THE ANIMATE OBJECT OF KINETIC ART, 1955-1968

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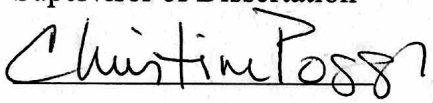

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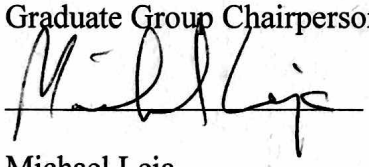

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ABSTRACT

THE ANIMATE OBJECT OF KINETIC ART, 1955-1968

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This dissertation examines the development of kinetic art—a genre comprising motorized, manipulable, and otherwise transformable objects—in Europe and the United States from 1955 to 1968. Despite kinetic art's popularity in its moment, existing scholarly narratives often treat the movement as a positivist affirmation of postwar technology or an art of mere entertainment. This dissertation is the first comprehensive scholarly project to resituate the movement within the history of performance and "live" art forms, by looking closely at how artists created objects that behaved in complex, often unpredictable ways in real time. It argues that the critical debates concerning agency and intention that surrounded moving artworks should be understood within broader aesthetic and social concerns in the postwar period—from artists' attempts to grapple with the legacy of modernist abstraction, to popular attitudes toward the rise of automated labor and cybernetics. It further draws from contemporaneous phenomenological discourses to consider the ways kinetic artworks modulated viewers' experiences of artistic duration. Structured around case studies of four artists, the chapters draw from archival material and close examinations of artworks to elucidate diverse approaches to the kinetic. Chapter One examines Jean Tinguely's early motorized reliefs, modeled on the paintings

of the historical avant-garde, and argues that their shifting compositions enact an intensifying doubt about the principles of abstract composition. Chapter Two addresses Pol Bury's exploration of perception in his slow-moving objects, linking the intense experiences of anticipation and suspense they generate to their Cold War context. Chapter Three treats Gianni Colombo's flexible rubber and Styrofoam artworks, connecting them to the burgeoning field of Italian design and Umberto Eco's nascent concept of the "open work." Finally, Chapter Four investigates Robert Breer's *Float* sculptures, and demonstrates how these works parody Minimalist principles while also intervening into cybernetic debates about behavior and intentionality in self-driven objects. While grounded in the postwar period, this project intersects with contemporary scholarly interests in performance, animation, and materiality.

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INTRODUCTION

> *"The originality of the new art lies in the instability of the medium. The metamorphosis is played out in the heart of the material, which bears the message of the work… The aesthetic happening takes place before our very eyes: we observe the work as it is born, moves, vibrates, consumes energy, dies and is reborn."*[1] -Jean Clay, *Robho,* 1967

Kinetic art made its debut at Denise René's Parisian gallery in the 1955 exhibition *Le Mouvement.* The show featured wall-mounted reliefs with geometric parts that could be detached and rearranged, a motorized device that produced drawings with a spindly robotic arm, and a sculpture that apparently possessed the ability to walk all by itself.[2] Critics struggled to name this new art, proposing the terms "automata," "mechanical reliefs," and "animated paintings."[3] In the years following the exhibition, kinetic art quickly exploded, drew large numbers of artists and intense critical attention, and then nearly as quickly burned out, leaving behind artifacts to languish in museum storage. The very nature of the objects—like the genre itself—seemed temporary: they were prone to breaking down, to requiring new wiring, motors, drive belts, or light bulbs. A 1965 *New Yorker* cartoon made light of the problem [Fig. 0.1]. An elegantly dressed couple in an art gallery observes a kinetic sculpture, a vigorously moving jumble of spinning panels and

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[1] Jean Clay, "La peinture est finie," *Robho,* no. 1 (June 1967): n.p., translated as "Painting—A Thing of the Past," *Studio International* 174, no. 891 (July/August 1967): 12-17.

[2] René Barotte, "Le Journal des arts: A l'Exposition du Mouvement: Toiles en pièces détachées et statues qui marchent toutes seules!," *Paris-presse-l'intransigeant,* April 19, 1955.

[3] The French terms used are "automates" (R.V. Gindertael, in the exhibition brochure for *Tinguely* at the Galerie Arnaud, Paris, May 27-June 9, 1954); "reliefs mécaniques" (in the exhibition *Automates, sculptures et reliefs mécaniques de Tinguely* at Studio d'architettura b. 24, Milan, December 4-31, 1954); and "tableaux animés" (in, for instance, Roger Bordier, "Une nouvelle exposition de tableaux animés de Tinguely, Galerie Arnaud," *Art d'aujourd'hui* 5, no. 7 [November 1954]: 30).

gears plugged into the wall behind it. While the woman studies a price list, the man turns to the gallerist beside him and asks, "But what about spare parts?"

Despite the movement's fairly short lifespan, kinetic art's flexible objects raised important questions regarding the legacy of abstraction, the relationship of motion and materiality, and the shifting nature of artistic authorship. These themes have yet to be explored in depth, although scholarship and museum exhibitions have in recent years begun to reexamine the movement's import.[4] It is clear, however, that kinetic art exists uncomfortably within the period's dominant narratives. Based primarily in Europe, kinetic artists found themselves overshadowed by—and often imagined themselves swimming against—the rising tide of Abstract Expressionist painting in the United States. They continued to grapple with the legacies of Constructivism, the Bauhaus, and the geometric, nonobjective painting that still dominated Paris and other European urban centers, while anticipating the major issues that artists would confront in the coming decades, from the nature of performance to the possibility of rendering art ephemeral.

Kinetic art retained an allegiance to prewar modernism but also pushed against its limits. Especially in the early days of the movement, many artists adhered to a strict abstract vocabulary, employing geometric forms that could have been plucked from Kazimir Malevich paintings; they investigated the problem of compositional motivation; they frequently hung their moving objects on the wall, like paintings. Yet by introducing movement, they also struck at the heart of certain modernist principles. Scholars have argued that modernism intensified a condition of painting that had been established from

[4] Recent exhibitions include *Tinguely* (Düsseldorf: Museum Kunstpalast; Amsterdam: Stedelijk, 2016), Serge Lemoine, *Dynamo: Un siècle de lumière et de mouvement dans l'art, 1913-2013* (Paris: Grand Palais, 2013), and Valerie Hillings, *ZERO: Countdown to Tomorrow, 1950s-60s* (New York: Guggenheim, 2014).

the Renaissance onward: to give an "all-at-once" view, a pure experience of the "now."[5] Painting was to exist in a separate realm, bracketed from real space and time. In contrast, kinetic artists created works whose appearances changed over time, displaying arrangements of parts and sequences of behavior beyond what their creators could accurately predict; the artists ensured that every viewer witnessed only a partial view of the work at hand. Abandoning art's claims to timelessness, they introduced rich experiences of time inflected by expectations and memories. The complex, hybrid nature of the genre marks a transitional moment in art history, one that warrants a more thorough and rigorous examination.

***

Much effort has been devoted to debating the boundaries of kinetic art. The important scholar and critic Frank Popper, in a 1968 volume that remains the most comprehensive text on the movement, proposed that kinetic art comprises two subsets: art objects in actual movement, powered by motors or natural forces, and works in virtual movement, which employ optical effects to produce the impression of motion, or invite intermittent participation on the part of the viewer.[6] That same year, Guy Brett—another key critic and curator of this work—argued for an even broader definition, writing that the term "kinetic art" could describe any artwork that "extends in time as well as in space."[7] (In a later exhibition, Brett juxtaposed the jittery, hallucinatory drawings of Henri Michaux and Wols alongside motorized sculptures by kinetic artists such as Jean

[5] Rosalind Krauss, *The Optical Unconscious* (Cambridge, Mass.: MIT Press, 1993), 213.
[6] Frank Popper, *Origins and Development of Kinetic Art,* trans. Stephen Bann (Greenwich, Conn.: New York Graphic Society, 1968), 93, 121.
[7] Guy Brett, *Kinetic Art* (London: Studio-Vista, 1968), 9.

Tinguely.[8]) Of course, both Popper's and Brett's definitions are so expansive that it becomes difficult to think of any artwork that does not in some sense satisfy their conditions. Rather than revisiting debates on categorization, I employ the term "kinetic art" in a more restricted sense: to refer to constructed artworks that produce real movement in space, primarily through mechanical processes. These literally moving artworks share important qualities, and concentrating on them exclusively allows the peculiarities of the genre to come into sharper relief.

By approaching kinetic art through a narrower lens, my dissertation lays out a two-part argument to account for the genre's significance within its historical moment, and to analyze its continued theoretical force. First, I resituate kinetic art as a crucial step in the history of performance and "live" art forms—but one in which objects themselves, rather than human bodies, were the primary actors. In the American context, we generally understand Happenings, performance art, and related forms as having grown out of action painting: the latter emphasized spontaneous gesture over composition, employed allover forms that ignored the boundary of the frame, and, by emphasizing the activity of the artist, seemed to merge the spaces and temporalities of art and life.[9] By the mid-1950s, kinetic artists had already explored the possibilities afforded by art that changes and develops in real time, although in their work it is the object—rather than the human body—that acts.

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[8] Brett, *Force Fields: Phases of the Kinetic* (Barcelona: Museu d'art contemporani, 2000).

[9] These claims are made by Allan Kaprow in "The Legacy of Jackson Pollock." Kaprow also implies a temporality in the allover structure of Pollock's paintings: they seem to "[go] on forever… refusing to accept the artificiality of an ending." Allan Kaprow, "The Legacy of Jackson Pollock," *Art News* 57, no. 6 (October 1958): 24-26, 55-57.

What might have spurred kinetic artists to introduce motion into their work? For many practitioners working after World War II, kineticism grew out of a questioning, suspicion, or anxiety surrounding conventionally accepted ideas about painterly composition. By the early 1950s, some artists working within geometric abstraction were pronouncing rigid principles regarding the necessity of pictorial balance and of finding a single, correct arrangement of parts. Early kinetic artists challenged this view: they adopted "live" motion as a means of rendering a composition more malleable, choosing multiplicity over singularity, open-endedness over certainty. In many ways, these practitioners employed kineticism as a testing ground for the principles of abstract painting, observing whether their works still "held" even as their parts were set in motion. Some described movement as a way to prolong the process of composing into infinity, denying it any closure. Others—particularly as the movement blossomed in the later 1950s and '60s—understood the act of setting art in motion as a means to distance their work from their own subjectivity. "I constructed these reliefs as paintings in which poetry intervened despite me," Tinguely explained of his early kinetic objects in 1966.[10] Allowing the work itself to perform was a means of delegating compositional responsibility away from the author.[11]

The simultaneous rise of kinetic art and performance attests to an intensified interest in artistic temporality and duration in the 1950s and '60s. Noting this commonality, a number of scholars have previously linked kinetic art to performance. In

[10] Alain Jouffroy, "Jean Tinguely," *L'Oeil,* no. 136 (April 1966): 36.
[11] This aspect of kinetic art can be related to what Yves-Alain Bois has called the "noncompositional" drive of twentieth century art, as I discuss in Chapter 1. See, for instance, Bois, "Ellsworth Kelly in France: Anti-Composition in Its Many Guises," in *Ellsworth Kelly: The Years in France, 1948-1954* (Washington, D.C.: National Gallery of Art, 1992), 9-36.

Passages in Modern Sculpture, Rosalind Krauss argues that "theatricality is an umbrella term," which encompasses happenings, kinetic art, and other forms.[12] In an essay on Latin American art of the 1960s and '70s, Brett has suggested that a "live element" cuts across medium categories—from performance to kinetic art—in this period.[13] Although "liveness" is a term normally applied to music and theater, the term is useful in that it is distinct from duration. For example, a film that records a past event, which is subsequently replayed in a two-dimensional light projection, can be described as durational but not "live." Kinetic art and performance both involve a temporal unfolding that happens in the same physical space and time as the viewer's body.

My aim here, however, is less to observe the category-level similarities that exist between the two movements than to explore what is distinct about kinetic art: its fusion of "live" duration with the material object. This is not to say that performance lacks materiality. Bodies are material, and much performance art emphasized this quality—from Carolee Schneemann's *Meat Joy* (1964), with its nude performers rolling in animal flesh, to Vito Acconci's *Trademarks* (1970), in which the artist bit imprints into his own

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[12] Rosalind Krauss, *Passages in Modern Sculpture* (Cambridge, Mass.: MIT Press, 1977), 204. Alex Potts notes an interplay between the rise of durational works—whether performative or kinetic—and a growing awareness of the temporal nature of viewing; see Potts, *The Sculptural Imagination: Figurative, Modernist, Minimalist* (New Haven: Yale University Press, 2000), 9-10. Pamela Lee includes discussions of kinetic art and performance in relation to changing conceptions of time in *Chronophobia: On Time in the Art of the 1960s* (Cambridge, Mass.: MIT Press, 2004). Finally, the Tate's recent exhibition on Alexander Calder examines the terms of performance and sculpture in an earlier moment. See particularly Penelope Curtis, "Performance or Post-Performance," in *Alexander Calder: Performing Sculpture,* ed. Achim Borchardt-Hume (New Haven: Yale University Press, 2015), 11-19.

[13] Guy Brett, "Life Strategies: Overview and Selection, Buenos Aires/London/Rio de Janeiro/Santiago de Chile, 1960-1980," in *Out of Actions: Between Performance and the Object, 1949-1979,* ed. Paul Schimmel (Los Angeles, Calif.: The Museum of Contemporary Art; New York: Thames and Hudson, 1998), 197.

skin. Recent scholarship has also examined the place of objects within performance. For example, Paul Schimmel's *Out of Actions: Between Performance and the Object, 1949-1979* examined the "residue" of performance, from props to new artworks generated during artistic events.[14] Yet a central aim of much early performance art was its ephemerality, the fact that it relied on the passing action of a human subject who would return to his or her everyday life following the event. In theory, at least, the siting of the artwork in the activity of a human subject would resist the pull of commodification. In their essay "The Dematerialization of the Art Object" (1968), Lucy Lippard and John Chandler name "performance attitudes" as a step along the way to the fuller dematerialization of the art object characteristic of conceptualism.[15]

While the actions of kinetic artworks may be transitory, they are inextricably linked to the solid presence of objects. Art conservators have perhaps stated this fact in its most precise terms. Kinetic artworks, they observe, possess distinct "on" and "off" modes: in the latter, they persist in a frozen state in which only their material basis, and not their time-based performance, is expressed. In effect, "The artwork exists as a whole only in the *on* mode, yet it is inconceivable without the *off* mode."[16] Owing to the natural wear and tear of mechanical systems—compounded by the fact that kinetic artists often worked with found materials and possessed minimal technical proficiency—these works

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[14] Paul Schimmel, "Introduction and Acknowledgments," in *Out of Actions*, 11.
[15] Lucy Lippard and John Chandler, "The Dematerialization of Art," in Lippard, *Changing: Essays in Art Criticism* (New York: Dutton, 1971), 259. Originally published in *Art International* 12, no. 2 (February 1968). Although her focus is on conceptual art, Lippard gives a brief nod to performance in the preface of *Six Years: The Dematerialization of the Art Object from 1966 to 1972* (New York: Praeger, 1973), 6.
[16] Reinhard Bek, "Between Ephemeral and Material – Documentation and Preservation of Technology-Based Works of Art," in *Inside Installations: Theory and Practice in the Care of Complex Artworks,* ed. Tatja Scholte and Glenn Wharton (Amsterdam: Amsterdam University Press, 2011), 206.

present notoriously difficult material concerns. They sometimes break down, requiring new parts and repairs to restore their function; or they may survive in material form only, becoming what some call a "relic."[17]

Kinetic art's dual nature has a number of ramifications. For one, material factors seriously constrain the nature of the object's performance. Kinetic artists and their critics quickly noticed that artworks employing motors, which generate repetitive rotational movement, themselves tend toward repetition; artists invented various strategies to combat or work with this tendency, as I will show in the second part of my argument. Another effect of durational, material artworks is that they frequently create the uncanny impression of animacy: they appeal to a childlike, deeply rooted tendency to see things that move as alive. Animistic language pervades period reviews of kinetic art. Critics compared kinetic objects to organisms from another world; they referred to sculptures as breathing or holding conversations; they attributed personalities to them, finding them lazy, violent, or moody.

The moving objects of kinetic art also created surprising shifts in the nature of artistic spectatorship. Such objects seemed to shape the behavior of their viewers, often causing them to freeze in place. Viewers sensed that they had lost mastery over kinetic artworks, or even imagined that the roles had been reversed and the works were now watching them.[18] The experience might also evoke the phenomenon of hypnosis, with its concomitant loss of critical distance. To understand this pattern, we might turn to

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[17] Ibid., 210.

[18] The critic Michel Zerbib, viewing kinetic art at Paris's Galerie Diderot, wrote that the work "becomes the Observer, while the art connoisseur freezes with astonishment and becomes canvas." Zerbib, *Structures Vivantes: Bury, Soto, Takis* (Paris: Galerie Diderot, 1963), 11.

Kenneth Gross's study of the enduring fantasy of moving statues in literature and art. Gross surveys stories from the Pygmalion myth to Pushkin's bronze horseman to think about why we are both attracted to, and repelled by the idea of a sculpture come to life. "The face of objects granted a more than ordinary life becomes the face of Medusa," he writes; such objects render the human viewer momentarily immobile.[19] That is, the animation of the object brings with it a "simultaneous objectification of the human, in which the life released in the object entraps us in turn"—an inversion that may be frightening or pleasurable.[20] These stories show, in Gross's words, "how images of animation and petrification circulate around each other, how they collide and parody each other."[21] Kinetic art, by introducing live action into a traditionally immobile form, produced similar collisions.

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While the first part of my argument focuses on the "liveness" of kinetic objects, the second half considers the nature of their action. Assembled from commercial motors and simple mechanical parts, moving artworks tended toward regular, cyclical activities. Noting these constraints, critics often remarked that kinetic art risked becoming repetitive and, hence, uninteresting. Aware of this apparent danger, artists set out to produce works that—while employing predictable power sources, such as motors—produced an outcome of, or at least gave the impression of, irregularity and novelty. They chose a variety of techniques to achieve this end, including building assemblages of numerous moving parts whose complex, shifting relationships made it difficult for a viewer to form a coherent

[19] Kenneth Gross, *The Dream of the Moving Statue* (Ithaca, N.Y.: Cornell University Press, 1992), 202.
[20] Ibid., 9.
[21] Ibid.

picture of the entire work. Yet their choices, grounded in physical mechanics, were restricted: the actions of any artwork remained within a delimited field of possibility.

At the same time that kinetic art risked being monotonous, it also at times verged on being too eventful. In a little-known essay from 1967, the New York critic Harold Rosenberg argued that kinetic art marked the culmination of a gradual conversion of art into "event"—a phenomenon visible in an earlier form in the action painting of Abstract Expressionism. For Rosenberg, the replacement of "pictures" with "occurrences" marked the end of traditional artistic contemplation.[22] Such a result was largely inevitable, he argued, in the technological context of the 1960s, in which television, household appliances, and toy gadgets competed for attention through the use of movement and flashing lights.

The question, then, is: how might we reconcile these two pictures of kinetic art: one in which too little happens, and one in which too much happens? To do so requires some specificity on the nature of these happenings. Looking closely at kinetic reliefs, sculptures, and other devices of the 1950s and '60s, we see that the majority of moving art takes the particular form of constant activity, without "event." To differentiate between the event and eventlessness is to distinguish the bare fact of something taking place—a change in position or state—from a notable, and more rare, occurrence that stands out because it marks a culmination, turning point, or resolution. The movements of Tinguely's mid-1950s meta-mechanical reliefs, built from groups of geometrical cutouts that rotate at different speeds, are difficult to predict in precise detail, but they conform to a general horizon of expectation. In contrast, Tinguely's 1960 *Homage to New York,* with

[22] Harold Rosenberg, "Movement in Art," *Vogue,* February 1, 1967: 170-171; 213.

its singular, dramatic explosion in the Museum of Modern Art's Sculpture Garden, constitutes an event. This dissertation focuses on the former mode, which—although far more widespread—has been little examined.

There is a long tradition of thinking about events and eventlessness in philosophy, literature, and film. Michael Sayeau has recently argued that a de-emphasis on the event is a characteristic feature of modernist literature, as seen in works by Robert Musil, Marcel Proust, Virginia Woolf, and others, which focus on everyday experience, near stasis, and the failure of meaning to cohere.[23] While the mode of eventlessness is perhaps easier to perceive in traditionally narrative-based forms such as literature, it has clear applications to time-based sculptural art. Kinetic artists took advantage of the material limitations of their form to explore the modalities of non-eventful time. They investigated time as many of us experience it for much of our lives: "a process of going on until something happens, and then back to the going on."[24] These explorations could take on various resonances. Some artists wanted to create a diffuse awareness of change. Others deliberately cultivated a sense of suspense—a feeling that something might take place—but held off the event in perpetuity. In some ways, this practice of replacing the traditional narrative structuring of time with a stream of aimless "goings on" echoed the painterly strategies of non-hierarchical composition or all-overness, translating them into temporal form. Behind these modes could also lie an ethical stance: artists asked viewers to accept impermanence, to acknowledge the limits of their perception, and to live with situations that lacked any ultimate resolution or clear meaning.

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[23] Michael Sayeau, *Against the Event: The Everyday and the Evolution of Modernist Narrative* (Oxford: Oxford University Press, 2013).
[24] Kathleen Stewart, *Ordinary Affects* (Durham: Duke University Press, 2007), 10.

From the moment of its debut, many observers have claimed that kinetic art holds a particular relationship to the present tense. This claim, however, demonstrates a confusion of "liveness" with "presentness." Throughout this dissertation, I aim to complicate this equation by explaining specifically how viewers encounter real-time action in modes that go beyond a simple experience of the present. Phenomenology, with its rich accounts of lived temporal experience, provides a useful framework, and one that is historically apt as it informed the thinking of many kinetic artists during this period. I frequently turn to the thinking of Edmund Husserl, who argued that the present has "width": it coexists with retention and protention, the involuntary processes of memory and anticipation that allow us to experience the world around us as continuous, rather than as a series of distinct "now" moments. I touch on the work of Jacques Derrida, who critiqued Husserl to argue that any experience of the present is subject to constant deferral; in his terms, the now, "*maintenant*" must be actively "maintained" by deliberately fighting our psychic pull toward past and future. I turn to other critical thinkers, and to the artworks themselves, to imagine how the present—with all its temporal complexity—is always open to reimagination.

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The two halves of this argument—the first regarding the nature of object performance, and the second regarding the relationship between movement and event—may initially seem distinct, but they overlap considerably. Clement Greenberg connects these themes in an essay he wrote on Calder in 1943. The world of the mobiles, he remarks, "lacks history": "*Lots of things go on in it but nothing happens*; for its laws have no necessity and are not sufficiently determined by a driving purpose working itself out

variously and progressively in fulfillment of the will or inherent nature of its creator."[25] That is, Greenberg argues that the mobiles—whose movements are largely unmotivated by human choice—are devoid of history *because* they lack a guiding subjectivity. For the critic, history and meaning depend on motivation and intentionality, on the deliberate construction of progress. Rosenberg makes a similar point in the conclusion of his 1967 essay. Kinetic art, he argues, tends increasingly toward pure energy divorced from any guiding plan, but "the art act… begins and ends in a particular person."[26] The four artists I examine in this dissertation were forced to wrestle with this dilemma: is authorial intent necessary to create meaning, or can meaning arise within a structure marked by open-endedness, instability, and inconclusiveness?

The critical discourse around kinetic art, then, raises questions about the nature of intention: who or what possesses it, and how does its absence affect our interpretation of events? These notions arose during a specific historical moment in which a similar discourse was being conducted across various disciplines and throughout several continents. In Europe and the United States in the decades after World War II, the growing science of cybernetics instigated a change in the concept of a machine, no longer conceived as self-contained but rather as actively communicating with its surroundings. Norbert Wiener, the inventor of the term "cybernetics," describes this shift as one from "power" to "communication" engineering. That is, the newest automatic machines did not simply produce force but controlled this force on their own, seeming to take on

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[25] Clement Greenberg, "Review of Exhibitions of Alexander Calder and Giorgio de Chirico," in *Clement Greenberg: The Collected Essays and Criticism, Volume 1: Perceptions and Judgments, 1939-1944,* ed. John O'Brian (Chicago: University of Chicago Press, 1988-95), 159. Originally published in *The Nation,* October 23, 1943. Italics are mine.

[26] Rosenberg, "Movement in Art," 213.

human-like powers of receptivity and decision-making in the process. As Wiener remarks, modern automata are "coupled to the outside world," receiving information and carrying out actions with "sense organs, effectors, and the equivalent of a nervous system"; as a result, "they lend themselves very well to description in physiological terms."[27]

Jean Baudrillard, too, observes this sense of animacy in the popular automatic objects of everyday domestic life. Modern man, he writes in 1968, increasingly desires objects that work "by themselves," from dishwashers to more frivolous automated gadgets. "Because the automated object 'works by itself,'" he notes, "its resemblance to the autonomous human being is unmistakable, and the fascination thus created carries the day. We are in the presence of a new anthropomorphism."[28] These discourses around cybernetics and automation drew a constantly shifting boundary between people and objects, thereby providing a cultural context for kinetic art's exploration of the agentic object.

Although they worked within this context of technological change, kinetic artists also departed from it by deliberately constructing "useless" objects: their moving reliefs and sculptures, despite consuming electricity and battery power, lacked any function whatsoever. Existing scholarship on kinetic art often emphasizes its technological optimism—the idea that artists took advantage of newly developed materials and techniques to produce high-tech art objects that, in turn, affirmed the positive value of postwar technology. Indeed, kinetic artists themselves took up this rhetoric at times. Yet

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[27] Norbert Wiener, *Cybernetics: Or, Control and Communication in the Animal and the Machine* [1948], 2nd ed. (New York: M.I.T. Press, 1961), 43.
[28] Jean Baudrillard, *The System of Objects* [1968], trans. James Benedict (New York: Verso, 1996), 111.

the works tell a different story. Artists repurposed motors from record players or children's toys, cobbled together pulleys, and housed their mechanisms in handmade wooden boxes. The resulting objects were fragile and frequently broke down; Hans Haacke once aptly compared them to "pets or bonsai trees that require constant care."[29]

It might be argued that such "useless" objects conform to Immanuel Kant's classic understanding of art as lacking a utilitarian function.[30] On the other hand, kinetic artworks parody this idea by adopting certain marks of functionality—motors and gears, for example—while divesting them of all practical end. In the process, they sharply oppose the emphasis on efficiency and smooth production so closely linked with the machine in the twentieth century. While cybernetics and automation aimed to solve specific economic and political problems, kinetic art constructed self-driven objects whose purposes were deliberately opaque or unknowable.

Animation and Animacy

The title of my dissertation refers to the "animate object" of kinetic art. In part, I have taken this term from the writings of the period: critics in the mid-1950s, for example, referred to kinetic reliefs as "animated paintings."[31] They also compared

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[29] Jack Burnham, "Hans Haacke Wind and Water Sculpture [Interview]," in *Force Fields: Phases of the Kinetic* (Museu d'Art Contemporani, Barcelona, and Hayward Gallery, London, 2000)*,* 297. Originally published in *Tri-Quarterly Supplement* (Northwestern University), no. 1 (Spring 1967).

[30] Kant's phrasing is that aesthetic beauty possesses "purposiveness without a purpose." Immanuel Kant, *Critique of Judgment,* trans. James Creed Meredith, ed. Nicholas Walker (Oxford: Oxford University Press, 2007), 57.

[31] See R.V. Gindertael, in *Tinguely* (Paris: Galerie Arnaud, 1954), n.p.

moving sculptures to animals and other biological life, and described them as leading lives of their own.[32]

What is meant by animacy? The word derives from *anima,* meaning breath or soul, and refers to something that is living. But "to animate" also refers to the production of movement by artistic means, as in animated film. In his work on cinematic animation, Tom Gunning proposes a useful distinction between what he calls "animation[1]" and "animation[2]": the former refers to the technical production of motion, while the second refers to the play with motion that appears in animated films: a sense of wonder at normally inert things coming alive.[33] Gunning's argument depends on film's structuring through the "instant"—that is, the individual, still frame that lies at the heart of film, and which yields to an experience of continuity during projection. This structure does not apply to moving sculpture, which is by nature materially continuous. Yet Gunning's argument gives a sense of the easy slippage between the two meanings of "animate": how technical animation can easily produce the impression of animacy.

Recent work has sought to expand the meaning of "animation" beyond the cinematic context. Suzanne Buchan's essay collection *Pervasive Animation,* for instance, includes discussion of an "expanded phylum" of case studies from Hans Bellmer's dolls, to the Quay brothers' puppet films, to Robert Breer's kinetic sculpture, emphasizing the always polymorphous, boundary-crossing nature of animation.[34] While not engaging with

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[32] Such comparisons abound, for instance, in John Canaday, "Art: Pol Bury's Sculptures at Lefebre's," *New York Times*, October 17, 1964.
[33] Tom Gunning, "Animating the Instant: The Secret Symmetry between Animation and Photography," in *Animating Film Theory*, ed. Karen Beckman (Durham: Duke University Press, 2014), 37-53.
[34] Siegfried Zielinski, "Expanded Animation," in *Pervasive Animation*, ed. Suzanne Buchan (New York: Routledge, 2013), 28. See also Buchan, "Introduction: Pervasive

the debates on the role of animation in cinema, my dissertation situates kinetic art within this broader landscape. That is, it aims to understand moving art as a genre that both brings movement to normally inert materials and that, in the process, may produce the impression of lifelike, autonomous behavior. As such, it is also compatible with recent scholarly explorations of the capacity of objects to "act as quasi agents or forces with trajectories, propensities, or tendencies of their own," in Jane Bennett's words.[35]

There are limitations, of course, in applying the metaphor of animacy to kinetic art. Even moving objects cannot escape the range of behavior that the artist has given them; most cannot respond to feedback from their environments, and they do not grow over time or reproduce. Yet the details—if not the overall scope—of such works' behavior are not precisely predictable or foreseeable by their creators, and it is this complexity that often evokes in viewers the impression of independent, self-motivated activity.

One early commenter who linked kinetic art to themes of animacy was Jack Burnham. Burnham's *Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of This Century* (1968), presents a sweeping analysis of twentieth-century sculpture, which the author believes owed a huge debt to developments in the scientific realm. Tracing the movement of sculpture toward greater openness, flexibility, and interchangeability of parts—in sum, toward an emphasis on the "system" rather than the object—Burnham argues that modern sculpture is "a preparatory stage representing

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Animation," 1-21, and the discussion of Breer in Edwin Carels, "Space of Wonder: Animation and Museology," 302-305.

[35] Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham: Duke University Press, 2010), viii.

steps toward the simulation of biological life."[36] Burnham makes many perceptive claims about kinetic artists' interests in intentionality, feedback, and interactivity. Yet he often takes an almost science-fictional tone, proposing that kinetic artists were literally moving toward the simulation of life; in the end, he suggests, art will disappear entirely into science and technology. As a side effect of this argument, Burnham favors art that most closely approaches the achievements of advanced technology, assuming that artists' ultimate goal is seamless industrial perfection. He offers only sporadic comments on the potential for kinetic art to critique—to embrace uselessness and waste in a culture obsessed with efficiency, or to present alternatives to strict means-ends rationality.

The artistic use of animacy has sometimes been charged with a loss of critical distance or seen as a retrograde return to representation. In *Passages in Modern Sculpture*, Krauss similarly disputes Burnham's narrative. She asserts that kinetic sculpture, by generating "a sense of itself as an actor" through its movements, belongs to the realm of theatricality.[37] Yet, she argues, not all theatrical works of art are created equal: some hold radical potential to disrupt viewing patterns, while others simply repeat the conventions of traditional theater. The difference can be seen in two works produced in the interwar period. László Moholy-Nagy's *Light Prop for an Electric Stage (Light/Space Modulator)* (1930), a revolving metallic construction enacting a relatively complex chain of actions (Krauss calls them "gestures,") resembles an automaton or mechanical actor.[38] As such, she argues, it conforms to Burnham's thesis that sculpture is inherently mimetic, that it aspires toward the recreation of life. In contrast to this work,

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[36] Jack Burnham, *Beyond Modern Sculpture: The Effects of Science and Technology on the Sculpture of this Century* (New York: George Braziller, 1968), 5.
[37] Krauss, *Passages*, 204.
[38] Ibid., 208.

she cites Francis Picabia's set for *Relâche* (1924), a curtain made of 370 spotlights, which when lit simultaneously produce a startling, blinding effect on the audience. For Krauss, the violent visual "attack" of this work—which recalls the conditions of Antonin Artaud's "theater of cruelty"—hinders the viewer from feeling any comfortable sense of control over the action.[39] In doing so, the work estranges its audience, by unmasking the arbitrary nature of existing aesthetic, and by extension, social conditions.

Krauss's rigorous analysis champions abstraction over animation, and eventfulness over eventlessness. Yet a closer examination of the range of kinetic work produced in the 1950s and '60s unsettles these binaries. (Indeed, in later works, such as *The Optical Unconscious* and *Formless: A User's Guide*, Krauss herself modified her views on kinetic art, devoting attention, for instance, to the "pulse" in Duchamp's rotating discs.[40]) Estrangement and political critique can indeed arise from works that appeal to animacy, and explorations of repetition, the non-event, and variation within narrow limits do not necessarily unthinkingly conform to convention. A further aim of this dissertation is to analyze artists who worked within these modes and explore their unique approaches to aesthetic and political critique.

The Prewar History of Kineticism

The history of kinetic objects is extensive and wide-ranging, spanning from Renaissance-era automata to popular nineteenth-century amusements, such as

[39] Ibid., 212.
[40] Krauss, *Optical Unconscious*; Krauss and Yve-Alain Bois, *Formless: A User's Guide* (New York: Zone Books, 1997).

kaleidoscopes and flipbooks.[41] In the early twentieth century, a number of artists began to incorporate moving mechanisms within a fine-art context. They arrived at these practices within diverse cultural contexts and through a range of motivations and theoretical orientations; for the most part, however, their experiments with motion were tentative and short-lived. In this section, I survey some of the most salient moments in the history of early kinetic art and highlight some of the challenges that these early artists encountered, which the subsequent generation would delve into more profoundly.

In their 1910 "Technical Manifesto of Futurist Painting," the Italian Futurists advocated a more dynamic art that could reflect the nature of a universe in constant change.[42] Two years later, Umberto Boccioni proposed concrete measures to achieve this goal in his "Technical Manifesto of Futurist Sculpture"; he encouraged sculptors to employ mixed media, modern subject matter, and "lines of force" to convey the essential vitality and interpenetration of matter. Boccioni also gestured toward the inclusion of actual movement in sculpture, remarking, "If a composition feels the need for a special rhythm of movement that would help or contrast the halted rhythm of the *sculptural ensemble* (a necessity of the work of art), any type of mechanism that can provide the rhythmic movement adequate to the planes and lines can be applied."[43] In a French-language version of the manifesto, published to accompany a 1913 exhibition at the

[41] For a short discussion of this history, see Popper, *Origins and Development,* 121-122.
[42] Umberto Boccioni, Carlo Carrà, Luigi Russolo, Giacomo Balla, and Gino Severini, "Technical Manifesto of Futurist Painting" [April 11, 1910], in Ester Coen, *Umberto Boccioni* (New York: Metropolitan Museum of Art, 1988), 230-231.
[43] Umberto Boccioni, "Technical Manifesto of Futurist Sculpture," trans. Richard Shane Agin and Maria Elena Versari, in *Futurist Painting Sculpture (Plastic Dynamism)* (Los Angeles: Getty Research Institute, 2016), 183.

Galerie La Boëtie, he went further, replacing the phrase "any type of mechanism" with "a little motor."[44] Proclaiming the beauty of technology, the text continues:

> We cannot forget that the ticktock and the movement of a clock, the entrance and exit of a piston in a cylinder, the opening and shutting of two cogs with the continuous appearing and disappearing of their little steel rectangles, the fury of a wheel or the whirl of a propeller are all plastic and pictorial elements that the Futurist sculptural work must use. The opening and closing of a valve creates a rhythm as beautiful as, but infinitely newer than that of, an animal eyelid![45]

Although he produced a significant body of sculptural work, Boccioni does not seem to have produced any works with actual motors. His ideas, however, would influence subsequent kinetic artists. The Futurist context also shaped the career of the Milanese artist Bruno Munari, who exhibited with the group in the 1920s. Munari began to make ceiling-hung mobiles that he called "useless machines" around 1933; while sharing the Futurists' focus on movement, the works nonetheless lack the speed and force called for in the group's manifestoes.

At the same moment that Boccioni advocated the use of motors in art, Marcel Duchamp assembled his *Bicycle Wheel* (1913) by setting a simple wheel on a stool. The piece resided in his Paris studio until it was lost during his move to New York; the artist replicated it in 1916, and then made a second replica for an exhibition at Sidney Janis's gallery in 1951.[46] When kinetic art began to solidify as a genre in the mid-1950s, critics retroactively recognized the work as an important forerunner. Writing to Guy Wheelen in 1955, Duchamp emphasized the importance of motion in *Bicycle Wheel*: he recalled that

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[44] Boccioni, "Technical Manifesto of Futurist Sculpture," in Robert L. Herbert, *Modern Artists on Art,* 2nd edition (Mineola, N.Y.: Dover, 2000), 49. Herbert proposes that Boccioni made this change in order to provoke more sophisticated French audiences. Ibid., 40.
[45] Boccioni, "Technical Manifesto," trans. Agin and Versari, 183.
[46] See the exhibition history of the work in Pontus Hultén, ed., *Marcel Duchamp, Work and Life* (Cambridge, Mass.: MIT Press, 1993).

the wheel's enthralling spinning evoked "the dancing flames of a log fire." The artist added that the movement of the wheel appealed to him "as an antidote to the habitual movement of the individual around the contemplated object."[47] Duchamp therein points to the reversal in habitual viewing patterns that kinetic art effects: the viewer, rather than moving around a sculpture, stands still while the sculpture itself presents ever-new configurations of its own material form.

