 1973
Courtesy of the Artist

TIM BAVINGTON
American, born England 1966

Fig. 232
Little x Little
2003
Diptych, acrylic on canvas on panel
60 x 192 in. (152.4 x 487.7 cm)
© Courtesy of Tim Bavington. Photography by Greg Preston

HANNES BECKMANN
American, born Germany, 1909–1977

Fig. 131
Muted Center (Blue Light)
1965–73
Acrylic on canvas
40 x 40 in. (101.6 x 101.6 cm)
Hood Museum of Art, Dartmouth College, Hanover, New Hampshire: Gift of the artist. P.973.118

LARRY BELL
American, born 1939

Fig. 181
Untitled
1964
Glass, bismuth, chromium, gold, and rhodium on gold-plated brass
54¼ x 16⅜ x 14¼ in.
(137.9 x 41.5 x 36.4 cm)
Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C.: The Joseph H. Hirshhorn Bequest, 1981. HMSG 86.294
Photography by Lee Stalsworth

KARL BENJAMIN
American, born 1925

Fig. 46
Bars: Black, Blue, Green
1959
Oil on canvas
40 x 50 in. (101.6 x 127 cm)
Courtesy of Louis Stern Fine Arts, West Hollywood, California. © Karl Benjamin, reproduced by permission

Fig. 139
VS #5
1960
Oil on canvas
34 x 42 in. (86.4 x 106.7 cm)
Collection of Neil K. Rector, Columbus, Ohio
Courtesy of Louis Stern Fine Arts, West Hollywood, California © Karl Benjamin, reproduced by permission

Fig. 149
Untitled
1960
Oil on canvas
30 x 50 in. (76.2 x 127 cm)
Private collection, Columbus, Ohio
Courtesy of Louis Stern Fine Arts, West Hollywood, California © Karl Benjamin, reproduced by permission

ERNST BENKERT
American, born 1928

Fig. 79
Black and White Op*Tickler
1964
Liquitex on canvas
24 x 24 in. (61 x 61 cm)
Location unknown
Courtesy of the Artist

Fig. 111
Warsaw #4
1965
Acrylic on paperboard
24½ x 24½ in. (62.2 x 62.2 cm)
Courtesy of the Artist and LewAllen Contemporary, Santa Fe, New Mexico

LINDA BESEMER
American, born 1957

Fig. 233
Multibulge Fold #4
2005
Acrylic paint over aluminum rod
48 x 48 in. (121.9 x 121.9 cm)
Courtesy of the Artist and Angles Gallery, Santa Monica, California

MAX BILL
Swiss, 1908–1994

Fig. 140
Field of 32 Parts in 44 Colors
1965
Oil on canvas
53 x 53 in. (134.6 x 134.6 cm)
Albright-Knox Art Gallery, Buffalo, New York: Gift of Seymour H. Knox, Jr., 1968
© 2006 Artists Rights Society (ARS), New York/ProLitteris, Zürich

FRANCIS CELENTANO
American, born 1928

Fig. 109
Phalanx
1965
Acrylic on canvas
47 3/4 x 64 1/2 in. (121.3 x 163.8 cm)
Henry Art Gallery, University of Washington, Seattle, Washington: Henry Gallery Fund, purchased by Parnassus and Northwest Craftsman Fund. 67.14
Photography by Richard Nicol

Fig. 167
Kinetic Painting III
1967
Lacquer on masonite, motorized
48 in. diameter (121.9 cm)
Albright-Knox Art Gallery, Buffalo, New York: Gift of Seymour H. Knox, Jr., 1968

TONY CONRAD
American, born 1940

Fig. 190
The Flicker
1965
16mm film
Courtesy of The Ohio State University, Columbus, Ohio

TONI COSTA
Italian, born 1935

Fig. 119
Visual Dynamics 1
1965
Wood on Plexiglas on polyethylene
51 x 51 in. (129.5 x 129.5 cm)
The JPMorgan Chase Art Collection

CARLOS CRUZ-DIEZ
Venezuelan, born 1923

Fig. 54
Chromosaturation for a Public Place
1969
Wood, colored Plexiglas, and electric lights
Eighteen chambers, each
47 1/4 x 47 1/4 in. (120 x 120 cm)
Installation at the "Art in the Street" festival, organized by the National Centre of Contemporary Art at the exit of Odeon metro station, Boulevard Saint Germain, Paris
Courtesy of Atelier Cruz-Diez and Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Fig. 55
Physichromie 174
1965
Aluminum, plastic, and cardboard
23 5/9 x 20 x 1 3/4 in.
(59.7 x 50.8 x 4.5 cm)
Private collection
Courtesy of Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Fig. 58
An Optical Modulation of the Surface (Modulación Úptica de la superficie)
1957
Wood and acrylic
27 x 29 1/8 in. (68.5 x 74 cm)
Courtesy of Atelier Cruz-Diez and Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Fig. 92
Chromointerference Environment
1977
Wood, acrylic, paint, and eight mobile projectors
315 x 315 x 118 in.
(800 x 800 x 300 cm)
Installation at the Contemporary Art Museum Sofia Imber/Sala CADAFE, Caracas, Venezuela
Courtesy of Atelier Cruz-Diez and Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Fig. 175
Chromatic Environment
1974
Ceramic tiles
885.8 x 29.5 feet (270 x 9 m)
Installation in the central hall at Simon Bolivar International Airport, Maiquetia, Venezuela, with Architects Montemayor and Sully
Courtesy of Atelier Cruz-Diez and Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

BEN CUNNINGHAM
American, 1904–1975

Fig. 2
Equivocation
1964
Synthetic polymer paint on composition board
26 x 26 in. (66 x 66 cm)
The Museum of Modern Art, New York, New York: Larry Aldrich Foundation Fund. 106.1965
Digital Image © The Museum of Modern Art/Licensed by SCALA/Art Resource, New York

Fig. 110
Untitled
c. 1964
Oil on masonite
30 x 30 in. (76.2 x 76.2 cm)
Private collection, Columbus, Ohio

Fig. 207
Equivocation II
1965
450 piece jigsaw puzzle, manufactured by Springbok Editions Inc., SQ50
Private collection, Columbus, Ohio

GENE DAVIS
American, 1920–1985

Fig. 153
Micro-Painting
c. 1966–68
Acrylic on canvas
5/8 x 1/2 in. (1.6 x 1.3 cm) (picture actual size)
Smithsonian American Art Museum, Washington, D.C.: Bequest of Florence Coulson Davis. 1996.104.83
Photography by Smithsonian American Art Museum, Washington, D.C./Art Resource, New York

Fig. 154
Raspberry Icicle
1967
Acrylic on canvas
116 x 219 5/8 in. (294.6 x 557.9 cm)
Smithsonian American Art Museum, Washington, D.C.: Museum purchase. 1971.77
Photography by Smithsonian American Art Museum, Washington, D.C./Art Resource, New York

Fig. 261
Untitled
c. 1961
Magna on canvas
93 1/2 x 77 3/4 in. (237.5 x 197.5 cm)
Courtesy of Charles Cowles Gallery, New York, New York

PHILIPPE DECRAUZAT
Swiss, born 1974

Fig. 234
Mae West
2005
Acrylic on shaped canvas
94 1/2 x 86 5/8 in. (240 x 220 cm)
Courtesy of Gallery Praz-Delavallade, Paris, France. Photography by Marc Dommage

Fig. 235
Can I Crash Here
2005
Decals on floor
Dimensions variable
Installation view at Synagogue de Delme, Centre d'Art Contemporain, Delme, France, 2005
Courtesy of Gallery Praz-Delavallade, Paris, France. Photography by O.H. Dancy

ROBERT DELAUNAY
French, 1885–1941

Fig. 37
Portuguese Woman
1916
Oil on canvas
53 1/2 x 61 3/8 in. (135.9 x 155.9 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of Howard D. and Babette L. Sirak, the Donors to the Campaign for Enduring Excellence, and the Derby Fund. 1991.001.010

THOMAS DOWNING
American, 1928–1985

Fig. 82
Untitled
1960
Acrylic on canvas
102 x 102 in. (259.1 x 259.1 cm)
Courtesy of Conner Contemporary Art, Washington, D.C. and The Estate of Vincent Melzac

SALLY HAZELET DRUMMOND
American, born 1924

Fig. 133
Presence of the Heart
1962
Oil on canvas
60 x 60 in. (152.4 x 152.4 cm)
Private collection, Columbus, Ohio
Courtesy of the Artist and Alexandre Gallery, New York, New York

ANGEL DUARTE
Spanish, born 1930

Fig. 123
V32
1963
Glass, aluminum, and neon
19 11/16 x 19 11/16 x 2 3/4 in.
(50 x 50 x 7 cm)
Collection of Getulio Alviani, Milan, Italy

MARCEL DUCHAMP
American, born France, 1887–1968

Fig. 194
Discs Bearing Spirals
1923
Ink and pencil on paper
46⅝ x 46⅝ in. (118.4 x 118.4 cm)
Seattle Art Museum, Seattle, Washington. Eugene Fuller Memorial Collection. 63.22
Photography by Paul Macapia © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris/Succession Marcel Duchamp

GABRIELE EVERTZ
American, born Germany 1945

Fig. 231
Motion Parallax
1998
Acrylic on shaped canvas
72 x 72 in. (182.9 x 182.9 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of the artist, dedicated to Neil Rector in recognition of his valuable contribution to the arts. 2006.020
Courtesy of the Artist. Photography by Gil and Stephen AMIAGA

WOJCIECH FANGOR
Polish, born 1922

Fig. 161
M13
1968
Oil on canvas
56 x 56 in. (142.2 x 142.2 cm)
The JPMorgan Chase Art Collection

Fig. 127
#8
1964
Oil on canvas
42 x 42 in. (106.7 x 106.7 cm)
Collection of Joseph Masheck
Courtesy of Mitchell Algus Gallery, New York, New York

Fig. 134
M16–1966
1966
Oil on canvas
36 x 36 in. (91.4 x 91.4 cm)
The JPMorgan Chase Art Collection

PAUL FEELEY
American, 1910–1966

Fig. 163
EL 20
1965
Painted wood
8 x 8 x 8 in. (20.3 x 20.3 x 20.3 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of the Betty Parsons Foundation. 1985.024.005

Fig. 147
Gomelza
1965
Synthetic polymer on canvas
80 x 80 in. (203.2 x 203.2 cm)
Whitney Museum of American Art, New York, New York: Purchase, with funds from the Friends of the Whitney Museum of American Art. 67.28
Photography by Matt Flynn

LORSER FEITELSON
American, 1898–1978

Fig. 141
Untitled
1968
Acrylic on canvas
36 x 36 in. (91.4 x 91.4 cm)
Collection of Nancy and Dave Gill, Columbus, Ohio
© Feitelson Arts Foundation, reproduced by permission

Fig. 148
Magical Space Forms
1962
Oil and enamel on canvas
60 x 50 in. (152.4 x 127 cm)
Columbus Museum of Art, Columbus, Ohio: Museum Purchase, Derby Fund. 2005.027
© Feitelson Arts Foundation, reproduced by permission

BEVERLY FISHMAN
American, born 1955

Fig. 236
Dividose: B.R.H.
2006
Silkscreened vinyl collage on powder-coated metal, in three parts
53 x 48 in. (134.6 x 121.9 cm)
Courtesy of the Artist, Bernard Jacobson Gallery, London

KARL GERSTNER
Swiss, born 1930

Fig. 114
Lens Picture #19
1962
Mixed media construction with Plexiglas lens and fluorescent light
25 x 25 x 4½ in.
(63.5 x 63.5 x 11.4 cm)
Private collection

Fig. 166
Prism Picture #7
1958/62
Mixed media construction with Plexiglas prism, fluorescent lights, and maneuverable color filters (three views)
28 x 28 x 4½ in.
(71.1 x 71.1 x 11.4 cm)
Private collection

BOB GOODNOUGH
American, twentieth century

Fig. 50
Bomb II
1965
Oil, acrylic, and charcoal on canvas
80 x 104 in. (203.2 x 264.2 cm)
Columbus Museum of Art, Columbus, Ohio: Museum purchase with funds provided by Neil K. Rector. 2006.010