Two works that Duchamp produced in the 1920s display a more deliberate exploration of movement. Constructed together with Man Ray, his *Rotary Glass Plates (Precision Optics)* (1920) consists of five rectangular glass sheets, painted with black and white lines. A motor causes them to spin, producing a ghostly image of concentric circles [Fig. 0.2]. In 1925, Duchamp produced another kinetic work, *Rotary Demi-sphere (Precision Optics),* in which a rotating, painted half-sphere produces a mesmerizing spiraling effect [Fig. 0.3]. In a letter, Duchamp acknowledged the device's hypnotic quality, referring to it as "the machine to send you to sleep."[48] Duchamp's machines are masterful studies of how motion can generate optical illusion and manipulate the viewer's perception of depth, yet the artist had reservations about his project. In a 1924 letter to Jacques Doucet, he worried that "it could become tedious to see [*Demi-sphere*] rotating too many times." To address this problem, he added engraved words and mottling that

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[47] Letter from Duchamp to Guy Weelen, June 26, 1955, in *Affectionately, Marcel: The Selected Correspondence of Marcel Duchamp,* edited by Francis M. Naumann and Hector Obalk (Ghent: Ludion Press, 2000), 345-346. Weelen was likely writing to Duchamp as part of the research for his book, *Le problème du mouvement dans l'art contemporain.*

[48] Letter from Duchamp to Henri-Pierre Roché, July 15, 1952, in Naumann and Obalk, *Affectionately Marcel*, 317.

would make the object "look curious even when still."[49] The letter presages two concerns that would become pertinent in later kinetic art: first, an uncertainty over the artwork's status when it lay dormant, and second, a fear that the work's repetitive motion could become tiresome. Duchamp ultimately stopped his experiments in kinetic art, perhaps finding the genre's prospects for further development limited.[50] Yet he would become a figurehead for many kinetic artists, who expanded his investigations in unforeseen directions. He became close with Tinguely, in particular, telling Calvin Tompkins in 1964, "I feel with him a closeness and a rapport that I have felt with few other artists."[51]

In post-revolutionary Russia in 1920, Naum Gabo created another early work of motorized kinetic art: the *Kinetic Construction (Standing Wave),* a steel rod that vibrates to produce the impression of a virtual volume [Fig. 0.4]. Gabo described his sculpture as an "illustration" of the "introduction of kinetic rhythms into a constructed sculpture," rather than a completed artwork in itself.[52] The use of movement in Russian art had revolutionary overtones, of course. Gabo worked in a moment in which labor theorists sought to understand and harness movement—conducting detailed studies of efficient motion—to solve the productive problems of the new society. His own work sought a similar sense of efficiency by paring down unnecessary mass and reducing the excessive, accidental, and arbitrary. Gabo would continue to imagine kinetic constructions in the

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[49] Letter from Duchamp to Jacques Doucet, October 20, 1924, in Naumann and Obalk, *Affectionately Marcel,* 147.
[50] Pierre Cabanne, *Duchamp & Co.* (Paris: Terrail, 1997), 162. Cabanne quotes Duchamp as saying that Op and kinetic art do not "offer much scope for future development."
[51] Duchamp, quoted in Calvin Tomkins, *The Bride and the Bachelors* [1965], rev. ed. (New York: Gagosian, 2013), 226.
[52] Naum Gabo and Witt Wittnebert, "Naum Gabo's 'Kinetic Construction': Construction and Reconstruction," in *Gabo on Gabo: Texts and Interviews,* ed. Martin Hammer and Christina Lodder (East Sussex: Artists Bookworks, 2000), 259-262. Originally published in *Techne: A Projects and Process Paper* 1, no. 1 (April 14, 1969).

following years, yet the 1920 object was the first and last that he actually made; he was apparently dissatisfied with the technical means available to him and was displeased by the way the mechanical mechanism intruded into the overall effect of the work.[53]

Finally, Moholy-Nagy completed his *Light Prop for an Electric Stage* in 1930 [Fig. 0.5]. The sculpture consists of a motor-powered rotating base, metal frames and disks, and a metal runner on which a ball slides back and forth. *Light Prop* appeared at the *Exposition de la Société des Artists Décorateurs* Paris in 1930, where it occupied one room of a model apartment designed by Walter Gropius and others. Certain aspects of its installation at this show, however, are not clear. When Moholy-Nagy published an article on *Light Prop* in the journal *Die Form* in 1930, he included a photograph of the work set inside a large box with two circular windows. Hidden colored light bulbs would illuminate the work in a programmed sequence; viewers could presumably observe the body of the machine through the windows. Yet photographs from the Paris exhibition indicate that the box's openings were covered for the occasion, likely with dark glass. Viewers, therefore, may have perceived changing light effects on the glass without being able to see the machine itself directly.[54] *Light Prop* also played a starring role in Moholy-Nagy's film *Lichtspiel: Schwarz Weiss Grau* (1930), which records the machine's

[53] Gabo wrote, "Mechanics has not yet reached that stage of absolute perfection where it can produce real motion in sculptural work without killing, through the mechanical parts, the pure sculptural content; because the motion is of importance and not the mechanism which produces it. Thus the solution of this problem becomes a task for future generations." Gabo, "The Constructive Idea in Art," in Hammer and Lodder, eds., *Gabo on Gabo,* 97-106. Originally published in *Circle: International Survey of Art*, ed. J.L. Martin, Ben Nicholson, and Gabo (London: Faber and Faber, 1937), 1-10.

[54] See Jennifer King, "Back to the Present: Moholy-Nagy's Exhibition Designs," in *Moholy-Nagy: Future Present,* ed. Matthew S. Witkovsky, Carol S. Eliel, and Karole P.B. Vail (New Haven and London: Yale University Press, 2016), 145.

movements while incorporating cinematic effects, such as double exposure.[55] From very early in its history, the *Light Prop*'s function was ambiguous: it could be understood alternatively as a sculpture, a decorative object, a theatrical or filmic apparatus, or as a model for a larger and more complex future work.[56] Although Moholy-Nagy, too, did not pursue the construction of actual kinetic objects at length, his was an important theoretical voice. His book *Vision in Motion* called for the progression of art toward greater dynamism.[57]

The first artist to produce a comprehensive body of work based on movement was Alexander Calder, who began to construct abstract works in motion in 1930, as a member of the Abstraction-Création group in Paris. Among the works that Calder showed in an exhibition at Paris's Galerie Vignon in February 1932, about half had motorized components.[58] While many of his works during this phase took the form of freestanding, open wire sculptures, some mimicked the appearance of painting: *Black Frame,* for instance, includes a spiraling wire that rotates, a painted metal circle that turns between white and yellow sides, and a red ball that flops in and back out of the frame, all powered

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[55] The artist had previously explored many of these effects in his photograms, which he made from 1922 onward. Beginning in 1923, he began to produce photograms using moving objects and light, transforming the works into something like "records of orchestrated darkroom performances." Julie Barten, Sylvie Pénichon, and Carol Stringari, "The Materialization of Light," in Witkovsky, Eliel, and Vail, *Moholy-Nagy,* 189.
[56] Potts, "László Moholy-Nagy: Light Prop For An Electric Stage. 1930," in *Bauhaus 1919-1933: Workshops for Modernity*, ed. Barry Bergdoll and Leah Dickerman (New York: The Museum of Modern Art, 2009), 274-277.
[57] László Moholy-Nagy, *Vision in Motion* (Chicago: P. Theobald, 1947).
[58] Arnauld Pierre, "Painting and Working in the Abstract: Calder's Oeuvre and Constructive Art," in *Alexander Calder: The Paris Years, 1926-1933,* ed. Joan Simon and Brigitte Leal (New York: Whitney Museum; Paris: Centre Pompidou, 2008), 231.

by a motor [Fig. 0.6].[59] In later years, Calder recalled that Duchamp had come up with the name "mobile" to refer to one of these motorized works during a visit to his studio. Calder noted that the word, in French, held a double meaning: something that moves and "motive."[60] This story, in which Duchamp intuited that moving objects seem to carry agentic potential, suggests how questions of intentionality appeared at the very origins of kinetic art. In 1946, Jean-Paul Sartre wrote a review of Calder's exhibition at Galerie Louis Carré that anticipated other important themes. "In his mobiles, the 'devil's share' is probably greater than in any other human creation," Sartre states. "The forces at work are too numerous and complicated for any human mind, even that of their creator, to be able to foresee all their combinations."[61] As I will explore in detail, the complex problem of how to reckon with artworks whose "live" actions exceed even their creators' control would be a major preoccupation for kinetic artists in the following decades.

Postwar Kineticism

As previously mentioned, the exhibition *Le Mouvement* opened in April 1955 at Galerie Denise René in Paris, a venue known for its support of geometric abstraction. Narratives of the exhibition's genesis differ, but it is likely that René and the artist Victor Vasarely conceived the show's initial premise: to present a new wave of young artists

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[59] Joan Marter has suggested that a similar work employing a frame should be called an "abstract painting in motion," in contrast with the more spatially expansive sculpture. Joan M. Marter, *Alexander Calder* (Cambridge: Cambridge University Press, 1991), 113.
[60] Alexander Calder, *Calder: An Autobiography with Pictures* (New York: Pantheon Books, 1966), 127.
[61] Jean-Paul Sartre, "Calder's Mobiles," in *The Aftermath of War (Situations III),* trans. Chris Turner (Calcutta: Seagull, 2008), 356. Originally published as "Les Mobiles des Calder," in *Alexander Calder: Mobiles, Stabiles, Constellations* (Paris: Galerie Louis Carré, 1946), 9-19.

interested in bringing real and optical movement into art. The young curator Pontus Hultén soon became involved and further shaped the exhibition. Ultimately, the artists Yaacov Agam, Breer, Pol Bury, Jesús Rafael Soto, Tinguely, Richard Mortensen, and Robert Jacobsen showed work, with sculptures by Calder and Duchamp brought in as historical precedents. A documentary film produced by Hultén and Breer gives a sense of the work on display: Duchamp's *Rotoreliefs* spin on a wall-mounted backing, a viewer rearranges the parts of a "do-it-yourself abstract relief" by Agam, a Plexiglas triptych shifts in appearance based on the angle of viewing, and more.

Several higher-profile museum exhibitions followed. In 1959, Tinguely, Bury, and other artists helped to organize an exhibition at the Hessenhuis in Antwerp that came to be known as *Vision in Motion—Motion in Vision.*[62] The exhibition broadened kinetic art's international scope. Alongside the organizers' own work, it featured that of Soto, an important Venezuelan-born artist who worked with optical effects; Heinz Mack and Otto Piene, founders of the Düsseldorf-based Zero group whose members worked with light, optical vibration, and dynamism; and several others. The next significant exhibition of kinetic art, organized by Hultén and titled *Bewogen Beweging* (*Moving Movement*) opened at the Stedelijk Museum in Amsterdam in 1961; it then traveled to the Moderna Museet in Stockholm (under the title *Rörelse Konsten* or *Movement in Art*), and to the Louisiana Museum in Copenhagen. The exhibition strongly emphasized Tinguely's work

[62] The untitled exhibition came to be known by the title of its catalogue introduction, which made reference to Moholy-Nagy's well-known text. See Valerie Hillings, "Countdown to a New Beginning: The Multinational Zero Network, 1950s-60s," in *Zero: Countdown to Tomorrow, 1950s-60s* (New York: Guggenheim Museum, 2014), 16 and 21-24.

and, like *Le Mouvement,* situated Duchamp and Calder as important forerunners of kineticism.

In the same year that Hultén opened *Bewogen Beweging*, a group of artists from Eastern Europe planned an international exhibition of kinetic art with a different bent. *Nove Tendencije (New Tendencies)* and its 1963 sequel *Nova Tendencija (New Tendency)* featured artists more inclined to work in collectives, to investigate the intersection of art and science, and to link their work to leftist politics. A number of northern Italian artists from the kinetic collectives Gruppo T and Gruppo N played a prominent role in these exhibitions; they also showed together in the important exhibition *Arte programmata,* held in Milan in 1962. Histories of kinetic art frequently contrast their practices, supposedly based in the legacy of Constructivism, with those of artists such as Tinguely, ostensibly descended from Dada.[63] Yet this contrast is highly oversimplified. The most compelling kinetic artists—including the four featured in this dissertation—moved back and forth between these two tendencies, and often incorporated features of both in their work.

The year 1965 marked the beginning of the end of the kinetic movement. In February, the Museum of Modern Art's *The Responsive Eye* launched Op onto the American stage. While the curator, Peter Selz, originally wanted to show kinetic art at the museum—and started to plan such an exhibition in 1961—the project would not come to fruition until 1966, by which time he was employed at the University Art Museum at Berkeley.[64] Titled *Directions in Kinetic Sculpture* and presented at the university

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[63] See, for instance, Popper, *Origins and Development,* 131-140.
[64] See Peter Selz, "Acknowledgments," *Directions in Kinetic Sculpture* (Berkeley: University Art Museum, 1966), 1-2.

museum, the show included the work of 14 artists, including Tinguely, Bury, Colombo, and Breer. Toward the end of the decade, Frank Popper opened several exhibitions—including *Kunst Licht Kunst* (1966), *Lumière et Mouvement* (1967), and *Cinétisme, spectacle, environnement* (1968)—that focused on light and kinetic environments. MoMA finally had its kinetic moment with the 1968 *The Machine, as Seen at the End of the Mechanical Age,* another Hultén exhibition, which I discuss in my conclusion. By the highly charged late 1960s, many kinetic artists had left behind the production of sculpture in favor of more immaterial and explicitly political practices.

Chapter Summaries

My chapters center on four protagonists of the kinetic art movement: Jean Tinguely, Pol Bury, Gianni Colombo, and Robert Breer. These artists all incorporated motors and mechanical devices in their art, and they exhibited their work in some of the most important exhibitions of the period. All produced kinetic works that carried out complex, "live" actions—frequently exceeding their creators' foresight—that were often described in terms of animacy. At the same time, their work employs a range of approaches. Collectively, the four artists demonstrate that kinetic art, while sharing the core features I have highlighted, was also a discursive field, one in which artists held distinct positions, participated in conversations with one another, and could use the language of movement to achieve disparate ends.

Chapters One and Two focus on Tinguely and Bury, who were active in the early development of kinetic art in the mid-1950s. These chapters in part address themes of abstraction and the ways in which artists turned to movement to interrogate the

assumptions of painterly composition. Chapters Three and Four discuss later moments: the early 1960s, in which kinetic collectives arose in Italy and France, and the mid-1960s, in which kinetic art began to intersect with a changing art historical context in the United States. There are themes that span chapters, as well. Notably, all four artists primarily employed slow movement rather than speed in their work, seeking to play with viewer perception and to interfere with the normal operations of memory. All four were also inclined toward bricolage rather than technological finish, preferring to work in an experimental mode and to construct objects by hand. Finally, as some discussions of kinetic art neglect to point out, all understood their work to be in dialogue with the broader artistic tendencies of their moment, whether it was 1950s geometric abstraction or 1960s Minimalism.

My first chapter focuses on the notion of the "drawing machine" in the 1950s work of Tinguely. I suggest that Tinguely's early meta-mechanical reliefs—rotating geometric shapes attached to a backing board—responded to a number of concerns that plagued postwar abstract painters, including the arbitrariness of composition, the legibility of gesture, and the vexing question of when one might consider a painting completed. I then address Tinguely's transition to his more famous *Méta-Matic* drawing machines, showing how these works make explicit the economic analogies that were already implicit in his earlier work. This chapter also introduces many themes that I continue to expand upon in later chapters, including the nature of the present as inflected by the past and future, and the role of the artist's subjectivity in relation to work whose shifting appearances are never completely predictable.

Chapter Two examines the work of Bury, particularly his uncanny surfaces of twitching wires, to illuminate the viewer-object relationship engendered by kinetic art. I explore how Bury used the temporal mode of slowness to modulate perception, giving viewers feelings of doubt and anticipation, and denying them the possibility of having any complete, unmediated access to the work's action. I discuss how the dynamics of suspense created by Bury's unpredictably moving objects compare with those employed in film, and how they relate to their Cold War context. I also introduce Derrida's critiques of presence to elucidate the way Bury's work deliberately defers satisfying resolution.

In Chapter Three, I turn my attention from kinetic art in which elements move on a stable backing, to surfaces that themselves become flexible and mobile. I focus on Colombo, who created kinetic reliefs in the form of unstable grids and puckering, skinlike surfaces, while working with the Milan-based collective Gruppo T. I examine the moving artwork's relation to the postwar commodity, showing how critics related the flexible forms of their kinetic art to the modular, customizable furniture and design objects of the period. I also relate them to Umberto Eco's ongoing formulation of the "open work," which he based in part on a study of kinetic art. Finally, I demonstrate how the works articulate the problem of creating novelty from preexisting parts, a question central to debates around planned economies during Italy's postwar economic boom.

My final chapter moves from thinking about mobile elements and flexible surfaces to Breer's *Floats,* kinetic artworks that move independently across the floor. I explore the works' relation to the cybernetic theories of Norbert Wiener and others, suggesting that the sculptures' purposeless, undirected nature might offer a critique of such research. I further contrast Breer's kineticism with Minimalism's contemporary

investigations of time and duration, and show how the artist ultimately proposed a new notion of "site" that differed from both traditional conceptions and those of his peers.

CHAPTER 1: Modernism in Motion: Jean Tinguely's Art-Making Machines

Around 1954, having recently moved to Paris, Jean Tinguely began to scavenge the trash heaps at the margins of the city for scrap metal. Back in his studio, he cut and painted the scraps to make geometric forms, welded these forms to metal spindles, and set them to rotate on wooden boards backed with tiny motors. The results were animated paintings that harked back to the pioneers of abstraction—from Kazimir Malevich, to Piet Mondrian, to Jean Arp. Tinguely would devote the next five years to these works, the "meta-mechanical reliefs," before moving on to his trademark drawing machines and the spectacular, self-destructive performances of the 1960s. He would later rename the reliefs, making their source material more explicit: *Méta-Malevich, Méta-Kandinsky, Méta-Mortensen.*

Although Tinguely was not the first artist to produce kinetic or manipulable art in the postwar period, his exhibitions of the reliefs at Paris's Galerie Arnaud in 1954 signaled a decisive consolidation of activity in this realm.[1] Tinguely was perhaps the most overt in making reference to geometric abstraction within his moving art, but he was certainly not alone. Indeed, the first major European experiments in kinetic and manipulable art in the 1950s—Yaacov Agam's rearrangeable reliefs and Pol Bury's turning *Plans mobiles*—drew their formal vocabulary from this language. More pointedly, the moving artworks that these artists produced were also *about* abstraction.

[1] Roger Bordier, assessing the development of kinetic art in a 1983 essay, felt Tinguely's Arnaud show to be the "most decisive and unique *a priori*" of these early exhibitions. Bordier, "Mouvement, Mouvements," *Cimaise*, nos. 162-163 (January-March 1983, Numéro spécial: Art cinétique): 10.

They used movement to explore the basic problem of abstract composition: how, in the absence of a real-world referent, one might justify the choice of any particular arrangement of elements. Early observers saw this clearly. Indeed, a critical debate on the topic unfolded in the pages of the Parisian journal *Aujourd'hui*—a bastion of postwar geometric abstraction—between 1955 and '56. Was kinetic art merely derivative of abstraction, or was it a truly new paradigm? Critics bitterly argued this point, as I will show, revealing deep-seated assumptions about the nature of artistic authorship and originality. In the postwar context, in which the language of modernism was being recovered and reconstructed, this question seemed particularly pressing.

From one perspective, Tinguely's mechanical recreations of Malevich and other painters of the teens and '20s might appear a paradigmatic instance of Peter Bürger's neo-avantgarde, a simple repetition of an earlier, heroic moment, now drained of its original force. But that paradigm, as many have since argued, is drastically oversimplified, positing a singular, heroic "before" and a passive, neutered "after." It may be wiser to conceive of the postwar generation as engaged in an active reception, a critical working-through of the ideas of its predecessors.[2] The meta-mechanical reliefs show Tinguely in conversation with the legacy of modernism—not just as it stood frozen in the teens and 1920s but as it continued to evolve in the '30s and beyond—finding its moments of doubt and internal contradictions, and bringing those moments into clearer focus.

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[2] See Peter Bürger, *Theory of the Avant-Garde*, trans. Michael Shaw (Minneapolis: University of Minnesota Press, 1984), and Hal Foster, "What's Neo about the Neo-Avant-Garde?" *October*, no. 70, The Duchamp Effect (Autumn 1994): 5-32.

This chapter analyzes Tinguely's active reading of modernism through a close examination of the meta-mechanical reliefs. In 1954, Tinguely first began to use the motor not so much to investigate the nature of postwar technology as to explore questions posed by abstract painting itself. (After all, these works had little in common with modern technology: their tiny, simple motors were of the sort used for toys and models.) The machine proved a particularly effective vehicle for this investigation. With its interconnected, turning gear wheels, it permitted Tinguely to explore the variable positions of elements in abstract painting and the changing relations among them. It allowed him to understand the combinatory logic that governed these elements' constant rearrangement—a logic that allowed the appearance, if not the reality, of endless novelty. Yet the artist's choice to use movement as the vehicle to study these problems also introduced new concerns. For one, using live movement in the reliefs introduced a temporal flow that shaped viewers' perception of the work, putting memory and anticipation into play. Moreover, the use of mechanical assemblages to produce new compositions—whose specific configurations even the artist himself could not always anticipate—raised questions about the necessity or non-necessity of human subjectivity in producing a work of art.

Gradually all of these questions converged, for Tinguely, into a broader one: what consequences arise once the labor of composition has been delegated to a machine? After charting the artist's beginnings, I then shift my attention back to the better-known drawing machines, which push this question, in parodic form, to its logical end. I conclude by considering how we might reread these well-known objects in light of Tinguely's earlier, less studied work.

The Development of the Meta-mechanical Reliefs

Tinguely was born in Fribourg, Switzerland, in 1925 and grew up in Basel, where he attended classes in the 1940s at the School of Arts and Crafts. He was particularly inspired by Julia Ris, an instructor who taught material studies in the Bauhaus tradition and introduced him to the historical avant-garde. "Every now and then she would ask, 'Ah! So you know Schwitters, do you?'" he would later recall. "And I didn't. Who knows Schwitters at the age of seventeen in the middle of the war? So she brought me magazines and initiated me into Schwitters."[3] Despite the tumultuous wartime conditions, Tinguely thus became familiar early on with the avant-garde tradition.

When Tinguely moved to Paris in 1953, he encountered a landscape still marked by the legacy—and in some cases, the continued presence—of the early twentieth-century artists he had studied, now mediated by the effects of time and the war. By the 1930s, artists from a wide variety of avant-garde groups had coalesced into broader, loosely affiliated circles united by an interest in abstraction. These groups, foremost among them Cercle et Carré and its successor Abstraction-Création, were dominated by Constructivist, De Stijl, and Bauhaus influences, but also included artists from other backgrounds, such as the Surrealist Arp. In 1946, following the war, the Salon des Réalités Nouvelles formed as an heir to Abstraction-Création and included many of the same members.

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[3] Jean Tinguely, "The Artist's Word" (extracts from an interview with Jean Tinguely by Charles Georg and Rainer Michael Mason, June 1976), in Pontus Hultén, *Jean Tinguely: A Magic Stronger Than Death* (New York: Abbeville Press, 1987), 347. See also Heidi E. Violand, *Jean Tinguely's Kinetic Art or A Myth of the Machine Age* (PhD diss., New York University, 1990), 20, which includes material from the author's interview with Tinguely and Ris.

A large number of these artists identified their work as "concrete," a term meant to affirm the nature of artistic elements as *belonging to,* rather than *derived from,* the real world. That is, painted lines, shapes, and surfaces were not to be considered abstracted representations of objects, or even as representations of mental ideas, but were to be new creations continuous with our own reality.[4] Similar efforts to define a "concrete" art were taking place across other media. Pierre Schaeffer, for instance, had popularized the term *musique concrète* to refer to music produced not by composing via notation but by collecting sounds, often from non-musical sources, and manipulating them through tape-splicing and other techniques. Concrete poets including Tinguely's Swiss friend Daniel Spoerri emphasized the visual qualities of language to create malleable texts that the reader could navigate in a variety of ways. Although their approaches differed, the common thread among these tendencies was a desire to distance the work from the author's psychological interiority by means of an anti-illusionistic search for the "real."

Kineticism also developed within the context of concrete art. The logical relation between the two can be seen in a statement by the Italian artist Bruno Munari, a founder of the *Movimento arte concreta* in Italy and a major influence on Tinguely's work. Munari attributed the development of his 1930s mobiles, which he called "useless machines," to a critique of the work of Kandinsky: "I realized that the abstract art of that time was actually a veristic representation of objects," he remarked in an interview. "A still life of invented objects: triangles, squares, lines, planes… instead of bottles and pears. […] And there was still 'composition,' in which there existed a background with

[4] See Kristine Stiles, "Geometric Abstraction," in *Theories and Documents of Contemporary Art: A Sourcebook of Artists' Writings,* ed. Stiles and Peter Selz (Berkeley: University of California Press, 1996), 63-64.

colored geometric, or non-geometric, objects. The observation of this fact pushed me to extract the forms from painting and to construct them in real space."[5] To achieve this goal, he hung his forms from the ceiling, where they turned with the movement of the air. Munari's path suggests a basic paradox within the logic of concrete art: its practitioners wanted to move out of representation into something more real, to make art share human space and time, yet they remained committed to the language of nonobjective forms.

Such was the artistic milieu when Tinguely showed his reliefs at the Galerie Arnaud from May to June, and again from November to December 1954. Jean-Robert Arnaud recalled that Tinguely approached the gallery with his reliefs, which Arnaud described as having left him with an "intense poetic impression."[6] These initial reliefs share a simple, pared-down appearance. Most consist of white, and occasionally red or blue, metal rectangles and circles projecting on thin spindles from the front of a black wooden box [Fig. 1.1]. A small motor, wheels, and a belt hidden on the reverse of the box rotate each metal element at a different, yet constant, speed, creating a flow of slowly changing compositions [Fig. 1.2]. Unlike manipulable reliefs or hanging mobiles, these objects move independently of human gesture and air currents, relying instead on a steady supply of electricity to power their motion.

Tinguely created meta-mechanical reliefs through 1959, exploring a range of possibilities that the form afforded. The works can be divided into several distinct series: the *Méta-Malevich* reliefs, with simple, primarily white shapes on a black background;

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[5] Interview with Munari by Arturo Carlo Quintavalle, in *Bruno Munari* (Parma: Università di Parma, Centro Studi e Archivio della Comunicazione, Quaderni n. 45, 1979), 15.

[6] Jean-Robert Arnaud, "Éditorial," *Cimaise*, no. 162-163 (January-March 1983, Numéro spécial: Art cinétique), 7. Tinguely also showed wire sculptures in this exhibition.

the polychrome *Méta-Kandinskys* and *Méta-Mortensen*, which include a greater number and variety of elements; the *Blanc sur noir*, *Blanc sur blanc*, and *Noir sur blanc* series, which return to the monochrome mode with larger, more irregular metal elements; and the *Oeufs d'onocrotales*, *Stabilités*, and *Probabilités*, in which elements are clustered together to suggest an overall shape.[7] Tinguely also created a related series called the *Méta-Herbins*, freestanding wire sculptures that include colored planes referring to the abstract paintings of Auguste Herbin.

What sources might Tinguely have drawn on in these series of works? The relief form had been popular with abstractionists from the 1920s onward, from the raised biomorphic forms of Arp to a small series of works by Jean Miró that similarly include elements raised off the support surface by metal spindles [Fig. 1.3]. Tinguely may have also come across mechanical reliefs by Calder, which the artist had made in the early 1930s before abandoning the use of the motor [Fig. 0.6].[8] Finally, in the 1950s, the Israeli

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[7] These series are delineated and described in Andres Pardey, ed., *Jean le jeune: Jean Tinguelys politische und künstlerische Basler Lehrjahre und sein Frühwerk bis 1959* (Basel: Museum Jean Tinguely, 2002). Only a single *Méta-Mortensen* remains, but it is possible that the work was once part of a larger series whose other members have been lost.

[8] Calder first showed his motorized mobiles at the Galerie Vignon in Paris in February 1932; the exhibition was widely reviewed in art magazines. Images and descriptions of the works appeared in the catalogue for James Johnson Sweeney's 1943 monographic exhibition on the artist at the Museum of Modern Art, New York. French art magazines, particularly *Art d'Aujourd'hui,* devoted substantial coverage to Calder throughout the 1950s—though they tended to focus on his ceiling-hung, air-powered sculptures. See, for instance, Talcott Clapp, "Calder," and Léon Degand, "Notes sur Calder," *Art d'Aujourd'hui*, nos. 10-11 (May-June 1950): n.p.

Calder's work also appeared in a 1947 exhibition at the Kunsthalle, Bern, and it is possible that Tinguely encountered it there in person (see Beat Wismer, "Why Should a Picture Always Be Static? Why Can't It Change?: Jean Tinguely's First Decade, from Meta-Art to Auto-Destructive Installation," in *Tinguely* [Amsterdam: Stedelijk; Düsseldorf, Museum Kunstpalast, 2016], 35-36). The artist, however, denied to Heidi Violand that he had seen Calder's work before he moved to Paris (Violand, *Jean*

artist Agam produced his first manipulable kinetic works, which shared a similar aesthetic of white elements on a black background [Fig. 1.4]; these were shown at Paris's Galerie Craven in 1953. Of course, the clearest references in these works are to the abstract painters themselves. Denise René proposed that Tinguely's early reliefs were inspired specifically by the artist's frequent visits to the studio of Herbin, a founder of both Abstraction-Création and the Salon des Réalités Nouvelles.[9] Indeed, the elongated triangles, bars, and perfect circles in Tinguely's reliefs could have been torn from a Herbin painting of the early 1950s, such as *Fou* (1953) or *Minuit* (1953) [Fig. 1.5]. Yet this geometric vocabulary was shared by a large number of abstract painters from the 1920s onward, and the specificity implied by Tinguely's later titling may be somewhat misleading.

Early critics who viewed the Arnaud shows clearly understood Tinguely to be working within the realm of abstract painting. In the May 1954 exhibition brochure, R.V. Gindertael gave the works the name "automata," yet he noted that they were more akin to paintings than to sculptures. Specifically, he wrote, the works generate "a suite of multiple compositions" that we perceive as "a single animated painting."[10] In a review in *L'Art d'aujourd'hui,* Roger Bordier made a similar point: Tinguely's reliefs "moved closer not to sculpture, but deliberately to plastic painting." Bordier also understood the works as producing multiple compositions. Yet while Gindertael had emphasized the perceptual experience of flow in the reliefs, Bordier noted that the "simple press of a

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Tinguely's Kinetic Art, 42, note 7). Hultén writes that the similarities between the works "result from the similarity of their points of departure" (*Méta*, 37).

[9] Catherine Millet, *Conversations avec Denise René* (Paris: Éditions Adam Biro, 1991), 84.

[10] R.V. Gindertael, in *Tinguely* (Paris: Galerie Arnaud, 1954), n.p.

button" allowed one to select and freeze a particular composition.[11] A third review of the Arnaud exhibitions came from Herta Wescher in *Cimaise,* who observed that the reliefs not only produce nearly infinite combinations, but in the process also seem to exceed human control. Their rotating parts "display an autonomous life, which stable painting can only indicate," she wrote.[12]

Late in 1954, Tinguely received a letter from the young Pontus Hultén, a critic and curator who had seen his exhibitions at Arnaud and who would go on to become the most influential promoter of his work. Hultén, departing from Gindertael's terminology, decided to christen the works "meta-mechanical reliefs"; the prefix was meant to indicate how the works functioned both "with" and "beyond" the mechanical.[13] Several years later, Tinguely would show the Arnaud reliefs under the *Méta-Malevich* title, though Hultén observed that the frivolity of this appellation would not have been acceptable at the time of their creation.[14] Tinguely himself, decades later, emphasized the flippant aspects of the reliefs. Their message, he told Catherine Francblin, was that "'*malévitchisme'* was screwed."[15] Certainly, an irreverent attitude pervades Tinguely's

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[11] Roger Bordier, "Tinguely à la Galerie Arnaud," *Art d'aujourd'hui* 5, 4-5 (May-June 1954). It is unclear, however, to what extent the average gallery visitor would have been able to stop and start the mechanism. It seems more likely that the works were kept running continuously.

[12] Herta Wescher, "Tinguely, Gallery Arnaud," *Cimaise* (November-December 1954): 20.

[13] Pontus Hultén, *Jean Tinguely: Méta* (London: Thames and Hudson, 1975), 16. For a comprehensive account of Hultén's role in shaping Tinguely's career, see Stephanie Jennings Hanor, "Jean Tinguely: Useless Machines and Mechanical Performers, 1955-1970" (PhD diss., University of Texas, Austin, 2003).

[14] Hultén, *Méta,* 46. To my knowledge, the first use of the title *Méta-Malevich* was in Hultén's exhibition *Bewogen Beweging,* which opened at the Stedelijk Museum in Amsterdam in 1961.

[15] "Jean Tinguely: Farces et attrapes," interview by Catherine Francblin, *Art Press,* no. 131 (December 1988).

work throughout his career. Yet in the mid-1950s, this irreverence coexisted with an element of homage; the reliefs read less as a pure mockery of the abstractionists than as an extension and critique of their vocabulary from within.

Process and the Provisional

In early 1955, Bordier published a long essay in *Aujourd'hui* surveying the rise of what he called "the transformable artwork." Citing objects by Tinguely, Bury, and others, he argued that the invention of kineticism marked a veritable paradigm shift in which the work "ceased to be a unique, eternal given."[16] In the following issue, the critic Léon Degand delivered a scathing riposte to Bordier's article. Kinetic artists, he contended, merely borrow their vocabulary wholesale from geometric abstraction and annex motion to it, without intervening into the artistic tradition in any substantial way. Change, moreover, has always existed in art, as when spectators encounter architecture or sculpture from multiple viewpoints.[17] Bordier responded in September, reiterating his original position and insisting on the difference between natural perspectival displacement and the deliberate aesthetic use of motion and change.[18] Echoes of the debate resonated in subsequent issues, as various observers chimed in regarding the

[16] Bordier, "Propositions nouvelles: le mouvement, l'oeuvre transformable," *Aujourd'hui: Art et architecture,* no. 2 (March-April 1955): 12-17.
[17] Léon Degand, "Les expositions: Le mouvement, nouvelle conception de la plastique," *Aujourd'hui: Art et architecture*, no. 3 (May-June 1955): 14.
[18] Bordier, "Quelques notes complémentaires sur le mouvement," *Aujourd'hui: Art et architecture*, no. 4 (September 1955): 17.

relationship of kineticism and abstraction.[19] A close look at the works in question shows the extent to which Degand's reading ignored the complexity of these moving objects.

Tinguely himself began to discuss his entrance into kinetic art in interviews in the early 1960s. He attributed his adoption of the form to his failure as a painter—specifically, his inability ever to finish paintings, which he said "paralyzed" him. "I could never finish and could go on working on a painting for months, until the canvas was worn out – scraping it off, doing it again, never letting the paint dry," he said. "Movement was an escape from the petrification, the ending."[20] The meta-mechanical reliefs, Tinguely implies, allow the process of painting to extend into infinity.

While the Arnaud reviews imply that the reliefs present a series of equally valid "multiple compositions," Tinguely's story suggests a different model: that the reliefs may be better understood as a constant experimentation with different arrangements, each of which fails to hold and is immediately canceled out. As the motor runs on a *Méta-Malevich*, the place and orientation of each piece gradually changes: a vertical line becomes a horizontal one, a rod suddenly pokes out beyond the bounds of the support. The relations among the parts change, too. Placed at different distances from the surface, the shapes cross paths and overlap. Some reliefs, such as *Trois points blancs* (1955), include large fixed planes behind which smaller moving elements disappear and reappear,

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[19] See, for example, Lawrence Alloway, "L'intervention du spectateur," *Aujourd'hui: Art et architecture*, no. 5 (November 1955): 25.

[20] Tinguely, "The Artist's Word," extracts from an interview with Charles Georg and Rainer Michael Mason, June 1976, in Hultén, *Magic,* 347. Tinguely made this claim as early as 1962, however: "Up to then I had been a painter, but painting didn't satisfy me. The results always seemed static. I began experimenting, and by 1953 I realized that the machine gave me a way to leave things 'unfinished'—an opening onto infinity which paint couldn't approach." (William R. Byron, "Wacky Artist of Destruction," *Saturday Evening Post*, April 21, 1962.)

creating a kind of "peekaboo" effect [Fig. 1.6]. The possibilities of parts overlapping introduce variation not only in the arrangements of the elements, but also in their apparent shape and number.

Of course, the continuous rearrangement of the reliefs is quite different from the process of painting, scraping, and repainting that Tinguely describes having abandoned. The metal shapes, discrete elements on a surface, function more like collage elements than like paint. Their movement from one arrangement to the next is fluid, and in it moments of erasure are conflated with moments of creation. In this sense of separate elements shifting positions on a surface, Tinguely's process of rearrangement finds a surprising analogue: the use of paper cutouts, a practice taken up by abstractionists from the late teens onward as a compositional aid.[21]

The best-known practitioner of the cutout was, of course, Henri Matisse, who experimented with the device precisely because it allowed a freedom to revise less laborious than painting and repainting. More relevant to Tinguely's Constructivist milieu, however, was Mondrian. Visitors to that artist's studio in the 1920s and '30s recalled seeing him plan out his paintings by manipulating strips of paper on top of canvases or even on the floor.[22] Mondrian's use of this process intensified after his move to New York in 1940, when he began to employ strips of black and colored tape as well as paper [Fig. 1.7]. It was around this time that his method seems to have entered a crisis. In Harry

[21] Interestingly, a reviewer of Pol Bury made a related point about that artist's works, writing that they "surpassed in possibility the compositions made by means of cut papers which the initiators of abstraction made use of." (1954 review by L.-L. Sosset, "Les Expositions à Bruxelles," no publication data available, Fonds Pol Bury, Institut Mémoires de l'édition contemporaine, Press, 1951-1955.)

[22] Harry Cooper, "Looking into the Transatlantic Paintings," in Cooper and Ron Spronk, eds., *Mondrian: The Transatlantic Paintings* (New Haven: Yale University Press, 2001), 49.

Cooper's words, Mondrian's work in New York conveys "an accelerating doubt about whether it is possible, or even desirable, ever to finish a painting."[23] From late 1940 to early 1944, the artist worked constantly, yet his obsessive revision meant that he completed only three paintings. Of course, producing a finished painting was always Mondrian's end game. But the idea of constant revision through the rearrangement of parts may have opened the door for a younger generation of artists to find alternative solutions.

A well-known story recounted by Calder suggests the relevance of Mondrian's practice to kinetic artists. When asked to account for his entrance into kineticism, Calder recalled that he visited Mondrian's studio in 1930 and felt a desire to put the older artist's forms into motion. What is particularly interesting is that it was not Mondrian's paintings that inspired Calder, but precisely the cutouts: "I was particularly impressed by some rectangles of color he had tacked on his wall in a pattern after his nature," he said. Calder told the painter that he wanted to make the forms "oscillate," though Mondrian objected to the idea.[24] Photographs of the walls of Mondrian's Paris and New York studios, covered with such rectangles, appeared in *Art d'Aujourd'hui* in June and December 1949, respectively.[25]

The idea that elements might slide around the surface of a painting, and the almost three-dimensional "fluttering" effect of paper pinned lightly to a surface, find a logical extension in the elements of Tinguely's reliefs that rotate on their thin metal axles.

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[23] Ibid., 53.
[24] Alexander Calder, "What Abstract Art Means to Me," *The Bulletin of the Museum of Modern Art* 18, no. 3 (Spring, 1951), 8.
[25] See illustrations in Michel Seuphor, "Le Mur," *Art d'Aujourd'hui*, no. 1 (June 1949): n.p., and in Mondrian, excerpts from "Le home – la rue – la cité" [1926], *Art d'Aujourd'hui*, no. 5 (December 1949): n.p.

This consonance is particularly visible in a work such as *M II* (1956), in which the irregularly shaped elements give an impression of fragility, like scraps of paper that have fallen to the ground [Fig. 1.8]. On a more conceptual level, the use of cutouts—far more than the practice of repainting—generates a sense that any composition is provisional and may be revised, even to the point of never being complete.

As Mondrian's example shows, the very ease of rearrangement that cutouts allowed went hand in hand with an increasing doubt about the fixity of the principles of abstraction. Similar hesitations appeared in Mondrian's writing, too. In his 1937 essay "Plastic Art and Pure Plastic Art," for instance, the artist argues for a nonfigurative art governed by "fixed laws" regarding the arrangement of elements in a work.[26] Foremost among these laws is that of "dynamic equilibrium," or the necessity that a painting carry a sense of rhythm and tension. This overarching principle generates secondary laws regarding the position, dimension, color, and other qualities of the painted elements, all aimed toward a dynamic yet balanced effect. In some cases, Mondrian is quite strict about these rules—he insists on the exclusive use of pure primary colors, for example. Yet the artist realizes that compliance with these laws is not enough to produce a complete work. In discussing the principles that govern the dimension of lines and shapes, he writes that the artist has considerable room for "individual expression" in this realm—and he concludes that this "freedom of choice" is "one of the most difficult problems" that he must face.[27] As much as Mondrian insisted on the rules that bind visual art, he understood that painting should not be trapped within a closed system of

[26] Piet Mondrian, "Plastic Art and Pure Plastic Art" [1937], in Robert L. Herbert, ed., *Modern Artists on Art,* 2nd ed. (Mineola, NY: Dover, 2000), 155.
[27] Ibid., 159.

calculation. Yet, as his writing and artistic practice show, he found the necessity of reconciling subjective decision-making with his tightly constructed system troublesome.

Some artists critiqued the idea of composition directly. For Malevich, working in the very different context of pre-revolutionary Russia, composition merely exemplified another instance of a decadent, bourgeois concern for taste. It stood for a useless shuffling of parts and hindered the creation of a radically new art. "However much we arrange furniture about rooms, we will not extend or create a new form for them," he wrote. Rather than serving to prop up an outdated notion of beauty, he continued, "Forms must be given life and the right to individual existence."[28] This attitude—that each form must be considered an independent entity with its own freedom, trajectory, even will—produced an effect of randomness in his paintings. His Suprematist works feature brightly colored squares, circles, and rectangles in at times chaotic configurations, tilting and turning in unexpected directions, bumping and overlapping each other as they seem to fly toward the edges of the canvas. Some of the works conjure up the image, as T.J. Clark has written, of the "throwing of balls and batons into the air."[29] In others, smaller sets of elements appear to float in a magnetized field.