FRANCO GRIGNANI
Italian, 1908–1999

Fig. 122
243 Periodical (243 periodica)
1968
Tempera and ink on cardboard
27⅜ x 19⅞ in. (69.5 x 50.5 cm)
Courtesy of Arte Struktura, G.F. Bonomi and Getulio Alviani, Milan, Italy

PETER HALLEY
American, born 1953

Fig. 225
Day Glo Prison
1982
Acrylic, Day-Glo acrylic, and Roll-a-Tex on canvas
63 x 78 in. (160 x 198.1 cm)
Courtesy of the Artist and Baldwin Gallery, Aspen, Colorado

FREDERICK HAMMERSLEY
American, born 1919

Fig. 95
Sugar Free #7
1966
Oil on canvas
36 x 42 in. (91.4 x 106.7 cm)
Courtesy of Charlotte Jackson Fine Art, Santa Fe, New Mexico

WILLIAM HENRY
American, twentieth century

Fig. 218
Poster for the Youngbloods, Mt. Rushmore and Phoenix concert, Avalon Ballroom, San Francisco, California, February 16–18, 1968
Silkscreen on paper
20 x 14 in. (50.8 x 35.6 cm)
© 1968 Family Dog Productions

FRANCIS HEWITT
American, 1936–1992

Fig. 112
Overlap Series #3
1967
Acrylic on masonite
36 x 36 in. (91.4 x 91.4 cm)
Collection of Karen Hewitt, Burlington, Vermont

ROBERT IRWIN
American, born 1928

Fig. 137
Untitled
1963–65
Oil on canvas on bowed wood veneer frame
84½ x 82½ in. (214.6 x 209.6 cm)
Collection Walker Art Center, Minneapolis, Minnesota: Gift of Albert A. List Family, 1972. 1972.6
© 2006 Robert Irwin/Artists Rights Society (ARS), New York

JIM ISERMANN
American, born 1955

Fig. 228
Untitled (0589)
1989
Enamel paint, Orlon acrylic yarn on wood panels
96 x 96 x 2 in.
(243.8 x 243.8 x 5.1 cm)
Courtesy of Jim Isermann and Richard Telles Fine Art, Los Angeles, California. Photography by David Familian

Fig. 229
Untitled (0205)
2005
Vacuum formed polystyrene
Dimensions variable
Courtesy of Jim Isermann and Deitch Projects, New York, New York. Photography by Tom Powel Imaging

JASPER JOHNS
American, born 1930

Fig. 152
Flags
1967–68
Lithograph, edn 34/43
34½ x 25 in. (87.6 x 63.5 cm)
Wake Forest University Student Union Collection of Contemporary Art, Winston-Salem, North Carolina
© Jasper Johns/Licensed by VAGA, New York, New York

DONALD JUDD
American, 1928–1994

Fig. 86
Untitled
1966/68
Stainless steel and Plexiglas in six parts
Six cubes, each 34 x 34 x 34 in.
(86.4 x 86.4 x 86.4 cm)
Milwaukee Art Museum, Milwaukee, Wisconsin: Layton Art Collection, purchase, L1970.25
© Judd Foundation/Licensed by VAGA, New York, New York

WASSILY KANDINSKY
Russian, 1866–1944

Fig. 35
Composition VIII
1923
Oil on canvas
55⅛ x 79⅛ in. (140 x 201 cm)
Solomon R. Guggenheim Museum, New York, New York: Gift, Solomon R. Guggenheim, 1937. 37.262
Photography by David Heald © SRGF, New York © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

ELLSWORTH KELLY
American, born 1923

Fig. 151
Blue Green Red
1964
Oil on canvas
73 x 100 in. (185.4 x 254 cm)
Whitney Museum of American Art, New York, New York: Purchase, with funds from the Friends of the Whitney Museum of American Art. 66.80
Photography by Jerry L. Thompson © Ellsworth Kelly

PAUL KLEE
German, 1879–1940

Fig. 39
Lonely Flower
1934
Watercolor with pen and black ink on tan paper, laid down
18⅞ x 12⅜ in. (47.9 x 31.4 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of Howard D. and Babette L. Sirak, the Donors to the Campaign for Enduring Excellence, and the Derby Fund. 1991.001.025
© 2006 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn

BILL KOMODORE
American, born Greece, 1932

Fig. 65
Vermont
1964
Liquitex on canvas
63 x 62¾ in. (159.9 x 159.4 cm)
National Gallery of Art, Washington, D.C.: Gift of Mr. and Mrs. Burton Tremaine. 1971.87.5.2618/PA
© 2006 Board of Trustees, National Gallery of Art, Washington, D.C.

Fig. 97
Thousands
1964
Synthetic polymer on canvas
60½ x 49½ in. (153.7 x 125.7 cm)
Whitney Museum of American Art, New York, New York: Purchase. 65.68
Photography by Sheldan C. Collins

EDOARDO LANDI
Italian, born 1937

Fig. 104
Visual Structure (Struttura visuale)
1961–71
Elastic on masonite
26 x 26 x 1⅜ in. (66 x 66 x 3.5 cm)
Collection of Getulio Alviani, Milan, Italy

JULIO LE PARC
Argentinean, born 1928

Figs. 93 a–d
Photographs from the exhibition catalogue by GRAV for *Participation*, Museum am Ostwall, Dortmund, Germany, February 11 – March 31, 1968
Mirror (Miroir)
1966
Glasses for Another Vision (Lunettes Pour une Vision Autre) 1965
Environment, Surprised Movement with Light Blowing (Environment, Mouvement Surprise avec Lumière Pulsante)
1967
Balls to Vibrate (Boules à Vibrer) 1963
© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

MON LEVINSON
American, born 1926

Fig. 71
White Moving Planes – VI
1964
Mixed media construction
22½ x 16 in. (57.2 x 40.6 cm)
Collection of the artist
Courtesy of the Artist

Fig. 120
The Edge II
1965
Mixed media construction
24 x 24 in. (61 x 61 cm)
Collection of the artist
Courtesy of the Artist, New York, New York

Fig. 174
Sculptural Fence
1967
Painted tubular steel
72 x 360 x 144 in.
(182.9 x 914.4 x 365.8 cm)
Installation at P.S. 166, New York, New York
Courtesy of the Artist

ALEXANDER LIBERMAN
American, born Russia, 1912–1999

Fig. 10
Continuous on Red
1960
Oil on circular canvas
80 in. diameter (203.2 cm)
The Museum of Modern Art, New York, New York: Gift of Mr. and Mrs. Fernand Leval. 381.1961
Digital Image © The Museum of Modern Art/Licensed by SCALA/Art Resource, New York

Fig. 150
Sun II
1962
Acrylic on canvas
79¼ in. diameter (201.3 cm)
Private collection, Columbus, Ohio
© The Alexander Liberman Trust and Courtesy of Mitchell-Innes & Nash, New York, New York

RICHARD PAUL LOHSE
Swiss, 1902–1988

Fig. 44
Fifteen Systematic Color Rows with Vertical Condensations
1950–68
Oil on canvas
59⅛ x 59⅛ in. (150.2 x 150.2 cm)
The Museum of Modern Art, New York, New York: The Riklis Collection of McCrory Corporation. 1040.1983
Digital Image © The Museum of Modern Art/Licensed by SCALA/Art Resource, New York © 2006 Artists Rights Society (ARS), New York/ProLitteris, Zürich

WOLFGANG LUDWIG
German, born 1923

Fig. 4
Cinematic Painting No. XVIII (Kinematische Scheibe XVIII)
1969
Acrylic on composition board
43⅝ x 43⅝ in. (110 x 110 cm)
Private collection, Columbus, Ohio
Courtesy of the Artist and Sabine Ludwig © 2006 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn

Fig. 20
Cinematic Painting (Pittura Cinematica)
1964
Oil on composition board
24 1/16 x 48 1/16 in. (61 x 122 cm)
Private collection, Columbus, Ohio
Courtesy of the Artist and Sabine Ludwig. Photography by Jürgen Graaff © 2006 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn

EDUARDO MAC ENTYRE
Argentinean, born 1929

Fig. 159
Generative Painting (Pintura Generative)
1966
Acrylic on canvas
63½ x 73½ in. (161.3 x 186.7 cm)
Miami University Art Museum, Oxford, Ohio: Gift of Beatrice Cummings Mayer. 1991.524
Courtesy of the Artist

STANTON MACDONALD-WRIGHT
American, 1890–1973

Fig. 38
California Landscape
c. 1919
Oil on canvas
30 x 22⅛ in. (76.2 x 56.2 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of Ferdinand Howald. 1931.275

HEINZ MACK
German, born 1931

Fig. 169
Sun of Antarctica
1965
Wood, glass, and motor
58 x 58 x 14 in.
(147.3 x 147.3 x 35.6 cm)
Miami University Art Museum, Oxford, Ohio: Gift of Beatrice Cummings Mayer. 1991.525
© 2006 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn

AGNES MARTIN
American, born Canada, 1912–2004

Fig. 126
Untitled
1960
Oil on canvas
70 x 69½ in. (177.8 x 176.5 cm)
Private collection
Courtesy of PaceWildenstein, New York, New York. Photography by Gordon R. Christmas © 2006 Agnes Martin/Artists Rights Society (ARS), New York

Fig. 128
Garden
1964
Synthetic polymer and colored pencil on linen
72⅛ x 72⅛ in. (183.2 x 183.2 cm)
Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C.: Holenia Purchase Fund and Joseph H. Hirshhorn Purchase Fund, 2001. HMSG 01.10
Photography by Lee Stalsworth © 2006 Agnes Martin/Artists Rights Society (ARS), New York

ALMIR DA SILVA MAVIGNIER
Brazilian, born 1925

Fig. 3
Convex Surfaces (Konvexe Flächen)
1966
Oil on canvas
14 3/16 x 14 3/16 x 2 in. (36 x 36 x 5 cm)
Collection of Getulio Alviani, Milan, Italy
Courtesy of the Artist

JOHN McLAUGHLIN
American, 1898–1976

Fig. 96
No. 5–1961
1961
Oil on canvas
42 1/4 x 60 1/8 in. (107.3 x 152.7 cm)
Santa Barbara Museum of Art, Santa Barbara, California: Gift of Katherine Peake in memory of her mother, Alice F. Schott. 1982.67

ED MIECZKOWSKI
American, born 1929

Fig. 63
Labyrinth
1967
Acrylic on canvas on board
48 x 48 in. (121.9 x 121.9 cm)
The Marilynn and Carl Thoma Collection
Courtesy of LewAllen Contemporary, Santa Fe, New Mexico © Ed Mieczkowski

Fig. 64
Blue Bloc
1967
Acrylic on canvas
48 x 48 in. (121.9 x 121.9 cm)
Courtesy of LewAllen Contemporary, Santa Fe, New Mexico © Ed Mieczkowski

LÁSZLÓ MOHOLY-NAGY
Hungarian, 1895–1946

Fig. 179
Light Prop for an Electric Stage (Light-Space Modulator)
1930
Aluminum, steel, nickel-plated brass, other metals, plastic, wood, and electric motor
59 1/2 x 27 1/2 x 27 1/2 in.
(151.1 x 69.9 x 69.9 cm)
Busch-Reisinger Museum, Harvard University, Cambridge, Massachusetts: Gift of Sibyl Moholy-Nagy, BR56.5
© 2006 President and Fellows of Harvard College Photographic Services

PIET MONDRIAN
Dutch, 1872–1944

Fig. 56
Composition with Grid 4: Lozenge Composition, 1919
1919
Oil on canvas
23 5/8 x 23 5/8 in. (60 x 60 cm) (sides)
Philadelphia Museum of Art, Philadelphia, Pennsylvania
© 2007 Mondrian/Holtzman Trust c/o HCR International, Warrenton, Virginia

FRANÇOIS MORELLET
French, born 1926

Fig. 102
Tirets 0–90°
1960
Oil on canvas
31 7/16 x 31 7/16 in. (80 x 80 cm)
Musée de Grenoble, Grenoble, France: Donation of Foundation Abstraction and Square (Vaduz–Liechtenstein) in 1987. MG 4185
Photography © Musée de Grenoble. © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Fig. 162
Grid Sphere
1962
Stainless steel
Installation view at the Third Paris Biennale, Musée d'Art Moderne de la Ville de Paris, Paris, 1963
Courtesy of the Artist © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