A slightly different brand of questioning appeared in the collage practice of Arp, another figure close to Tinguely.[30] In the teens, Arp and Sophie Tauber had produced

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[28] Kazimir Malevich, "From Cubism and Futurism to Suprematism: The New Painterly Realism [1915]," in *Russian Art of the Avant-Garde: Theory And Criticism, 1902-1934,* rev. ed., ed. and trans. John E. Bowlt (New York: Viking, 1976), 122-123.
[29] T.J. Clark, *Farewell to an Idea: Episodes from a History of Modernism* (New Haven: Yale University Press, 1999), 271.
[30] Years later, Tinguely would name Arp as a particular early influence, alongside Kurt Schwitters. Dieter Daniels, "Often Neglected—But One of the Greats," interview with Jean Tinguely, January 1987, in *Marcel Duchamp* (Ostfildern-Ruit: Hatje Cantz, 2002), 156.

precise, carefully finished collages, cutting out shapes with a paper cutter. Later, Arp would recall his pursuit of "unattainable perfection" in these collages, including his attempts to eliminate all traces of the hand from their surfaces.[31] In the late 1920s, Arp returned to those early works and was surprised to discover that they had disintegrated, as the glued papers had come unstuck and the paper had crumbled. Yet the artist soon found himself attracted to this decay. Abandoning his earlier precision, he began to create collages from torn paper that foregrounded process and the passage of time. Briony Fer has argued that Arp's work in collage was always "animated by the impossibility of a terminal point"—whether the defensive, obsessive concern with finishing the earlier work or the conscious acceptance of decay in the later collages.[32] To deliberately incorporate deterioration into the work, she argues, is another strategy for postponing the definitiveness of an ending.

All of these examples point to a palpable concern over the possibility of "finish" that had grown out of avant-garde art by the later 1920s and '30s. The apparent openness of abstraction, the way its arrangements were not tethered to the real world, had produced a kind of anxiety that found its emblems in the endless rearrangements of the cutout or the embrace of continual change. Tinguely foregrounded this concern in a more explicit way by creating kinetic works whose constant revision ensures that they literally never end. In this light, his work cannot be read as a simple postwar invalidation of a modernism that had always been perfectly secure in its choices, as a number of critics have argued. Hultén, for instance, maintained that the problem of justifying the validity

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[31] Jean Arp, "Looking," in *Arp,* ed. James Thrall Soby (New York: Museum of Modern Art, 1958), 15.
[32] Briony Fer, *On Abstract Art* (New Haven: Yale University Press, 1997), 73.

of one abstract composition over another did not even occur to artists such as Malevich, Kandinsky, and Mondrian, whose paintings expressed an almost-religious sense of faith and conviction.[33] Rather, Tinguely pushed the sense of doubt that was already there much further, making it visible on the surface and rendering its operations "live."

Some viewers have understood the constant reworking of the reliefs as an expression of absolute freedom. Hultén originated this view: in his 1955 essay "Vicarious Freedom, or, On Movement in Art and Tinguely's Meta-mechanics," he reads the multiplicity inherent in the works as an expression of extreme liberty.[34] Tinguely himself would also encourage this reading, sometimes hyperbolically. A 1956 article in *Elle*, for instance, attributes to the artist the statement that one of his reliefs would take at least 10,000 years before it repeated the same arrangement.[35] Both Hultén and Tinguely, at times, related this freedom to their own anarchist political commitments.[36] It is clear, however, that the dynamic of the reliefs is less one of complete openness than of flexibility and rearrangement within a pre-existing set of parts—a system best described as combinatory or modular.

In Tinguely's reliefs, each element follows a fixed circular path of greater or lesser circumference at a pre-determined speed. Much of the writing on Tinguely

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[33] Franz Meyer similarly suggests that the artists of the historical avant-garde to whom Tinguely refers "had been able to work within a stable, self-contained immutable system," one that no longer sustained conviction in the postwar period. (Hultén, *Méta,* 7; Franz Meyer, "Introduction," in Christina Bischofberger, *Jean Tinguely, Catalogue raisonné: Sculptures and Reliefs* [Küsnacht/Zurich: Edition Galerie Bruno Bischofberger, 1982-1990], 7.)

[34] Hultén, "Vicarious Freedom, or, On Movement in Art and Tinguely's Meta-mechanics" [1955], in Hultén, *Magic,* 35.

[35] "Jean Tinguely," *Elle,* November 9, 1956.

[36] For a treatment of the anarchist argument, see Violand, *Jean Tinguely's Kinetic Art,* 22-38.

suggests that the artist constructed his early reliefs in a deliberately sloppy way so that their rubber belts would slip or jump, introducing an element of chance into the mechanism itself.[37] Yet this assertion is dubious for a number of reasons. First, the backs of the reliefs show that Tinguely took steps to preserve his mechanisms: many show traces of an anti-corrosion primer, an unlikely addition if the artist did indeed want his machines to function irregularly.[38] Second, if the rubber belts were to slip, the effect would likely be to stop the machine from functioning altogether—a particularly risky outcome for an artist early in his career. In later years, the artist did speak of a preference for irregularity in machines, a penchant he would take to its extreme in his self-destructive works. In the initial reliefs, however, it is likely that Tinguely was more interested in the production of variation within a modular system than in the exploration of mechanical failure.

The discourse of modularity had a long history in the prewar period. In a 1919 letter, Theo van Doesburg accused Mondrian of having become too "modular" in his recent *Checkerboard* paintings, in which a grid of uniform, multicolored rectangles covered the full surface of the canvas. In their extreme standardization and repetition, he wrote, these paintings are "without composition."[39] Mondrian acknowledged the validity of this critique and soon began to employ a variety of techniques in order to reintroduce

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[37] See, for instance, Hanor, "Jean Tinguely," 7.

[38] I am grateful to Reinhard Bek, formerly Chief Conservator of the Tinguely Museum in Basel, for these observations and for assistance in understanding the technical aspects of Tinguely's work. For further insights on the conservation of Tinguely's kinetic art, see Bek, "Conserving the Kinetic: Mechanical Sculptures at Museum Tinguely," in Andres Pardey, ed., *Museum Tinguely Basel: The Collection* (Basel: Museum Tinguely; Heidelberg: Kehrer, 2012), 190-207.

[39] Letter from Theo van Doesburg to J.J.P. Oud (June 24, 1919), quoted in Carel Blotkamp, *Mondrian: The Art of Destruction* (New York: Abrams, 1995), 126.

irregularity into his work. He varied the width of his black lines, rendering them as thin bands or thick elongated rectangles. He played with the relation of these lines to the painted surface, sometimes truncating them before they reached the edge of the canvas, and other times extending them outward. Such techniques demonstrate Mondrian's effort to retain a measure of subjective composition—to avoid the impression of arbitrary reshuffling—while working within a reduced vocabulary. Tinguely's approach proceeds further in the direction from which Mondrian had retreated. His choice to set his elements in motion—thus producing a sequence of unforeseeable rearrangements—reduced his decision-making to a minimum.

It is this aspect of the work, the deliberate concession of agency to the motor-powered object, that separates Tinguely from his abstract predecessors. In a 1966 interview with Alain Jouffroy, Tinguely emphasized that he wanted the meta-mechanicals to exceed not only their models, but also his own intentions. "I constructed these reliefs as paintings in which poetry intervened despite me; they work all by themselves and place themselves in the infinite," he said.[40] Of course, Tinguely's agency does not disappear altogether: his intention is displaced to the selection of elements, the choice of colors, and the speed and circumference of movements. One might even locate a form of agency in Tinguely's initial decision to work with kinematic flux. And although the process of recombination is removed from the author's hands, we cannot say that it is entirely chance-based, as the fixed parts of the machine predetermine the elements' paths. Yet the unforeseeability of the constant flow of compositions, once the work has been set in motion, represents a considerable erosion of Tinguely's authorial control.

[40] Alain Jouffroy, "Tinguely," *L'Oeil* 136 (April 1966).

Tinguely was not alone in experimenting with the withdrawal of his own subjectivity from his work. His approach had much in common with that of Ellsworth Kelly, also part of the Parisian geometric abstractionist group around the Galerie Arnaud in the 1950s. The paintings that Kelly showed there—for instance, the tidy monochrome grid initially called *Relief: Blanc sur blanc I* (1950) (Fig. 1.9)—initially appeared to fit neatly into the post-Mondrian tradition being carried on by figures such as Max Bill and Richard Paul Lohse. These works, however, departed from that tradition in a significant way: as Kelly later revealed, he had drawn many of the compositions for the Paris works from real-world referents. For example, *Blanc sur blanc,* which the artist would later rename *Neuilly,* replicated the patterns of paving stones from the American Hospital in Neuilly. Such a strategy would have been offensive to the abstractionists, who constantly had to evade charges of mere decorativeness and who understood the careful process of constructing a balanced composition as the artist's central responsibility. In works such as *Seine* (1951) from the same period, Kelly also experimented with permutation and aleatory strategies, creating gridlike frameworks whose units he arranged or filled in randomly by pulling numbers from a hat. Yve-Alain Bois has argued that Kelly turned to the strategy of anti-composition as a way to escape the weight of European art-historical influence—particularly that of Pablo Picasso, a figure who seemed to have already invented everything.[41] While it is unlikely that Tinguely understood Kelly's strategies in the mid-1950s, his impulse to minimize his own involvement in composition was similar. Rather than drawing arrangements from the readymade features of the urban landscape or

[41] See Yve-Alain Bois, "Ellsworth Kelly in France: Anti-Composition in Its Many Guises," in *Ellsworth Kelly: The Years in France, 1948-1954* (Washington, D.C.: National Gallery of Art, 1992), 9-36.

using chance techniques, however, he turned toward movement: toward compositions that constantly reinvented themselves, and that constantly disappeared.

It is important to differentiate Tinguely's reliefs from the work of Bill, who also engaged the notion of permutation and whose thinking was deeply influential for many abstract, kinetic, and Op artists. In 1949, Bill called for a new art form based on "a mathematical line of approach to its content."[42] In practice, his paintings and sculptures often took their final form from pre-selected mathematical formulas and systems. Bill, too, was interested in moving away from a notion of human composition, but his work ends by producing what Bois has called the "bad dream" of modernism's "noncompositional drive": the author becomes subjected to the tyranny of his system, and his work is characterized by a dull, dry rationalism.[43] While Tinguely's works are also "determined" in a sense by their mechanisms, their constant movement emphasizes the provisionality of any momentary arrangement—they enact, as we have seen, a constant process of erasure and remaking. And the shifting connections between the reliefs' parts, to use Sol LeWitt's terms, may be described as "logical"—following the necessary movements prescribed by their mechanisms—but not as "rational."[44]

In sum, how might we conceptualize the relationship between the reliefs and their sources? We have seen that, by the 1980s, Tinguely suggested that his reliefs might function as mockeries or parodies of their source material. I have argued that their

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[42] Max Bill, "The Mathematical Approach in Contemporary Art" [1949], in Stiles and Selz, 75.
[43] Bois, in "Abstraction, 1910-1925: Eight Statements," *October*, no. 143 (Winter 2013), 14.
[44] For a discussion of this distinction, see Rosalind Krauss, "The Mind/Body Problem: Robert Morris in Series," in *Robert Morris: The Mind/Body Problem* (New York: Solomon R. Guggenheim Foundation, 1994), 11.

meaning in the 1950s was quite different, and that the objects were not so much caricatures as they were a radical extension of the implications of their namesakes' work; they foregrounded the anxious attitude toward composition that those earlier artists would never have made so explicit, and embraced movement as a way to postpone the resolution of the finished object. As my analysis shows, it was specifically *composition*—rather than shape, color, material, or any number of other elements—that emerged during this period as a stand-in for a broader idea of subjective intention. Composition also presented Tinguely with the most logical site for his kinetic intervention; it is easier to make parts move about than to make them change shape or color.

In *Palimpsests,* his wide-ranging study of literary hypertextuality, Gérard Genette proposes a variety of possible relations between a text and the earlier sources that it draws upon. Tinguely's reliefs most closely fit the model of "transposition." Such works, Genette argues, transform rather than strictly imitate the original text through a variety of strategies: they may transpose style or genre, for example, or render the work more concise or more expansive.[45] In their simultaneous extension of and critical perspective on their referents, Tinguely's reliefs are best characterized by a particularly slippery mode of transposition that Genette calls the "supplement." The supplement, the critic writes, is "an extrapolation disguised as an interpolation" or "a surplus in the nature of a commentary or a free, even illegitimate, interpretation."[46] It may take the shape, for instance, of a novel that purports to simply extend the story of an earlier work, but which

[45] Gérard Genette, *Palimpsests: Literature in the Second Degree,* trans. Channa Newman and Claude Doubinsky (Lincoln and London: University of Nebraska Press, 1997), 212-214.
[46] Ibid., 203.

carries a critical intent in that extension.[47] Such a reading of the reliefs as hypertextual supplements corresponds with Hultén's wordplay in titling the works, his insistence on the dual meaning of "meta" as signifying both "with" and "beyond." The reliefs extend the vocabulary of Mondrian, Malevich, and other abstractionists forward in time, rendering it vast in its variations and nearly infinite in its duration; yet in doing so, they convert those artists' doubt over the possibility of finish into the ceaseless turning of a machine.

Dada Connectivity

The meeting of machine logic and a sense of irrationality in Tinguely's reliefs also suggests another reference point in avant-garde art: the legacy of Dada. Tinguely, of course, had concrete ties to the movement: he recalled having first encountered Duchamp's work through Julia Ris around 1941-42, and then again circa 1955 through Hultén. Indeed, Hultén gave Tinguely a set of Marcel Duchamp's *Rotoreliefs* at some point following their 1954 meeting, and Tinguely created an apparatus to display the works on the wall in Denise René's *Le Mouvement* in 1955. The artist's ties with Dada would soon intensify, as he would go on to meet Duchamp, Tristan Tzara, Richard Huelsenbeck, and Marcel Janco.[48] In 1960, Tinguely would be among the founding

[47] Genette's examples include Jean Giraudoux's play *The Trojan War Will Not Take Place* (1935), a prelude to the *Iliad* that uses Homer's characters to communicate an anti-war message. Ibid., 378-381.
[48] Daniels, "Often Neglected," 159, 164.

members of Nouveau Réalisme, a group whose indebtedness to the earlier movement was frequently made clear in writings by its founder, Pierre Restany.[49]

One particularly relevant point of comparison for the meta-mechanical reliefs is the Dada diagram, in which disparate parts are incorporated into a web of interrelations. To examine the question of connection in Tinguely's reliefs, it is perhaps easiest to turn to a group of works that display their mechanisms on the surface: the *Méta-Kandinsky* series of 1955 to 1956. While in the majority of the meta-mechanical reliefs Tinguely concealed his wheels, belts, and motors on the reverse of the work, in the *Kandinskys* the rubber belts become a design element [Fig. 1.10]. In *Méta-Kandinsky I* (1956), for instance, black rubber belting zips across the surface of the work, linking differently colored circles: it runs a long and seemingly inefficient path from a white circle toward the center of the long canvas to an ochre one on the far right; then to a larger half-black, half-white one below, and briefly back up to a tiny red one; then all the way to a black element at the far left. When it is turned on, the belt pulls the circles into motion in different directions and at different speeds. The overall effect is busier and more chaotic than in the earlier *Malevich*-type works.

The "inside out" quality of the Kandinsky reliefs makes visible a condition of all the meta-mechanical reliefs: that the elements do not move independently, but rely on a network of wheels and belts. As *Méta-Kandinsky I* shows, the zigzagging connections are frequently inefficient, and no logical principle suggests why one particular element

[49] The first manifesto of Nouveau Réalisme (1960), for example, referred to the group's philosophical position as "40 degrees above the zero of Dada," a phrase that Restany would also use for an exhibition of their work the following year. See Pierre Restany, "Les nouveaux réalistes," preface for the exhibition *Arman, Dufrêne, Hains, Yves le Monochrome, Tinguely, Villeglé* (Milan: Galerie Apollinaire, May 1960), in Catherine Francblin, *Les Nouveaux Réalistes* (Paris: Editions du Regard, 1997), 178.

should be attached to the next. But once they are linked together, the position of each piece affects that of the next, pulling it clockwise or counterclockwise in a web of moving parts.

A similar kind of interrelatedness may be found in Francis Picabia's mechanomorphic drawings. In these works, seemingly incongruous elements—gear wheels, pieces of text, symbols, and abstract shapes—are linked together into graphic maps of imaginary, functionless machines [Fig. 1.11]. These diagrammatic images employ what David Joselit has called an "expansive" logic that attempts to relate disparate parts (in contrast to the "implosive" model of Cubism, which fragments or collapses the object). But this connective activity does not lead to increased coherence, to an image that is restored to wholeness. Rather, it simply generates a "free play of polymorphous linkages."[50]

Joselit's reading of the Dada diagram relies on Gilles Deleuze and Félix Guattari's notion of the "desiring machine," a notion that the philosophers define as "a set of really distinct parts that operate in combination *as being really distinct* (bound together by the absence of any tie)."[51] They use the term "mad vector" to describe the seemingly illogical connective path that binds together the improbably grouped parts. Deleuze and Guattari choose a number of artistic examples to illustrate the concept of the desiring machine, but among their favorites are precisely Tinguely's machines. Although they focus on later, more exaggerated assemblages, the same principle is already present

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[50] David Joselit, "Dada's Diagrams," in Leah Dickerman, ed., *The Dada Seminars* (Washington: National Gallery of Art, 2005), 232.
[51] Gilles Deleuze and Félix Guattari, "Balance-Sheet for 'Desiring Machines,'" in Guattari, *Chaosophy: Texts and Interviews 1972-1977,* ed. Sylvère Lotringer, trans. David L. Sweet, Jarred Becker, and Taylor Adkins (Los Angeles: Semiotexte, 2009), 104.

in the reliefs, in which elements are bound together by a mechanical web that incorporates them.

George Baker has compared Calder's mobiles to the diagram, arguing that we look to Dada, rather than to Mondrian, for the source of his kinetic work.[52] Yet I want to make a slightly different argument: that in Tinguely's reliefs, the combination of Constructivist and Dada references suggests that the artist sensed a kind of deep compatibility between these apparently disparate lineages. His intuition was that modernism itself, when its emphases on time, process, and combination were pushed far enough, could end up producing something like a Dada machine.

In addition to the Méta-Kandinskys, Tinguely made several other early experiments using what would later come to be seen as a neo-Dada aesthetic. In two reliefs from 1955 titled *Méta-méchanique sonore*—one of which he showed at the Salon des Réalités Nouvelles of that year—he included found objects, such as bottles, tins, a saw, and a funnel, all of which he painted black [Fig. 1.12]. As the title indicates, these works produced various sounds: small metal pieces strike the objects as the relief's wire cog wheels rotate, creating intermittent, tinny, jangling noises. White shapes rotate alongside the sound-producing elements. In these works, Tinguely harnesses the temporal quality of his reliefs to that of music, an art already understood as dependent on the passage of time. In a sketch from circa 1954, Tinguely records notes for an artwork that would incorporate guitar, violin, piano, and "indigenous instruments." Following the latter phrase, he cites a "Dr. Schlager"—likely the Swiss ethnomusicologist Ernst Schlager, who studied the music of Bali. Below these notes, Tinguely adds the phrase,

[52] George Baker, "Calder's Mobility," in *Alexander Calder and Contemporary Art: Form, Balance, Joy,* ed. Lynne Warren (London: Thames & Hudson, 2010), 94-109.

"*liberé de l'influence humaine,*" indicating his interest in art and music that originate in a nonhuman source. In other drawings from the same period, Tinguely investigates a variety of additional mechanisms for producing movement, some of which he draws from popular culture. These include a spring-powered jack-in-the-box, balloons, and a Christmas cracker that expels its contents when pulled open (Tinguely labels the latter mechanism the "bonbon-principle").[53]

Apart from the interrelation of their parts, the machines also establish a physical connection to their environment. The rotation of Tinguely's meta-mechanical reliefs depends on a steady flow of electricity. Photographs of early installations show dark electrical cords running downward from behind the reliefs [Fig. 1.13]. Indeed, in his review of the second Arnaud show in 1954, Bordier underlines the importance of this fact. The reliefs cannot properly be called automata, he argues, because they rely on a "completely foreign" energy source. "Their characteristic quality is that they are not precisely moved by themselves, and that is what seems interesting to me," he writes.[54] Whereas a clockwork automaton could be wound in advance and then left to perform on its own, the meta-mechanicals require a constant stream of power supplied via a non-human, distant energy source.[55] A review of Tinguely's 1959 exhibition at the Galerie

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[53] Facsimiles of Tinguely's sketches, c. 1954, Museum Tinguely Archives, Basel. Some pages are reproduced in Hultén, *Magic,* 22-23, and in Pardey, *Museum Tinguely Basel: The Collection*, 286-291.

[54] Bordier, "Une nouvelle exposition," 30.

[55] One might also think of Duchamp's play with the notion of foreign energy sources in *The Large Glass* and related works. Duchamp proposed that a waterfall—which he chose not to depict—powered the bachelors' Water Mill in the lower half of the glass; in a 1959 sketch of the apparatus, he reimagined the Mill hooked up to an electrical pole. The energy that animates these works, including sexual desire, thus stems from nonhuman origins. See Dalia Judovitz, "Landscape as Ironic Causality in Duchamp's *Étant donnés,*"

Schmela in Düsseldorf makes the point more explicitly, noting that "the city's public works thus play their part—albeit anonymously—as patrons in modern art's success, delivering 220 volts at 6 amperes." Nonetheless, the recipients of this resource are totally useless: the reliefs "cannot be used as mixing machines or electric razors."[56]

Tinguely was clearly aware of the status of his meta-mechanical reliefs as useless machines. His thinking on the topic had been influenced in part by Munari, the artist who had developed his own *macchine inutili* after his encounter with Kandinsky. Munari's *Manifesto del macchinismo* ("Manifesto of Machinism") had been published in the journal *Arte concreta* in 1952. The text warned of the potential danger of machines, which were making increasing demands on their human caretakers: "they already force us to take care of them… we have to keep them clean, provide them with nourishment and rest, continually visit them and make sure they are lacking in nothing. In a few years we will be their little slaves."[57] In this climate, artists could no longer afford to continue working with brushes and canvas. Rather, they must learn more about the nature of machines—"their moods, their nature, their animal defects"—and ultimately "divert them to function in irregular ways."[58] It was only by rerouting the machine toward nonutilitarian functions that humans could avoid domination by technology, Munari contended.

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in *Marcel Duchamp and the Forestay Waterfall,* ed. Stefan Banz (Cully: Kunsthalle Marcel Duchamp; Zurich: JRP/Ringier, 2010), 86-96.

[56] G.P.F., "Des Bilderschlossers Kunstmotoren: Elektrische Blechplastiken von Jean Tinguely in der Galerie Schmela," *Der Mittag,* February 3, 1959. Thanks to Leah Chizek for assistance with the translation of this and other German-language sources.

[57] Bruno Munari, "Manifesto del Macchinismo," *Arte Concreta,* no. 10 (1952), n.p.

[58] Ibid., n.p.

In December 1954, Tinguely visited Milan to show his work, mostly large-scale *Malevich*-type reliefs, at the Studio d'architettura b. 24 [Fig. 1.14]. There, he met with Munari, who gave him two of his *macchine inutili*. On that occasion, Tinguely reportedly told Munari, "I do what you talk about in your manifesto."[59] The Italian artist's own experimentation with motors was limited at the time; in the mid-1950s, he was more occupied with making experimental light-based artworks, called the "polarized projections." Yet he shared with Tinguely an aesthetic located somewhere on the border between Constructivism and Dada, between the precision of geometric abstraction and the exploration of chance, irrationality, and the ludic.

The dependence of Tinguely's works on being "plugged in" to the infrastructure of the city resolutely denies the quality of autonomy frequently claimed by modern art. As soon as they are disconnected from this infrastructure, they temporarily lose their status as complete artworks. (This is, of course, a feature of all motorized kinetic art.) As we have seen, moreover, the works are not only non-autonomous, but also actively divert or *détourne* energy to a machine that produces nothing; they operate only on themselves. They reframe art not only as useless but also as actively *consuming* in an operation of unproductive expenditure, perhaps literalizing the idea of art as a drain on public funds. Whether Tinguely read Georges Bataille is uncertain, but the centrality of nonutilitarian expenditure in his work is clear.[60] The reliefs are remarkable in that they combine this literal economic waste with a formal expression of destruction.

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[59] Hultén, *Méta,* 16.

[60] In *The Accursed Share,* Bataille argued that the expenditure of excess energy—rather than production—should be considered the primary economic force. The work was first published in 1949. Georges Bataille, *The Accursed Share: An Essay on General Economy,* v. 1, trans. Robert Hurley (New York: Zone Books, 1988).

The economic ramifications of the reliefs would be intensified in the following phase of Tinguely's work, the drawing machines. Yet before turning to that development, we should examine another feature of the series that sets the reliefs apart from their avant-garde precedents.

The Experience of Time

Comparisons to Dada machine diagrams or to the process of painting, of course, cannot account for the literal quality of motion in Tinguely's kinetic abstraction. As we have seen, the works may remind us of the temporal process of construction and erasure, and call our attention to the inherently temporal nature of all artistic viewing. But the fact of their literal movement calls for more precision regarding their relationship to time.

We can understand the importance of the temporal factor in the reliefs by returning to the Parisian critics' early descriptions of the works. To reiterate, Bordier reported that Tinguely's machines create many, distinct compositions, and that the viewer may select any one of these compositions by turning the device off.[61] His reading would apply equally to a manipulable relief by Agam, in which a viewer moves parts around to produce an arrangement that subsequently stands on its own for a time; it would also apply to photographs of Tinguely's reliefs that isolate an instant of their motion. In contrast, Gindertael observed that Tinguely's configurations flow into a "single animated painting."[62] In the former reading, temporality is essentially a side effect that results from presenting different pictures consecutively. In the second—and more sophisticated—interpretation, duration forms a central part of the work's essence and shapes its meaning.

[61] Bordier, "Tinguely à la Galerie Arnaud," 30.
[62] Gindertael, *Tinguely,* n.p.

Tinguely's reliefs all employ a single type of movement: rotation. Rotation is the type of movement inherent to a motor; it is also the type of movement used to measure time, in the clock. In 1961, Tinguely created an object that explicitly connected his reliefs to the clock. For a commission from a collector, he cut down one of his 1955 reliefs to fit the face of a grandfather clock, ironically titling the result *Swiss Made* [Fig. 1.15].[63] This work, though an anomaly in Tinguely's oeuvre, reminds us of the resemblance between the structure of the meta-mechanical reliefs and that of a clock—both include geometric elements that revolve at regular rates on a static background, producing shifting relationships with each other as they move. Of course, while the reliefs imitate the language of the clock, they uncouple it from the standards that allow it to function as a utilitarian object. Tinguely himself professed to hate clocks; he claimed not to own any, and, in a 1959 manifesto, enjoined his readers to "forget hours, seconds, and minutes" and "live in the present."[64] Similarly, Hultén interpreted the meta-mechanical reliefs in 1955 as instantiating a presence that he described as "relativity in action." "There is no beginning and no end, no past and no future, only everlasting change," he wrote.[65] Both statements employ the language of immediacy and presence that cuts across a wide variety of practices in the postwar period. Yet critical debates of the moment show that

[63] Bischofberger gives the work's date as 1961, though the back of the relief carries the date 1955. When the work was recently sold at Christie's, the auction house speculated that a 1955 relief had been cut down to its circular form in 1961, when the work was commissioned by the Swedish artist Oscar Reutersvärd. Bischofberger, *Jean Tinguely, Catalogue raisonné*, 158. A comparison of the work in its current state with an archival photograph shows some apparent discrepancies in the shapes of elements, perhaps resulting from the replacement of parts.
[64] Tinguely, "For Statics" [1959], in Bischofberger, *Jean Tinguely, Catalogue raisonné*, 88.
[65] Hultén, "Vicarious Freedom," 35.

kinetic art could be read in other ways, too, its appeal to the present interpreted either as the destruction or extension of traditional viewing modes.

Harold Rosenberg, the New York critic of action painting, summarized the prevailing argument regarding kinetic art's relation to time in his 1967 essay "Movement in Art." Rosenberg traces the ways in which artists have sought to introduce action into their artwork over the course of the twentieth century, to convert "the art object into the art event."[66] Kinetic art represents the culmination of this tendency, and its rush to set its viewers adrift in "a sea of occurrences" marks nothing less than "the end of contemplation."[67] In sum, Rosenberg argues that kinetic art's immersion in real time prevents that suspension of time characteristic of previous art viewing, instead causing the viewer to become caught up in a whirl of events. His position is surprisingly close to Michael Fried's evaluation of Minimalism published in the same year.[68]

Rosenberg's essay provocatively links Abstract Expressionism and kinetic art, two tendencies that are frequently seen as opposed.[69] Yet in his focus on the fast-paced, attention-grabbing "event" and "occurrence," he fails to account for the workings of much kinetic art. A more complex analysis appeared the following year in an essay by Michael Kirby, published in *ARTnews.* Kinetic art, Kirby argues, is a diverse enough genre that it cannot be discussed in the aggregate. He offers a scheme for classifying kinetic art works not by the quality of movement they produce—real versus illusory,

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[66] Harold Rosenberg, "Movement in Art," *Vogue,* February 1, 1967, 213.
[67] Ibid.
[68] Michael Fried, "Art and Objecthood" [1967], in *Art and Objecthood: Essays and Reviews* (Chicago: University of Chicago Press, 1998), 148-172. I further discuss the relationship between Minimalism and kinetic art in Chapter 4.
[69] Umberto Eco also identified common ground between these modes. I discuss his arguments at length in Chapter 3.

mechanical versus natural, as Frank Popper and others had done—but by the particular *experience* of time that they generate.

Kirby discerns four distinct modes of temporal experience that kinetic art can produce. The first and rarest mode is closest to that of theater, involving "memory and expectancy and their relationship."[70] Kinetic artworks in this mode operate through extended time, causing us to develop expectations and defeating them through unforeseen actions. This category includes works such as Robert Breer's *Float* sculptures, which travel across the floor so slowly that one is surprised to look back at them and find they have changed position. Second is the "static mode"; these kinetic artworks are always moving, but paradoxically use movement to create an unchanging form, like the virtual volume of Naum Gabo's *Kinetic Construction*.[71] In the third mode, the artwork changes, but makes no "extended dynamic claims to the past or future."[72] A sculpture that simply rocks back and forth would fall into this category: we understand fairly quickly its circumscribed possibilities of movement. Finally, in the fourth or "transitional" mode, "a series of different present moments flow one into the other without creating operative memories or expectations."[73] In Thomas Wilfred's light-based works known as "lumia," for instance, we perceive changes in the color and pattern of projected light, but cannot remember the complex sequences once they have passed. The effect is a "wash" of present moments. Kirby ends by suggesting that this fourth mode produces a kind of

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[70] Michael Kirby, *The Art of Time: Essays on the Avant-Garde* (New York: E.P. Dutton, 1969), 248. First published as "The Experience of Kinesis," *Art News* 66, no. 10 (February 1968).
[71] Ibid., 251.
[72] Ibid., 253.
[73] Ibid.

contemplative, even absorptive, "timelessness" that is, in fact, quite close to the traditional understanding of artistic spectatorship.

Following Kirby's scheme, how might we classify Tinguely's meta-mechanical reliefs? The majority of them appear to fit most closely into Kirby's third or fourth categories. Most include a high enough number of parts—usually seven or more, though some have as few as three—which rotate at different speeds, making it difficult to track them. But if the works' appearances are always different, they are also always the same: they are hard to remember because they lack singular events. If one of the pieces did something truly unexpected, such as changing color or moving across the board, it would prompt viewers to produce memories and, in a way, generate a "past" for itself. It is partly the fact that these works conform to a general horizon of expectation that makes them difficult to remember. If the reliefs produce difference, it is an *internal* difference, one that appears within the boundaries of a unified work.

We might further understand this point by looking to Husserl's phenomenological theory of time. Our experience of time, Husserl contends, does not consist of a series of discrete "now" moments; rather, the present has "width," as it is harnessed to "retention" and "protention."[74] That is, we always passively remember and anticipate events as we simultaneously experience the present: there is no such thing as an experience of "pure" presentness. For Husserl, this structure of time explains the phenomenon of surprise, which occurs when an event contradicts our implicit anticipation of it. Tinguely's reliefs generally do not produce surprise because they correspond to our mental protention, our implicit sense of the way things will go. (Clement Greenberg's observation about

[74] See Dan Zahavi, *Husserl's Phenomenology* (Stanford, Calif.: Stanford University Press, 2003), 82.

Calder—that "lots of things go on" in his mobiles but "nothing happens"—speaks to the same point.[75]) Although Tinguely never discussed the work of Husserl, the Italian kinetic artist Gianni Colombo and his peers in Milan, whom I discuss in Chapter 3, cited the philosopher as a major influence on their work.

Tinguely did, however, create reliefs—including examples from the series called the *Oeufs d'onocratales,* the *Stabilités,* and *Probabilités*—that establish a different relationship to time from the Malevich-type works. In the *Oeufs d'onocratales* (*Pelican Eggs*)*,* the artist assembles groups of white, irregularly shaped elements that appear to be the fragments of a single form, such as a broken egg [Fig. 1.16]. The slow movement of the elements creates the expectation that they will eventually cohere and return to their original shape. Tinguely deliberately cultivates this sense of anticipation by using elements that seem to have been cut along a single boundary line—elements that theoretically could be rejoined, like puzzle pieces—and by placing them tantalizingly close to each other on the wooden surface. Yet regardless of how long a viewer observes the turning pieces, the moment of resolution never arrives. The frustrating dynamic of the *Oeufs* recalls another precedent of kinetic art: Alberto Giacometti's *Suspended Ball* (1930-31), in which a ball hangs from a string directly over an elongated wedge; the shapes of the two forms suggest that they might be joined, yet the slightly too-short length of the string prevents them from ever meeting [Fig. 1.17]. This experience of time as frustrated anticipation both exceeds readings of Tinguely's work as expressing a pure "present" and differs from the steadier state of the Malevich-style reliefs.

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[75] Clement Greenberg, "Review of Exhibitions of Alexander Calder and Giorgio de Chirico," in *Clement Greenberg: The Collected Essays and Criticism,* ed. John O'Brian (Chicago: University of Chicago Press, 1988-95), 159. Originally published in *The Nation,* October 23, 1943.

Tinguely seems to have been alert to the possible metaphorical meanings of his reliefs. He named some of them *Éclosion* ("hatching" or "blooming") and *Spirale Eclatée* ("exploded spiral"), suggesting their resemblance to works in the process of formation or destruction. In 1956, he titled two of them *Yokohama* and *Yokohama II,* referring to the Japanese city destroyed by American bombing in World War II (and which had been devastated by an earthquake two decades earlier). *Yokohama II* resembles many of the *Oeufs* [Fig. 1.18]. Its cluster of black elements on a white background consists mostly of circles set alongside the irregular, leftover scraps of metal from which those circles have been cut. Drawing a comparison between the literal destruction of war and the destruction of form, Tinguely suggests the impossibility of return to an original, unbroken state. Simultaneously, with their increased emphasis on memory and anticipation, this series implies that the experience of the pure present may not be available in such a historical situation—one in which the weight of the past remains palpable.

In hindsight, then, Hultén's claim that the meta-mechanical reliefs have "no past and no future" fails to account for the complexity of the works' temporal nature.[76] The perception of the reliefs as non-repetitive depends on our failure to remember, and in some cases their dynamic depends on our failure to anticipate the future. If this mode can be called "timelessness," as Kirby suggests, it is a timelessness tinged with anxiety—a kind of avoidance, staving-off, or suspension. The German Zero artist Heinz Mack expressed a similar sentiment when he described the effect of infinite vibration in his

[76] Hultén, "Vicarious Freedom," 35.

work as a means to evade "the sadness of finality," as if one could avoid endings by moving forever.[77]

Tinguely's reliefs are remarkable in the way that they cast this sensation in terms of the modernist vocabulary. More than any other series in Tinguely's career, they express an increasing sense of doubt over the possibility of the wholeness, fixity, or correctness of form and composition, a sense of loss that could be read both artistically and historically.

Drawing Machines

Following his exhibitions at Arnaud and in Milan, Tinguely was soon invited to participate in *Le Mouvement*, the first major group exhibition to examine the rising phenomenon of kinetic art. Accounts of the show's genesis differ slightly, but it is likely that Victor Vasarely proposed the idea to Denise René early in 1955; the show, assembled on a short timeline, opened in April.[78] In addition to reliefs and a sculpture called *Auto-Mobile* that seems to have had some limited movement on the floor, Tinguely

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[77] Heinz Mack, "Resting Restlessness," in *Zero,* ed. Otto Piene and Mack, trans. Howard Beckman (Cambridge: MIT Press, 1973), 41. Originally published in *Zero,* no. 2 (1958). In Chapter 2, I discuss the experience of suspense in relation to Cold War anxieties in the work of Pol Bury.

[78] René recalls that Vasarely proposed the idea of an exhibition about movement to her with an intense urgency, because the idea was already "in the air" in Paris at that moment. He and René immediately thought of Agam, Bury, Jesús Rafael Soto, and Tinguely—whom René had met in Paris before his Arnaud debut—as the first group of young artists invited to show. René also showed work by Calder and Duchamp to provide historical context. Hultén, meanwhile, reports that he, Tinguely, and Robert Breer took the lead on the planning and on persuading René, though Vasarely had formulated the initial idea. Given the centrality of Vasarely's text in the exhibition brochure, it does seem that the artist played a key role in *Le Mouvement*'s organization, although many of the artists clearly resented what they saw as an excessive focus on his work and philosophy. (Millet, *Conversations,* 74-87; Hultén, *Magic,* 27.)

showed two wall-mounted pieces of a new type. Both titled *Machine à dessiner*, they combined elements of the relief form with rudimentary drawing apparatuses. In these works, and in a third created in the same year, a mechanized wire arm attached to the support makes erratic movements and draws with a pen on a rotating circle of white paper. The resulting drawings are fuzzy circular webs and spirals of color, akin to those produced by a child's spirograph toy, dense at the center and fading toward the paper's outer rims. Two of these machines include elements of the kind found on the meta-mechanical reliefs—three white circles in one case and five irregular white "scraps" on the other—alongside the drawing apparatus [Figs. 1.19, 1.20].

The rotary movement of the paper sheets in these drawing machines strongly recalls Duchamp's *Rotoreliefs*, and Tinguely must have noticed the resemblance as well, given that the works hung together at René. In his reliefs, Duchamp had been interested in the production of optical illusion, the way a flat spiral made to rotate could appear to project outward in space and generate a "pulse" that disrupted the apparent stability of its form.[79] Tinguely's *Machines* may have created limited optical effects through the rotation of the marked paper, but this was not their primary aim. Instead, the works undo formal stability through their obsessive and endless activity of drawing in circles.

Reviews of *Le Mouvement* largely overlooked the *Machines à dessiner*, and Tinguely subsequently abandoned the series for four years.[80] (One of the works did receive a mention in a photo caption for an article in *Combat,* which referred to a "Robot" that could create drawings and concrete music. The latter seems to be a

[79] Rosalind Krauss, *The Optical Unconscious* (Cambridge, Mass.: MIT Press, 1993), 205-206.
[80] Hultén, *Méta,* 30.

reference to the sound of the machine's motors and its jangling arm.[81]) Tinguely returned to the idea in 1959, by which time he had moved from Denise René's gallery to Iris Clert's. He exhibited freestanding drawing machines, which he now called the *Méta-Matics*, from July 1 to 30 at Clert in Paris and from October 15 to 31 at the Kaplan Gallery in London. These exhibitions catapulted the artist to notoriety, bringing him amused and outraged press coverage throughout Europe and across the ocean in New York.

The mature series of *Méta-Matics* are primarily self-supporting sculptures on three legs. Descriptions of these machines rarely note that they still share the geometric vocabulary of the reliefs: black and white circles and irregular metal scraps now mingle among the wheels and belts of the mechanism, as in *Méta-Matic No. 10* [Fig. 1.21]. In fact, they somewhat resemble the three-legged, freestanding sculptures that Tinguely had been producing alongside the reliefs, such as the *Méta-Herbins* [Fig. 1.22]. The difference, of course, is that the *Méta-Matics* hold a writing implement attached to a clamp in one spindly mechanical arm and a piece of paper in a second. When a viewer turns on a machine by inserting a token, the first arm scribbles frantically on the paper. Reviews indicate that early viewers were able to select and insert their choice of drawing implements, to stop and start the machines in order to change these implements, and at least in some cases, to choose among a selection of drawing speeds.[82] The machines ran for about three minutes before requiring an additional token to restart them. Whereas the

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[81] *Combat* (April 18, 1955), no further publication data available, Museum Tinguely Archives, Basel.

[82] One newspaper article refers to a *Méta-Matic* having five speed options. See "Whirr!... Splash!... And There's a Work of Art," *The Evening Telegraph & Post,* November 4, 1959.

Machines à dessiner tended to produce spiral-like webs of long, interconnected lines, the *Méta-Matics*' drawings tend toward choppier, more staccato effects featuring shorter lines and dots of color [Fig. 1.23].

Iris Clert promoted Tinguely's *Méta-Matics* with her characteristic zeal. Invitations to the October exhibition emphasized its interactivity: "Come and create, with spirit, fury, sweetness, or elegance, your own painting in collaboration with Tinguely's *Méta-Matics*: the sculptures that paint," read one.[83] The gallery sponsored a contest for the best machine drawing, with a jury that included Arp, Yves Klein, Raymond Queneau, and a cross-section of Paris's most distinguished art critics.[84] Tinguely produced a portable iteration, *Méta-Matic No. 14,* which could be strapped to the chest and operated manually in the manner of a hurdy-gurdy; the artist and his assistants carried it around the neighborhood of Saint-Germain-des-Prés to lure visitors to the show.[85] Finally, Tinguely applied for and received a patent of the latter work, likely at Clert's urging.[86]

By 1959, Tinguely himself was also becoming more interested in the operations of publicity. On the occasion of his exhibition at the Galerie Schmela in January and February of that year, he staged a stunt in which he purportedly dropped thousands of copies of a manifesto, "For Statics," from a plane over Düsseldorf.[87] He also conceived

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[83] Invitation, "Les Méta-Matics de Tinguely: Les sculptures qui peignent," Galerie Iris Clert, Paris (July 1-30, 1959), Museum Tinguely Archives, Basel.
[84] The brochure also lists Gindertael, Jouffroy, Michel Ragon, Pierre Restany, Michel Seuphor, and others. Museum Tinguely Archives, Basel.
[85] Pardey, *Museum Tinguely Basel: The Collection*, 54.
[86] Daniels, "Often Neglected," 164. Tinguely submitted the application to the French Ministry of Industry on June 26, 1959, and received the patent—number 1.237.934—on June 27, 1960.
[87] Recent scholarship suggests that, despite Tinguely's claims, the plane may never have left the ground. See Dominik Müller, "The Life of Jean Tinguely," in Pardey, *Museum Tinguely Basel: The Collection*, 392.

the opening night at Schmela as a performative event, with Daniel Spoerri, Haio Bode, and Claus Bremer simultaneously reading from texts hung on a cylinder that rotated too fast for them to keep up. (A letter from Alfred Schmela to Tinguely indicates that the artist also wanted Karlheinz Stockhausen, the composer of electronic and serial music, to speak at the event, but that he was unavailable.[88]) Tinguely's growing appetite for publicity may have been encouraged, in part, by his increased closeness with Klein, an artist notoriously interested in promotion; the two had showed together at Clert's gallery in November 1958.[89]

The atmosphere of scandal surrounding the *Méta-Matics*, which contrasts with the more restrained reception of the reliefs five years before, may suggest a break between these two phases of Tinguely's career. But to what extent are the works really different in their concerns? The coexistence of both the relief and drawing-machine modes in the *Machines à dessiner* in 1955 indicates that Tinguely understood these two types of image production to be in dialogue. As we have seen, he also retained relief-like elements in the architecture of the *Méta-Matics*. The artist showed the two types of works alongside each other in a number of shows: at Kaplan, at the Staempfli Gallery in New York in 1960, and elsewhere. Finally, Tinguely's early interest in the pioneers of abstraction seems to have been holding strong in the late 1950s; Hultén notes that, in January 1959, the artist signed his letters 'Vive Kasimir!'"[90] This exclamation suggests, once more, that

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[88] Letter from Alfred Schmela to Tinguely (January 11, 1959), Museum Tinguely Archives, Basel.
[89] The two showed in *Vitesse pure et stabilité monochrome par Yves Klein et Tinguely* at the Galerie Iris Clert, Paris, which opened on November 17, 1958.
[90] Hultén, *Méta,* 76.

Tinguely's interest in Malevich lay closer to genuine appreciation than to ironic dismissal.

As we have seen, observers had understood the reliefs as engines for generating constantly evolving abstract compositions. Tinguely made a similar claim for the *Méta-Matics*, suggesting that each drawing they produced would be one of a kind. This uniqueness can be attributed partly to the nature of the mechanism—the fragile connection between the arm and the support may provide a place for chance effects to occur—and partly to the new, though limited, possibilities for viewer decision-making.[91] Yet both the meta-mechanicals and *Méta-Matics* are, at base, machines that produce variations on abstract art. The key difference between them is that the latter series makes the analogy to *economic* production and consumption—which I would suggest was already latent in the first—more explicit. This heightened literalness is evident in a few important changes between the two sets of machines.

Most obviously, in the meta-mechanical works, the relief itself functions as both producer and product.[92] That is, the rotating metal parts are simultaneously the means of creating a new composition and the content of the work itself. The reliefs collapse the distinction between the moment of making and the moment of viewing; the fact that the work is never "finished," and that it is always in process, generates this temporal congruence. If, as Bordier suggested, the spectator turns the machine off to freeze a particular composition, some distinction would be reintroduced. But even in this case, the producer and product, the rotating relief and the still relief, remain physically coincident.

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[91] Annja Müller-Alsbach, "The Medium of Drawing in the Oeuvre of Jean Tinguely," in Pardey, *Museum Tinguely Basel: The Collection*, 269.

[92] This is, of course, setting aside Tinguely's initial labor in constructing the machines.

The situation is different with the *Méta-Matics*, which separate production from consumption in a material way. The drawing machine yields a physically detached, "finished" drawing each time it is operated. (An *Apollo* reviewer picked up on this difference when he described a *Méta-Matic* as "an exceptionally animated 'mobile' which not only moves but *does something*."[93]) This may lead to some confusion over where the art is located in the *Méta-Matics*: is the art the producing machine itself or its product? Or is the answer "both," as physically distinct as these may be? Indeed, the machines' drawings were sometimes hung on the gallery wall alongside the machines themselves, as photographs from *Le Mouvement* and the Staempfli exhibition show [Fig. 1.24].

Tinguely emphasized his new focus on consumption and exchange by requiring tokens to start his *Méta-Matics*, and by asking spectators to purchase these tokens with real money. The tokens were printed with Tinguely's name and the first names of his friends and associates—including "Pontus," "Yves," and "Iris"—drawing an equation between currency and the proper name, and also perhaps calling attention to the figures who had bestowed his work with its economic value.[94] The single names lend an aura of celebrity to the whole affair, suggesting that these art-world insiders could be identified by their first names alone.

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[93] W.R.J., "Jean Tinguely," *Apollo* 70, no. 416 (October 1959), 98.

[94] In *S/Z,* Roland Barthes discusses the "economic nature of the Name." He writes that the name, functioning as a kind of simplification or condensation of a more complex notion of personhood, "is an instrument of exchange: it allows the substitution of a nominal unit for a collection of characteristics by establishing an equivalent relationship between sign and sum." Barthes, *S/Z: An Essay,* trans. Richard Miller (New York: Macmillan, 1975), 94-95.

One visitor to the Kaplan exhibition described his experience with the *Méta-Matics* in a newspaper report. Upon arriving, he paid five shillings to the gallery receptionist to receive a token. He recounted the experience in an ironic tone: " 'Your picture won't really be worth 5s,' the receptionist said, carefully removing my two half-crowns from my hand. 'But M. Tinguely feels you will get more out of the experience if you have to pay something first.'"[95] As we have seen, critics of the meta-mechanicals had noticed that the reliefs diverted public utilities for the purpose of creating nothing. These later machines, however, demanded an outlay of money for a product of dubious value in a more direct way. If the earlier works had dwelled on the failure of artistic resolution, the drawing machines found an easy solution to the problem: a drawing was finished when the spectator's money, and hence the machine's activity, ran out. While the meta-mechanical reliefs played with time inflected by memory and anticipation, in these works time was apportioned by expenditure.

The discourse around the *Méta-Matics* also had something to say about the position of Tinguely himself. Rather than an honest worker, the artist could now be understood as the owner of the means of production, required to work less because he could control and benefit from his machines' labor.[96] An anecdote recounted in *Apollo* magazine following the Kaplan exhibition is telling. Tinguely, the story goes, received a visit from a certain "unsavory character," a Corsican pimp from Paris's red-light district.

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[95] "Whirr!... Splash!... And There's a Work of Art."

[96] Helen Molesworth has commented on this aspect of the *Méta-Matics*: "If one of the promises of mechanized labor was the increased amount of free time for leisure activities, then Tinguely suggests that artists could share in such privileges." Molesworth, "Jean Tinguely," in *Work Ethic* (Baltimore: Baltimore Museum of Art; University Park, PA: Pennsylvania State University Press, 2003), 204.

> The Corsican congratulated him in these words: 'You're really someone, the king of us all. People put money in your machines; the machines do the work, and the customers even help it: they stop when the drawing's finished, then they come and ask for your signature and congratulate you. That's money for jam.'[97]

The character's personal identification with Tinguely, "the king of us all," also draws an analogy between pimping and machine production, between profiting from the labor performed by the bodies of others and that performed by the *Méta-Matics*.

It is true that the *Méta-Matics* do allow the viewer to contribute in some ways to the final appearance of their drawings, by choosing to use a red marker or a fast speed, for instance. William Rubin would later understand the machines' dependence on this initial process of selection as something like a precursor to Conceptual art: "Their perhaps unintentional revelation," he wrote, "was to confirm that painting is almost entirely a matter of decisions following from conception, as distinct from facility in the techniques of execution."[98] Yet how much leeway did the viewer's decisions actually allow? In the scholarship on participatory art, the sheer fact of a viewer's "activation" by an artwork has frequently been regarded as a kind of emancipation from the apparent passivity of traditional viewership—and often, by extension, conflated with political participation. Yet the particular mode of participation in a given work may have many different implications.[99] In Tinguely's work, we might understand the very paucity of the viewer's contribution as a parody of the idea of "choice" in consumer society—the significance attached to the selection between minimally differentiated models, such as a red car over a black car, that masks a deeper lack of real personal choice in the face of the

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[97] Jean Yves Mock, "Notes from Paris and London: Tinguely at the Kaplan Gallery," *Apollo* 70, no. 417 (November 1959): 132.
[98] William Rubin, *Dada, Surrealism, and Their Heritage* (New York: Museum of Modern Art, 1968), 23.
[99] Claire Bishop, *Installation Art: A Critical History* (New York: Routledge, 2005), 102.

capitalist economy.[100] In a sense, the reliefs had already made a similar point. While they could be described using the rhetoric of freedom, one that Hultén and Tinguely frequently employed, the space for true freedom and variation in them is, in fact, fairly restricted.

A project from 1960 further elucidates the convergence of concerns between the meta-mechanical reliefs and the *Méta-Matics*. In *Maschinenbild Haus Lange* (1960), Tinguely designed a relief in the style of an early *Méta-Malevich* for an exhibition at the Museum Haus Lange in Krefeld, Germany. Viewers who purchased the exhibition catalogue received a plan of the relief with building instructions, which they could use to fabricate the object independently of the artist. Upon completing the construction, they could send a photograph to the museum and receive in exchange a signed label from Tinguely, to be affixed to the back of the work.[101] Although the multiple appears on its face to be a simple reiteration of the *Méta-Malevich* series, it incorporates a newly intensified interest in commerce and reproduction.

The *Méta-Matics* thus render explicit the references to production and consumption that remained latent in the reliefs: the dependence on public resources, the artist's withdrawal from work, the blurred line between freedom and restriction. Yet the similarities between the two series are not restricted to this realm. Both also examine what it might mean for an artwork to exceed the foresight of its creator: how the fleeting compositions of the rotating elements could escape Tinguely's anticipation in the reliefs,

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[100] Meredith Malone, *Chance Aesthetics* (St. Louis: Mildred Lane Kemper Art Museum, 2009), 115.

[101] Jean Tinguely, *Maschinenbild Haus Lange. Bauanleitung,* single-page insert for the catalogue Museum Haus Lange, Krefeld 1960, Museum Tinguely, Basel. Reproduced in Pardey, *Museum Tinguely Basel: The Collection,* 397.

and how a pen could be guided across paper in the absence of a controlling human consciousness in the *Méta-Matics*.

This problem finds more literal expression in the second series. The structure of the *Méta-Matics*—with their upright tripod supports, their mechanical arms holding real drawing implements, and their bumbling movements—made them easy to read anthropomorphically. Tinguely accentuated this parallel in some sculptures, as in *Metamatic No. 12 (Le grand Charles)* (1959), whose six-and-a-half-foot height brings it much closer to human scale—and whose name alludes to Charles de Gaulle [Fig. 1.25]. One Italian journalist reporting on the drawing machines attributed different temperaments to them: one initially moved "with laziness, as if it had no desire to begin painting," and then later with a kind of crazed violence, "as if it hated the man who had awoken him with the torture of the electric current."[102] Far more than the reliefs, the *Méta-Matics* seemed to share some qualities with the living, seeming to possess personalities and experience shifting moods.

Yet it is obvious that there is no guiding awareness driving the machines' mechanical hands. This paradox, that the works seemed animate but unaware, led many in the press to draw comparisons between the *Méta-Matics* and famous stories of painting animals. More than one reference was made to Lolo, the donkey who with his tail had supposedly made an Impressionist painting, subsequently titled *Sunset over the Adriatic* and shown at the Salon des Indépendants. In Tinguely's *Méta-Matics*, "the donkey's

[102] Alberto Baini, "Un gettone da trecento franchi per un quadro meta-meccanico," *Giornale d'Italia*, August 6, 1960.

caudal appendage is replaced by a mechanical arm," wrote one reporter.[103] Another suggested that the machines outdid "that crazy four-year-old London Zoo ape, Congo, who put his stubby fingers in the paint pots and ran them madly over paper."[104] For a time, it seems that Tinguely agreed to sign his *Méta-Matics'* drawings with his own signature, but he eventually stopped, turning over full authorship to his machines.

Many observers have noted the connection between Tinguely's work and the history of literary painting machines. The most famous of these appears in Raymond Roussel's *Impressions of Africa* (1910), a novel that, particularly in its adaptation as a play, served as a major influence on the Surrealists. In the novel, the character Louise Montalesco—who is herself part machine—demonstrates a painting apparatus to a crowd gathered outdoors. The core of the device is a photographic plate sensitive to light reflected from the surrounding environment. Through a series of electrical wires, the plate communicates instructions to ten paintbrushes attached to a hinged arm; the brushes apply color to a canvas and replicate the photographic image. In a second demonstration, Montalesco shows that the machine can also produce sketches in pencil on paper. With its two central elements, the convoluted setup conflates photography and *plein-air* Impressionist painting. Interestingly, although Roussel's machine functions independently of human input, it cannot be said to have any creative involvement itself.

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[103] "Progrès décisif pour la peinture non figurative: Le chef-d'oeuvre peut se faire à la machine," *Le Figaro littéraire,* July 25, 1959. Another reference to Lolo appears in Guy Dornand, "En attendant le Salon des Robots," *Le Hors-Cote* 5, no. 145 (August 5, 1959).
[104] "Press the button and out pops ART," *Daily Sketch* (London), June 24, 1959.

As the observers in the novel remark, the finished work "remained rigorously faithful to the model."[105]

The idea of artistic production separated from a human being's conscious control was, of course, also the founding idea of Surrealist automatism. In 1924, André Breton had defined Surrealism as "psychic automatism in its pure state," that is, an expression of thought recorded "in the absence of any control exercised by reason."[106] In the visual arts, automatism took diverse forms, ranging from the immediate recording of mental images evoked when a person was half asleep or in other states of partial consciousness; to the production of purely abstract marks which were then interpreted for hidden content; and to various combinations of these modes.[107] In his automatic drawings, for instance, André Masson began by allowing himself to produce "pure gesture, rhythm… pure scribbles," and then returned to find figures within them.[108] The resulting works are filled with partial, emerging, and incomplete images, often of fragmented human bodies [Fig. 1.26]. The aim of Surrealist automatism was to locate an "other" within the self; in Masson's drawings, this subjective splitting finds a parallel in the disintegration of image and form.[109]

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[105] Raymond Roussel, *Impressions of Africa* [1910], trans. Mark Polizzotti (Champaign, Ill.: Dalkey Archive Press, 2011), 127. In her dissertation, Hanor treats the connection between Tinguely's work and this machine—as well as painting machines that appear in other works by Roussel and Alfred Jarry—at length. See Hanor, "Jean Tinguely," 83-96.
[106] André Breton, "Manifesto of Surrealism" [1924], in *The Sources of Surrealism: Art in Context,* ed. Neil Matheson (Aldershot [England]; Burlington, VT: Lund Humphries, 2006), 302.
[107] Clark V. Poling, *André Masson and the Surrealist Self* (New Haven: Yale University Press, 2008), 46.
[108] Masson, "Propos sur le surréalisme" (1961), in *Le Rebelle du surréalisme: écrits,* ed. Françoise Will-Levaillant (Paris: 1976), 37. Quoted in Poling, 48.
[109] Poling, *André Masson,* 55.

In Tinguely's *Méta-Matics*, it is the machine rather than the human being that acts automatically. Yet the idea of an automatism mediated through technology was nothing new in the 1950s. Already in the 1920s, Breton had compared the Surrealist practitioner of automatic writing to a "modest recording instrument" that uncritically documented the movements of thought, much like a seismograph would record the movement of the earth's surface; in the visual arts, he described the process of automatism as a kind of "tracing" of unconscious images, rather than a sovereign "drawing."[110] In his view, to make the body more like a machine or automaton by temporarily suspending critical faculties was a means of giving access to the normally blocked unconscious.

The *Méta-Matics* maintain the basic principle of the recording instrument: the graphic mapping of an input onto a support. (In 1946, Sartre had made a similar claim for Calder, though his mobiles had no graphic output: he wrote that the works function as "resonators, traps," that give tremors and currents "fleeting form."[111]) Yet the difference between the drawing machine and the recording instrument is that the former's product appears impervious to interpretation, as the movement of the mechanical hand records nothing but a spinning motor. Surrealist automatic drawing, even if it began in an unconscious gesture or a randomness-producing technique, such as frottage or decalcomania, ended with the reentry of reason: the draughtsman would "read in" to his production, finding figures in what seemed to be meaningless scribbles. Tinguely's blindly drawing machines instead enact what we might call an "unmotivated" kind of automatism.

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[110] Breton, "Manifesto," 303.
[111] Sartre, "Calder's Mobiles," 354-355.

The relationship between Tinguely's machines and automatism was the subject of a debate in the October issue of the journal *Sens Plastique* in 1959. The review's editor Jean-Jacques Lévêque had organized the so-called "Procès de l'automatisme," sending a questionnaire regarding the artistic merit of Tinguely's machines to a variety of artists and critics, and publishing their replies. Although many of the respondents forthrightly dismiss the *Méta-Matics*' status as legitimate artworks, certain common threads emerge in the replies of the defenders and the attackers alike: they focus on the ambiguous place of the artist in relation to the drawing machines and the extent to which this configuration still allows one to speak in terms of intentionality.

Pierre Jacquemon goes furthest in his claims for the presence of intentionality in the machines' drawings. He argues that Tinguely's machines should be understood as "tools" akin to traditional implements such as brushes and pencils. While a *Méta-Matic* may have more "autonomy" from its user than such instruments, he writes, its "automatism" is doubtful: the machine may be unaware ("*inconsciente*"), but its creator certainly was not. Jacquemon terms this dynamic "willed automatism."[112] Robert Lapoujade, similarly, argues that chance in art is admissible but that it must be transformed with intention. This is what happened in Surrealist automatism, and what happens now in gestural painting, he points out: the pure production of automatic signs is not enough, and reason must intervene in the end.[113]

Robert Lebel and Stanley William Hayter both converge on a single question: What is the difference between Tinguely's machines and a mechanical recording device?

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[112] Pierre Jacquemon, response to questionnaire in "Procès de l'automatisme, une enquête dirigée par Jean-Jacques Lévêque," *Sens Plastique,* no. 8 (October 1959): n.p.
[113] Robert Lapoujade in "Procès," n.p.

Lebel defends Tinguely's machines, arguing that they should not be read as a serious attack on painting. If these works make an ironic or playful mockery of the "exhaustion of pictorial inspiration," he remarks, then they merely participate in a conversation that has been going on between painters and sculptors long before the invention of automatism or lyrical abstraction. If observers really do feel threatened by Tinguely's machines, they should be even more concerned about "the least seismograph or electrocardiograph"—machines that create original and unpredictable patterns in a way truly independent from any kind of human will.[114] Hayter also compares Tinguely's works to recording technologies; he mentions in particular a machine constructed by a Dr. Breder, meant to record the movement of fishes' scales. Such machines may produce objects of beauty, Hayter argues, but only with the intervention of a person who turns them on and off at the desired moment. Tinguely's machines "do not threaten lyrical abstraction any more than a pebble threatens sculpture," he asserts, seemingly making the point that it is the lack of intention behind the machine's drawings that makes them aesthetically inadmissible.[115]

A different response to the problem comes from Robert Estivals, a linguist and former member of the Lettrist movement, who poses the question in terms of semiotics. Estivals argues that the *Méta-Matics* are machines that produce "natural signs."[116] Drawing on Ferdinand de Saussure, he explains that a sign is made of a signifier and a signified, which are united like two sides of a sheet of paper. In a *natural* sign, Estivals writes, the signifier is a "direct" or "automatic" expression of the signified. These natural

[114] Robert Lebel in "Procès," n.p.
[115] Stanley William Hayter in "Procès," n.p.
[116] Robert Estivals in "Procès," n.p.

signs fall into two groups: those produced by a "subjectivity" (he suggests a cry, an automatic gesture, and lyrical abstraction as examples) and those made by an objective reality (Estivals gives no examples, but we might think of indexical signs such as smoke or thunder). It is into the latter category that the *Méta-Matics*' productions fall, Estivals observes. Yet he also acknowledges that the drawings come very close to the subjective signs, as it is the artist who made the machine—it did not occur randomly in nature. His response points to a confusion we have already encountered: whether the art of the *Méta-Matics* lies in the machine or the product.

The *Sens Plastique* "Procès" ends with a reproduction of a scribble-like drawing signed "Bryen"—likely the Informel painter Camille Bryen—and a handwritten note, which reads, "Machines must have machine adventures. Here is a drawing executed by a plane." A caption explains the origins of this drawing: as the artist traveled to Amsterdam by airplane in May of 1957, he held a piece of paper and a Bic pen on his knee, and thus "the plane drew." The sketch recalls Robert Rauschenberg's *Automobile Tire Print* (1953), in which Rauschenberg directed John Cage to drive a Ford over paper to produce an ink print of the car's tires. It also anticipates William Anastasi's subway drawings of the 1960s, in which the artist held a piece of paper and pen in his pocket, allowing the pen to mark the paper according to the bumps and turns of the subway. In these examples, the human hand functions as a "medium" expressing not the unconscious mind, but the seemingly meaningless movements of transportation technology. In Tinguely, meanwhile, the artist's hand is removed by one additional degree: it creates the machine that in turn creates the machine-drawing.

Of course, critics have more commonly read the *Méta-Matics* not in light of Surrealist automatism but as a parody of the automatic gestures of contemporary Abstract Expressionism or Informel painting.[117] This generation of painters had taken up the legacy of Surrealism, but modified its philosophical grounding. Robert Motherwell, for instance, explicitly discussed employing psychic automatism in his own work. He saw its completely personal and unmediated nature as a means of bypassing "style."[118] Furthermore, for Motherwell, psychic automatism—which stemmed solely from the individual unconscious and was thus fully walled-off from art historical influences—guaranteed absolute originality. Tinguely's works would have been threatening to such an aesthetic in that they give the lie to its claim of a purely spontaneous expression of the unconscious and to any promise of uniqueness. After all, Tinguely seems to suggest, the finished objects, whether produced by psychic automatism or machine automatism, *look* the same: their appearance does not tell us much about the process of their creation. The works critique the *legibility* of the Informel mode, the idea that its paintings may be transparently read as expressive.[119]

The functional mechanism of the machines reinforces this point. The viewer cannot even activate a *Méta-Matic* directly: he or she must first purchase a token, then use that token to turn on the machine. This chain of events further exaggerates the

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[117] See Müller-Alsbach, "The Medium of Drawing," 265, for examples of this reading from the period of the works' execution.

[118] Letter to Edward Henning (October 18, 1978) in *The Collected Writings of Robert Motherwell,* ed. Stephanie Terenzio (New York and Oxford: Oxford University Press, 1992), 230. See Arthur C. Danto, "The 'Original Creative Principle': Motherwell and Psychic Automatism," in *Robert Motherwell on Paper: Drawings, Prints, Collages,* ed. David Rosand (New York: Abrams, 1997), 39-58.

[119] For a discussion of the problem of legibility or transparency in relation to Surrealist automatism, see Laurent Jenny, "From Breton to Dali: The Adventures of Automatism," trans. Thomas Trezise, *October,* no. 51 (Winter, 1989): 105-114.

distance between the machine's drawing and the viewer's hand. By emphasizing this distance, Tinguely plainly forestalls the practice of "reading in," of interpreting hidden meanings behind the gestural marks. Clert's competition for the best *Méta-Matic* drawing makes light of the idea that any one of the machine's products could be superior to any other.

In part, Tinguely's *Méta-Matics* responded to the anxiety of a culture whose economy was shifting from the mechanical to the automatic, as Pamela Lee has recently argued.[120] (The change in titles between the meta-*mechanical* reliefs and the *méta-matics* seems to draw on the tension between these modes as well.) Despite the fact that the drawing machines were simple mechanical constructions, employing scavenged motors of the sort that would be used in toys or record players, they presaged a future in which the machine would come to control even the most apparently human and personal of realms: art.

Yet the public response to the *Méta-Matics* was not purely anxious. Perhaps the dominant emotional responses that we find in their reception, from reviews to photos from gallery openings, are those of laughter, humor, and enchantment. It is clear that the machines' drawings never posed a real challenge to painting, and that they were understood as basically useless: an automatism re-routed toward irrational ends. Instead, beginning with the first reliefs, Tinguely's kinetic art provided a site for viewers to encounter and think about a kind of agency beyond the human. When Tinguely observed that the meta-mechanicals "intervene" in his own creative process, when Wescher described them as leading autonomous lives, and when the critics of *Sens plastique*

[120] Pamela Lee, *Chronophobia: On Time in the Art of the 1960s* (Cambridge, Mass.: MIT Press, 2004), 105.

quarreled over the place or non-place of intentionality in *Méta-Matics*, they all circled around the question of just how much input the machine itself has during the process of composition.

If we are to think of Surrealist automatism in terms of the splitting or fragmentation of subjectivity into self and other, something similar can be observed in the *Méta-Matics'* fragmentation and dispersal of human agency. The vague and changing language used to describe the relationship between the drawing machines and their users (who were variously asked to "collaborate" with the machine, to "do-it-yourself," and so on) points to the uncertainty over just how much each party contributes to the final work. This confusion could be frightening or threatening, as the angry dismissals and charges of hoaxing lobbied at Tinguely suggest. But it could also be pleasurable, as a series of large-scale works from 1960 makes clear. Shown in the ironically titled exhibition *L'art fonctionnel de Tinguely* at the Galerie des 4 Saisons in Paris, these works are non-motorized machines that extensively explore the forms that human input may take in the artistic process. In one work, for instance, the spectator could ride a bicycle to produce an engraving, and in another, turn a barrel with his or her feet to carve a sculpture, redistributing art-making beyond the hand [Fig. 1.27]. The ludic nature of these works suggests a kind of pleasure, at least in certain circumstances, in the reduction of the self to a simple activating agent, and in the rejection of the lofty claims sometimes made for artistic gesture. In the end, the sheer absurdity of these machines—and of the *Méta-Matic*s—ensured that they did not equate to a pure embrace of technological automatism or a coercive collaboration with forces that would replace the human. They instead

estranged the situation, making more visible the new relations between human and thing in complex, and often humorous, ways.

Conclusion

In his meta-mechanical reliefs, Tinguely took up the language of prewar abstraction to reveal its hesitations regarding compositional resolution and finish, both by producing intensely malleable compositions and by protracting artistic process into an extended temporal flow. In the *Méta-Matics*, he turned to the realm of economics to continue this investigation: the machines produced drawings automatically upon the insertion of a token, presented the viewer with constrained choices regarding color and style, and declared their production finished once the time paid for had run out. Throughout this process, Tinguely's explorations remained resolutely on the surface. His *Méta-Kandinskys,* with their visible zigzagging belts, radically expose the mechanisms that make the object function. Even the *Méta-Malevich*-style reliefs—despite the fact that their motors are not visible—rotate in such a predictable manner that they create little sense of curiosity regarding the apparatus that lies inside their black boxes. The drawing machines, too, are structurally open. If they resemble people in their uprightness and in the seemingly improvised irregularity of their movements, they wear their motors, belts, and decorative metal flourishes on the outside; they show no trace of a concealed interior. This was, in a sense, the point. Tinguely's aim in these machines, whose parts slide around their surfaces or which scribble marks on a page, was to question the extent to which choices *required* a subjectivity to guide and motivate them, and to dispute the idea that drawing gave access to some deeper level of self.

For Tinguely, then, kinetic animacy had its limits. If his machinic parts had a "life of their own," it was lived purely at the surface level: there was never any real question as to what lay beneath. In this regard, his early kinetic work differs dramatically from that of Bury, the subject of my second chapter. Working from a different artistic formation and toward different aims, Bury exploited the half-hidden structure of his kinetic art to create the sense of an unconscious—a mysterious entity whose activity could be glimpsed periodically on the surface.

CHAPTER 2: The Threat of Movement: Pol Bury's Slow Kineticism

In 1964, Pol Bury shipped ten of his kinetic sculptures to the Venice Biennale, where they drew crowds to the Belgian national pavilion. The sculptures included *Ponctuation* (1963), a wall-hung panel densely covered with nylon wires that tremble briefly at unpredictable points; *Petit meuble* (1964), an object resembling a wooden chest from which spring quivering cylindrical growths; and *Erectile cadre* (1962), a frame whose canvas has been replaced by sporadically twitching tubes.[1] In *L'Oeil* magazine, Jean-François Revel tried to account for the popularity of these works, which eluded the usual categories of moving or non-moving sculptures to become "sculptures that move just a little bit."[2] Observing one of Bury's sculptures for a moment, Revel writes, a viewer suddenly has the impression of being unwell. He *thinks* he sees the wires jerk and the cylinders shift, but their movements are so tiny that they might just be products of his imagination. He finds a fellow visitor who might be able to confirm his impressions—but this person, too, wonders if he is hallucinating, and will need to call a third witness. And that, Revel concludes, is why Bury's room at the Biennale is always full.

Revel's story about Bury's sculptures foregrounds the sensations of doubt, anticipation, and even paranoia that viewers experienced in the face of these works. While many kinetic artists sought to create objects whose movements were nonrepetitive

[1] Bury's submission sheet lists ten sculptures: "*Colonne* (1962), *Erectile (Cadre)* (1962), *Meuble* (1962), *Erectile-retractile* (1963), *Retractile (Armoire)* (1963), *Retractile* (1963), *Ponctuation* (1963), *Cuivre-Ponctuation* (1963), *Aluminum* (1963), *Petit meuble* (1964)." Venice Biennale archives (Segnatura b. 124 [32 esposizione] 3. Fascioli dei paesi – Belgio).

[2] Jean-François Revel, "XXXIIe Biennale de Venise," *L'Oeil*, nos. 115-116 (July/August 1964).

and unpredictable, Bury achieved this aim in a particularly effective way by combining minimal motion with long periods of motionlessness. He used this strategy to push at the boundaries of human perception, and to investigate the psychic experiences that intermittent, slow, and unpredictable motion could induce in its viewers.

This chapter begins by tracing Bury's growth out of various Surrealist-associated groups in the 1940s and '50s and his final development of manipulable kinetic artworks derived from the principles of geometric abstraction in 1953. I then discuss Bury's turn from participatory to motorized art, a move that might be regarded as reactionary in its apparent rejection of spectator involvement. Yet Bury did not simply return to traditional viewing models, but rather imagined a kind of art-making that takes advantage of the space between viewer and object to create experiences of non-knowing that are themselves politically resonant.

In the central part of the chapter, I consider Bury's mature kinetic works, the *Punctuations.* Unlike Tinguely in his surface-oriented objects, Bury exploited the division between the visible and the hidden in his motorized works, causing elements on the surface to move sporadically and unpredictably through the activities of concealed mechanisms. I first examine the way the uncanny intermittent and slow movements of these works can be understood in dialogue with critical models of the optical and psychic unconscious. I then show how the psychic states of doubt and anticipation they engender find an analogy in the world of cinematic suspense. While carrying its own ramifications within the development of Bury's artistic practice, the dynamic of suspense also resonates with its broader Cold War context.

In the previous chapter, I argued that Tinguely's movable works responded to a generalized concern over the possibility of "finish" that had emerged in avant-garde art by the later 1920s and '30s. In Bury's work, an initial doubt about the nature of abstract composition gradually shifted into a different kind of doubt: one concerning the limits of human perception and knowledge, and one that translated into an intense experience of anticipation—and even paranoia—for its observers.

Early Work

Born in 1922 in Haine-Saint-Pierre, Belgium, Bury studied at the Académie des Beaux-Arts in Mons. As a young artist, he was initially drawn to the Surrealist movement; he formed a close friendship with the Surrealist poet Achille Chavée and became a member of the Brussels-based Surrealist group *Rupture* and its successor *Hainaut*. During this period, Yves Tanguy and René Magritte were, in turn, major influences on his painting style; he showed spare landscapes featuring bare trees and uncanny architectural elements in the exhibition *Surréalisme* at Brussels' Galerie La Boétie in 1945. The *Hainaut* group fell apart during World War II and reunited in partial form in 1946. By the following year, however, Bury had begun to paint in an increasingly abstract mode, and the Surrealists pressured him to leave the group. He briefly became associated with *La Jeune Peinture Belge,* a loose collective of young painters united more by age and nationality than by common pictorial aims. It was during this time that the artist met Christian Dotremont, a founder of the nascent CoBrA movement—a Surrealist offshoot whose members hailed from Copenhagen, Brussels, and Amsterdam. Bury soon became a member and participated in their Brussels exhibition *L'exposition*

expérimentale – La fin et les moyens in March 1949. His work during this period consists of canvases marked with thick, roughly painted contours that sometimes suggest forms such as masks or crudely drawn human figures.

The postwar period was a fraught time for the Surrealist movement and its heirs. In 1947, Dotremont had broken with the main branch of the movement led by André Breton, who was increasingly advocating an apolitical brand of Surrealism based on the study of mythology. In response, Dotremont established Revolutionary Surrealism, a group that hoped to maintain the movement's ties to Communist thought. Yet Revolutionary Surrealism itself ultimately ran into problems with the Communist party and collapsed, and in 1948, many of its members went on to establish CoBrA. Letters from Dotremont to Bury during this period show the pair discussing these political clashes. Despite recent events, Dotremont remains firmly committed to both Communism and Surrealism: "I think, in short, that Surrealism remains by far the richest, most complete, and most coherent enterprise in modern art," he writes in one letter to Bury.[3]

In their journal, the CoBrA group defined their similarities to and departures from Breton's Surrealism in light of their continued materialist commitments. According to the artist Asger Jorn, they aimed to create an aesthetic based on painterly "spontaneity"—a term that they defined in opposition to the traditional Surrealist notion of psychic automatism.[4] Jorn articulates the problem in the first issue of *Cobra*. The Surrealist

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[3] Letter from Christian Dotremont to Pol Bury, 11 avril [1948]. Institut Mémoires de l'édition contemporaine (IMEC), Fonds Pol Bury, BRY 4.23 (Dotremont). Dotremont further argues that the Communist party had condemned the French Revolutionary Surrealists because they were becoming too close to Dada; they had left the Belgians alone because they were more truly Surrealist.

[4] Asger Jorn, "Discours aux pingouins," *Cobra, 1948-1951* (Paris: Éditions Jean-Michel Place, 1980), 8. Originally published in *Cobra,* no. 1 (1948).

mission, he argues, is based on a false premise—that the "pure psychic automatism" that the group sought could be translated into pictorial form at all. "The fact of expressing oneself is a physical act that materializes thought," he says; one can never express oneself in a purely psychic fashion.[5] Indeed, Jorn questions the existence of any purely psychic phenomena at all, as thought itself reflects the material world and has its source in the material human body. Rather than pure psychic automatism, Jorn argues that artists should practice a spontaneous expression of thought in dialogue with material.

In an essay published in the second issue of *Cobra*, Bury echoes Jorn's emphasis on the material. Comparing the disciplines of painting and writing, he indicates painting's unique ability to remain in the "material domain" and to stimulate what he called our "material reverie." In addition to advocating for a particularly material art, Bury also calls for a type of art that he designates "peinture *imagineante*" [sic] rather than "peinture *imaginée*." The painter "no longer imagines for the spectator, he no longer steals the spectator's right to imagination, he imposes nothing," Bury writes. "He did not dream the painting in advance, he dreams it in executing it and he will dream it more after its execution."[6] That is, Bury advocates for a form of art produced in a dialogue between the artist and the material, which in turn will generate a dialogue between the viewer and the finished work. Despite CoBrA's break with Surrealism, the roots of Bury's concept lie in the earlier movement. The Surrealists employed techniques such as *frottage*—rubbing a

[5] Ibid.
[6] Bury, "De la pièce montée à la pierre," in *Cobra, 1948-1951.* Originally published in *Cobra* 2 (March 21, 1949): n.p.

pencil across a paper on a textured surface—to reduce conscious authorial input and evoke surprise in the artist as much as in the viewer.[7]

Bury also created the cover for this issue of *Cobra*, a linocut consisting of an allover design of small, glyph-like forms that hover around a human- or animal-like figure [Fig. 2.1]. The linocut perhaps exemplifies Bury's ideal of *peinture imagineante*: one has the sense that the central figure, rather than being conceived in advance, congealed spontaneously from the tick-marks that cover the background in a dense web. Its stick figure-like form reflects the CoBrA group's sustained attention to "primitive" art and the art of children; Jorn, for instance, had a longstanding interest in archaeology.[8]

In his *Cobra* text, Bury cites the philosopher Gaston Bachelard, who would remain a significant influence on his work. Bachelard had begun his career as a philosopher of science, but increasingly became attracted to psychoanalysis and Surrealism. He considered imagination to be the primary driving force in human behavior, and published a series of books in which he explored the relationship between imagination and the basic elements of life—air, water, fire, and earth. Bachelard's writing on matter and duration was, in part, in dialogue with the work of Henri Bergson on the same themes. Yet Bachelard departed from Bergson in some significant ways, as I discuss at several points in this chapter.

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[7] The inventor of *frottage* was Max Ernst. In an essay, he said he employed the technique to "reduce to the extreme the active part of that one whom we have called, up to now, the 'author' of the work." Ernst, "Beyond Painting," in Robert L. Herbert, ed., *Modern Artists on Art,* 2nd ed. (Mineola, NY: Dover, 2000), 129.

[8] See Karen Kurczynski and Nicola Pezolet, "Primitivism, Humanism, and Ambivalence: Cobra and Post-Cobra," *Res,* no. 59/60 (Spring/Autumn, 2011): 282-302. See also Kurczynski, *The Art and Politics of Asger Jorn: The Avant-Garde Won't Give Up* (Farnham, Surrey; Burlington, VT: Ashgate, 2014), 223-224, for a discussion of Jorn's interest in archaeology.