VICTOR MOSCOSO
American, born 1936

Fig. 185
Poster for the Miller Blues Band concert, Matrix, San Francisco, California, January 10–15, 1967
Silkscreen on paper
20 x 14 in. (50.8 x 35.6 cm)
© 1967 Neon Rose

Fig. 219
Poster for the Quicksilver Messenger Service, Mt. Rushmore, Big Brother and the Holding Company concert, Avalon Ballroom, San Francisco, California, June 29, 1967
Silkscreen on paper
20 x 14 in. (50.8 x 35.6 cm)
© 1967 Family Dog Productions

SPENCER MOSELEY
American, 1925–1998

Fig. 124
Little Portuguese Bend
1965
Acrylic on canvas
40 x 40 in. (101.6 x 101.6 cm)
Tacoma Art Museum, Tacoma, Washington: Gift of Max Moseley and Grendl Lofkvist Moseley. 1999.46.8
Photography by Richard Nicol

RAKUKO NAITO
American, born Japan 1935

Fig. 103
Black and White Stripe – Circle with Thin White Stripes
1965
Acrylic on canvas
32 x 32 in. (81.3 x 81.3 cm)
Collection of the artist
Courtesy of the Artist

Fig. 106
Black and White Stripe – Circle
1965
Acrylic on linen
46 x 46 in. (116.8 x 116.8 cm)
Collection of the artist
Courtesy of the Artist

REGINALD NEAL
American, born England, 1909–1992

Fig. 125
Square of Two
c. 1965
Color lithograph, ed. 92/100
21 1/4 x 21 1/4 in. (54 x 54 cm)
Private collection, Columbus, Ohio

KENNETH NOLAND
American, born 1924

Fig. 27
Fugle
1962
Acrylic on canvas
48 x 48 in. (121.9 x 121.9 cm)
Private collection
© Kenneth Noland/Licensed by VAGA, New York, New York

Fig. 83
Split Spectrum
1961
Acrylic on unsized canvas
69 15/16 x 69 15/16 in.
(177.6 x 177.6 cm)
Blanton Museum of Art, Austin, Texas: Gift of Mari and James A. Michener, 1991 1991.280
© Kenneth Noland/Licensed by VAGA, New York, New York

Fig. 173
Installation view of the Kenneth Noland exhibition, André Emmerich Gallery, New York, 1964
From *Kenneth Noland* by Kenworth Moffett, New York (Harry N. Abrams, Inc.) 1977
© Kenneth Noland/Licensed by VAGA, New York, New York

VERNER PANTON
Danish, 1926–1998

Fig. 213
Geometri Furnishing Fabric
1960
Courtesy of Maharam Marketing, New York, New York. Image by Philippe Regard

Fig. 214
Interior design, Hotel Astoria, Trondheim, Norway
1960
Courtesy of Verner Panton Design, Basel, Switzerland

Fig. 215
Swimming Pool, Spiegel Publishing House, Hamburg, Germany
1969
Courtesy of Verner Panton Design, Basel, Switzerland

HENRY C. PEARSON
American, 1914–2006

Fig. 136
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Oil on canvas
52 x 70 in. (132.1 x 177.8 cm)
Collection of Mitchell Algus and Dyanne Maue
Courtesy of Mitchell Algus Gallery, New York, New York

Fig. 164
Continuum
1965
Acrylic on paper on aluminum sphere
20 in. diameter (50.8 cm)
Collection Tweed Museum of Art, University of Minnesota, Duluth, Minnesota: Gift of the artist

LARRY POONS
American, born Japan 1937

Fig. 61
Untitled
1962
Graphite and red watercolor on graph paper with blue lines
13 x 17 in. (33 x 43.2 cm)
National Gallery of Art, Washington, D.C.: Andrew W. Mellon Fund
1975.56.1 B-28489/DR
Photography by Dean Beason © 2006 Board of Trustees, National Gallery of Art, Washington
© Larry Poons/Licensed by VAGA, New York, New York

Fig. 73
Northeast Grave
1964
Acrylic and pencil on canvas
80⅛ x 90⅛ in. (203.5 x 228.9 cm)
Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C.: Gift of Joseph H. Hirshhorn, 1966
HMSG 66.4106
© Larry Poons/Licensed by VAGA, New York, New York

Fig. 143
Cripple Creek
1962
Oil, Fabspray, and pencil on canvas
56 x 56 in. (142.2 x 142.2 cm)
Miami University Art Museum, Oxford, Ohio: Gift of Walter A. and Dawn Clark Netsch. 1986.4
© Larry Poons/Licensed by VAGA, New York, New York

PACO RABANNE
Spanish, born 1934

Fig. 201
Pink, Green, and White Disk Dress and Necklace
1967–68
Plastic disks
The Ohio State University, Geraldine Schottenstein Wing for the Historic Costume and Textiles Collection: Gift of Frederick and Isabel Eberstadt

AD REINHARDT
American, 1913–1967

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Abstract Painting
1960–66
Oil on canvas
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Solomon R. Guggenheim Museum, New York, New York: By exchange, 1993. 93.423.9
Photography by David Heald © SRGF, New York
© 2006 Estate of Ad Reinhardt/Artists Rights Society (ARS), New York

Fig. 130
Abstract Painting
1963
Oil on canvas
60 x 60 in. (152.4 x 152.4 cm)
Milwaukee Art Museum, Milwaukee, Wisconsin: Gift of Friends of Art. M1967.22
© 2006 Estate of Ad Reinhardt/Artists Rights Society (ARS), New York

BRIDGET RILEY
British, born 1931

Fig. 5
Balm
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Oil on canvas
77¼ x 77¼ in. (196.2 x 196.2 cm)
National Gallery of Art, Washington, D.C.: Gift of Mr. and Mrs. Burton Tremaine. 1970.37.2 2549/PA
© 2006 Board of Trustees, National Gallery of Art, Washington, D.C. Photography by Lorene Emerson © 2006 Bridget Riley, All Rights Reserved