Bury recalled having purchased Bachelard's *Earth and Reveries of Will: An Essay on the Imagination of Matter* shortly after its 1948 publication.[9] In that text, the philosopher investigates the way humans have pictured dirt, mud, and other terrestrial matter in poetry, literature, and intellectual thought. Earthly matter, he argues, provides a site to think about the basic resistance of material, providing humans with their first experience of what he calls "the resistant world."[10] Bachelard notes that one of the modes that this can take is slowness—the sluggish pace with which material responds to the human hand, as when one attempts to produce a malleable ball of dough from an unyielding mixture. Bury would go on to propose his own theory of slowness, resistance, and materiality almost two decades later.

Bachelard developed his notion of temporality more fully in two earlier volumes on water and air, published in 1942 and 1943, respectively. In *Air and Dreams*, he elaborates a view of the human imagination based not in the "structure" of images, but in their "mobility"—their ability to morph and transform.[11] Fixed forms and images, Bachelard contends, are easier to describe than motion, which is why psychologists have built theories of the psyche based on such forms. Yet imagination contains motion at its core. It is "the faculty that frees us from immediate images and *changes* them. If there is no change… there is no *imaginative act*," he concludes.[12]

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[9] André Balthazar, "Questions et Réponses," in Eugène Ionesco and Balthazar, *Pol Bury* (Brussels: Cosmos, 1976), 101. Bury recalls that he purchased the book in 1947, but it was not published until the following year.
[10] Gaston Bachelard, *Earth and Reveries of Will: An Essay on the Imagination of Matter,* trans. Kenneth Haltman (Dallas: Dallas Institute of Humanities and Culture, 2002), 13.
[11] Bachelard, *Air and Dreams: An Essay on the Imagination of Movement,* trans. Edith R. Farrell and C. Frederick Farrell (Dallas: Dallas Institute Publications, Dallas Institute of Humanities and Culture, 1988), 2.
[12] Ibid., 1.

Bachelard positioned his theory of the imagination against that of Bergson, whom he felt did not sufficiently address its dynamic qualities.[13] Yet the philosopher was not alone in connecting imagination with movement. In *The Imaginary* (1940), his contemporary Jean-Paul Sartre had explored how bodily movements both evoke and are evoked by flights of imagination. When we face an abstract wallpaper pattern or a cloudy sky, for instance, our eyes move freely across its surface, and they sometimes discover a coherent "path" in the abstract pattern that makes a dog or a man suddenly appear.[14] Kinesthetic movements can also substitute for images entirely. When we trace a figure in the air, for instance, we imagine its trajectory in the form of an image, relying in part on the processes of retention and protention.[15] In another scenario, imagination can *elicit* movement: Sartre remarks on the back-and-forth motion of his eyes as he visualizes a moving swing.[16]

Bachelard's thinking is distinct from previous models in the way it emphasizes the essential role of movement *within* imagination: it posits imagination as dynamic force or function that transforms the images we perceive.[17] As such, imagination directs the mind toward new images and possibilities, urging it toward constant becoming. At times, Bachelard suggests that this force is reciprocal, and that imagination exists as an

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[13] See Jean François Perraudin, "A Non-Bergsonian Bachelard," trans. Eileen Rizo-Patron, *Continental Philosophy Review* 41, no. 4 (December 2008): 463-479. Revised version of "Un Bachelard Non-Bergsonien," in *Gaston Bachelard*: *Du rêveur ironiste au pédagogue inspire*, ed. Jean Libis (Dijon: Centre Regional de Documentation Pédagogique, 1984), 61-76.

[14] Jean-Paul Sartre, *The Imaginary: A Phenomenological Psychology of the Imagination,* trans. Jonathan Webber (London; New York: Routledge, 2004), 36.

[15] Ibid., 75. Sartre cites Husserl directly in his discussion of retention and protention.

[16] Ibid., 81.

[17] For a clear discussion of Bachelard's thinking, see Edward K. Kaplan, "Gaston Bachelard's Philosophy of Imagination: An Introduction," in *Philosophy and Phenomenological Research* 33, no. 1 (September 1972): 1-24.

exchange between people and things in which each partner transforms the other. Nature actively solicits the human gaze, which in turn both perceives and transforms its object. "Everything which shows, sees," he writes.[18] Bury's early encounters with Bachelard's thinking likely helped him to formulate a notion of the mobile artwork that could mirror the operations of the mobile imagination, and to consider the reciprocal imagination that unfolds between people and things.

Following his involvement with CoBrA, Bury's work developed toward a colder, more geometric abstraction, and his painting lost its natural references entirely by the time the group disbanded in 1951. Later, the artist would explain that he had never been able to paint with the gestural or emotional force that CoBrA demanded, and that his personality was more suited to careful, precise work.[19] Bury subsequently became a founding member of the group *Art Abstrait* in 1952. He released a manifesto titled "Le Spatialisme" (1953), also signed by the other members of the group including Jo Delahaut, Karel Elno, and Jean Séaux.[20] The manifesto calls for the inclusion of time, duration, and movement in art; for a merger between fine art and applied art; and for the abolishment of the conception of the unique artwork. Such ideas drew on the legacy of Constructivism, which, as we have seen in Chapter 1, had reemerged in Europe with the rise of the Parisian Salon des Realités Nouvelles and journals that promoted geometric abstraction. *Art Abstrait's* painting was less unified than its manifesto would suggest:

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[18] Bachelard, *Water and Dreams: An Essay on the Imagination of Matter,* trans. Edith R. Farrell (Dallas: Pegasus Foundation, 1983), 30.
[19] Balthazar, "Questions et Réponses," 100.
[20] At the time, Bury appears to have been unaware of Lucio Fontana's Spatialist movement, founded in 1947. Bury, Jo Delahaut, Karel Elno, and Jean Séaux, "Le Spatialisme" [1953], in Rosemarie E. Pahlke, *Pol Bury* (Brussels: Gemeentekrediet, 1994), 247-249.

some members painted in a lyrical style, while others tended toward more rigorous geometry.[21]

Bury's paintings from this period, many of which are titled "Composition," feature slightly curved rectangles and L-shapes in flat, unmodulated colors that cover the full surface of the canvas. Some are crowded with smaller shapes that lock together like puzzle pieces [2.2]. Others are sparer, with fewer colors and large, taut forms [Fig. 2.3]. Writing in 1952, the critic André Marc summarized these two tendencies in the artist's work of the period: the first explores the color harmonies and incorporates irregular, imprecise lines, while the second—a highly "reasoned" kind of work that sometimes risks excessive dryness—focuses on creating balance among a smaller number of geometric surfaces.[22] Bury recalled that he studied Joan Miró and Piet Mondrian during this time, and his paintings clearly demonstrate an effort to obtain the "dynamic equilibrium" that the latter painter advocated.[23] That is, the works reflect an attempt to create animation or tension among the painted elements while maintaining an overall sense of stability. The slight bends of Bury's lines, meanwhile, reflect Bury's efforts to introduce a "quivering" into Mondrian's cold regularity.[24] They also resemble the curvier geometry of midcentury abstractionists such as Jean Hélion [Fig. 2.4].

The terms in which Bury and his critics discussed his early paintings conformed to the then-dominant understanding of European abstraction promulgated by Michel

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[21] Pahlke, *Pol Bury,* 22.
[22] André Marc, "A l'A.P.I.A.W.: Deux époques dans la production de Pol Bury," *La Meuse,* Liège, October 10, 1952. Another reviewer wrote of Bury's paintings from this period: "they carry out a Constructivism that is extremely pleasing to view." H.K., "Le Prix 'Jeune Peinture Belge,'" no further publication data available, Bibliothèque Kandinsky, Centre Pompidou, Paris (BURY Pol, Presse, Boite 1).
[23] Balthazar, "Questions et Réponses," 100-101.
[24] Ibid., 101.

Seuphor and others. In 1949, Seuphor defined abstract art as that which possesses "no relation to, no evocation of observed reality… all art that one must legitimately judge from the sole point of view of harmony, of composition, of order, or of disharmony, counter-composition, deliberate disorder."[25] The critic and his peers believed that abstract compositions must be motivated, that there must be some reason behind any particular arrangement of parts. Yet their formulation was distinct from Clement Greenberg's formalism, which considered medium-specificity and the pursuit of flatness to be the painter's central goals. Seuphor and his critical peers still believed *expression* in some sense—whether of the artist's inner life or a broader sense of artistic meaning—to be the aim of the compositional process.[26] Bury endorsed this view in a newspaper article of the period, telling the interviewer, "I paint according to my temperament in seeking a harmony between forms and colors that reflects a state of mind."[27]

During his abstract period, Bury had an encounter that he would later pinpoint as the origin of his interest in kineticism: he saw Alexander Calder's mobiles in an exhibition at the Galerie Maeght in 1950. In an interview with André Balthazar, Bury remarked that he admired the way that Calder retained an allegiance to abstract forms while freeing them from the "prison of the canvas" and allowing them greater liberty in space.[28] Years later, Bury expanded on his encounter with Calder in an essay titled "Calder l'aérien." In drafts of the essay, he noted that Calder "cut canvas" to make his

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[25] Michel Seuphor (pseud. of Ferdinand Louis Berckelaers), *L'Art abstrait: Ses origines, ses premiers maîtres* (Paris: Maeght, 1949), 14.
[26] Ibid., 11; see also Briony Fer, *On Abstract Art* (New Haven: Yale, 1997), 57-58.
[27] JMS, "Pour la seconde fois, Pol Bury s'est distingué au 'Prix Jeune Peinture Belge,'" *Indepéndance* (1952?), no further publication data available, IMEC, Fonds Pol Bury (Press, 1951-1955).
[28] Balthazar, "Questions et Réponses," 101.

mobiles, reinforcing the way he understood Calder's mobiles to be an outgrowth of painting.[29] Bury's first kinetic works similarly preserved the vocabulary of abstraction while making its forms increasingly mobile.

The *Plans mobiles* and *Multiplans*

The rhetoric of artistic "liberation" was widespread in the late 1940s and early '50s. It appeared equally in the discourse around Abstract Expressionism and Informel painting, with its language of expansive bodily gesture, and in the ostensibly opposed tendency of kinetic art, which aimed to make artworks more physically flexible. Yet this liberation was not without its limits. As the criticism of Bury's early manipulable artworks reveals, alongside kinetic art's increased mobility came a fairly constrictive set of rules.

Bury showed his first kinetic work in the exhibition *10 plans mobiles de Pol Bury* at Brussels' Galerie Apollo in December 1953. Like Tinguely, he understood his move into kineticism as a reaction to abstraction, calling these works "a fusion of my earlier painting and the revelation that the Calder mobiles had given me."[30] Hand-manipulable reliefs, the *Plans mobiles* formally resemble Bury's paintings of the early 1950s. They consist of irregular geometric forms in Masonite or metal painted in bright colors, mostly red, blue, black, and yellow. Bury layered the forms, one behind the other, and connected them via one or more hidden axes. Viewers can rotate each form, causing the shape of the overall composition to vary. Bury's structure abandons the frame to a more drastic extent

[29] Bury, draft of "Calder l'aérien." IMEC, Fonds Pol Bury, BRY 13.5 (Alexandre l'aérien).
[30] Peter Selz, "Interview with Pol Bury," in *Pol Bury* (Berkeley: University Art Museum, 1970), 4.

than Tinguely's, as any movement of the planes causes major changes to the overall shape of the work.

Taking a closer look at one of the *Plans mobiles* makes this point clearer [Fig. 2.5]. Although it may appear to be a jumble of many parts, the work comprises only three planes, painted in various combinations of red, blue, and black. Turning the elements allows one to alter the shape and dimensions of the piece, making it extend slightly further horizontally, vertically, or to one side, and to bring differently colored areas together or separate them. Furthermore, two of the black segments include empty cutout areas that render visible the other elements behind them. In the absence of an all-encompassing frame, these cutouts function as mobile frames within the work. While highlighting parts of the red and blue areas, they also incorporate the white background of the wall into the work itself.

While Bury cited Calder as a primary inspiration in his turn to kinetic art, his sources were likely more diverse. His early work possesses some similarities to that of the Argentinian Madí group, for instance, which he may have come across in person or in reproduction.[31] The group developed out of *Arturo,* an abstract art magazine founded by Tomás Maldonado, an Argentinian artist who worked with Max Bill at the Bauhaus-descended Hochschule für Gestaltung in Ulm, Germany. Among its best-known members was Gyula Kosice, who created an articulable sculpture called *Röyi* in 1944 [Fig. 2.6]. Despite their grounding in constructivist-derived concrete art, the Madì departed from figures such as Bill by rejecting any allegiance to mathematics and by giving their

[31] Photographs of the group's work appeared in Parisian art journals; see, for instance, J.A., "Les Madis," *Art d'Aujourd'hui,* nos. 10-11 (May-June 1960): n.p.

practice an explicitly Marxist undergirding.[32] At the Salon des Realités Nouvelles in Paris in 1948, the Madì had shown shaped canvases that broke radically with the rectangular frame [Fig. 2.7]. Some of these were wall-hung constructions crafted from geometric parts connected by axes, called "coplanals" [Fig. 2.8]. The group exhibited additional works of this kind in rooms devoted to their work in the 1952 and 1953 Salons.[33] As Monica Amor has recently shown, the coplanal remained within the realm of painting while attacking the medium's autonomy and tendency toward illusionism. The form thereby expressed the materialist premises of its authors: their aim to reveal concrete materials and real space.[34] Certain works by Bury, including the *Relief mobile 5* (1954) [Fig. 2.9], closely resemble the coplanals in their structure.

Bury and his critics considered the *Plans mobiles* to be primarily concerned with one particular issue in abstract art: that of a painting's orientation. In the Galerie Apollo exhibition brochure, Jean Séaux—one of the signatories of Bury's *Spatialisme* manifesto—writes that the artist brings our attention to the fact that, "abstract painting can and must be put, to be seen, in all the positions, but more: he refuses to admit that there can only be four positions." From these conditions, Séaux suggests, there springs a "conception of freedom, even a moral one: better an axis (or two) than a frame."[35] Reviewers of the exhibition followed Séaux's lead. The works, remarked Léon-Louis Sosset, stem from the idea that the arrangement of elements and colors in an abstract

[32] Lynn Zelevansky, *Beyond Geometry* (Los Angeles: Los Angeles County Museum of Art; Cambridge, Mass.: MIT Press, 2004), 55.
[33] Dawn Ades, "*Arte Madí/Arte Concreto-Invención,"* in *Art in Latin America: The Modern Era, 1820-1980* (London: Hayward Gallery, 1989), 241-251.
[34] Monica Amor, *Theories of the Nonobject: Argentina, Brazil, Venezuela, 1944-1969* (Berkeley: University of California Press, 2016), 57-58.
[35] Jean Séaux, "10 Plans Mobiles de Pol Bury," in *10 Plans Mobiles de Pol Bury* (Brussels: Galerie Apollo, 1953).

painting "must be balanced, whatever the position of the canvas may be." He notes that the combinatory possibilities of this rearrangeable work surpass those of the cut-paper compositions employed by the pioneers of abstraction.[36]

Bury himself endorsed this understanding of his work in interviews. Speaking to Catherine Millet in 1982, he said:

> In making abstract painting, I perceived—moreover, in the same way as Kandinsky, it appears, discovered abstraction by turning a landscape—that it was a common practice among painters to turn the painting on its four sides. I asked myself: why not apply this principle to the *interior* of the painting, why not cut the forms instead of painting them and place them on axes? The spectator could move these forms, suppress weight, reverse the top and bottom of the painting. It is thus for pictorial reasons indeed that I turned to the relief.[37]

Bury thus positions his work as an extension of the principles developed by the early abstractionists. Yet Bury's account differs slightly from Kandinsky's own. In his 1913 essay *Reminiscences,* the artist recounts how he once glimpsed an "indescribably beautiful picture drenched with an inner glowing" in his studio at twilight, only to realize that he was looking at one of his own paintings turned on its side, its figurative subject matter rendered unintelligible.[38] Bury partly misreads Kandinsky, interpreting his quasi-mystical encounter as a formalist exercise.

Bury may have encountered Kandinsky's story in a number of different places; it was included, for instance, in Seuphor's popular catalogue *L'Art abstrait*.[39] Bury's interpretation of the story draws on a longstanding piece of advice given to beginning

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[36] L.-L. Sosset, "Les Expositions à Bruxelles."
[37] Catherine Millet, "Pol Bury: Sculpteur et provocateur," *Art Press,* no. 63 (October 1982): 35. Bury also discussed this point with Balthazar in 1976. See Balthazar, "Questions et Réponses," 102.
[38] Wassily Kandinsky, "Reminiscences," in Herbert, 28-29.
[39] Seuphor, 17-18. Seuphor reprints an excerpt from Kandinsky's essay and uses the story to illustrate how the invention of abstraction was, in part, the result of lucky accidents.

painters—one that appears as early as Leonardo da Vinci's treatise on painting—to turn a canvas on its side, or to view it in a mirror, in order to balance the weight of its forms.[40] By using these strategies, one can theoretically observe the formal composition more clearly, having varied the view to which one has become accustomed. In abstract art, the concept of orientation received new attention, as artists began to rethink how space might be structured in the absence of representational elements. El Lissitzky, writing in 1920, had said that "the surface of the *Proun* ceases to be a picture and turns into a structure round which we must circle, looking at it from all sides, peering down from above, investigating from below"; he imagined an active viewer circulating around the work.[41] László Moholy-Nagy, meanwhile, believed that the worth of a painting could be decided even if it were displayed upside-down.[42] Bury thus incorporates a practice that once served as a compositional aid into the very structure of his manipulable works.

Critics largely read Bury's move as a means of freeing the forms of abstraction. This was not explicitly understood as a Marxist gesture, as in the Argentinian context—Bury had long since broken with the Communist party—but as a more general act of liberation.[43] Abstract painting that remained within a frame, one reviewer suggested, "could be compared to a prisoner who has freed himself from his shackles while still

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[40] Leonardo da Vinci, *A Treatise on Painting*, trans. John Francis Rigaud (Amherst, N.Y.: Prometheus Books, 2002), 142-143 and 262.
[41] El Lissitzky, "PROUN: Not World Visions, BUT – World Reality" [1920], in *El Lissitzky: Life, Letters, Texts* (London, Thames & Hudson, 1968), 343. Originally published in *De Stijl* 5, no. 6 (June 1922).
[42] László Moholy-Nagy, *Painting, Photography, Film*, trans. Janet Seligman (Cambridge, Mass.: M.I.T. Press, 1969), 13.
[43] For a discussion of Bury's break with Communism, see Millet, "Pol Bury," 37.

inside his cell."[44] Bury's work, abandoning the frame, breaks out of the cell itself. Yet as responses such as Sosset's showed, in order for the *Plans mobiles* to qualify as art, each possible arrangement of shapes and colors had to retain its sense of balance. This produces a scenario that is paradoxically more restrictive than that of its predecessors: it is not only four orientations that must produce a compositionally satisfying work, but a vastly larger number of combinations. Bury tries, in a sense, to have his cake and eat it too: to introduce flexibility into the relief's structure while preventing arrangements from becoming completely arbitrary or unmotivated.[45]

Bury took specific steps to ensure that each state of the *Plans mobiles* could stand on its own. In order for a work to retain an overall sense of balance regardless of the precise positions of its parts, the artist reduced its overall dimensions and employed movable elements that were roughly symmetrical. In one work from 1953, for instance, a central element in the form of two interlocking "L" shapes may rotate, but the planes in back remain fixed in place [Fig. 2.10]. This arrangement ensures that, irrespective of the viewer's specific actions, it is impossible to make the work appear top-heavy or highly asymmetrical.

As the structures of the *Multiplans* demonstrate, one of the major problems inherent in the construction of manipulable artworks concerned the proper distribution of agency between the artist and the spectator. If a work's parameters were *too* open, there arose a risk that spectators could create arrangements that no longer qualified as works of

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[44] Robert Geerts, "Visite aux Salons," *La dernière heure,* review of Bury at Galerie Apollo, no further publication data available, IMEC, Fonds Pol Bury (Press, 1951-1955).
[45] On the problem of "motivating the arbitrary" in abstract art, see Yve-Alain Bois, "Strzemiński and Kobro: In Search of Motivation," in *Painting as Model* (Cambridge, Mass.: MIT Press, 1990), 123-155.

art. This question emerged, for instance, during *Le Mouvement* in 1955, in which Bury showed *Plans mobiles.* In an essay in the exhibition brochure, Roger Bordier contrasted Bury's work with that of Yaacov Agam, in which viewers could freely move white elements on a black background, rotating them at will and setting them into different holes in the support [Fig. 2.11]. "If Bury's work prudently only allows [the spectator] the choice between several parts, some of Agam's boards of autonomous mobile elements leave him an initiative that is, to my mind, too large," he writes.[46] Hand in hand with artists' enthusiastic embrace of viewer participation came a critical anxiety over just how far this participation could properly extend.

Bury continued to explore the problems of the *Multiplans* in a sculptural series called the *Girouettes*, which included both freestanding sculptures and wall-hung pieces, whose parts were connected by visible metal supports. He began his next significant series of kinetic works, the *Multiplans,* in 1957. These works depart from the *Plans Mobiles* by returning, in a sense, to the rectangular frame. They consist of vertical slats with different patterns of colors on each of their two or four sides, placed within a wooden casing. The slats produce different compositions when they are turned, as certain patterns come forward and others are hidden on the backside of the work. Bury made at least one of the early *Multiplans* in manipulable form, allowing the elements to be turned by hand. He then introduced mechanized movement into the series, showing motorized *Multiplans* at the Galerie St. Laurent in Brussels from November 15 to December 4,

[46] Roger Bordier, "L'oeuvre transformable," in *Le Mouvement* (Paris: Denise René, 1955). My translation comes from an uncredited English-language facsimile at the Museum Tinguely Archives, Basel.

1958.[47] In one *Multiplans*—likely the first made with a motor—15 closely spaced slats are positioned parallel to each other within a black case [Fig. 2.12]. Each slat presents a primarily black background alternating with occasional areas of red, green, blue, gray, and other colors. Bury arranged the colored areas so that, for instance, red shapes on neighboring slats can meet, producing the impression of larger geometric shapes. Yet the effect is more fractured than that of the *Plans mobiles,* as the spaces between the slats never fully disappear. Bury reported that he used pulleys from Meccano toy-sets and motors from record players to control the rotation of the pieces, which was very slow.[48]

Marc, reviewing the Saint-Laurent show, describes Bury's *Multiplans* as producing "a continual succession, almost rhythmic, of elusive 'paintings.'"[49] Yet he points to the same problem present in the *Plans mobiles,* in which the potential for transformation within the work simply multiplies the necessity of achieving "good composition" many times over. The variation of color and form "could just as well be nothing but an imbroglio, if the game did not have its rules, in order to discipline chance," he writes. It is here that the artist must intervene, to ensure that the formal elements of the work are in harmony at any particular moment: "If one imagines this development in time of paintings, which are linked to one another as an uninterrupted succession of 'frozen' paintings, there must at any instant answer a perfect image." Yet Marc also realizes the impossibility of achieving this goal: "Here no more than elsewhere, perfection is impossible. The essential is to approach it," he concludes. Marc's

[47] Bury had briefly experimented with the motor in 1953, but abandoned it again between 1954 and '57. See Pahlke, *Pol Bury,* 29.
[48] Balthazar, "Questions et Réponses," 127.
[49] André Marc, "Pol Bury: Des tableaux qui ne tiennent pas en place," *La Lanterne,* November 20, 1958.

response indicates the way critics perceived these transformable artworks less as essentially about *movement* itself—they rarely discuss the nature of movements or the arc of the moving elements over time—than as multiplied paintings. His terms strongly recall those that critics used to describe Tinguely's meta-mechanical reliefs: with a few notable exceptions, observers understood the works as machines for generating distinct abstract compositions, rather than devices that activated duration and temporal flow.

Why did Bury choose to introduce motorization into his art? In 1958, only a few artists were working extensively with electric motors. Tinguely, of course, had begun his reliefs in 1954, and Bury would likely have been aware of his precedent; as mentioned above, he was probably also aware of the work of the Madí group, who showed motorized objects at the Salon des Réalités Nouvelles in 1953. Of course, there were also modernist precedents, from Moholy-Nagy's *Light Prop* (1930) to Calder's early work. Yet for Bury, who worked extensively with manipulability at the beginning of his career, the turn to the motor seems to have been motivated by the particular problems he encountered with viewer participation.

On a number of occasions, Bury argued that inviting spectators to intervene tended to work better in theory than in practice. He was dissatisfied with the way viewers interacted with the *Plans mobiles*—flipping the panels back and forth without pausing to consider the composition produced. On the one hand, then, turning to motorization may have been a form of recouping artistic control and allowing the artist to dictate the particular kind of movement that a work would undergo. Yet Bury's dissatisfaction with viewer participation was more complicated. The spectator, the artist thought, "could personify a certain chance but he doesn't do it, because all spectators make nearly the

same gestures."[50] That is, allowing greater freedom to viewers ironically limited the potential outcomes of the work because these viewers tended to act based on their habits or their observation of other viewers. Bury's dissatisfaction with participation recalls John Cage's defense of chance methods over improvisation. Improvisation, Cage said, generally leads performers to rely on their personal tastes and their memory, whereas indeterminacy may produce more genuinely new and surprising outcomes.[51] Bury believed that manipulation allowed for too much mastery on the part of the viewer, thereby foreclosing many of the object's more unusual possibilities.

On another occasion, Bury contrasted his own approach with that of the Paris-based Groupe de Recherche d'Art Visuel (GRAV). Founded by Julio Le Parc, François Morellet, and other kinetic artists from Europe and South America, GRAV attempted to demystify art through strategies that included increased viewer participation. For example, for their 1963 exhibition *L'Instabilité,* held at the Musée d'Art Moderne de la Ville de Paris during the Biennale de Paris, they created a winding labyrinth through which visitors could walk and encounter a variety of objects and situations, from moving light sculptures to manipulable works. Three years later, in *Une journée dans la rue (A Day in the Street),* the group brought their participatory work onto the streets of Paris, where they invited viewers to try on vision-altering glasses, assemble their own sculptures from Plexiglas parts, and sit on bouncing stools. The ultimate goal of such works was to convey a sensation of instability in the artwork—one that paralleled what

[50] Balthazar, "Questions et Réponses," 127.
[51] See John Cage, from interview with Stanley Kauffmann (1966), in *Conversing with Cage*, ed. Richard Kostelanetz (New York: Limelight Editions, 1988), 238.

the group understood to be the fundamental instability of the social world.[52] Yet Bury was skeptical of the group's complete embrace of participation. While he considered their ideological position laudable, he continued that it is nonetheless important "to have respect for the work as one has respect for a book or a person."[53] Whereas GRAV had handed over the responsibility for their works' realization to the viewers, Bury remained invested in the preservation of distance between the artwork and its audience.

Bury's position may initially come across as reactionary. Yet the 1960s debate between artists and critics endorsing participation versus those defending nonparticipation was a complex one. As Claire Bishop points out, GRAV's language always held coercion and openness in tension, as their manifesto explained how they aimed to "make" the spectator participate.[54] Indeed, the Situationist International denounced GRAV for precisely this reason. They believed that GRAV's practice of allowing viewers to participate by choosing from a preexisting set of options simply reproduced the kind of coercion disguised as freedom that characterized the society of the spectacle. In their view, GRAV's work granted viewers a fictional sense of real agency in a system in which true participation was impossible. (Tinguely's *Méta-Matic* drawing machines, which I discuss in the previous chapter, present a direct parody of this notion of minimal choice disguised as open participation.)

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[52] See Alexander Alberro, "Julio Le Parc, the Groupe de Recherche d'Art Visuel, and Instability in the 1960s," in *Julio Le Parc: Kinetic Works* (Zürich: Daros Latinoamerica AG; Ostfildern, Germany: Hatje Cantz, 2013), 53. On GRAV's interest in communication and control, and their relationship to postwar French "technocracy," see Lily Woodruff, "The Groupe de Recherche d'Art Visuel against the Technocrats," *Art Journal* 73, no. 3 (Fall 2014): 18-37.
[53] Millet, "Pol Bury," 37.
[54] Claire Bishop, *Artificial Hells: Participatory Art and the Politics of Spectatorship* (London; New York: Verso, 2012), 91.

Given the complexity of this debate, it is important to differentiate Bury's anti-participatory position from the traditional notion of the autonomous work of art. Bury clearly rejected the position of sovereignty normally granted to the artist: as he moved into the fully kinetic *Punctuations,* he produced works whose movements even he could not fully predict. At the same time, however, he advocated for the continued importance of distance between the viewer and the object. For the artist, preserving this margin of unknowability between self and things is essential to create an encounter characterized by unfamiliarity, desire, and surprise. As I will show, this margin—necessary to the cultivation of a sensation of doubt— opens onto broader social implications. Bury's goal is less to empower the viewer than to foster an attitude of holding the mind open to a broad variety of potential outcomes.

For Bury, the introduction of the motor enabled a larger shift in interests. From the late 1950s, he would become less focused on using motion to approach the problems of abstraction than on the nature of movement itself. The critical problem of the *Plans Mobiles* and *Multiplans*—the necessity for each position of the work to present a defensible composition—now disappeared, replaced by a newly anti-compositional attitude. The artist definitively left behind the principles of balance and harmony that lingered in his previous abstract work in favor of strategies more centered on questions of perception and the experience of time. Of the motorized *Multiplans,* Bury wrote, "I had, all things considered, started a machine to destroy my abstract paintings."[55]

[55] Balthazar, "Questions et Réponses," 127. Bury's rhetoric drew on the language of Joan Mirò, who had similarly declared his intention to "destroy" painting; indeed, Bury often cited the artist as an influence on his work. For Miró, to attack painting was to reject traditional materials and notions of beauty in favor of more raw, deskilled, even ugly

The Early Punctuations

The year 1959 marked a turning point in Bury's work. It also represented a key moment for the consolidation of kinetic art in Europe more broadly. In March, Bury, Tinguely, Daniel Spoerri, and Paul Van Hoeydonck organized an exhibition called *Vision in Motion-Motion in Vision* at the Hessenhuis in Antwerp, bringing together kinetic and interactive works by a broad range of international kinetic artists, including Heinz Mack and Otto Piene, Jesus Rafael Soto, Dieter Roth, and others.[56] In the same year, Spoerri established Edition MAT, a pioneering series of art multiples whose first edition included works by kinetic artists from France, Italy, Germany, and other countries. Along with this increased international exchange came a shift in interests. A number of kinetic artists who had previously grounded their work in abstract painting began to seek other strategies, turning away from works that questioned the nature of composition to works that interrogated the possibilities of movement more broadly. By 1959, for instance, Tinguely had shifted his focus from his meta-mechanical reliefs to his drawing machines; Mack had turned from producing black and white geometric paintings to his reflective aluminum "light reliefs"; and Soto had left behind his designs on superimposed Plexiglas and had begun to work with everyday materials placed in front of painted backgrounds in his *Vibrations*.

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objects that often resisted medium categories. See Anne Umland, *Joan Miró: Painting and Anti-Painting, 1927-1937* (New York: Museum of Modern Art, 2008).

[56] The show did not originally have a title but came to be known by the title of its catalogue introduction. The introduction, in turn, referred to László Moholy-Nagy's book *Vision in Motion* of 1947. See Valerie Hillings, "Countdown to a New Beginning: The Multinational Zero Network, 1950s-60s," in *Zero: Countdown to Tomorrow, 1950s-60s* (New York: Guggenheim Museum, 2014), 16 and 21-24.

Bury made a similar shift. Having rejected the language of abstraction, he turned toward a stripped-down form of kinetic experimentation in a series called *Ponctuations* (Punctuations) that focused on the nature of the point. The *Punctuations* took several different forms. In one type, Bury created a mechanism in which pointed implements pushed against the back of a rubber sheet, causing protrusions to rise and fall on the surface. In others, he shone light through metal plates punched with small holes. In another type, a black, perforated disc rotated above a stationary disc marked with white areas, creating constellations of flickering points. In 1959, the artist produced a work of the latter type for Edition MAT; he would contribute a similar multiple to the 1965 edition [Figs. 2.13, 2.14].

In a 1966 text, Bury considered what drew him to the motif of the point. For one, he appreciated its temporal ambiguity: the point, he said, can indicate a beginning or an end, as in the phrase "a point on the horizon."[57] Bury also cited Kandinsky's thoughts on the point, which the artist had elaborated in his *Point and Line to Plane* (1926). Like Bury, Kandinsky drew a connection between the linguistic "point" (or "period") and the artistic "point." In writing, he said, the point both signifies silence and functions as a "bridge" between elements. The point emerges as an artistic element when it is removed from its practical function in language and "begins its life as an *independent being*."[58]

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[57] "Le Point" [1966] in Bury, *Les horribles mouvements de l'immobilité: Recueil de textes écrits depuis 1959* (Paris: C. Martinez, 1977), 13.

[58] Kandinsky, *Point and Line to Plane,* trans. Howard Dearstyne and Hilla Rebay (New York: Dover, 1979), 28. The original German edition of the work was part of the Bauhausbücher series (*Punkt und Linie zu Fläche* [München: Albert Langen, 1926]). The Guggenheim published an English edition in 1947. The essay does not seem to have appeared in French until 1970 (see *Point-ligne-plan* in *Ecrits complets,* v. 2, ed. Philippe Sers [Paris: Denoël/Gonthier, 1970], 53-216). To my knowledge, Bury did not read German, but he may have encountered the essay's central ideas in an art journal. *Art*

Given its status as "short, fixed, and quickly created," the point stands as the "proto-element of painting."[59] Finally, Kandinsky also connected the point to the idea of time, calling the point "temporally the briefest form" and comparing it to a single drumbeat in music.[60] Indeed, Kandinsky's conception of painting as stemming from the *movement* of basic elements lay at the foundation of much kinetic art.

The *Punctuations* also brought about a new relationship between Bury's work and its viewers. While the *Plans Mobiles* and *Multiplans* had presented viewers with mutable compositions—whether generated by the viewer's own actions or those of a motor—they still left the viewer in a position of relative mastery, able to take in the visual information offered by the work. With the black and white *Punctuations,* in contrast, the unending stream of white points appearing and disappearing denies viewers this ability, deliberately exceeding the limits of optical perception. This dynamic introduced a new theme into the criticism of Bury's work. In the 1959 MAT exhibition brochure, André Balthazar described the effect of the *Punctuations*. "The eye travels, stimulated by this chase that never ends," he wrote; "the eye no longer knows if it is watching or if it is watched."[61] For Bury, the motor introduced a pattern that would animate his later career and that of a number of other kinetic artists: it allowed him to present more visual information than the viewer could easily process. To Balthazar, this situation led to a kind

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d'Aujourd'hui, for instance, included a dossier of articles on Kandinsky in its January 1950 issue; a bibliography directed interested readers to the German and English editions of *Point and Line to Plane.*

[59] Ibid., 32

[60] Ibid., 34.

[61] André Balthazar, untitled statement, in *Edition MAT: Multiplication d'oeuvres d'art* (Paris: Galerie Loeb, 1959).

of reversal in the normal viewing dynamic, promoting the object into the position of observer.

The Later Punctuations and the Erectiles

Bury's best-known body of works, which also bear the title *Punctuations,* move fully into three dimensions. They comprise fields of moving elements—nails, rods, or nylon wires with spherical points on their tips—on a planar support, often a wood or Masonite board [2.15]. The artist introduced the new title *Ponctuations érectiles (Erectile Punctuations)* or *Entités érectiles (Erectile Entities)* for some objects of this kind.[62] These *Punctuations* proved to be one of Bury's most enduring formats; he produced variations through the 1980s. The works function via a clever mechanism on their reverse sides: a motor moves a screen hanging a small distance from the back of the support, causing it to swing slowly and catch on the protruding backs of the elements to agitate them periodically and unpredictably.[63] As Bury observed, the kind of movement obtained in these works depended primarily on the material quality of the elements affected: the same mechanism applied to a rigid nail versus a malleable wire would produce very different

[62] There is a great deal of inconsistency in the titling of these works. "*Ponctuations*" may be considered an umbrella term for all objects in the series, and sometimes refers specifically to the works featuring tiny spheres on the tips of wires. "*Erectiles,*" meanwhile, may refer to the reliefs with more rigid elements. Yet Bury also titled many wire-based objects "*Entité érectile*" or "*Erection molle*" ("soft erection"). See Gilles Marquenie, "Time in Motion," in *Pol Bury: Time in Motion,* ed. Marquenie (Brussels: Mercatorfonds, Bozar Books, 2017), 22-23.

For the purposes of this chapter, I refer to the *Punctuations* incorporating punched holes, rubber, and light as the "early" Punctuations—because Bury experimented with them for only a few years—and those featuring protruding wires and rods as the "later" *Punctuations*. It should be noted, however, that these series do overlap chronologically.

[63] The appearance of the screen varies from work to work. In the reliefs featuring nylon elements, the screen is often perforated with small or large holes; in those with metal elements, the screen may be solid.

types of motion. His observation recalls the kinetic artist George Rickey's remark that movement, while it may sometimes be used to dematerialize matter, also reveals material qualities: "A calm lake could be a frozen one, while waves show liquidity; we shake a salt cellar; to find out what a fishing rod is made of, we wave it."[64] Indeed, Bury was among the kinetic artists most interested in the nature of materials; unlike many artists of the period, he showed little desire to use motion to produce virtual volumes or to make matter seem to disappear.

The *Erectile Entities* received their name during Bury's first exhibition at Iris Clert Gallery in 1961, soon after the artist moved to Paris.[65] In his discussion with Balthazar, Bury acknowledged the erotic aspect of the series that its title signaled. He connected it to his fascination with the interplay between *felt* and *seen* movement: as a male artist, he was interested in the nature of the male erection as "a movement felt," one "more sensed than seen." Thus he suggested that the *Erectiles* were not so much images of erections as a "materialization of movements felt" during periods of sexual arousal.[66] Bury did not mention another striking fact about the works, that they each contain not one but many phallic stand-ins. The works might be compared with other explorations of the multiplied phallus in the mid-1960s, such as Yayoi Kusama's "phalli-fields," which parody the singularity of the phallus by allowing it to proliferate to the point of

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[64] Balthazar, "Questions et Réponses," 139-142; George Rickey, *The Morphology of Movement: A Study of Kinetic Art* (New York: G. Braziller, 1965), 108.
[65] Both Iris Clert and the artist Bro were apparently involved in naming this series of works. Balthazar, "Questions et Réponses," 153-155.
[66] Discussing Bury's work in general, Daniel Marchesseau suggests that Bury was influenced by the "erotic dimension of the Duchampian experience" present in such works as the *Please Touch* catalogue. Daniel Marchesseau, "Moments in Time," in *Pol Bury: Instants Donnés: 50 ans de sculpture* (Paris: Flammarion, Fondation EDF, 2015), 29.

absurdity.[67] Bury further imagines the movement of these multiplied parts as a fragile, feeble one that might even evoke laughter in its viewers. Beyond the erotic implications of their titles, the works also call to mind the broader notion of involuntary bodily movements: goose bumps, hairs that stand up on an arm in response to emotional or environmental states, movements of the skin that we feel but cannot control. A cartoon by Maurice Henry that ran in Iris Clert's *Iris Time* newsletter in November 1963 signaled the variety of reactions that one might have to a sculpture by Bury [Fig. 2.16]. One male observer laughs, another hides his face in fear, and a woman touches her finger to her mouth with seductive interest.

The later *Punctuations* and *Erectiles* intensified the provocative reversal in the viewer-object relationship that Balthazar had identified in the early *Punctuations.* Yet the strength of their effect depends on their scale and the density of elements on their surfaces. In a relatively early *Erectile Entity* from 1962, for instance, a small number of long wires cluster toward the center of the textured red surface [Fig. 2.17]. The wires move in a generally continuous, if jerky, fashion, and the viewer can easily hold them within his or her visual field. In the work *2270 points blancs sur un losange* (1965), dense tufts of nylon wires spread over a large, diamond-shaped surface [Fig. 2.18].[68] Here, the large size of the field prevents the viewer from easily keeping track of the moving wires, which rise and fall at seemingly random points across the expansive surface. Moreover, unlike in the previous example, any single wire moves only briefly

[67] Mignon Nixon has described the frequent appearance of the fragmented phallus as "part object" in the art of the 1960s. See Nixon, "Posing the Phallus," *October*, no. 92 (Spring, 2000): 98-127.

[68] Many of the works have similar titles, giving an apparently precise number of the hundreds or thousands of points on their surfaces and conveying a sense of obsessive accumulation.

and alternates with long periods of immobility. These mature works create Bury's trademark effect, in which the viewer begins to question whether the wires are moving at all. The work's action seems to take place entirely within one's peripheral vision, as viewers periodically notice a wire moving out of the corner of their eyes.

In *Formless: A User's Guide,* Yve-Alain Bois explores Bury's work within a lineage of art practices that disturb or disrupt the claims of orthodox modernism. Bury, he contends, is concerned with the implications of the "allover" composition—especially one aspect of it that had been repressed in modernist thinking. Within the modernist framework, distributing pictorial elements in a non-hierarchical way across the entire support was a way to homogenize the surface, so that the eye could take in the full extension of the picture at once and favor no single part over any other. Bury, in Bois's reading, points to the impossibility of such a surface: in his works, we realize that we are unable to keep the entire visual field under uniform optical control at once. As the eye darts across the support, responding to slight movements in its peripheral vision, the work "addresses itself instead to the persistence of animal capabilities in our visual perception, to what still ties us to the workings of the fly."[69] Thus the work may be understood to undermine the premises of modernism both by foregrounding fragmentation—favoring the "part object" over the whole—and by insisting on the viewer's inability to perceive a unified visual expanse.

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[69] Bois, "Very Slow," in Bois and Rosalind Krauss, *Formless: A User's Guide* (New York: Zone Books, 1997), 198. Bois goes on to contrast the treatment of time in Bury's kinetic work to that in cinema. Film, being generally "averse to dead time," rarely exploits the kind of extremely intermittent motion seen in Bury's work. The closest analogue, he suggests, may be Warhol's films, which can be so eventless that "the continuity of time ends by being suspended within perception."

This deliberate thwarting of the viewer's efforts to exert visual control over the work did not go unnoticed among critics. When Bury's work appeared in the 1963 exhibition *Structures Vivantes* at Paris's Galerie Diderot*,* alongside that of Soto and the Greek kinetic artist Takis, Michel Zerbib elaborated on this point in the exhibition catalogue. In the kinetic art on view, he declared, the work "becomes the Observer, while the art connoisseur freezes with astonishment and becomes canvas."[70] The experience of this reversal, he suggested, could be disquieting: "to contemplate a work of Bury and Soto, is to feel oneself observed by a work of art and judged by it."[71] Like previous critics, Zerbib imagines that a loss of control on the part of the viewer grants the artwork itself a kind of animation or even agency.

This sense of animation is perhaps strongest in the later *Punctuations* and *Erectiles,* which frequently seem to allude to living forms in the natural world. Although Bury denied that he had intended these associations, the fidgety wires often resemble tentacles, antennae, or hair. When Bury showed a selection of wall-hung reliefs and freestanding sculptures at Lefebre Gallery in 1964, one reviewer noted that the sculptures were "kinetic in the way people, animals, or any living and growing things are kinetic. Their motion… seems not to be that of machines, but of organisms, although these are the organisms of an enchanted and sometimes disturbing world."[72] An anonymous French-language reviewer made a similar point. In Bury's work, he argued, the combination of slowness and unpredictability creates the impression that "it is truly life

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[70] Michel Zerbib, in *Structures Vivantes: Bury, Soto, Takis* (Galerie Diderot, Paris, 1963), 11.
[71] Ibid., 12.
[72] John Canaday, "Art: Pol Bury's Sculptures at Lefebre's," *New York Times*, October 17, 1964.

that seizes his constructions, a life completely foreign to human rhythms." Bury gives an illusion of life that "truly escapes our measures, our criteria and is all the more appealing—another life."[73] Both proposed that Bury's objects resemble not only living things, but also organisms different from those we encounter in everyday life.

In a variation on this theme, some critics suggested that Bury's works resemble familiar forms, but ones revealed through a kind of special vision not normally available to human eyes. Both the French reviewer above and a British critic writing in 1964, for instance, compare the works to the movement of plants registered by cinema: to "those sequences in nature films in which plants grow visibly and flowers burst into bloom before our eyes."[74] The works present a number of qualities likely to provoke this response: the movement of the elements is jerky, appearing alternately slowed-down and sped-up; it is difficult to predict which elements will move and when; and when movement occurs, it appears to be self-directed, controlled by no visible mechanism.

When Bury's critics compared his sculptures to films granting access to normally hidden phenomena, they touched on a discourse around such media that had developed earlier in the twentieth century. Responding to forms such as chronophotography and time-lapse film, Walter Benjamin argued that such media offer access to a realm of vision that he called the "optical unconscious." For Benjamin, the technology of the camera opens onto "another nature": it allows human beings a view of the secrets hidden behind

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[73] "Pol Bury: Ni sculpteur ni peintre," no publication data available, IMEC, Fonds Pol Bury (Press, 1956-1971).

[74] Robert Wraight, *The Tatler*, February 12, 1964: 334. He continues, "But more often there is an element of menace in this quasi-vegetal growth…. At other times it is a subtle and undefinable menace that produces a wholly irrational sense of unease such as one may experience through reading science fiction."

everyday life, such as the mechanisms of walking and the structure of plants.[75] Once this realm has been rendered visible, Benjamin observes, we may find worlds of images that seem to border on the magical: ancient columns or gothic tracery in photographic enlargements of plants, for example.[76] Bury's work does not literally provide an optic into a hidden world within our world, but gives the impression of doing so through the odd experience of time that it engenders—one different from that which we encounter in everyday life.

While reviewers connected the visual experience of Bury's artworks to the *optical* unconscious, the structure of such works also presents a suggestive resonance with the *psychic* unconscious. Like much kinetic art, Bury's works feature a disconnection between the moving elements visible on the surface and the hidden mechanism whose workings, behind this surface, remain mysterious. Freud's best-known metaphor for the unconscious was the device of the *Wunderblock* or "mystic writing pad."[77] The device consists of three layers: a slab of resin or wax at the base, a thin paper sheet that rests above the wax, and a transparent plastic sheet that covers the paper. Writing on the plastic sheet with a stylus produces grooves in the wax layer that are visible on the surface. Pulling the two cover sheets upward makes this writing disappear from the surface, yet allows its traces to remain on the wax block. Freud analogizes the split between the upper and lower layers to that between consciousness and the unconscious: a

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[75] Walter Benjamin, "Little History of Photography" [1931], in *Walter Benjamin: Selected Writings, 1927-1934,* vol. 2, ed. Michael W. Jennings, et. al., trans. Rodney Livingstone, et. al. (Cambridge: Harvard University Press, 1999), 510.
[76] Ibid., 512.
[77] Sigmund Freud, "A Note Upon the 'Mystic Writing-Pad" [1925], in *The Standard Edition of the Complete Psychological Works of Sigmund Freud,* volume 19, trans. and ed. James Strachey with Anna Freud (London: Hogarth Press, 1962), 227-232.

two-part system that is always potentially receptive or "clean" on its surface but that simultaneously offers unlimited storage in its depths.

Kinetic art as a genre relies largely on an apparent separation between the visible surface and the hidden back. Of course, there are limits to this comparison: the kinetic art machine *records* nothing, and experience does not proceed from the surface inward toward the mechanism (indeed, the reverse would be more accurate). Yet the comparison captures the sense of a split structure, one in which the outermost and innermost layers are connected, but the lower ones remain invisible and largely unknowable.

Importantly, temporality is at the forefront of Freud's model, animating the periodic transfer of material from consciousness to unconscious storage. In a reading of Freud's essay, Derrida emphasizes precisely this aspect of the model. He writes of the *Wunderblock*: "Its *maintenance* is not simple. The ideal virginity of the present [*maintenant*] is constituted by the work of memory."[78] In other words, in order to keep the pad—or consciousness—receptive, a hand must wipe it clean periodically by lifting and thus erasing the upper sheet. Rosalind Krauss, in discussing this model, refers to the dynamic of periodic lifting as "pulse."[79]

Bury's work, too, involves a kind of periodic clearing. The artist believed that viewers must forget an object's past movements in order to appreciate it fully: their forgetting ensures that the present remains "clean." His machines' movements were, indeed, programmed so as to make viewers fail to remember more than a short sequence of movements. Yet, as Derrida contends, the construction of a pure present is a fraught

[78] Jacques Derrida, "Freud and the Scene of Writing," trans. Jeffrey Mehlman, *Yale French Studies,* no. 48 (French Freud: Structural Studies in Psychoanalysis [1972]): 112.
[79] Rosalind Krauss, *The Optical Unconscious* (Cambridge, Mass.: MIT Press, 1993), 57-58.

operation, one ultimately doomed to failure. Critiquing Husserl, Derrida observes that when we acknowledge the processes of retention and protention, we admit otherness or "nonpresence" into the "*blink of the instant.*"[80] In order for the present to register as such, it must retain a "trace" of past experience.[81] At the same time that the present is pulled backward into the past, its meaning is projected into the future: "the living present is… deferred *ad infinitum.*"[82] Given that objects and circumstances constantly change, their meaning only ever coheres from a future viewpoint, one that will itself be beset by the same problems; any stable future viewpoint is constantly delayed. Derrida thus denies the phenomenological tenet that, despite its complexities, "temporality has a nondisplaceable center, an eye or living core, the punctuality of the real now."[83] He asserts the impossibility of the "present of self-presence"—a stable temporal center that would allow for transparent self-knowledge and unmediated experience—altogether.[84]

Bury's work, more than Tinguely's, foregrounds these dynamics. If we can speak of a "present" in his work, it does not belong to any transparent cause and effect structure. Bois' observation that Bury's reliefs prevent the spectator from mastering the visual field also speaks to this point: the work can never be fully "present" to the viewer, and its activity deliberately defers or delays a satisfying resolution. The quality that Bury called "slowness" is central to this dynamic.

Slowness and Intermittency

[80] Jacques Derrida, *Speech and Phenomena, and Other Essays on Husserl's Theory of Signs,* trans. David B. Allison (Evanston: Northwestern, 1973), 65.
[81] Ibid., 68.
[82] Ibid., 99.
[83] Ibid., 62.
[84] Ibid., 61.

From the moment of his *Multiplans*—whose slats turned at an unhurried rate—Bury found that he was interested above all in slow movement. The artist explained that his attraction to slowness stemmed from "the pleasure of seeing transformation operate almost unknown to the eye."[85] This *perceptual* problem—an exploration of the hazy border between perceived and non-perceived movement—motivated Bury's lifelong pursuit of slowness. Such an interest cannot be reduced to a simple rejection of the fast pace of modern life, as some have argued.[86] Rather, Bury attends to the way a moving object's pace affects our perception of its more material, qualitative aspects.

It is important, first, to clarify Bury's use of the word "slow." As several critics have pointed out, many of the artist's later *Punctuations* do not move slowly as much as they move intermittently.[87] Indeed, this quality causes viewers to doubt whether the object has moved at all, as the objects' wires twitch only briefly and in unpredictable places—often at the periphery of one's vision. Roger Bordier, writing in 1963, observes that Bury departed from the many optical artists who sought "the illusion of movement"; instead, he created "the illusion of fixity."[88] Similarly, Dore Ashton remarks that Bury's art deals less with movement than with the "*possibility* of movement."[89] A description of Bury's work as slow moving thus encompasses both objects whose individual parts move at a gradual pace, and those that are slow to generate activity.

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[85] Balthazar, "Questions et Réponses," 123.
[86] Selz, *Pol Bury,* 4.
[87] Bois, for example, writes in *Formless:* "In the *Punctuations,* in fact, the movement itself is not particularly slow; it is rather very *short,* a spasmodic flicker of one or several tiny particles among so many other similar ones" (Bois, "Very Slow," 200).
[88] Bordier, "Spectacle Pol Bury," *Iris Time,* no. 10 (November 7, 1963): 1.
[89] Dore Ashton, *Pol Bury* (Paris: Maeght, 1970), 14.

Bury approached the question of slowness at length in perhaps his best-known essay, *Le temps dilaté (Time Dilated)* (1964). Bury acknowledged that when he wrote this essay, he was primarily describing later works in which elements moved along longer paths on a surface, such as a group incorporating elements that traveled across magnetic plateaus.[90] Yet, even in the absence of long trajectories, the core of the analysis still holds. The artist begins his essay by defining slowness as a state between immobility and mobility. He then argues that a moving object's extremely slow pace prevents the human eye from successfully registering its trajectory, as we gradually forget the position in space where the object began its movement. "Only slowness," he writes, "permits [the object] to efface its own traces, to be an eraser of memory, to make us forget its past."[91] Here and elsewhere, Bury proceeds as though the object itself desires certain mental outcomes in its viewers.

The phenomenon of slowness has a number of additional consequences. First, it encourages the viewer to focus more closely on the material properties of the moving object. If a sphere moves quickly between two points, Bury observes, it almost loses its round shape, becoming simply a tool in the production of its straight trajectory. Slowness allows the sphere to retain its essential roundness. Second, slowness affects the viewer's perception of space. Seen as a speeding vector, an object forecloses the space around it: we limit our awareness of space to the path traversed. A slow-moving object, meanwhile, keeps the possibilities of many paths open, thereby seeming to increase its spatial purview. "Speed limits space, while slowness multiplies it," according to Bury.[92] To

[90] Balthazar, "Questions et Réponses," 185.
[91] Bury, "Le Temps dilaté" [1964] in *Les horribles mouvements de l'immobilité,* 117.
[92] Ibid.

summarize, Bury suggests that slowness has the power to defeat the limited, means-end rationality implied by efficient travel; to produce a kind of expanded awareness of individual objects and the space surrounding them; and to hold the mind in a space of uncertainty. In making these claims, Bury resists what Paul Virilio would later describe as the increasingly central role of speed in politics, with its concomitant suppression of space in favor of temporal acceleration.[93]

Bury then returns to the central point in the essay: that slowness and the concomitant process of forgetting change the dynamic between the object and its observer. Slowness, when the eye is "no longer able to trace an object's journeys," "gives the eye following the sphere the possibility of escaping its own observer's imagination and letting itself be led by the imagination of the traveling sphere itself."[94] As the viewer loses control, the artwork may induce him or her into new kinds of perception. In a clear echo of Bachelard's language, object imagination replaces human imagination.

Pamela Lee has approached the problem of time in Bury's work by turning to Bachelard. She argues that Bury's kinetic artworks do not demonstrate a seamless *durée*

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[93] Paul Virilio, *Speed and Politics: An Essay on Dromology* (New York: Columbia University, 1986).

[94] Bury, "Le Temps dilaté," 117. Bury's attempt to separate movement from trajectory recalls Gilles Deleuze's distinction between the "movement-image" and "time-image" in cinema. In the movement-image—as in traditional narrative cinema or the montage-based films of Eisenstein—continuous action or logic connects one sequence to the next. Time appears only indirectly, as an effect or byproduct. In the time-image, images and moments no longer follow a clear causal logic and time appears in a more isolated form. We might think, for instance, of an Antonioni film in which the characters, deprived of meaningful action, simply wait as time passes emptily. Bury seems to be after something like a time-image: a sensation of time separated from trajectory or logical progression. (Deleuze, *Cinema 1: The Movement-Image,* trans. Hugh Tomlinson and Robert Galeta [London: Athlone Press, 1986], and *Cinema 2: The Time-Image,* trans. Tomlinson and Galeta [Minneapolis: University of Minnesota Press, 1989]. The examples are drawn from David Rodowick, *Gilles Deleuze's Time Machine* [Durham, NC: Duke University Press, 1997], 13.)

of the kind theorized by Henri Bergson. Rather, with their stops and starts, they propose a Bachelardian experience of time as "consistently riven, fractured, discontinuous."[95] (Lee draws on Bachelard's *L'Intuition de l'instant,* in which the philosopher argues directly against Bergson in favor of a "lavish heterogeneity of duration."[96]) Lee's argument provides an important perspective on Bury's intellectual conception of time, but it stops short of considering the psychic experience of watching such works in action. Yet this experience is one of the most striking aspects of Bury's work. Perhaps more than any other kinetic artist, Bury makes objects that are particularly effective in eliciting the feelings of anticipation and suspense.

The effect of intermittent movement on the viewing experience deeply intrigued Bury. Initially, the artist used stillness as a means to interfere with the endless repetition of the motor—a goal that his kinetic peers shared.[97] Yet Bury's concern soon extended beyond the simple avoidance of repetition. The artist realized that, by creating works in which apparent fixity is "threatened by movement," the interplay between two states "engenders doubt" in the viewer.[98] His insistence on unpredictability also denies a sense of motivation—an impression that things are moving for a specific reason or in a particular order. Instead, Bury embraces the arbitrary, violating the principles of geometric abstraction he had previously followed.

Many aspects of Bury's thinking about memory, prediction, and movement were not unique to him. Tinguely, too, wanted to make viewers unable to recall or predict the

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[95] Pamela Lee, *Chronophobia* (Cambridge, Mass.: MIT Press, 2004), 123.
[96] See Bachelard, from *L'Intuition de l'instant*, in Mary McAllester Jones, *Gaston Bachelard: Subversive Humanist* (Madison: University of Wisconsin Press, 1991), 34-35.
[97] Peter Selz has pointed out that in Bury, this dynamic, which posits "the boredom of regularity and the promise of mystery" has Surrealist roots. Selz, *Pol Bury,* 8.
[98] Balthazar, "Questions et Réponses," 170.

path of the elements in his meta-mechanical reliefs, in order to produce the continual impression of "new" compositions. In my next chapter, I will show how Gianni Colombo and members of other kinetic collectives in the early 1960s took up the same problem, relating it to the broader social concepts of planning and novelty. Yet Bury's work, because of the way it engages stillness in combination with movement, is perhaps the most successful in creating intense feelings of doubt and suspense in its viewers.

Suspense and the *Cinétisations*

Writers in the field of film theory have provided the most robust theorizations of suspense. While Bury never wrote about the topic of suspense explicitly, he did reveal an interest in cinematic time: in an interview, he said that he enjoyed the movies, "especially American movies which have the best sense of time."[99] Comparing cinematic theorizations of suspenseful time with the generation of suspense in Bury's motorized objects clarifies what is unique about the artist's work.

Noël Carroll has proposed perhaps the dominant theorization of suspense in film.[100] Carroll follows what he calls an "erotetic" model of film narrative, in which events in earlier scenes pose questions that are answered in later scenes. Suspense, he argues, emerges when a clear question appears in a scene that has two possible, opposing answers. Moreover, one of these potential answers is "morally correct" (or desired by the viewer within the film's moral framework) and *unlikely*, while the other answer is "evil" and *likely*. One example of such a scenario would be that a film's heroine has fallen into a

[99] Selz, *Pol Bury,* 8.
[100] Noël Carroll, "Toward a Theory of Film Suspense," in *Theorizing the Moving Image* (New York: Cambridge University Press, 1996), 94-117.

river with strong currents, and is approaching a waterfall; her potential rescuers seem unable to reach her in time. This model appears logical, but does have one problem: it requires that the viewer be uncertain of the film's outcome, and thus makes the fact that he or she may feel suspense upon watching the film for a *second* time into a paradox.

In order to resolve this so-called "paradox of suspense," other theorists have tried to build a theory of suspense that does not rely on the condition of uncertainty. The philosopher Aaron Smuts, for instance, argues that suspense is, at base, a matter of "desire frustration."[101] He notes that, in real life, we do not feel suspense if we are actively working to produce a certain outcome; it is only when a matter is out of our hands that we really experience suspense. In sum, he writes, "Suspense only arises when our ability to make a difference is radically diminished. Suspenseful situations are those where we want to affect an outcome—that is, where we strongly desire to have a causal impact—but our desire is frustrated."[102] Smuts's model explains why we feel suspense in film and literature much more often than in daily life: because fictive narratives inevitably force the spectator into a position of passivity. Other theorists in film and philosophy have suggested alternative ways to understand suspense and explain its central paradox. Yet most identify the same basic elements at play: the viewer desires one outcome over another, weighs the relative probability of each outcome, and lacks control over the ultimate result.

All of these models, of course, assume a high level of *content* in the suspenseful material. Do they still apply in a case in which suspense results from the movement of

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[101] Aaron Smuts, "The Desire-Frustration Theory of Suspense," *The Journal of Aesthetics and Art Criticism* 66, no. 3 (Summer, 2008): 281-290.
[102] Ibid., 284.

completely abstract elements, as in Bury's work? While Carroll's moral framing is clearly unsuitable for such a case, other core elements of these theories hold. Uncertainty is clearly present, as we can note by comparing Bury's works with Tinguely's: the general path of Tinguely's elements is apparent, while the viewer has no real way of predicting which of Bury's wires or balls will move and what paths they will take. Desire is at work, too, as the viewer wants to discern the system that makes one piece move and another not, and to be able to predict these movements. Yet Bury deliberately withholds such knowledge by refusing to reveal the works' mechanisms. Finally, in these non-manipulable works, the viewer cannot affect the course of events. This leads to an important distinction: while manipulable art may be surprising—as I will discuss in my chapter on Colombo—it is rarely suspenseful.[103]

One basic difference between traditional cinematic suspense and the suspense generated by these kinetic objects is that Bury's artworks *never* reach a moment of resolution. Generally, in models of suspense, we trust that the author will eventually provide resolution.[104] Here, however, the author not only provides no resolution, but is himself unable to predict the turn of events. Perhaps as a result of this clear lack of resolution, suspense generally wears off after a few minutes of viewing a Bury work—

[103] It is possible to imagine some situations in which these distinctions are not so clear-cut. For example, one might feel suspense in putting money into a slot machine and waiting for the result, or in playing a sport such as baseball. In this case, one has some ability to alter the outcome, but not full control.

[104] On the role of the author in suspense film and literature, see Juan A. Prieto-Pablos, "The Paradox of Suspense," *Poetics* 26, no. 2 (1998): 103-104. Prieto-Pablos writes, "There is an emotional or affective commitment, determined by the terms of the interaction between reader and author. It must not be forgotten that the author is the one who finally provides a resolution to the suspenseful situation, therefore the one on whom we depend for the relief of our uncertainty and tension. The communicative conditions implicit in the reception of suspense discourse require that we trust the author absolutely."

once we sense that no resolution will ever come, we are unable to sustain desire indefinitely. This sense of endlessly deferred resolution may also explain some of the broader viewer reactions to kinetic art as repetitive and unexciting. If a work moves, we want it to follow a narrative structure, rather than to function like a still painting. Interest in movement without a narrative arc is more difficult to sustain.

What is the function of suspense? Some critics have argued that it is an essentially conservative device, catering to the audience's desire for closure and a neat conclusion, or simply providing an unsophisticated way to arrange a plot. Suspense also tends to place the viewer into a position of passivity—a criticism that could also be levied at kinetic art. Yet recent scholarship has also proposed a more complicated reading of suspense. As Caroline Levine explains in her analysis of Victorian novels, for example, the rise of suspense in narrative literature is deeply related to the rise of realism as a worldview. In her argument, suspense narratives create a sense of uncertainty for an extended time—an attitude also central to scientific discourse at the time. "In order to grasp the fundamental alterity of the world, it was necessary to put aside one's own intellectual habits and presumptions. The mind must come to know its own limits," she concludes.[105] This ability to acknowledge the mind's limits, to imagine a future that may or may not occur, drives suspenseful narratives as well as scientific experimentation and radical politics.[106] Kinetic art in general came out of a similar historical moment marked by scientific advancement. Some artists, especially those in the French and Italian art collectives, created deliberately open-ended work and compared their practice to that of

[105] Caroline Levine, *The Serious Pleasures of Suspense: Victorian Realism and Narrative Doubt* (Charlottesville: University of Virginia Press, 2003), 3.
[106] Ibid., 9.

scientific research teams; when they advocated for "instability" as worldview, they intended the term to have both scientific and social implications. Bury's work shares many of these qualities yet goes further in its deliberate cultivation of a sense of suspense.

Roland Barthes gave a central role to suspense in the narrative context. Narrative language, he argues, draws its particular character from "distortion": the distancing of two temporally contiguous events by "insertions" of various kinds—tactics of stalling the forward, linear motion of a story through digressions and narrative tangents. It follows that suspense is an exaggerated form of distortion—to the point where it "offers the threat of an uncompleted sequence, of an open paradigm." Barthes concludes that suspense constitutes "a veritable 'thrilling' of intelligibility: by representing order… in its fragility, 'suspense' accomplishes the very idea of language."[107] He believes that suspense—understood as an intensely-experienced uncertainty about the relative probability of outcomes—points to the tenuousness of all structures. As I will discuss further on, Eugène Ionesco had something quite similar to say about how Bury's perceptual uncertainty opens up onto broader questions about social instability.

First, however, I want to take a step back and situate the feeling of suspense within its historical context—that of the Cold War. In the previous chapter, I examined Harold Rosenberg's 1967 analysis of kinetic art as the culmination of a gradual

[107] Roland Barthes, "Introduction to the Structural Analysis of Narratives," in *Image, Music, Text,* trans. Stephen Heath (New York: Hill and Wang, 1977), 119. The idea of delay also holds a central place in Viktor Shklovsky's thinking on estrangement. For Shklovsky, art deliberately forestalls our ability to recognize things according to our normal habits; thus "perception is impeded and the greatest possible effect is produced through the slowness of the perception." See Shklovsky, "Art as Technique," in *Russian Formalist Criticism: Four Essays,* ed. and trans. Lee T. Lemon and Marion J. Reis (Lincoln and London: University of Nebraska Press, 1965), 22.

conversion of art into "event." Rosenberg ends his essay by making a rather extreme claim, linking kinetic art to the atomic age. He concludes:

> The supreme kinetic sculpture is, of course, the hydrogen bomb... This masterpiece of our culture can never be exhibited in its working state, if for no other reason than that if it is, the audience-participants will be in no condition to appreciate it. The great hidden art object of this era, the Bomb is comparable to the Ship of Cheops, which upon completion was buried 'forever' in a mountainside. Power-driven art thus reaches its apotheosis in becoming invisible, a presence of pure energy that cannot be endured.[108]

Rosenberg names the nuclear bomb as the ultimate piece of kinetic art because it represents the complete triumph of energy over material. This triumph is so great, in fact, that it overcomes even the materiality of its viewers' bodies—it "cannot be endured."

Of course, Rosenberg was not the first or only observer to link kinetic art to its nuclear-era setting. Starting in 1960, Tinguely had begun to create self-destroying machines that he linked explicitly to notions of apocalypse—as in, for instance, his *Study for the End of the World, No 2,* in which he set off an elaborate destructive machine in the Nevada desert and broadcast the performance on NBC. Pamela Lee has read this work as commenting not only on the atomic bomb but also on the changes to our conception of time wrought by new media. The performance's broadcast on television, she observes, neatly enfolds "medium with message," as television, like the bomb, enacts a "compression of time and space."[109]

Yet self-destructive machines comprised only a small subset of the kinetic art produced in the 1960s. A greater part of this production, as I have suggested, is concerned less with the single, unimaginably destructive event than with a kind of ongoing eventlessness. I argue that *this* mode—the constant production of suspense,

[108] Harold Rosenberg, "Movement in Art," *Vogue,* February 1, 1967, 213.
[109] Lee, *Chronophobia,* 140, 153.

anticipation, and the denial of closure—represents an equally powerful interpretation of the experience of time in the Cold War.

Recent work in literary theory has sought to understand suspense as a quintessential affect of the Cold War period.[110] Daniel Cordle, for instance, has argued that the "deferral of nuclear explosion, anticipated, threatened but never delivered" is key to the period, and that we can learn much by examining "nuclear anxiety narratives" in addition to "nuclear disaster narratives."[111] Indeed, the former may be more revealing than the latter, as disaster narratives actually provide a kind of closure that anxiety narratives refuse to deliver. Cordle analyzes a number of period texts to understand how their structure—not only their content—relates to their Cold War context. In the first half of Douglas Coupland's short story "The Wrong Sun," for instance, characters anticipate a nuclear disaster that never comes, and their anxiety is mirrored in the shape of the text—fragmentary, lacking a forward-moving narrative, and ending in an anticlimax. Similarly, Paul Saint-Amour has recently examined the literature of the interwar period through the lens of a rising anxiety about the possibility of total war. In doing so, he attempts to formulate a theory that would account for the trauma brought about by the *anticipation* of an event, rather than by the event itself: a new kind of trauma theory that would allow for

[110] The recent writing by Cordle, Saint-Amour, and others draws on the legacy of a short-lived movement called Nuclear Criticism—which grew from a seminar paper delivered by Derrida in 1984—that sought to reorient literary criticism in the wake of the atomic threat. The paper was published as "No Apocalypse, Not Now (full speed ahead, seven missiles, seven missives)," trans. Catherine Porter and Philip Lewis, *Diacritics* 14, no. 2 (Summer 1984): 20-31.

[111] Daniel Cordle, *States of Suspense: The Nuclear Age, Postmodernism and United States Fiction and Prose* (Manchester and New York: Manchester University Press, 2008), 3, 25.

the existence of a "pre-traumatic syndrome" resulting from the constant expectation of disaster.

As we have seen, Bury's work addresses the experience of anticipation: it combines a sense of overall eventlessness with the possibility that any element may suddenly move with no warning or apparent logic. Bury himself understood that this dynamic could produce a kind of paranoia in his viewers. Situations such as those elicited by his works cause the observer's gaze to become more sensitive, he explained: "This sensibility can even, at a certain point of exasperation, become paranoid, and make one believe that 'that' is moving while nothing is moving."[112] If we can see these works as fostering an attitude of openness to possibility, we can also see that the "paranoid gaze" they generate might equally be understood in the context of traumatic social uncertainty.

Bury's relationship to the anticipation of disaster became more literal in a series of graphic works called the *Cinétisations,* which he began in 1964 and created in a concentrated manner between 1965 and '67.[113] To produce these works, Bury began with a photographic or printed image, most often of a well-known building. He cut concentric circles in the paper, and then rotated these circles to break up the image into offset rings. The resulting images portray structures that seem to be at the brink of crumbling, yet nevertheless stand in place. For instance, Chicago's Richard J. Daley Center—then the tallest building in the city—appears to crumple on its sides [Fig. 2.19]. Bury never presents an image of complete destruction, but rather unsettles the stability of these

[112] Balthazar, "Questions et Réponses," 144.
[113] Bury stated to Balthazar that the title of the *cinétisations* was intended to be ironic, as Vasarely and others had given the name to their rigorous variant of kinetic art. Ibid., 206.

structures. Although Bury denied that the works had apocalyptic overtones, the images of crumbling buildings would certainly have had such resonance during the Cold War era.[114]

In 1964, as we have seen, Bury represented Belgium at the Venice Biennale. At the Biennale, Bury's friend Pierre Alechinsky introduced him to John Lefebre, the New York dealer known for his support of European artists. This chain of events led to Bury's first solo exhibition in New York, in 1964 at Lefebre; he would show at the gallery again in 1966. The latter exhibition, called *Twice Pol Bury,* was divided into two parts, one focusing on moving sculptures and the other on the *Cinétisations*.

In the *Twice Pol Bury* exhibition catalogue, Ionesco gave a perceptive reading of the artist's work. Ionesco's text runs alongside two slightly different versions of the Eiffel Tower *cinétisation*. In the face of claims that "perfect order is here with its pillars… of solid rock," he writes, Bury presents a vision of "the world filled with menace," in which "in an instant, everything might change." He continues:

> For Pol Bury there is constant anguish originating from the basic intuition that everything might collapse under us at any moment: we are sure of nothing. If we enter a forest, the trees may embrace us in their leafy arms and crush us… In an instant anything might happen behind the apparent reality, the world might split in two pieces, in three, in four, the stars might explode. But so far there is only the humming of danger, the warning of catastrophe.[115]

Ionesco finds in Bury's work a sense of constant, underlying threat of disaster that "so far" has not arrived. His observations may apply equally to the *Cinétisations* and to the mechanically kinetic works. Whether understood in the register of menace or simply openness to possibility, the works foster a prolonged, often uncomfortable sense of uncertainty.

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[114] Selz, *Pol Bury,* 10.
[115] Eugène Ionesco, "Pol Bury," trans. Simona Tuten, in *Twice Pol Bury* (New York: Lefebre Gallery, New York, 1966).

The *Meubles*

At the Biennale and at Lefebre, Bury also exhibited the *Meubles,* a series of fully three-dimensional works that he had begun between 1962 and '63. The *Meubles* are wooden sculptures that often take the form of pieces of furniture, such as lecterns and armoires, covered with mobile spheres or cylinders that creep across or dangle from their surfaces. Hidden wires tether the elements and ensure that they do not fall off of the supports. In *Petit meuble* (1964), for instance, cylindrical tentacles sprout from the sides of a wooden cube that resembles a small chest of drawers [Fig. 2.20]. The cylinders slowly rise and fall, extending outward and then falling back limply. Given Bury's early interest in Magritte, the *Meubles* likely drew from the Surrealist painter's earlier efforts to render domestic furnishings strange and uncanny. Over the following years, Bury's *Meubles* grew increasingly abstract, losing their specific references to furniture. A large part of the sculptures feature spheres that mystifyingly roll up inclined planes or crawl around the insides of boxes.

Several aspects of the *Meubles* combine to give them an intensely disquieting effect. First, Bury's references to furniture and other everyday objects place the works in close dialogue with the human body: we can imagine encountering these objects in familiar settings, such as a bedroom or living room. Second, while works such as the *Punctuations* and *Erectiles* seem to move on their own, many of the *Meubles* also appear to contradict the basic forces of weight and gravity: a wooden ball rolling down a ramp will suddenly pause and reverse course. Peter Selz, who showed Bury's *Nine Balls on Five Planes* (1964) [Fig. 2.21] in a 1970 solo exhibition at Berkeley, recalled that viewers

frequently reached out and tried to catch the balls as they were poised to fall from the work's tilted surfaces.[116] Like the *Cinétisations,* the *Meubles* suggest a situation in which breakdown or collapse—even a minor one—is constantly averted.

The motif of objects resisting the force of gravity had an extensive precedent in the historical avant-garde, as artists such as Kazimir Malevich created compositions of floating geometric shapes to free their work from any reference to earthly forces. Meanwhile, postminimal artists in Bury's own 1960s moment—from Robert Morris with his felt sculptures to Lynda Benglis in her poured floor pieces—tried to surrender their work to the force of gravity in an effort to reduce the presence of human subjectivity. Bury's use of electric motors to counter gravity exists in a different register: one more banal and more physical than its precedents, in which the resistance of objects to their downward pull is at times nerve-wracking and at other times humorous. The artist reported that he was interested in the essentially absurd nature of gravity, which produces a world in which things are always falling down.[117] In the *Meubles,* he seems to propose an image of a world constantly suspended at the edge of collapse, but where the seemingly inevitable sometimes fails to happen.

Conclusion

The arc of Bury's work from 1950 to '66 demonstrates a slow unraveling of the principles of orthodox geometric abstraction, and the development of an alternative art form that contradicted nearly all of its terms. Following his engagement with Surrealist groups, Bury adhered to geometric painting in the mid-1950s, accepting the dominant

[116] Selz, *Pol Bury,* 6.
[117] Ibid.

understanding that a work must be compositionally motivated. He began to question this view in his early manipulable and moving works, the *Plans Mobiles* and *Multiplans,* which introduced flexibility and denied viewers instantaneous access to the work's complete visual possibilities. In this phase, however, Bury still retained a notion of motivation: he understood that each particular arrangement of parts must "hold" on its own, giving a sense of balance and rhythm. In his mature kinetic art, Bury finally abandoned this notion, making works whose effect depended on the arbitrary quality of their movement. It was this feature—the fact that no fixed principles determined where on a surface a pin vibrated, or when a sphere moved—that allowed him to produce the sensations of suspense so characteristic of his work.

In *Passages in Modern Sculpture,* Krauss reads kinetic art through the lens of theatricality and compares the moving artwork to a kind of actor. Yet Bury's sculptures, with their extremely minimal, peripheral movements, do not seem to conform to the pattern of spectacularly performing works like Len Lye's acrobatic metal loops or Tinguely's slapstick assemblages. They create a more subtle situation: in a room full of Bury's reliefs and sculptures, viewers pause and enter a state of extreme perceptual alertness, attuned to the slightest movement or noise. They become, in a sense, "complicit" with the sculptures themselves, enacting the same "subliminal activity" that the objects suggest and becoming actors in the works' own drama.[118]

What are the ramifications of this encounter with an artwork whose actions we are unable to predict or control and that seems, at times, even to govern our interactions with it? On the one hand, Bury's motorized works foster an attitude of openness and

[118] Krauss, *Passages in Modern Sculpture* (Cambridge, Mass.: MIT Press, 1977), 221.

encourage a withholding of judgment, producing encounters marked by surprise, enchantment, and humor; they remind viewers of the limits of human perception and the necessity of holding the mind open to a future that cannot be imagined precisely. On the other hand, the frustrating impossibility of intervening in these works may have an oppressive effect, reinforcing viewers' sense of impotence in the face of events whose course they are chronically unable to affect.

CHAPTER 3: Open Form: Gianni Colombo's Flexible Surfaces

In 1959, Gianni Colombo created the first iteration of his kinetic artwork *Strutturazione pulsante (Pulsating Structuralization)*, variations of which he would continue to produce through the following decades. An uncanny reimagination of the modernist grid, the wall-hung relief consists of stacked, brick-like blocks animated from behind by a mechanism that causes different areas of the surface to push slowly outward and sink back inward. As the work's title suggests, the effect is one of strict regularity disturbed by the organic; many viewers have the impression that the object is breathing.

If the grid is an emblem of modernism—flat, geometric, and autonomous, mapping nothing but painting's surface—then Colombo's work unsettles this paradigm from within.[1] The monochrome grid of *Pulsating Structuralization* is no longer a stable, impermeable ground, but one invaded by bodily disturbances and subject to change over time. Indeed, the majority of Colombo's early kinetic work may be understood as an extended meditation on the collapse of the autonomous surface, a denial of the picture plane as a space apart from, and unaffected by, the outside world. These early pieces include a relief in which a rubber sheet extends over knob-like protrusions that one can grasp and manipulate; a support covered with fur that sinks into craters when one pulls a lever; fields of regular projecting elements that one can tilt and nudge off-kilter; and an expanse of paper cards that flutter as a mechanical device lifts them off the surface.

About a decade younger than Tinguely and Bury, Colombo was part of a second wave of kinetic artists that emerged around 1960. These artists could look to the first-

[1] Rosalind Krauss, "Grids," *October,* no. 9 (Summer, 1979): 50-64.

wave kineticists as models and were more aware of their work as belonging to a larger, shared project. Many operated in collective teams—Group Zero in Germany, Equipo 57 in Spain, GRAV in France, Gruppo N and Colombo's Gruppo T in Italy—that aimed to move away from art's reliance on the notion of individual genius and toward an idea of the artist as a collaborative planner. In Italy, kinetic art and related tendencies came to be called *arte programmata*, and Colombo would exhibit his oeuvre under this label beginning in 1962.

Among the Italian artists, Colombo stands out both for the scope and coherence of his kinetic art, and for its complex engagement with the organic, which critics are now beginning to recognize.[2] In Chapter 1, I argued that the rotating shapes of Tinguely's meta-mechanical reliefs enact the provisionality of composition, of elements that fail to coalesce into meaningful form. In Chapter 2, I showed how Bury's intermittently moving wires and spheres produce the temporal experience of suspense and endlessly deferred resolution. In the majority of these works, both artists still employed rigid planar supports as the background for their investigation of animated forms. Colombo, in contrast, never explored figure-ground relationships: in his kinetic work, it is not the surface elements but the support itself that becomes warped and subject to change. As many of his titles—*Pulsating Structuralization, Fluid Structuralization,* and so on—imply, these objects hold structure and organic change in tension. They undergo variation over time, but

[2] See, for instance, Carolyn Christov-Bakargiev, "Participated Space" (19-26), and Marco Scotini, "Gianni Colombo: The Abstract Machine" (29-41), in *Gianni Colombo,* ed. Christov-Bakargiev (Rivoli: Castello di Rivoli; Milan: Skira, 2009); and Lucilla Meloni, writing about Gruppo T more generally, in *Gli ambienti del Gruppo T: Arte immersiva e interattiva* (Cinisello Balsamo, Milan: Silvana, 2004).

nonetheless retain and can revert to an underlying order, frequently suggesting a dynamic of elasticity rather than complete mutability.