Fig. 23
Blaze 3
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Acrylic on board
37½ x 37½ in. (92.7 x 92.7 cm)
Private collection
Courtesy of Karsten Schubert, London, England (BR 738). © 2006 Bridget Riley, All Rights Reserved

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Oil on linen
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Private collection
© 2006 Bridget Riley, All Rights Reserved

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Private collection
Courtesy of PaceWildenstein, New York, New York. Photography by Kerry Ryan McFate
© 2006 Bridget Riley, All Rights Reserved

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Emulsion on board
48 x 48 in. (122 x 122 cm)
Private collection
Courtesy of Karsten Shubert, London, England
© 2006 Bridget Riley, All Rights Reserved

Fig. 108
Current
1964
Synthetic polymer paint on composition board
58⅜ x 58⅞ in. (148.3 x 149.5 cm)
The Museum of Modern Art, New York, New York: Philip Johnson Fund. 576.1964
Digital Image © The Museum of Modern Art/Licensed by SCALA/Art Resource, New York
© 2006 Bridget Riley, All Rights Reserved

Fig. 170
Suspension
1964
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(116.2 x 116.5 cm)
Collection Walker Art Center, Minneapolis, Minnesota: Gift of Mr. and Mrs. Julius E. Davis, 1981. 1981.50
© 2006 Bridget Riley, All Rights Reserved

Fig. 212
Straight Curve
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Emulsion on board
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DIA Art Foundation, New York, New York
© 2006 Bridget Riley, All Rights Reserved

SUSIE ROSMARIN
American, born 1955

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Cube #3
2006
Acrylic paint on MDF
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JASON SALAVON
American, born 1970

Fig. 237
Everything, All at Once (Part III)
2005
Custom software, workstation, real-time audio/video input, video projector and monitor, edn 3
Dimensions variable
Courtesy of the Artist and Ronald Feldman Fine Arts, New York, New York

PETER SCHUYFF
American, born Holland 1958

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Acrylic on linen
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PETER SEDGLEY
British, born 1930

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Courtesy of the Artist

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Courtesy of the Artist

GINO SEVERINI
Italian, 1883–1966

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Rhythm of the Dance (Dancer)
1913
Oil, plaster, and sequins on board
10¾ x 10¾ in. (27.3 x 27.3 cm)
Columbus Museum of Art, Columbus, Ohio: Gift of Howard D. and Babette L. Sirak, the Donors to the Campaign for Enduring Excellence, and the Derby Fund. 1991.001.067
© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

PAUL SHARITS
American, 1943–1993

Fig. 191
T,O,U,C,H,I,N,G
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16mm film
Courtesy of The Ohio State University, Columbus, Ohio © Paul J. Sharits Estate; Christopher Sharits

PAUL SIGNAC
French, 1863–1935

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The Museum of Modern Art, New York, New York: Fractional gift of a private collector. 85.1991
Digital Image © The Museum of Modern Art/Licensed by SCALA/Art Resource, New York
© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

ADELE SIMPSON
American, 1903–1995

Fig. 200
Polychrome Stripe Coat
1965–69
Wool
The Ohio State University, Geraldine Schottenstein Wing for the Historic Costume and Textiles Collection: Gift of the Estate of L. Corinne Babbert

TONY SMITH
American, 1912–1980

Fig. 146
Untitled (from the Louisenberg Series)
1953–54/68
Acrylic on canvas
40 x 60 in. (101.6 x 152.4 cm)
Collection of Annette and Robert Swain
© 2006 Estate of Tony Smith/Artists Rights Society (ARS), New York

JESÚS RAFAËL SOTO
Venezuelan, 1923–2005

Fig. 51
Transformable Harmony (Harmonie Transformable)
1956
Plexiglas, wood, lacquer, and metal
39⅜ x 15¾ x 39⅜ in.
(100 x 40 x 100 cm)
Fundación Museo de Arte Moderno Jesús Soto, Ciudad Bolívar, Venezuela
© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Fig. 116
Spiral (Spirale)
1955
Plexiglas, wood, enamel, and metal
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(39 x 39 x 9 cm)
Collection of Getulio Alviani, Milan, Italy
© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

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The Three Blue Cubes (Les Trois Cubes Bleus)
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Paint on wood and metal with nylon filament
39⅜ x 39⅜ in. (100 x 100 cm)
Marcia Cristina and Pablo Henning Collection, Houston, Texas
Courtesy of Sicardi Gallery, Houston, Texas
© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

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1969
Acrylic paint on Plexiglas on wood base
98½ x 98½ x 98½ in.
(250 x 250 x 250 cm)
Installation view at Stedelijk Museum, Amsterdam, The Netherlands, from *Soto* by Gérard-Georges Lemaire, Paris (Editions de la Différence) 1997
Photography by André Morain © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

JULIAN STANCZAK
American, born Poland 1928

Fig. 62
Untitled sketches
1958
Ink in sketchbook
5¼ x 8½ in. (13.3 x 21.6 cm), open
Collection of the artist
Courtesy of the Artist

Fig. 69
Determinative Focus
1962
Synthetic polymer and tempera on canvas
35½ x 45½ in. (90.2 x 115.5 cm)
Smithsonian American Art Museum, Washington, D.C.: Gift of Mr. and Mrs. David K. Anderson, Martha Jackson Memorial Collection. 1980.137.96
Photography by Smithsonian American Art Museum, Washington, D.C./Art Resource, New York

Fig. 75
Provocative Current
1965
Acrylic on canvas
66 x 53 in. (167.6 x 134.6 cm)
Collection of the artist
Courtersy of the Artist

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Acrylic on canvas
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Collection of the artist
Courtesy of the Artist

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76 x 76 in. (193 x 193 cm)
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Acrylic on canvas
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HENRYK STAZEWSKI
Polish, 1894–1988

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Composition (Kompozycja Fakturowa)
1930–31
Oil on canvas
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Museum Sztuki, Łódź, Poland
Photography by Piotr Tomczyk

JEFFREY STEELE
British, born 1931

Fig. 98
Triangulation
1960
Oil on canvas
27 15/16 x 20⅞ in. (71 x 53 cm)
Collection of Getulio Alviani, Milan, Italy