Kinetic art is often cited as a step on the road to the total dematerialization of the art object, and it is true that many contemporary critics and artists did understand it within that discourse.[3] At the same time, it is important to remember that motion and material are not opposing terms, and that kinetic art—as we have seen—holds the potential to emphasize materiality as dissolve it.[4] This chapter examines Colombo's work in the context, not of the "dematerialized" object, but of a transformed idea of the object: one that can change shape, whose parts can be recombined, that can bend and bounce back, and yet that still holds together as a discrete entity.

The notion of the transformable object can also be understood as part of a broader social transformation, one that extends beyond the art world. In the earliest, hand-powered version of *Pulsating Structuralization*, Colombo chose a very particular material to construct his blocks: *gomma piuma,* or foam rubber. Developed and promoted in postwar Italy by the Pirelli Company, foam rubber quickly became a popular material in furniture construction. Design firms arose to take advantage of the flexible, non-rigid forms it allowed, such as chairs that could bend in all directions. In the exploding postwar consumer market in Italy, these kinds of flexible objects answered to the opposing

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[3] László Moholy-Nagy, for instance, made this argument in *The New Vision*, where he traced the evolution of sculpture from weighty, block-like volumes to hollow, light, and kinetic objects. He writes that in the latter objects—he is thinking primarily of kinetic works that create "virtual" volumes, such as Naum Gabo's *Kinetic Construction* (1920)—"the original phenomenon of: sculpture = material + mass relations, changes to the dematerialized and highly intellectualized formula: sculpture = volume relationships." Moholy-Nagy*, The New Vision* [1928], 4th rev. ed., and *Abstract of An Artist* (New York: Wittenborn, Schultz, 1947), 47.

[4] See George Rickey, *The Morphology of Movement: A Study of Kinetic Art* (New York: G. Braziller, 1965), 108.

demands of standardization and individualism, permitting manufacturers to mass-produce objects while allowing consumers to modify them according to personal needs and desires. Given the particular closeness that existed between design and kinetic art in Milan, Colombo's work provides an ideal site in which to examine the dialogue between these two realms.

It is no coincidence that Umberto Eco, too, formulated his idea of the "open work" in Italy during the same moment of the late 1950s and early 1960s. With this term, Eco tried to theorize the emergence of artworks that could be substantially altered by their spectators—either in their interpretive reception or, in many cases, quite physically through the rearrangement of parts. Yet Eco held that such works still retained some grounding in authorial intention or communicative purpose. As I will show, kinetic art, alongside the new industrial design, was a key impetus for Eco in the formulation of his theory. He would go on to write specifically about the work of Gruppo T in two additional essays.

Finally, the category of *arte programmata* in Italy had a notion of flexibility built into its foundations. As Italian critics have pointed out, the term "programmare"—meaning "to plan" or "to program"—was ubiquitous in the early 1960s, figuring prominently in debates around the usefulness of economic planning.[5] Such debates centered on the compatibility, or incompatibility, of the principles of planning and freedom; its participants disagreed on the extent to which change, novelty, and growth could emerge from a context bound by fixed rules.

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[5] See especially Andrea Branzi, *Introduzione al design italiano: Una modernità incompleta* (Milan: Baldini & Castoldi, 1999), 121-124.

As a whole, this chapter aims to read Colombo's elastic objects in the social context of Italy's economic boom, the realm of design, Eco's nascent theories, and the larger conversations around *programmazione*. The artist's works are in dialogue with, yet are not constrained by any of these contexts; within and sometimes in friction with them, Colombo develops a notion of the flexible object that produces striking, and frequently uncanny, effects.

Early Career and the Milanese Context

Born in Milan in 1937, Colombo studied painting at the Accademia di Brera. His early interests lay in abstract painting and Surrealism. Colombo wrote his thesis on Max Ernst, and his student work included drawings and collages in a biomorphic style, reminiscent of Jean Arp or Paul Klee. Colombo also became active in ceramics in the mid-1950s, regularly showing work at exhibitions in Faenza and Gubbio between 1955 and 1961. Like the drawings, Colombo's ceramics allude to organic forms, seeming to sprout eyes and tentacles. Beginning in the late 1950s, the artist began to include the potential for movement in his ceramics. He composed the works of the "intermutable" series, for instance, by stacking discs on a metal stand in such a way that they may be rotated to produce different configurations.

In 1958, Colombo contributed ceramics and mixed media works to a group show in Bellinzona, Switzerland, alongside his fellow Brera students Carlo Berta, Davide Boriani, and Gabriele Devecchi. In the exhibition brochure, the artists named Klee, Wassily Kandinsky, and Jean Arp as important predecessors for their brand of abstraction. "Our works stem from a Surrealist experience, expressed through the specific

means of abstract painting," they wrote.[6] Around this time, Colombo also began to experiment with works in gray felt mounted on Masonite, titled *Grigio*. In *0.1 Grigio* (1958) and *0.6 Grigio* (1959) [Figs. 3.1, 3.2], uneven cuts divide the felt surfaces into a crooked grid and irregular half-circle, with bulges and folds in the material further disturbing the regularity of the forms. The *Grigio* reliefs already give the sense of a collision between geometry and the material or organic that would become so prominent in Colombo's kinetic work. The artist likely rendered the works in gray as a means to bypass the expressive possibilities of color in favor of an emphasis on material and texture. Colombo showed some of the *Grigio* works at an exhibition with Boriani, Devecchi, and Giovanni Anceschi in 1959; Enrico Crispolti compared the work of the young artists to that of Alberto Burri, Lucio Fontana, and Antoni Tàpies.[7]

Late in 1959, Colombo formed the collective Gruppo T with Boriani, Devecchi, and Anceschi. The artists chose the letter "T" to denote their interest in time (*tempo*), an affinity that—as I will show—grew out of their studies of Edmund Husserl and other philosophers of temporality. The group held its first show, *Miriorama,* at Milan's Galleria Pater in January 1960, and released an accompanying manifesto for the occasion. Later that year, Grazia Varisco, already a close associate of the artists from Brera, officially joined Gruppo T. The collective continued to hold exhibitions titled *Miriorama* through 1964 and produced its final joint project in 1968.

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[6] Carlo Berta, Davide Boriani, Gianni Colombo, and Gabriele Devecchi, untitled statement, in Christov-Bakargiev, *Colombo*, 205. Originally published in *Berta, Boriani, Colombo, Devecchi* (Bellinzona [Switzerland]: Sala Patriziale del Municipio, 1958).
[7] Enrico Crispolti, "Exhibition of Anceschi, Boriani, Colombo, Devecchi," in Christov-Bakargiev, *Colombo,* 206. Originally published in *Anceschi, Boriani, Colombo, Devecchi* (Milan: Galleria Pater, 1959).

In *Miriorama I,* Gruppo T showed a number of larger-scale works with a Dadaist bent. The centerpiece of the show was the collectively-authored *Grande oggetto pneumatico (Large Pneumatic Object)* (1960), a room-sized object made of six or seven large plastic tubes that were inflated and deflated by an air pump, disturbing the positions of the spectators in the exhibition space. Alongside their own work, Gruppo T included a selection of work by other artists, including a meta-mechanical relief by Tinguely; a work by Enrico Baj incorporating broken mirrors; and a "useless machine" mobile by Bruno Munari.[8] They also included texts by Kandinsky, Klee, and the Futurists. Although the specific selection of their writings has been lost to time, Anceschi has suggested that this inclusion was a "critical operation" meant to situate the group in a historical lineage of artists interested in temporality.[9] Kandinsky and Klee had both written texts concerned with the relationship between movement and line; the Futurists, of course, had advocated a form of painting that could express movement in all its immediacy. Subsequent *Miriorama* exhibitions—a mixture of solo and group shows—focused on smaller-scale, mostly wall-hung kinetic objects.

Milan during the 1950s and early '60s provided a particularly vibrant environment for young artists. Colombo and the other members of Gruppo T had been born in the late 1930s and had childhood memories of the war, but they came of age during the precipitous growth of the economic miracle. During this period, the central

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[8] Tinguely's work had been shown at Studio d'architettura b. 24 in 1954, an exhibition that Devecchi recalled seeing. See interview with Marco Meneguzzo, "Interviste agli artisti, 1995: Gabriele Devecchi," in *Programmare l'arte: Olivetti e le neoavanguardie cinetiche,* ed. Meneguzzo, Enrico Morteo, and Alberto Saibene (Monza: Johan & Levi, 2012), 129. The members of T would have also seen contemporary kinetic work at the MAT exhibition at Danese in February 1960.

[9] Giovanni Anceschi, interview with the author, April 2014.

figures of the Milanese art scene were Fontana, engaged in the production of his Spatialist hole- and cut-based paintings; Munari, then associated with Italy's concrete art movement; and the younger Piero Manzoni and Enrico Castellani, who were elaborating what they called a "new artistic conception" opposed to the subjectivity of the Informel.[10] All of these sources were relevant for Colombo's artistic formation. Munari and Fontana, in particular, strongly supported Gruppo T: both wrote on the group, Fontana was one of their earliest collectors, and Munari constantly promoted their work.[11] But Manzoni and Castellani, with their interests in the monochrome, seriality, and the dynamic artistic surface, perhaps provide the most apt comparison to Colombo's work. It was Colombo's use of real motion that allowed him to extend Manzoni and Castellani's preoccupations in a different direction—to investigate the nature of flexibility, variation, human gesture and response, planning and contingency.

The First Reliefs

Like Tinguely, Bury, and many other kinetic artists of the period, Colombo adopted the relief form for his first kinetic experiments. The *Rilievi intermutabili (Intermutable Reliefs)* (1959) [Fig. 3.3] may have first been shown at Manzoni's Galleria

[10] The phrase comes from the title of an exhibition, *Nuova concezione artistica,* that Castellani and Manzoni organized at Milan's Galleria Azimut in January 1960. The second issue of *Azimuth* magazine had the same name. For a comprehensive discussion of the gallery and journal, see Francesca Pola, ed., *Manzoni: Azimut* (London: Gagosian; Milan: Fondazione Piero Manzoni, 2011).

[11] Munari published "I giovani del Gruppo T," in *Domus,* no. 378 (May 1961): 53, while Fontana wrote the brochure text for Gruppo T's show *Miriorama 10.* According to Gabriele Devecchi, Fontana purchased four pieces from *Miriorama 1* (Marco Scotini, "It was a construction, not a gesture: Interview with Gabriele de Vecchi [2009]," in Christov-Bakargiev, *Colombo*, 77.

Azimut from December 1959 to January 1960.[12] In these works, a number of irregularly placed spheres or cylinders protrude against a thin layer of rubber stretched over a board. The spectator is invited to manipulate the positions of these elements through the rubber surface, producing an unsettling sense of touching a solid lump through skin. The works initiate a theme present throughout Colombo's reliefs: that of something lurking just behind the surface, whose workings the spectator may be able to influence in some manner but can never access directly. Materially, the works seem to draw an analogy between the relief form and the human body, as the rubbery, fleshlike "skin" is pulled taut over a hidden interior. As we have seen, Colombo had an early interest in Dada, and these reliefs echo the earlier movement's exploration of the fragmented, uncanny, or partly mechanical body. In particular, they recall Duchamp and Enrico Donati's *Prière de toucher (Please Touch),* the cover for the catalogue for the Parisian exhibition *Le Surréalisme en 1947.* That work featured a foam-rubber breast on a velvet backing that, as the title indicates, solicited a tactile response from its viewers. Colombo's reliefs may refer to this precedent, yet they fail to coalesce into the legibly female form of the breast. Instead, their ambiguous expanses of rubbery "skin" deny any secure identification, and the act of touching that they invite merely reveals another layer of ambiguous forms withheld from vision.

In the *Intermutable Reliefs,* the spectator manipulates the moveable elements directly, although they are hidden behind a rubber screen. The *Superficie in variazione (Surface in Variation)* (1959) [Fig. 3.4] works propose a more mediated form of manipulation. Colombo executed at least one version of this work in foam rubber, but

[12] Christov-Bakargiev, *Colombo*, 206.

then turned to white, plush fur in subsequent iterations. A series of small metal handles lies across the bottom of the support. Pulling down on one of the handles causes the fabric to pucker inward at an unexpected point on the field, and releasing the handle restores the work to its initial state. Handles can be operated one at a time or in any combination, allowing one to produce different temporary patterns on the surface. (Some of the *Surface in Variation* works now show a slight darkening from the loss of fur at the repeatedly sunken-in points, but these darkenings were not yet present in the work's initial state. In fact, these marks belie the object's claim to elasticity, as they preserve the traces of its past movement.)

In its "activated" state, the appearance of *Surface in Variation* recalls Castellani's puckered white monochromes, whose peaks and valleys produce changing effects of light and shadow. Yet the use of fur, and the "live" process of sinking and rising, give Colombo's work a corporeal quality absent from the older painter's work. In written texts, however, Colombo rarely referred to the bodily connotations of his art. Instead, he borrowed the language of phenomenology to emphasize variation, temporality, and becoming. In his solo exhibition *Miriorama 4* in 1960, Colombo presented objects of the *Surface in Variation* type, titled *Superficie in divenire (Surface in Becoming)* and *Spazi in divenire (Spaces in Becoming).* In the exhibition brochure, he wrote that the basis of his work lay in this conviction: "It is only in variation that an object shows its character, emerging from the uniformity of the space that surrounds it."[13]

Colombo's language, with its reference to a visual horizon, likely stems from the artist's engagement with Enzo Paci, an Italian phenomenologist and scholar of Husserl

[13] Colombo, untitled statement, in *Miriorama 4* (Milan: Galleria Pater, 1960).

who was Anceschi's teacher during this period. Gruppo T's first manifesto, largely the work of Anceschi, also foregrounds this philosophical orientation: "We consider reality to be the continuous becoming of phenomena that we perceive in variation," the group declared. "Considering the work as a reality made with the same elements that constitute the reality that surrounds us, it is necessary for the work itself to be in continuous variation."[14] The artists' description of their work as itself a "reality" echoes the language of concrete art, which aimed to reject illusionism in favor of nonfigurative art objects that belonged to the real world. Their use of phenomenological language, however, departs from that tradition, placing a greater emphasis on the experience of duration. We have seen how Tinguely's meta-mechanical reliefs depend on retention and protention to complicate notions of the present, and how Bury's *Punctuations* and *Erectiles* enact endless deferral to deny the experience of pure presence altogether. What is distinctive about Colombo's approach to temporality? Looking more closely at Paci's work may suggest some answers.

Paci was among the most important figures in the revival of Husserl's phenomenology in Italy in the mid-1950s and early '60s, which resulted from translations of the philosopher's late works into Italian.[15] Paci's philosophy—frequently published in

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[14] Giovanni Anceschi, Davide Boriani, Gianni Colombo, and Gabriele Devecchi, "Miriorama I: Manifestazione del Gruppo T," in *Miriorama 1* (Milan: Galleria Pater, 1960). Facsimiles of this and other documents related to the group can be found in Italo Mussa, *Il Gruppo Enne: La situazione dei gruppi in Europa negli anni 60* (Rome: Bulzoni Editore, 1976). According to Anceschi, the first draft of the manifesto had more explicitly revealed the influence of Husserl and Paci, while the published revision—with its emphasis on the unbroken *durée*—recalls Henri Bergson above all else. Anceschi, interview with the author, April 2014.

[15] Little has been written on Enzo Paci in English. My analysis is drawn largely from Rocco Sacconaghi, "*Ideen I* in Italy and Enzo Paci and the Milan School," in *Husserl's*

the Milanese journal *Aut Aut,* which he edited—contains several distinctive features influenced by the later Husserl. First, he describes his work as a " 'relational' phenomenology": he believes that meaning arises from the relationships between people and things.[16] Second, he gives a central place in his philosophy to the experience of time; following Husserl, he describes an "enlarged" present inflected by retention and protention.[17] Whereas Derrida would seize on this reading to argue against the existence of any unmediated present, Paci proceeds in a different direction. He argues that the present, as it draws upon past and future, exists as a unique meeting of the finite and the infinite—a "finite part of the time in which the whole as infinite is present."[18] Paci further considers the irreversibility of time to be an essential part of human experience. The impossibility of ever going back to a lost origin engenders the need and desire—including economic need imagined in Marxist terms—that propel us forward into the future.[19] Yet, while Paci understands time as one-directional, he denies that *meaning* is fixed forever. He gives ethical weight to the *epoché*—the philosophical suspension of judgment—arguing that it allows us to rediscover the world afresh: not to move backwards, but to encounter things as if they were "just born now."[20] Colombo's elasticity may be read along these lines. Although foregrounding the continual passage of time, his works simultaneously present themselves to us as always new.

Ideen, ed. Lester Embree and Thomas Nenon (Dordrecht; New York: Springer, 2013), 161-176.

[16] Enzo Paci, *Diario fenomenologico* (Milan: Bompiani, 1961), 77. The "phenomenological diary" includes Paci's reflections from 1956 to 1961.

[17] Paci, "Sulla presenza come centro relazionale in Husserl," *Aut Aut*, no. 58 (July 1960): 237.

[18] Ibid., 237-238.

[19] Paci, *Diario fenomenologico,* 108. Paci understood his phenomenology to be completely compatible with Marxism.

[20] Ibid., 25.

In the *Miriorama 4* brochure, Colombo explains that the uneven surfaces of his earlier canvases had forced the spectator's eye to rise and fall, to enter and exit depressions in the surface, and to investigate the changing effects of natural light—already a kind of variation. Yet it is only in his new manipulable works, he contends, that "authentic variation" happens. He has set up these works to produce "an unforeseeable order of succession, so that the disturbance of the uniformity of their surfaces can represent a true and proper surprising drama."[21] Again, it is the existence of an "enlarged presence" incorporating memory and anticipation that makes this experience of surprise or drama possible.

It may seem odd to hear Colombo refer to manipulable works—in which the viewer or user presumably controls the action—as producing surprise. Yet the artist structured *Surface in Variation* in such a manner as to create exactly this effect, by de-coupling the viewer's gesture from the object's response. The mechanism hidden on the back of the work makes this disjunction possible: pulling downward on one of the object's levers tightens a string set on an elevated track on the back of the work and pinned to the reverse of the plush fabric, causing the support to pull backward at the pinned point. Works by other artists in Gruppo T follow the same pattern. In an early hand-operated version of Gabriele Devecchi's *Superficie in Vibrazione (Vibrating Surface)* (c. 1960), for instance, the viewer pulls and releases a handle at the base of the work, generating a flickering movement across the surface as bent wires catch on the backs of the pins [Fig. 3.5]. Both pieces not only disconnect gesture and result, but foreground and amplify this rupture, making it the central aspect of the work's appeal. In

[21] Colombo, *Miriorama 4*.

Colombo's *Surface in Variation,* part of the surprise of the work is that pulling a handle downward causes a point in the canvas to push back at a ninety-degree angle to the action. This disconnection makes the works more complex, for instance, than Colombo's *In-Out* reliefs (c. 1959-63), in which the viewer can change how far elements protrude from a surface by pushing on them directly [Fig. 3.6].

In addition to contributing to the effect of "variation," the separation of gesture from its result in these works may have something to say about the nature of contemporary technology. In 1968, Baudrillard wrote about this kind of disjunction in an analysis of the automatic object. Discussing household appliances, cars, lights, and other everyday objects, Baudrillard observes that "buttons, levers, handles, pedals" have "replaced pressure, percussion, impact or balance achieved by means of the body, the intensity and distribution of force, and the abilities of the hand."[22] The rise of these mediated forms of control—we might think, for example, of pressing a button to unlock our car, rather than turning a key to open the lock—leads to an increased "abstractness of human praxis with respect to objects."[23] In a sense, Colombo's early objects, and certain works by other members of Gruppo T, foreground this condition. They articulate the withering of human gesture in the age of the automatic object, rather than seek an impossible return to a pre-technological moment.[24]

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[22] Jean Baudrillard, *The System of Objects* [1968], trans. James Benedict (New York: Verso, 1996), 49.
[23] Ibid.
[24] Marco Scotini has analyzed Colombo's work through the concept of the "device," arguing that Colombo's objects estrange the process of perception and make it visible to the viewer. Scotini, ed., *Gianni Colombo: Il dispositivo dello spazio* (Milan: Skira, 2006), 11-21.

Yet there is a kind of humor and absurdity in these objects that the comparison with Baudrillard's automatism does not fully capture. In *Surface in Variation,* for instance, I have noted how the human gesture of *pulling* produces its exact opposite, as if someone had *pushed* the canvas at a certain point. This playful, deliberate circuitousness recalls Paolo Virno's recent work analyzing the joke as a kind of creative rule-bending. Drawing on Wittgenstein, Virno argues that the joke exploits the gap between a given rule and its application—it shows, for example, how a word, phrase, or idea employed "correctly" but in an unusual context may produce unexpected and thus comical results. "Every joke puts into focus, in its own way, the variety of alternatives that come forth in applying a norm," Virno writes. "Rather than 'continuing along the road' it is always possible 'to take a side path, or go across the fields.'"[25] It is from this circuitousness that humor—but also innovation—comes. This play with gesture and outcome, or rule and application, would continue to be a major feature of the next phase of Colombo's work.

The Design Context

Before moving on to Colombo's involvement with *arte programmata*, however, we should step back and examine another context for the artist's work: the field of design. From the beginning, kinetic artists in Italy had close ties with design, and Colombo was no exception. His brother, Joe Colombo, was employed as a designer, as were other members of Gruppo T; all of them showed their work in design exhibitions as well as in artistic ones. In 1960, Munari—a practitioner of both art and design—

[25] Paolo Virno, "Jokes and Innovative Action: For a Logic of Change" [2005], trans. Isabella Bertoletti, James Cascaito, and Andrea Casson, *Artforum* 46, no. 5 (January 2008): 252.

coordinated a collaboration between Gruppo T and the Danese design company for the production of kinetic multiples, timed for the Christmas season. Colombo contributed the *Rotoplastik* (1960)*,* a wooden object consisting of five irregular pieces with holes cut at their centers stacked on a rod [Fig. 3.7], an arrangement reminiscent of some of the artist's ceramics. The ends of the rod function as the object's handles, and the viewer may shake or turn these handles to rotate the positions of the pieces in relation to one another. The object may also be displayed upright, neatly transforming the handle into a sculptural base. The five layers, like the artist's ceramics, display an Arp-like biomorphism. The title may also nod to Duchamp's *Rotoreliefs,* which similarly featured rotational movement. Yet Colombo here demonstrates little interest in optical illusion, instead focusing on the concrete—or "plastic"—and tactile effects of the wooden parts. While *Rotoplastik*'s first outing was in a design show, the work would go on to be displayed in museum exhibitions, as in Pontus Hultén's *Bewogen Beweging (Moving Movement)* at Amsterdam's Stedelijk Museum in 1961. Colombo produced variations of the piece over time, including some in plastic.

The closeness between art and design in postwar Italy was in some sense inevitable. In the late 1950s, Milan's design industry was booming—its success in the postwar period formed an essential part of the nation's economic recovery. During Italy's economic miracle between 1958 and '63, the production of household appliances and furniture underwent extremely rapid growth, both feeding a strong export market and creating new mass consumption at home.[26]

[26] Penny Sparke, *Design in Italy, 1870 to Present* (New York: Abbeville Press, 1988), 121-123.

Yet the new ubiquity of the consumer object coincided, in a way, with the collapse of the object—that is, of the object conceived as stable, unchanging entity. During the reconstruction period of the late 1940s, designers tried to solve the practical problems of smaller living spaces: they introduced compact and flexible furnishings, such as stacking and folding chairs, and relied on prefabrication and modularity to allow large-scale production.[27] In the following years, as prosperity returned, these concerns were largely replaced by aesthetic ones. Still, the desire for flexibility in objects remained. In 1948, Pirelli hired Marco Zanuso to create designs in malleable foam rubber, leading to the formation of the Arflex company. State-owned enterprises made plastics and synthetic rubber cheap and plentiful.[28] Osvaldo Borsani's reclining chairs and sofas for Tecno appeared on the cover of *Domus* and in advertisements that emphasized how they could be raised and lowered to a wide range of angles [Fig. 3.8]. Modular shelving units and moveable accordion walls appeared in the pages of design magazines; in one advertisement, a company characterized the process of arranging its modular kitchen furniture as being as "easy and fun as a game."[29] A 1959 *Domus* article, describing a home interior in Milan, praised its "pleasing variability and freedom of appearance and function, with the use of modular elements that may be reconfigured in various ways: from couches that may be separated and put back together (and whose support may also become a bench or a base for other furniture), to the unique floor tiles, which may be arranged to produce different patterns."[30]

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[27] Ibid., 78-80.
[28] Ibid., 124.
[29] Advertisement for "Siltal" modular furniture, *Domus* (January 1959): n.p.
[30] "Interni di due appartamenti a Milano," *Domus,* no. 356 (July 1959): 6.

The increased flexibility of modern furnishings did not escape Baudrillard's attention. In the new paradigm, he notes in *The System of Objects,* "things fold and unfold, are concealed, appear only when needed."[31] Previously, he argues, objects were fixed, given forms reflecting a model of the human being as a vessel of inwardness. Now, the world is "no longer given but instead produced – mastered, manipulated, inventoried, controlled: a world, in short, that has to be *constructed.*"[32] Part of this shift entails the emergence of "man the interior designer" who no longer consumes objects but "dominates, controls and orders them. He discovers himself in the manipulation and tactical equilibration of a system."[33]

In his book *Future Shock,* the popular sociologist Alvin Toffler suggested a further motive for the rise of flexible furnishings in the years before 1970. He postulated that the reconfigurable objects of the era addressed the period's particular relationship to the future, in which change was assumed to be inevitable, but the form it would take was unpredictable. Hence, Toffler concludes, "avoiding commitment to fixed forms and functions, we build for short-term use or, alternatively, attempt to make the product itself adaptable."[34] In Toffler's view, consumers favored modular objects in an attempt to exert control over rapidly changing situations.

This idea of the variable, modular, flexible object entered the realm of art, too. Munari, Gruppo T's promoter and a designer as much as an artist, produced many variable objects over the course of his career. These included his *Sculture da viaggio (Traveling Sculptures)*, several of which were published in *Domus* in October 1959 [Fig.

[31] Baudrillard, *System of Objects,* 27.
[32] Ibid., 29.
[33] Ibid., 27.
[34] Alvin Toffler, *Future Shock* (New York: Random House, 1970), 53.

3.9]. Munari constructed these brightly colored, folded geometric sculptures in such a way that they could be packed flat and carried in suitcases. They could then be unfolded and displayed in hotel rooms to reduce the sense of anonymity inherent to such spaces. The *Traveling Sculptures* addressed viewers leading lifestyles characterized by transience and mobility, while seeming to point to the out-datedness of the unique, auratic work of art. The concept behind the *Traveling Sculptures* derives in part from ideas that Duchamp had proposed in the preceding decades, particularly his *Traveler's Folding Item* (1916), a soft typewriter cover, and his *Sculpture for Traveling* (1918), a ceiling-hung sculpture made of strips of rubber shower caps. Duchamp gave both works their titles by 1941, linking their light, malleable forms to the potential for easy transportation.[35] Munari departs from Duchamp in his allegiance to geometric forms, and in his efforts to construct objects that could easily transition between flattened and unflattened states, thus maintaining a stiff, consistent shape each time they were opened.

The ease with which Munari could move between design and kinetic art suggests a particular compatibility between the two fields. Both concerned themselves with the idea of the multiple; placed little or no importance on the presence of the artist's hand or subjectivity in the work; and emphasized the creative process of planning over the physical one of hand-construction. In Italy, the Danese and Olivetti companies actively

[35] Duchamp described *Sculpture for Traveling*, without giving it a title, in a letter to Jean Crotti on July 8, 1918. See Francis Naumann and Hector Obalk, eds., *Affectionately Marcel: The Selected Correspondence of Marcel Duchamp,* trans. Jill Taylor (Ghent: Ludion Press, 2000), 53. He probably exhibited *Traveler's Folding Item* in New York in 1916, where it was identified only as a readymade. See Arturo Schwarz, *The Complete Works of Marcel Duchamp,* 3rd ed., vol. 2 (New York: Delano Greenidge Editions, 1997), 645. Duchamp used the titles for both works in the *Boîte-en-valise* (1935-41). He labeled the first work *...pliant, ... de voyage* and the second *Sculpture de voyage.* See Ecke Bonk, *Marcel Duchamp, the Box in a Valise: De ou par Marcel Duchamp ou Rrose Selavy: Inventory of an Edition* (New York: Rizzoli, 1989), 202 and 237-238.

cultivated relationships with kinetic artists. (In 1967, Bruno Danese, founder of his namesake company, wrote to a journalist who had recently published an article on kinetic art to remind him that Danese had been involved with "arte programmata e cinetica" since 1959.[36]) Artists and critics saw *kinetic* art in particular as compatible with design because both shared this interest in modifiability in the late 1950s and early '60s. Much of the language applied to flexible design, for instance, was also used to describe kinetic art when Daniel Spoerri's MAT (Multiplication d'art transformable) editions were shown in Milan in 1960—significantly, not in a gallery context but at the Danese showroom. This first series of editions comprised works by Yaacov Agam, Josef Albers, Bury, Duchamp, Heinz Mack, Man Ray, Munari, Dieter Roth, Jesus-Rafael Soto, Tinguely, and Victor Vasarely.

The Italian brochure for the MAT exhibition included an introductory essay by the critic Carlo Belloli. In these transformable works, Belloli contends, the artist employs "animation or reconfigurability" in order to achieve "that anonymity to which he has long aspired," and he makes his work into "a continuous spectacle in which artist-work-public participate in equal measure and with an identical share." The reduction of authorship on the part of the artist coincides with a greater freedom on the part of the spectator. The unfixed, unstable artworks, that is, can "renew themselves formally when their possessor considers it necessary to refresh his own emotions, to change the appearance of the everyday that surrounds him and whose existing petrification it seemed impossible to

[36] Handwritten letter from Bruno Danese to a journalist at *L'Espresso,* June 15, 1967, Fondazione Jacqueline Vodoz e Bruno Danese, Milan. Attached to the letter is a list of shows attesting to Danese's involvement.

escape."[37] Newspaper reviews echoed Belloli's latter point, suggesting that the MAT artworks might be reconfigured by their owners according to personal need or desire. "The objects can be integrated easily into a modern home, to which they adapt precisely through the personal participation of the possessor, who may vary them infinitely. Thus they no longer respond only to the exigency of taste and choice, but to the emotion of a moment," observed one Milanese critic.[38]

In one sense, flexible furnishings like Arflex's foam chairs addressed a problem of capitalist production: how to reconcile standardized mass production with consumers' desire for singular objects that expressed their owner's individuality. The reception of the MAT exhibition at Danese shows that transformable art could also be read along these lines. The dream was that furniture, and art, might match a person's changing needs perfectly, leaving no friction between self and object.

Yet not all artists and critics understood kinetic art as reconciling consumers with mass production. In an essay I will discuss later in this chapter, Umberto Eco, too, imagined kinetic sculptures located in the domestic setting. In his view, however, this art would continually challenge, rather than cater to, its viewers. Colombo's best work operates on precisely these lines: his objects change, but rarely do what their users or viewers want. As we have seen, even when his objects are manually controlled, they disconnect gesture from outcome; the motorized versions of the work build surprise and unforeseeability into the object's core. The effect is compounded because, of course, his kinetic objects have no clear function that would give their behavior a logical end. Far

[37] Carlo Belloli, "Animazione e moltiplicazione plastica," in *Opere d'arte animate e moltiplicate* (Milan: Galleria Bruno Danese, 1960). Fondazione Jacqueline Vodoz e Bruno Danese, Milan.
[38] "Opere moltiplicabili," *Vita,* March 31, 1960.

less interested in using change in the service of control or "customizability," Colombo deliberately reduces, or even forecloses, the possibility of control.

From Manipulable to Motorized: Pulsating Structuralization

Colombo created the first version of *Pulsating Structuralization* from blocks made of foam rubber, whose movement was generated by a hand-turned crank [Fig. 3.10]. At some point around 1960, he began to produce iterations of this work using polystyrene blocks and an electric motor [Fig. 3.11].[39] The works continued to display a handmade quality, particularly visible on their backsides. In one version measuring about two and a half feet square, for instance, a single motor in one corner rotates two rods bearing protruding springs. As the rods turn, the springs push one after another against a thin piece of foam covering the backs of the blocks that are held together by white twine. The hand-cut foam, the looped and knotted string, and the ingeniously jury-rigged mechanism as a whole suggest that the work resulted from a process of improvisation and experimentation.

[39] The motorized versions of the works are frequently signed with the date of 1959. However, it seems unlikely that Colombo would have withheld them from view in his *Miriorama 4* in March 1960 (they do not appear in the brochure, although they certainly existed before *Miriorama 10* in April 1961). It is more likely that the artist considered 1959 the date of the work's conception and backdated future iterations of the work accordingly. Regarding the use of materials, Colombo's former studio assistant Roberto Casiraghi reports that Colombo turned to polystyrene because it was more stable than foam rubber. However, this material has now presented its own conservation problems. See Giovanna C. Scicolone and Luca Cancogni, "Strutturazione Pulsante: Il restauro del movimento, della percezione complessa e del materiale," *VIII Congresso Nazionale IGIIC – Lo Stato dell'Arte – Venezia, 16-18 settembre 2010*.

Colombo and the members of Gruppo T began to introduce motors into their work sometime during 1960, possibly prompted by a suggestion from Davide Boriani.[40] Observers immediately latched on to the presence of machines in Gruppo T's work, lending them the nickname "quelli dei motorini" ("the ones with the little motors").[41] Fontana addressed the presence of the motor in his introduction for *Miriorama 10,* which included *Pulsating Structuralization.* In these works, Fontana claimed, *"*The machine is recognized as the means suitable for providing sequences of images, and exclusively as a means used for a positive necessity of investigation and communication, neither to celebrate it ingenuously, nor to turn it into an object of negative irony."[42] Gruppo T did not employ the machine to make works *about* machines, he suggests, but took it up solely as one artistic tool among many. Fontana may overstate the case: as we have seen, some of these works do seem to address the separation of gesture from outcome typical of automatic objects. Yet it is true that the works are far from both the technological embrace of an artist such as Nicholas Schöffer—who collaborated with the Philips Company to produce sculptures employing advanced technical components—and the parodic broken machines of the 1960s Tinguely.

Colombo, like many of the Gruppo T artists, began his work with motors by recasting previously hand-operated reliefs into new versions. These motorized objects further intensify the process of distancing that the artist had initiated with de-coupled gestures and mechanisms. While the earlier reliefs may have produced unpredictable

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[40] Carolyn Christov-Bakargiev, " 'The interaction is deliberate; it's done by manipulating the work': Interview with Giovanni Anceschi," in Christov-Bakargiev, *Colombo,* 72.
[41] Giovanni Anceschi, "Come non eravamo" [1983], in Lea Vergine, *Arte programmata e cinetica, 1953-1963: L'ultima avanguardia* (Milan: Mazzotta, 1984), 162.
[42] Lucio Fontana, untitled statement, in *Miriorama 10* (Rome: Galleria La Salita, 1961).

effects, they were still linked causally to human gesture. In the motorized versions, the pulse of the work continues at its own pace, unaffected by the viewer and, as we will see, deliberately exceeds his or her perceptual faculties.

Like Colombo's earlier *Intermutable Relief* and *Surface in Variation* works, *Pulsating Structuralization* explores the potential of the elastic or malleable surface. Here, that surface takes the form of a grid that arises from the narrow gaps between the uniformly sized foam blocks. While the figure of the grid implies leveling or equalization across a surface, Colombo's mechanical "pulse" continually disrupts this uniformity. As the motor runs and the springs push against the back of the work's surface, the crevices between the foam blocks widen and shrink, and the geometric regularity of the grid becomes warped.

Colombo's choice of a grid to explore the nature of time and variation is a provocative one. As Rosalind Krauss has emphasized, the grid is an emblem of atemporality; structuralism, for instance, had turned to the grid as a means of converting the narrative relationships of myth into spatial ones.[43] In *Pulsating Structuralization,* Colombo imagines a way in which this sign of atemporality may itself be made temporal. His introduction of time into the grid, however, does not take the form of a return to linear narrative, but rather of a ripple of temporal disturbance that slowly introduces difference into a uniform surface. Appropriately, this disruption generates a pulse: a corporeal swelling and receding that is deeply intertwined with the visual.[44]

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[43] Krauss, "Grids," 54-55.

[44] Krauss, *The Optical Unconscious* (Cambridge: MIT, 1993), 217. For Krauss, artists introduced "pulse" to contest modernist claims that the senses can ever be completely separated, and that the temporal lies "outside the visual."

The meeting of the ordered and the organic in *Pulsating Structuralization* and in Colombo's other works has often elicited comparisons with Manzoni's roughly contemporary *Achromes*. In *Achrome with Bread Rolls* (1961) [Fig. 3.12], for instance, Manzoni arranged pieces of bread in a four-by-four structure and coated them with white kaolin paint, making reference to the monochrome and grid through the ephemeral matter of everyday life. As Jaleh Mansoor argues, Manzoni adopted these modernist conventions only to disrupt them from within; in this particular work, the bread "presents itself as an internal contaminant, irritating the grid's self-closure."[45]

In an editorial published under a pseudonym in March 1960, Manzoni argued that the work of Gruppo T, which had recently initiated its series of *Miriorama* shows, was *too* close to his own. [46] Among other things, he accused the group of simply borrowing the concepts of time and dynamism from himself and Castellani, and of debasing or coarsening these concepts through the addition of mechanisms. The two artists had elaborated their ideas on "the new artistic conception" in issues one and two of their *Azimuth* journal. In the essay "Free Dimension," for example, Manzoni rejects an art based on "composition" in favor of the white monochrome, whose very emptiness gives it the quality of "pure becoming." He also discusses his *Linee (Lines)* (1959-61)—the straight lines that he drew on long rolls of paper and stored inside tubes—whose interest lies in the fact that their "only dimension is time."[47]

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[45] Jaleh Mansoor, "Piero Manzoni: 'We Want to Organicize Disintegration," *October,* no. 95 (Winter, 2011): 34.
[46] Antonio Caputo [Piero Manzoni], "Il taccuino delle arti: La nuova scuola a Milano," *Il Pensiero nazionale,* no. 5 (March 1960), 39.
[47] Manzoni, "*Libera dimensione*" ("Free Dimension"), in Marco Meneguzzo, ed., *Azimuth & Azimut: 1959: Castellani, Manzoni, e…* (Milan: Mondadori, 1984), n.p. Originally published in *Azimuth,* no. 2 (1960).

It is, of course, true that Gruppo T engaged the idea of "becoming," perhaps influenced by Manzoni but also by direct reading of phenomenological texts. Yet their work departs from Manzoni's in many ways. For one, their kinetic objects deal with time and becoming in a far more concrete way—a feature that may be attributed to their phenomenological commitments. Secondly, their works place more explicit emphasis on the experience of the viewer; specifically, they aim to reduce the viewer's sense of control or mastery before the work. Speaking of the *Pulsating Structuralization* series in a 1990 interview, Colombo explained that he began with the devices of the monochrome and the regular, symmetrical structure to establish a homogenous field. He then intervened in this field through the addition of a mechanical pulse, arranging its temporal disturbance "in such a way that the observer would be led to continually rectify his certainty regarding this order."[48] The viewer's inability to follow the series of pulses, made unpredictable owing to the combinatory and hence highly variable nature of the mechanism, would serve to "eliminate a determined center of attention and to put into place a polyvisual, rhythmic situation."[49] A single focal point would be replaced not so much by an "allover" leveling across the surface, but by multiple, shifting focal points impossible to follow in any logical sequence.

Anceschi recalls that Gruppo T became increasingly interested in the nature of perception following their adoption of motors. In the earlier work, he said in a 1995 interview, Gruppo T was enchanted by the spectacular qualities allowed by movement—how it might produce "a sort of artificial nature, like watching a fabricated earthquake."

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[48] Jole De Sanna, "Storia come filtro della qualità: Intervista a Gianni Colombo," in *I Colombo: Joe Colombo 1930-1971, Gianni Colombo 1937-1993,* ed. Vittorio Fagone (Milan: Mazzotta, 1995), 294.
[49] Colombo, "Strutturazione pulsante" [c. 1959-61], in Fagone, *I Colombo,* 401.