JENNIFER STEINKAMP
American, born 1958

Fig. 221
Loom
2003
Digital video projection
132 x 132 in. (335.3 x 335.3 cm)
Installation view at the Art gallery of Ontario, Toronto, Canada, 2005
Courtesy of the Artist, ACME, Los Angeles, California, Lehmann Maupin, New York, New York, and greengrassi, London

FRANK STELLA
American, born 1936

Fig. 66
Line Up
1962
Acrylic and graphite on canvas
77 x 77¼ in. (195.6 x 196.2 cm)
Hirshhorn Museum and Sculpture Garden, Smithsonian Institution, Washington, D.C.: Gift of the Joseph H. Hirshhorn Foundation, 1966 HMSG 66.4762
Photography by Lee Stalsworth © 2006 Frank Stella/Artists Rights Society (ARS), New York

Fig. 84
Slieve Bawn
1964
Metallic powder in polymer emulsion on shaped canvas
77 x 81½ in. (195.6 x 207 cm)
Columbus Museum of Art, Columbus, Ohio: On loan from a private collection
© 2006 Frank Stella/Artists Rights Society (ARS), New York

Fig. 142
Miniature Benjamin Moore Series: Island No. 1, Palmito Ranch, Sabine Pass, Delaware Crossing, New Madrid, Hampton Roads
1962
Alkyd on raw canvas
12 x 12 in. each (30.5 x 30.5 cm)
Brooklyn Museum, Brooklyn, New York: Gift of Andy Warhol. 72.167.1-6
© 2006 Frank Stella/Artists Rights Society (ARS), New York

ROBERT SWAIN
American, born 1940

Fig. 224
Untitled
1975
Acrylic on canvas
84 x 84 in. (213.4 x 213.4 cm)
Columbus Museum of Art, Columbus, Ohio: Museum Purchase, Howald Fund. 1976.001
Courtesy of the Artist

WACLAW SZPAKOWSKI
Polish, 1883–1973

Fig. 41
B: B5
1924
Ink on paper
11¾ x 10 3/16 in. (29.8 x 25.8 cm)
Collection of Getulio Alviani, Milan, Italy

PHILIP TAAFFE
American, born 1955

Fig. 227
Quad Cinema
1986
Linoprint collage on canvas
85¾ x 83½ in. (218 x 212 cm)
Private collection
Courtesy of Raymond Foye Ltd., New York, New York

TADASKY (TADASUKE KUWAYAMA)
American, born Japan 1935

Fig. 1
C 136
1965
Acrylic on canvas
69 x 69 in. (175.3 x 175.3 cm)
Collection of Nancy and Dave Gill, Columbus, Ohio
Courtesy of the Artist

Fig. 15
A 200
1965
Acrylic on canvas
47 x 47 in. (119.4 x 119.4 cm)
Collection of the artist
Courtesy of the Artist

Fig. 16
D 116
1965
Acrylic on canvas
49 x 49 in. (124.5 x 124.5 cm)
Private collection, Columbus, Ohio
Courtesy of the Artist

Fig. 157
C 120
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Acrylic on canvas
30 x 30 in. (76.2 x 76.2 cm)
Private collection, Columbus, Ohio
Courtesy of the Artist

Fig. 206
Whirling Discs
1968
500 piece jigsaw puzzle, manufactured by Springbok Editions Inc., PZL6017
Courtesy of the Artist

ALMA THOMAS
American, 1891–1978

Fig. 223
Splash Down Apollo 13
1970
Acrylic on canvas
61 7/8 x 52 in. (157.2 x 132.1 cm)
Private collection
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LUIS TOMASELLO
Argentinean, born 1915

Fig. 105
Atmosphere Chromoplastique 120A
1965
Acrylic on wood relief
23 5/8 x 23 5/8 x 2 5/16
(60 x 60 x 5.9 cm)
Courtesy the Artist and Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Fig. 135
Atmosphere Chromoplastique No. 222
1969
Acrylic on wood relief
47 5/8 x 47 5/8 x 2 3/4 in.
(121 x 121 x 7 cm)
Private collection, Miami, Florida
Courtesy of Sicardi Gallery, Houston, Texas © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

CLAUDE TOUSIGNANT
Canadian, born 1932

Fig. 160
Chromatic Accelerator (Accélérateur chromatique)
1968
Acrylic on canvas
84 in. diameter (213.4 cm)
Collection of the artist, Quebec, Canada
© Claude Tousignant 2006

JAMES TURRELL
American, born 1943

Fig. 180
Juke Green
1968
Cross corner light projection
Dimensions variable
Courtesy of PaceWildenstein, New York, New York and © James Turrell. Photography by Kerry Ryan McFate

GEORGES VANTONGERLOO
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Fig. 43
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1924
Cement cast, painted white
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VICTOR VASARELY
French, born Hungary, 1906–1997

Fig. 47
Vega
1957
Acrylic on canvas
100 x 73 in.
(254 x 185.4 cm)
Collection of Charles Fimonyi, Seattle, Washington
Courtesy of Michéle Vasarely. Photograph © 1999 Eduardo Calderón© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Fig. 87
Vega Or
1969
Oil on masonite
19 3/4 x 19 in.
(50.2 x 48.3 cm)
Collection of Charles Fimonyi, Seattle, Washington
Courtesy of Michéle Vasarely. Photograph © 1999 Eduardo Calderón © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

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Vonal Lila
1968
Acrylic on canvas
56 1/4 x 56 1/4 in.
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Collection of Charles Fimonyi, Seattle, Washington
Courtesy of Michéle Vasarely. Photograph © 1999 Eduardo Calderón© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

Fig. 100
Lux Novae
1962
Acrylic on canvas
76 3/8 x 45 11/16 in. (194 x 116 cm)
Courtesy of Michele Vasarely and the Vasarely Estate © 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

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Casein on masonite mounted on panel
32 x 29 1/2 in. (81.3 x 74.9 cm)
Collection of Neil K. Rector, Columbus, Ohio
© 2006 Artists Rights Society (ARS), New York/ADAGP, Paris

GERHARD VON GRAEVENITZ
German, 1934–1983

Fig. 168
Untitled
1964
Wood, plastic, and motor
32 1/2 in. diameter x 3 in.
(82.6 x 7.6 cm)
Miami University Art Museum, Oxford, Ohio: Gift of Debra and Robert Mayer from the Robert B. Mayer Memorial Loan Collection. 1984.9
© 2006 Artists Rights Society (ARS), New York/Beeldrecht, Amsterdam

ANDY WARHOL
American, 1928–1987

Fig. 85
Optical Car Crash
1962
Silkscreen on linen
81 7/8 x 82 1/8 in. (208 x 208.5 cm)
Kunstmuseum Basel, Basel, Switzerland: G 1970.4
Photography by Kunstmuseum Basel, Martin Bühler. © 2006 Andy Warhol Foundation for the Visual Arts/ARS, New York

LUDWIG WILDING
German, born 1927

Fig. 28
Black Sun (Sonne Schwarz)
1966
Wood, Plexiglas, and acrylic, edn 10/10
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Collection of the artist
Courtesy of the Artist

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Wood, Plexiglas, and acrylic, edn 7/10
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(75 x 75 x 8 cm)
Collection of the artist
Courtesy of the Artist

JUD YALKUT
American, born 1938

Figs. 192a, 192b
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Courtesy of Jud Yalkut/USCO

JEAN-PIERRE YVARAL
French, 1934–2002

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Painted wood and vinyl tubing (three views)
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Miami University Art Museum, Oxford, Ohio: Gift of Beatrice Cummings Mayer. 1991.529
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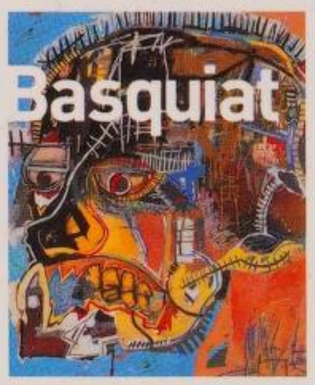
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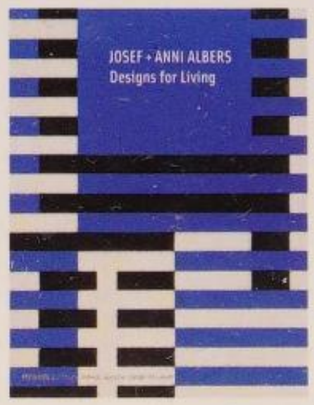
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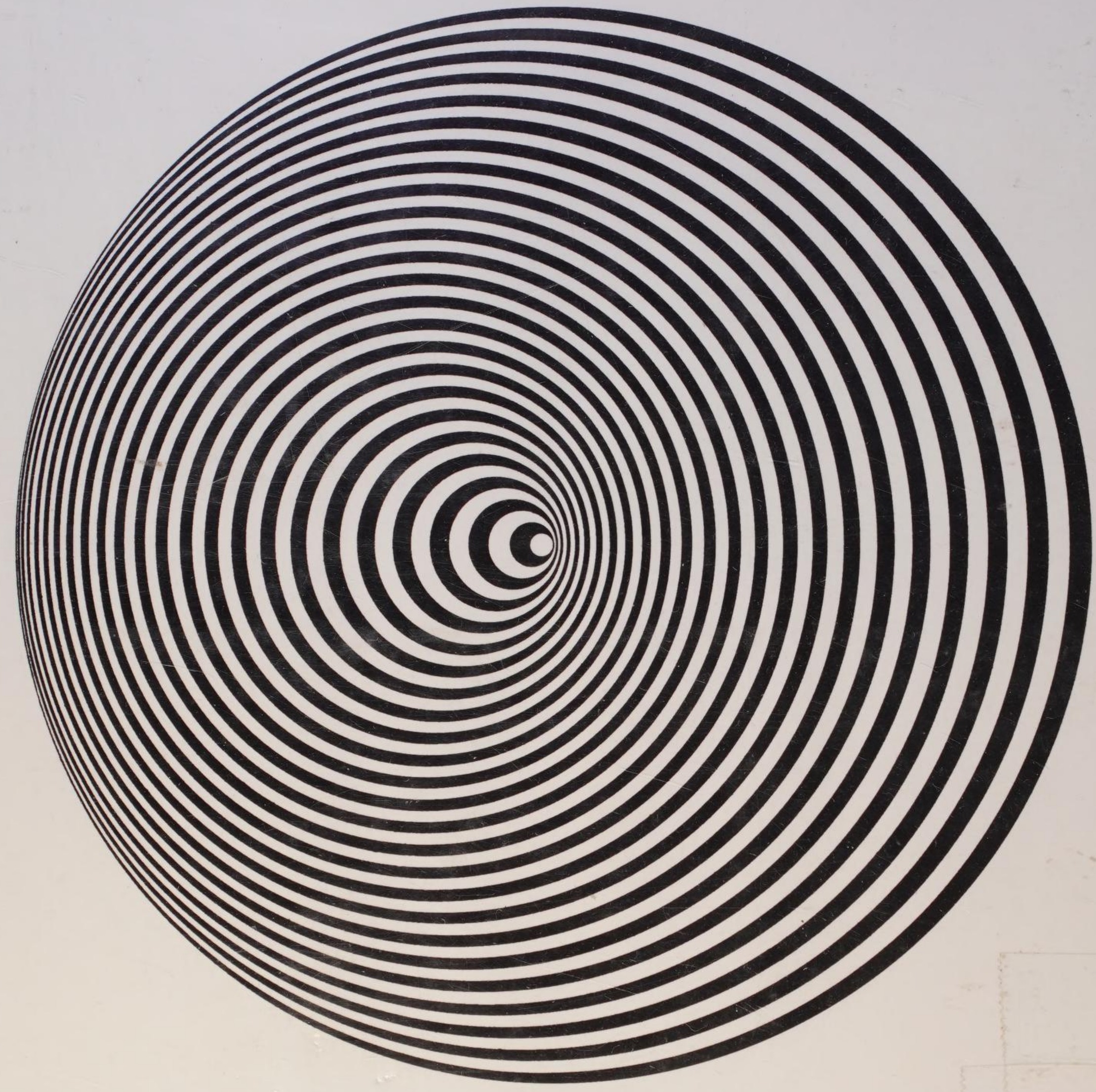


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