The introduction of motors, however, made it more difficult for the artists to avoid simple repetition. As a solution, they shifted their focus to the "perceiver" and to the possibility of making works that *appeared* never to repeat. "We had to make a work sufficiently complex to escape the field of perceptual control: if you succeed in making such a thing that escapes the limits of perception, you don't realize it's repeating," Anceschi said.[50] Using different means and theoretical bases, Gruppo T had come to a solution quite similar to Tinguely's.

In the years after 1960, Colombo continued to create iterations of *Pulsating Structuralization* in increasingly large sizes, referring to them as his "walls." The aim of constructing works of such outsized stature, Colombo said, was to "exceed the limits of the observer's visual field."[51] The walls compound the effects of the early versions: now, the viewer's inability to exert visual mastery over the field is an effect not only of the unpredictable, dispersed pulse but also of the work's larger-than-life scale.

Despite this new focus on the mental and physical limits of perception, the material basis of Colombo's work never disappeared. Many artists in this period were interested in the visual effect of "pulse"—from Hans Hofmann's theory of push and pull effects generated through the production of tension on a flat surface, to the burgeoning interest in optical pulsation by Op artists. In Colombo, pulse was never purely optical, as the visible friction between the slowly moving blocks and the creaking sounds they generate remind us.

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[50] Marco Meneguzzo, "Interviste agli artisti, 1995: Giovanni Anceschi," in Meneguzzo, Morteo, and Saibene, *Programmare*, 125.
[51] Colombo, "Strutturazione pulsante," 401.

Umberto Eco and the Kinetic "Open Work"

Around 1961, the work of Colombo and Gruppo T came to the attention of Umberto Eco, then a young critic at the beginning of his career. Eco lived in the vibrant intellectual atmosphere of Milan, where he developed friendships with Paci and other important figures of the period. He wrote two essays on kinetic art in Italy in the early 1960s, one published in a literary almanac and one in an exhibition catalog; these texts represent some of the most perceptive work on the Italian artists. Even before these essays, however, Eco showed interest in the genre, citing kinetic art in his early writing on the "open work" from 1958 onward. By the time *The Open Work* was finally published in book form in 1962, these reference points had largely faded into the background, as the critic turned to Informel painting as his primary example of "openness" in the visual arts. Tracing the evolution of Eco's ideas during this period can help us to recover the ways in which kinetic art was initially a fruitful paradigm in the development of the theory of "the open work" and to investigate the ways it may stand in tension with his theory.

Eco presented the lecture "The Problem of the Open Work" at the twelfth International Congress of Philosophy in Venice in September 1958. Here he laid out the core of his argument for the first time: that all art enacts a dialectical relation between completeness and openness—between clearly communicating the author's intention and allowing for the contingencies of viewer reception. Recent art, however, has shifted the balance of these terms toward openness. Among the examples of open works that Eco cites are Calder's mobiles, which "continually metamorphose" to provide different views, and James Joyce's *Finnegan's Wake,* whose complexity allows readers to generate

different, unpredictable connections between its parts.[52] In other open works, Eco writes, the viewer or receiver must literally complete the production of the work. He names Carlos Villanueva's Faculty of Architecture at the University of Caracas, where mobile walls allow the modification of the space; Stockhausen's and Pousseur's recombinable musical compositions; and, interestingly, recent examples of industrial design, such as modifiable lamps and armchairs that allow users to alter their environments at will.

In August of the following year, Eco published an essay called "L'opera in movimento e la coscienza dell'epoca" ("The Work in Movement and the Consciousness of the Era"), in the avant-garde music journal *Incontri musicali.* The essay expands the argument of the lecture, making its terms more precise. Here, Eco explicitly delineates a narrower category, which he calls the "work in movement," under the umbrella of the "open work."[53] While the open work invites the viewer to intervene, even if only on the level of imagination or interpretation, the work in movement depends on the spectator to complete its *structure*. This is the distinction, for instance, between Franz Kafka's stories, which open themselves to a variety of readings, and Stéphane Mallarmé's unfinished *Livre,* a book whose parts were meant to be re-orderable in a literal sense.[54] When discussing the "work in movement" in the field of the visual arts, Eco again cites Calder's mobiles, Villanueva's building, and industrial design. He also introduces another kinetic

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[52] Umberto Eco, "Il problema dell'opera aperta," in *Atti del XII Congresso Internazionale di Filosofia (Venezia, 12-18 settembre 1958),* vol. 7 (Florence: Sansoni, 1960-1961), 141.

[53] Eco, "L'opera in movimento e la coscienza dell'epoca," *Incontri musicali,* no. 3 (August 1959), 41.

[54] Ibid., 38-44.

example: Munari's "polarized projections," rotating colored slides that produce what Eco calls "painting in movement."[55]

In all of these works, Eco observes, the author hands over the components of form to the spectator "more or less like the pieces of a meccano"—a child's modular toy resembling an Erector set—and retains no control over the final outcome.[56] Yet despite the radicality of this "open" form, Eco makes clear, the viewer's position is not one of complete freedom. He or she must work within the initial parameters established by the author, within a predetermined "field" of possibilities.[57] If the form were too open, the object would no longer read as a "work" at all. In the following years, Eco would try to resolve this problem of the balance between openness and a guiding intentionality through the use of information theory.

It is striking that Eco chooses the term "work in movement" to identify the more radical case of the open work, emphasizing the *act* of rearrangement and the temporality inherent in it. This term, however, obscures an emerging ambiguity in the system: Eco groups together works that invite the spectator to move their parts to produce a new form (Mallarmé, Villanueva, Stockhausen), with works that move continually via non-human forces, actually affording the viewer little control (Calder, Munari). In works of the first type, the spectator ends up with a completed form, but the work remains open in the sense that different spectators may produce different forms in the future; in the second type, the form may never actually be complete. Indeed, Eco may have been uncertain

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[55] Ibid, 41. For a description of Munari's polarized projections, see Munari, *Design as Art,* trans. Patrick Creagh (Harmondsworth: Penguin, 1971), 188-190.
[56] Ibid., 34.
[57] Ibid., 49.

about the status of such works, as he moved Calder from the less-radical "open work" category into the more radical "work in movement" category in the second essay.

Eco recapitulated the *Incontri* argument in a more concise form in "L'oeuvre ouverte et la poétique de l'indétermination" ("The Open Work and the Poetics of Indeterminacy"), an essay published in the *Nouvelle Revue Française* in July 1960. Although his argument remains largely unchanged, his choice of visual examples is slightly different. Now the objects of five kinetic artists appear under the rubric "works in movement": Eco mentions Agam's transformable paintings, Duchamp's rotoreliefs, Roth's superimposable designs, Soto's kinetic structures, and Tinguely's machines.[58] He appends a footnote citing the brochure for Spoerri's Editions MAT. The multiples had first been shown at Paris's Galerie Edouard Loeb in November 1959 and then, as I have noted, at Milan's Danese showroom in February 1960, where Eco may have seen them before writing this version of his essay.

A major shift in Eco's thinking occurred in 1961 with "L'informale come opera aperta" ("The Informel as Open Work"), published in an issue of the Milanese journal *Il Verri* entirely dedicated to Informel painting. Eco now attempts to position this genre of painting—absent from his previous essays—as the prime instance of the open work in the visual arts. He first rehearses his earlier argument, citing several new examples of works in movement in an extended footnote: the *Miriorama* works of Gruppo T, Bury's mobile "constellations," Enzo Mari's manipulable objects, and Munari's articulated structures.[59] Eco could have seen Gruppo T's *Miriorama* multiples, including Colombo's *Rotoplastik*,

[58] Eco, "L'oeuvre ouverte et la poétique de l'indétermination," *Nouvelle revue française* 8, no. 91 (July 1960): 119-120.
[59] Eco, "L'informale come opera aperta," *Il Verri* 5, no. 3 (June 1961): 101-102, note 4.

at the Danese showroom in December 1960; the remaining four examples seem to have been drawn from the Edition MAT show. In the same footnote, Eco also excerpts a quotation from Duchamp's "The Creative Act" (1957), one that had also been included in the MAT brochure.

Eco then moves on to discuss Informel painting, a genre he now proposes to be a more "mature" version of the open work in the visual arts. Informel painting, he writes, is not literally in movement, nor does it require the movement of the viewer. But it is still open because its marks are not ordered hierarchically, eschewing even foreground and background distinctions and presenting the viewer with a field in which he or she may trace constellations of elements at will. The critic then returns to the problem that arose in his *Incontri* article: where does the boundary between the "open work" and a complete absence of meaning lie? What prevents this type of art from becoming a sort of blank screen onto which the viewer may project anything at all? Can the work begin to act, in Eco's words, like "a crazed electronic brain," generating an endless chain of equally plausible readings?[60]

To answer this question, Eco now turns to information theory, which draws a distinction between "meaning" and "information."[61] Texts that are high in meaning rely on probable structures and repetition, ensuring that their message will be received, while texts that are high in information employ improbable structures and ambiguity. Eco explains that art follows the second pattern, maximizing information while minimizing

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[60] Ibid., 110.

[61] Eco cites a range of sources in this area, including Claude Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana: University of Illinois Press, 1949) and Italian translations of Norbert Wiener's works, *La Cibernetica* (Milan: Bompiani, 1956) and *Introduzione alla cibernetica* (Turin: Einaudi, 1958).

meaning—but without reducing meaning to a zero point. He notes that one can retain a minimal level of meaning via framing devices or, more importantly, through cues in the structure of the work itself that hint at the intentionality at its origin, such as symmetry or—as in the case of much Informel painting—a trace of human action. Interestingly, Eco suggests that the requirement for intentionality is socially determined; he writes that some nonwestern cultures derive aesthetic pleasure from cloud patterns or reflections on water, while western audiences still require a stabilizing author.

Eco published *The Open Work* in 1962. The book largely recapitulates the essays, and Informel painting remains Eco's privileged example of the artistic open work. How might we explain the sudden entrance in 1961 of the Informel into Eco's thinking about the open work? Was it simply a consequence of an assignment he had been given for *Il Verri,* or is there something in the nature of Informel painting that would make it a better reference point for Eco than kinetic art? For one, choosing the former sidesteps the problem of whether the artwork is rearranged by the viewer or transforms on its own, placing the responsibility for interpretation squarely in the hands of the viewer. Eco's remarks on the danger of the open work becoming a "crazed electronic brain" may provide an additional answer. While Informel painting remains anchored in human gesture, kinetic art may stray too far from its author, producing unforeseen arrangements that may place "meaning" in danger.

Despite Eco's ultimate privileging of the Informel over kinetic art, he nonetheless sees these tendencies as deeply related, countering the usual opposition that is made

between them.[62] There were certainly some stylistic similarities between Gruppo T's work and that of the Informel. Anceschi, for example, produced many early works in which a device pushes liquid through winding plastic tubes, creating an effect that one review compared to a continual recreation of "Informel gestures."[63] Colombo's *Strutturazione Fluida (Fluid Structuralization)* (c. 1960), which I will discuss shortly, also relies on the curvilinear forms characteristic of the Informel, again generated by a mechanism rather than through human gesture.

Eco's sense of the compatibility of gestural painting and kinetic art emerges from his emphasis on the *structural* qualities of a completed Informel painting, avoiding the more existential reading of the work as an unmediated expression of the author's subjectivity. Where other critics would see the expression of an anxious mind asserting its freedom in the arena of the canvas, Eco observes a richly malleable field of signs. To the critic's mind, the openness of such works cultivates a valuable kind of perception, teaching its viewers "to conceive, feel, and thus see the world as possibility."[64]

Arte programmata

In May 1962, the exhibition *Arte programmata: Arte cinetica, opere moltiplicate, opera aperta* opened at the Olivetti showroom in Milan. Colombo exhibited *Fluid*

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[62] Guy Brett, citing Eco's example, has recently sought to recover this sense of compatibility between Informel and kinetic art. See Brett, *Force Fields: Phases of the Kinetic* (Barcelona: Museu d'art contemporani, 2000), 22-23.
[63] "Osservatore delle arti e delle scienze," radio broadcast, *Radio Svizzera Italiana* (January 13, 1961). Transcript at Fondazione Jacqueline Vodoz e Bruno Danese, Milan. Munari would later make the same comparison of Anceschi to the Informel in "I giovani del Gruppo T."
[64] Eco, *The Open Work,* trans. Anna Cancogni (Cambridge, Mass.: Harvard University Press, 1989), 104.

Structuralization, a new departure from the reliefs discussed in the first part of this chapter. In this work, a long, flat steel or plastic band enclosed between two panes of glass contorts itself into arabesque shapes [Fig. 3.13].[65] A motor hidden in the object's base slowly pushes one end of the steel loop upward into the glass frame and pulls the other end downward. The upward push into the constrained space of the frame causes a periodic build-up of tension and subsequent release, in which the band snaps into a new curvilinear form.

Fluid Structuralization retains some qualities of the relief form—the rectangular frame, the invitation to frontal viewing—but abandons others. For one, the work is not hung on a wall but is displayed free standing, and the transparency of the glass frame allows one to look through the work into "real" space. *Fluid Structuralization* thus abandons the "hidden back" effect of Colombo's earlier reliefs, which gave the impression of an invisible force warping or distorting a regular surface from behind.

Yet the work is still about the distortion of regularity, as the motor pushes the flat steel loop into organic shapes. Like the earlier reliefs, it seems to rely on the principle of elasticity. Just as the surface of *Pulsating Structuralization* falls neatly back into place after it has been pushed outward, the material in *Fluid Structuralization* retains no trace of its previous bends and folds. If the former work was about "pulse"—a push outward into three-dimensional space and then a sinking back—this one, as the title indicates, is about "fluidity": the sense of material yielding, flowing, circulating. Although Colombo,

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[65] The version displayed in *Arte programmata* had a band made of clear plastic. One review described it as "a band of celluloid moved by a pulley in order to force it to assume the image of a constantly chancing curlicue." Marco Valsecchi, "L'elettronica ispira i giovani," *Il Giorno* (Milan), May 23, 1962.

who insisted on his works' abstraction, would have resisted the comparison, the objects suggest the complementary pair of the heartbeat and circulatory system.

Colombo said that the work of Arp inspired the creation of *Fluid Structuralization*—confirming, once again, the importance of Arp for this generation of kinetic artists. He may have been speaking in a general way about the biomorphic forms of the artist's reliefs, whose curves resemble those produced by the moving band. Arp's string reliefs, such as *Two Heads* (1927) [Fig. 3.14], provide a more specific comparison. In that work, three loops of white cord are loosely arranged so as to give the barest suggestion of two joined heads and two eyes. The very looseness of the shapes suggests their provisionality, as if gravity might pull their slackened edges into other arrangements. In Colombo, the metamorphic potentiality of Arp's loops becomes literal, as the work performs a seemingly infinite repertoire of shapes. If Tinguely had turned to Arp for his exploration of chance and fragmented composition in the torn paper collages, Colombo borrows from Arp the suggestion of physical fluidity—of the line's potential to become material and malleable. The band appears as a kind of live drawing in space; indeed, Gruppo T's inclusion in *Miriorama 1* of texts by Klee and Kandinsky, both of whom developed notions of the dynamic line, seems to presage this work. Yet Colombo's line does not "flow" in the sense of producing perfect, frictionless circulation—it relies on the buildup and release of tension, as the band encounters the edges of the frame or collapses owing to gravity and periodically "snaps."

A major feature of *Fluid Structuralization* is the way it produces extremely irregular forms from the seemingly simple, regular premise of a band pulled by a motor. This latter aspect connects Colombo to the genre of *arte programmata*. The term "arte

programmata" first appeared in the 1962 *Almanacco Letterario Bompiani*, published in the winter of 1961. The almanac gathers a fascinating collection of texts dealing broadly with the effects of technology on literature and the arts; one section on the history of automata includes excerpts from texts as far-reaching as E.T.A. Hoffman's "The Sandman," Edgar Allan Poe on Maelzel's chess-player, Kafka's "The Cares of a Family Man," and Alain Robbe-Grillet's *Jealousy.* Both Munari—in his role as a graphic designer for Bompiani—and Eco were involved with the publication, and Munari suggested that Eco look to Gruppo T as a reference point for his essay on visual art. The objects reproduced in the almanac constitute an odd mix, some following the pattern of the artists' earlier work and some attempting to fit more closely into the "programming" theme. Colombo is represented, for instance, by the *Rotoplastik;* a work titled *Superficie pulsante N. 11 (Pulsating Surface No. 11)* [Fig. 3.15, now lost], a relief in the vein of *Pulsating Structuralization* with rectangular paper cards in place of the bricks; and an anomalous graphic work showing the progression of four circles passing across the background of a square [Fig. 3.16]. The latter work also appeared on the almanac's cover.

In a letter written during the lead-up to the exhibition, Munari defined "arte programmata" as a genre of artworks, "born from precise planning, from which they produce infinite (or varied) aspects."[66] In his essay, "The Form of Disorder," Eco expands on this definition, arguing that the work of Gruppo T and related artists exemplifies the principle of combination. That is, these artists initiate their work with a set of basic elements and precise rules for recombining these elements into various configurations; once the rules are set in motion, the artists must accept all outcomes that

[66] Undated (early 1962?) letter from Bruno Munari to Gruppo N, in Meneguzzo, Morteo, and Saibene, *Programmare,* 14.

result. It is important for Eco that no choosing or editing is involved at this point. "The work does not consist in the most successful element," he asserts, "but rather in the co-presence of all thinkable elements."[67]

At times, the members of Gruppo T related their own work to the notion of the combinatory. The title of their exhibitions between 1960 and '64, *Miriorama*, referred to nineteenth-century illustrated cards that could be recombined in various ways to produce different landscape scenes. The exhibition brochure for Gruppo T's show *Miriorama 12* incorporated a combinatory poem by the experimental poet Nanni Balestrini; folding the brochure in different patterns allows one to generate a variety of poems. At least some of Colombo's work may be said to employ combinatory logic—*Surface in Variation* and *Pulsating Structuralization,* for instance, depend for their effects on changing configurations of their set parts. But is the notion of the "combinatory" capacious enough to account for the effect of these works, and others such as *Fluid Structuralization*?

Yve-Alain Bois addresses a related problem regarding the nature of combinatory art in an essay that compares two superficially similar works by Sol Lewitt and François Morellet, only to reveal the conceptual rift that separates the two. While both artists employ systems, LeWitt's process is about "exhaustivity": he shows, for instance, every single way that a group of arcs, circles, and grids may be combined according to an initial set of rules, with the results spanning 195 images.[68] LeWitt's process is close to Eco's

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[67] Eco, "La forma del disordine," *Almanacco Letterario Bompiani 1962: Le applicazioni dei calcolatori elettronici alle scienze morali e alla letteratura,* ed. Sergio Morando (Milan: Bompiani, 1961), 176.

[68] Bois, "François Morellet/Sol LeWitt: A Case Study," in *Künstlerischer Austausch/Artistic Exchange, Akten des XXVIII Internationalen Kongresses für Kunstgeschichte, Berlin, 15-20 Juli 1992,* ed. Thomas W. Gaehtgens (Berlin: Akademie Verlag, 1993), 307.

reading of *arte programmata* in the Bompiani essay ("the co-presence of all thinkable elements") and it works well to describe some of the graphic works presented. As Bois points out, Morellet, on the other hand, seems to have understood the limits of this approach—that "only language can properly say *etc.*"[69] In contrast to the logical (though not necessarily "rational") unwinding of LeWitt's propositions, Morellet's systems are less legible as such; they are more about "infinity" than exhaustiveness, having to do with "the loss of control, with the disorder emerging from an accumulation of order, and with astonishment."[70] Bois compares the difference between the two to that between the closed system of structuralism and the "deep structures" of generative grammar, "a set of rules that will never be entirely actualized."[71] Colombo's work, with the exception of the anomalous Bompiani drawing, is far closer to that of Morellet—who was, not coincidentally, a close friend of the artist.[72] Colombo's kinetic works seem to relish the emergence of surprise, which arises through the introduction of movement and time. His *Fluid Structuralization* cannot be described as exhausting the combinative possibilities of a fixed number of forms. Instead, the work suggests an uncountable number of options that may or may not all come to pass; the element of time ensures that we would have no way of grasping these possibilities all at once, in any case.

Following the publication of the almanac, Munari went on to plan the exhibition of *arte programmata* to be held at the Olivetti showroom. In preparation for the show, he made a studio visit to Gruppo T along with his co-planners Giorgio Soavi and Ricardo

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[69] Ibid., 308.
[70] Ibid., 308.
[71] Ibid., 308.
[72] For Morellet's recollections of their friendship, see Christov-Bakargiev, "In Praise of Levity: Interview with François Morellet," in Christov-Bakargiev, *Colombo,* 82-91.

Musatti, both Olivetti employees. Musatti recalled the chaos of the studio during their visit: "An immense wall of expanded-plastic cubes moved like an excited sinusoid; then, an instant later the crisis: burnt-out tubes, pliers, switches, screwdrivers, limping motors, iron dust, magnets."[73] Olivetti offered its technical support to the artists to prevent the works' breakdown, though it is unclear to what extent the artists took up this offer. In addition to Gruppo T, Munari also invited the Padovan Gruppo N to exhibit in the show, suggesting that its members read the *Almanacco Bompiani* in preparation.[74] *Arte programmata* went on to travel to Rome, Venice, New York, and other cities through 1964, adding additional artists and artworks along the way. Munari and Soavi also produced a documentary film on the exhibition, which toured to additional locations.[75] The film contains long shots of *Fluid Structuralization,* both close-up and with visitors peering through its frame. Accompanied by a suspenseful soundtrack, the work evokes a snakelike organism winding its way through its glass container.

In his essay for the *Arte programmata* exhibition catalog, Eco presents a more nuanced view of kinetic art than that which appeared in the *Almanacco Bompiani.* He begins by drawing a contrast between the chaos of Informel and the order of geometric abstraction. Kinetic art seems to lie between the two, but its reliance on either unpredictable or predictable forces—the wind or the motor, for instance—threatens to reintroduce the "chance-versus-order" dichotomy. Yet contemporary science may provide a way to reconcile the two, as it allows for phenomena that are random yet

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[73] Brochure for the American *Arte programmata* exhibition, Archivio Storico Olivetti, Ivrea.
[74] Letter from Munari to Gruppo Enne, December 20, 1961, reproduced in Meneguzzo, Morteo, and Saibene, *Programmare,* 13.
[75] Documentation on the history of the exhibition and the film can be found in the Archivio Storico Olivetti, Ivrea.

statistically measurable *a posteriori.* In science and in this art, then, there is a "dialectic between chance and program, between mathematics and accident, between planned conceptions and the free acceptance of what will occur."[76]

While this thinking largely follows his previous work, in his catalog essay Eco also seems to attribute more radical effects to the role of motion in kinetic art, making this text his most convincing account of the problem. Whereas in the *Bompiani* essay, he had suggested that a disavowal of authorship by these kinetic artists leads to a LeWitt-like exhaustiveness, he now argues that, in kinetic art, completeness never arrives. A historian looking back on this moment, Eco imagines, will observe that,

> Aesthetic pleasure was no longer – or at least not always – derived from the vision of complete and completed objects, but rather from the image of organisms in the process of indefinite completion; and the quality of a work did not consist in being an expression of a law whose basis remained immutable and tangible, but in a kind of 'propositional function' according to which it continually attempted the adventure of mutability.

It is important to note that this is not simply a repetition of the "open work" idea. It is not the viewer who may rearrange the parts of an artwork: the work itself enacts its process "live." Eco considered that this sort of art would be beneficial for the man of the future: art, located in the household setting, could help him "to consider that forms are not something immobile that awaits to be seen, but also something 'becoming' while we watch it."[77]

Eco's catalog essay offers a compelling account for a work such as Colombo's *Fluid Structuralization.* Its "liveness," its existence as a performance in process, ensures

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[76] Eco, in *Arte programmata: Arte cinetica, opera moltiplicate, opera aperta* (Milan: Officina d'arte grafica A. Lucini, 1962), n.p.
[77] Ibid.

that we have no sense of when, or if, these combinations will ever be exhausted. Each moment may stand as a proposition, but a final or definitive state never arrives.

As a whole, the *Arte programmata* show included a much broader range of artworks than its sponsorship by Olivetti—then in the process of developing and promoting its new computer technology—would imply. As Giovanni Rubino notes, about half the works in the show seemed concerned with precise geometrical logic, while the other half explored chance in a looser mode, perhaps reminiscent of Tinguely.[78] Unexpectedly, the exhibition catalog and invitation included the following passage from *Hamlet*:

> Hamlet: Do you see yonder cloud that's almost in shape of a camel?
> Polonius: By the mass, and 'tis like a camel, indeed.
> Hamlet: Methinks it is like a weasel.
> Polonius: It is backed like a weasel.
> Hamlet: Or like a whale?
> Polonius: Very like a whale.[79]

On the one hand, the exchange may read as a playful send-up of how viewers struggle to make sense of new kinds of art. On the other hand, the comparison of clouds and kinetic artworks is a suggestive one: both are diffuse, changeable, uncertain forms whose instability poses problems to interpretation, providing no direct answers but instead enacting something closer to Eco's "propositional function."

The Social Dimension of "Programming"

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[78] Giovanni Rubino, "Una meccanica a orologeria. Arte Programmata e Nuove tendenze tra Venezia e Zagabria," in Meneguzzo, Morteo, and Saibene, *Programmare,* 29.
[79] A facsimile of the catalog appears in Meneguzzo, Morteo, and Saibene*, Programmare,* n.p. Invitation to *Arte programmata* (Venice, July 20-August 30, 1962), in Archivio Storico Olivetti, Ivrea.

In 1963, the art critic Filiberto Menna penned an essay on *arte programmata* that responded, in part, to Eco's catalog text. Rather than relying on contemporary science to understand the meeting of rule and chance in these works, Menna suggests, one could also turn to a different metaphor: that of the play instinct. To play a game also involves establishing an initial set of rules and allowing novel developments within their framework. Perhaps taking a page from Johan Huizinga, who understood the "play element" to lie at the origin of human culture, Menna then extends this metaphor to think about the works of *arte programmata* as models of social development.[80] "Ultimately," he writes,

> these objects and devices seem to hold in themselves the stimulating and infinitely 'open' sense of a new utopia—to enclose, as in a microcosm, the sense of a future society, a society comparable to a large, perfect device that moves with a necessary rhythm, and is yet always new and always unforeseen.[81]

Menna's metaphor is not entirely original, recalling the Enlightenment comparison of the world to a clockwork automaton.[82] Yet the emphasis on the continual emergence of the new and unforeseen situates his analysis firmly in its time.

As noted earlier, Italian critics have remarked that the term "programmare" was commonly used in the period to refer to economic planning.[83] In the decade following the conclusion of the war, a debate arose over the potential of national economic planning,

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[80] Johan Huizinga, *Homo Ludens: A Study of the Play Element in Culture* (Boston: Beacon Press, 1950).
[81] Filiberto Menna, "Attualità e utopia dell'arte programmata," in *XV Premio Avezzano. Strutture di visione* (Rome: Edizioni dell'Ateneo, 1964), 23-24. Originally published in *Film Selezione* (January-March 1963).
[82] Gottfried Wilhelm Leibniz and Isaac Newton, for instance, both imagined the universe as initiated by God the clockmaker. See Minsoo Kang, *Sublime Dreams of Living Machines: The Automaton in the European Imagination.* Cambridge: Harvard University Press, 2011.
[83] Branzi*, Introduzione al design italiano*, 121-124.

particularly as a means to address the extreme economic disparity between the industrial north and agrarian south. This debate reached a high point precisely between 1961 and '62, during which there appeared an "avalanche" of interventions from politicians and the media on the topic.[84] During this time, a number of different factions supported planning: the left wing of the Christian Democrats, though the party had rejected planning in the immediate postwar period; the *Partito Socialista Italiano* (PSI), which broke from its alliance with the Communist party to support planning within the existing capitalist system; and other parties of the democratic left. Conservatives rejected planning; they believed it was essentially Marxist and feared that it would slow economic development.[85]

Although in the end, economic planning remained mostly unrealized, the debate was significant for its sheer scale. At the base of the debate lay this question: to what extent was economic planning compatible with a market economy in a democratic context—given that Italy's system would certainly not take the form of Soviet-style planning?[86] An editorial from a Milan-based newspaper in 1962, for instance, quoted a Christian-Democrat minister suggesting that "democratic planning is 'an expression of liberty, not meant to compromise industry but to correct and orient the market.' "[87] Planning as an expression of liberty, the institution of rules and the emergence of the new: these terms would likely have resonated with readers of Menna's essay, and perhaps with viewers of *arte programmata* more broadly.

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[84] Joseph LaPalombara, *Italy: The Politics of Planning* (Syracuse: Syracuse University Press, 1966), 63.
[85] Ibid., 63-86.
[86] Ibid., 103.
[87] "La programmazione democratica accende il dibattito," *Il Giorno* (Milan), May 24, 1962.

Yet Menna's metaphor has its limits. It is true that a work such as Colombo's *Fluid Structuralization* "moves with a necessary rhythm"—produced by the pulley within the object's base—and that it also produces new configurations at every moment. At the same time, the work does not progress or develop in the sense that we normally use those terms. Not only is Colombo's object a useless machine, consuming energy and producing nothing, but it is also literally circular, an endless loop of metal. Suspended in an ever-changing present, it does not respond to history or build on the past. On one level, the work is powerful because it allows us to perceive this difference between newness and development so succinctly.

Later Work

From 1962 onward, Colombo increasingly began to show his work in large, international group exhibitions. In 1963, he participated with his *Fluid Structuralization* in *Nove tendencije 2* in Zagreb, an international exhibition of artists working in the kinetic and optical idioms. Matko Meštrović, the central theoretician of *Nove tendencije,* defined the movement according to the following characteristics: a preference for collective authorship; a commitment to progressive politics; an understanding of art as "research"; and the adoption of industrial production in the service of a more democratic art.[88] In Italy, among the major promoters of these tendencies was the prominent critic Giulio Carlo Argan, who wrote a series of essays analyzing the Italian and international

[88] Matko Meštrović, "Sociological Analysis of the 'Nouvelle Tendance,'" in Christov-Bakargiev, *Colombo,* 216-217. Originally published in *Nuova tendenza 2* (Venice: Editore Lombroso, Fondazione Querini Stampalia, 1963), n.p.

kinetic art groups under the rubric of what he called "Gestalt research."[89] For Argan, the work of these artists represented a rigorous interrogation of visual perception and Gestalt psychology, as well as a sophisticated intervention into the development of contemporary technology.

During this period of the mid-1960s, Colombo's work fell closer in line with the *New Tendencies* and Argan's frameworks, losing some of the organic, slightly uncanny quality that had made his early work so appealing. He began to experiment with light art and was increasingly interested in purely perceptual phenomena, such as the creation of afterimages and optical illusions. Among the most successful works of this period is *Strutturazione acentrica (Acentric Structuralization)* (1962), a cylindrical, beehive like structure that rotates at a fixed speed; the alternation of filled and empty cells in the structure produces the illusion that a square of light is traveling down the length of the work [Fig. 3.17]. Some critics could not resist seeing highly emotional content in even these apparently drier artworks. The critic Maurizio Fagiolo dell'Arco, in a sensitive review from 1966, suggested that *Acentric Structuralization* called to mind "alarm signals; proposals for an elegant instrument of torture; an obsessive, interminable S.O.S.; the whirling maelstrom of Edgar Allan Poe."[90]

Beginning in 1964, Colombo also experimented with walk-in kinetic environments. The best known of these, *Spazio Elastico (Elastic Space)* (1967) [Fig. 3.18], revives his interest in elastic geometry, now expressed in a fully three-dimensional form. *Elastic Space,* a room lined with a UV-lit grid whose position slowly shifts over

[89] See Giulio Carlo Argan, "La ricerca gestaltica," *Il Messaggero* (Rome), August 24, 1963; and "Forma e formazione," *Il Messaggero,* September 10, 1963.
[90] Maurizio Fagiolo [dell'Arco], "Una mostra di Gianni Colombo: Al principio fu il movimento," *Avanti!* (Rome), January 15, 1966.

time, produces a sensation of disorientation in its viewers. Colombo now destabilizes not only the boundaries of objects but also the shape of space itself.

Conclusion

In recent years, the persistent presence of the body in Colombo's work has increasingly come to the fore. The body appears in the hints of skin and fur in the early reliefs; in the throb of *Pulsating Structuralization*, and in the organic circulation of *Fluid Structuralization*. It is partial, fragmented, and partly mechanized, full of ball bearings and gear wheels. As such, it resembles less the Futurists' utopian merging of man and machine than the Dadaists' disjointed, mechanomorphic hybrids.

Such a reading departs far from the initial reception of Colombo and other Italian kinetic artists by figures such as Argan, with his Gestalt framework. An overtly scientific tone even appeared in Colombo's own language—on one occasion, for instance, he spoke of a desire to make his viewers into "technicians."[91] In spite of his involvement with the *New Tendencies* during the mid-1960s, however, Colombo fits into this model uncomfortably. A few critics noticed this difference at the time. A reviewer in 1968 contrasted his work with that of the Argentinian kinetic artist Julio Le Parc, calling Colombo's objects "more refined, amiable, and mysterious":

> His 'sculptures' move, emit lights, wink, babble, change colors, palpitate. His cubes resemble absurd, sly animal creatures from another world. His rooms that stiffen and dilate recall Poe's "The Pit and the Pendulum"…. One cannot look at *Pulsating Structuralization*—a sort of white wall whose bricks move themselves

[91] Colombo, untitled statement [1965], in *Gianni Colombo: After-Structures* (Genova: Galleria del Deposito, 1967).

> with little jerks, opening small fissures and then closing them—without a shadow of disquiet.[92]

In his 1966 review, dell'Arco summed up this point: "A base principle of this research is *metamorphosis,* and it saves him from scientific rigidity."[93]

As I have argued, Colombo's objects employ movement to explore material's ability to respond and its ability to bounce back. They enact a continual process of emergence or becoming, in which the viewer simultaneously perceives duration and experiences the work as constantly new. Eco's reading of *arte programmata* as the emergence of novelty from planned premises and a live experience of the "adventure of mutability" seems to cut much closer to the heart of Colombo's project than the scientific and technological readings of the later 1960s.

In their structural elasticity, Colombo's kinetic objects exceed the stable planar supports we have seen in Tinguely's meta-mechanical reliefs and Bury's *Punctuations*. Chapter 4 will explore how the artist Robert Breer rendered objects themselves mobile, allowing them to navigate and incorporate the surrounding environment.

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[92] "Mostra d'arte. Gianni Colombo (Galleria Schwarz, via Gesù 17)," *Corriere della sera* (Milan), October 16, 1968.
[93] Fagiolo [dell'Arco], "Una mostra di Gianni Colombo."

CHAPTER 4: Sculpture On the Move: Robert Breer's *Floats*

Of the many kinetic reliefs and sculptures created from the mid-1950s through the 1960s, the vast majority move "in place": they may have elements that rotate, surfaces that pulse inward and outward, or mechanical arms that swing back and forth on a fixed base or backing. Robert Breer's *Floats,* produced from the mid-sixties onward, are a major exception to this rule. These sculptures, motor-powered objects on wheels, move freely—if slowly—across the floor of an exhibition space, changing direction when they bump into walls or other sculptures. Like many kinetic artists, Breer desired that his artworks exist independently of his own subjectivity, that they possess what he called a kind of "autonomy."[1] For the artist, this autonomy took the form of seemingly self-propelled travel.

The sizeable freedom of movement allowed to the *Floats* speaks particularly well to an old fantasy central to kinetic art: the trope of the sculpture come to life. Breer himself acknowledged this aspiration when he referred to the "Pygmalion situation" he generated by making a sculpture that "goes on its way" once created.[2] In Ovid's *Metamorphoses,* the sculptor Pygmalion carves a perfect woman from stone, then falls in love with his sculpture; he prays to the gods, and the sculpture comes to life. Later

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[1] Charles Levine, "An Interview with Robert Breer Conducted by Charles Levine at Breer's Home, Palisades, N.Y., Approximate date July 1970," *Film Culture,* no. 56-57 (1973): 66. Breer repeated this phrase in a second interview, fifteen years later: "I got high on the idea that when I was through with them, these things had their own autonomy," he said. "I didn't think I was Pygmalion, but the idea of making art objects that were restless was intriguing to me." Breer, 1985 interview with Scott MacDonald, in *A Critical Cinema 2: Interviews with Independent Filmmakers* (Berkeley: University of California Press, 1992), 16.

[2] Ibid., 66.

Medieval and Renaissance retellings of the story add elements of doubt to what may initially appear to be a happy allegory of artistic mimesis: Pygmalion struggles to locate the particular moment in which marble gives way to skin, or worries that the newly-awakened woman might not live up to his sculptural fantasy. As Kenneth Gross writes in his study of the living statue, these stories are disturbing because they remind us of the always-difficult process of accessing the interior lives of other beings.[3]

A similar discourse on interiority, will, and purpose can be found surrounding Breer's *Floats* and other self-propelled kinetic sculptures in the 1960s. With their seemingly self-directed movement, the works possess an exaggerated version of the qualities of anthropomorphism and presence attributed to contemporaneous Minimalist sculpture. In their basic feedback mechanisms that resemble experimental robotic models, they also recall the analogies drawn between machines and bodies in the science of cybernetics. The *Floats* demonstrate Breer's parodic, often critical, attitude toward these contexts.

Breer's path to kinetic art was a circuitous one. American by birth, he spent his formative period as an artist in Europe, exhibiting in *Le Mouvement* in 1955 and beginning a close friendship with Jean Tinguely. He returned to the United States in 1960, where he became associated with the neo-Dadaists, Experiments in Art and Technology, and the periphery of the Pop movement. Although he was born just a year after Tinguely, he did not begin his major body of kinetic sculpture until around 1966, situating him at the tail end of this study. Spanning geographies and periods, Breer's work also encompasses diverse mediums: he is best remembered for his substantial work

[3] Kenneth Gross, *The Dream of the Moving Statue* (Ithaca, N.Y.: Cornell University Press, 1992), 85.

in avant-garde film, which he continued to produce while constructing multimedia sculpture for the gallery space.

This chapter surveys Breer's work from the mid-1950s onward, before coming to focus on the *Floats* and related sculptures. Although Breer demonstrated an enduring interest in the nature of perception throughout his long career, his work also contains internal shifts. While his early films employed a technique of what he called "unrelation"—the elimination of connective tissue between one frame and the next—to shock the viewer out of the usual experience of continuity, his optical toys foreground the operation of continuity, allowing viewers to flip pages to examine how the body's visual system constructs an illusion of movement.

The issue of relationality remained a central concern in the *Floats* and the associated *Rugs.* Breer preferred to show series of his sculptures together, so that their fluctuating relationships could become the focus of the viewing experience. Some critics compared the *Floats'* behavior to social interaction: they appeared to gather in groups or run from one another. Breer, in contrast, understood their behavior in abstract terms, and explained that aimed to emphasize "change of position rather than motion itself."[4] Importantly, the nomadic *Floats* propose a notion of place quite different from that which dominated in the sculpture of the 1960s. This chapter concludes with a discussion of several drawings by Breer in which the artist imagined the existence of kinetic, fluid sites in the real world.

[4] Robert Breer, *Floats* (New York: Galeria Bonino, 1966).

Breer has long held a secure place in the history of avant-garde film, figuring in histories by P. Adams Sitney and others.[5] His innovative body of kinetic sculpture has been less examined, though it has featured in a recent study of expanded cinema by Andrew Uroskie and in several museum exhibitions.[6] The relative neglect of this body of work has perhaps resulted from the extreme subtlety of the sculptures' slow effects, which contrast dramatically with the frenetic energy of the films. This chapter aims to elucidate the moving, seemingly purposive, *Floats* by reading them against the background of the history of sculpture, contemporary science and technology, and the rise of performance art.

Early Paintings and Films

Breer was born in Detroit, Michigan, in 1926, into a family deeply immersed in the city's industrial culture; his father, an automotive engineer at Chrysler, designed the well-known Airflow car in the 1930s. As a young man, Breer moved to California to attend Stanford University, where he studied art and was particularly drawn to Piet Mondrian's abstraction.[7] After serving as a commercial artist in the military for two years, he moved to Paris on the G.I. Bill in 1949. He soon became associated with the group of artists around Denise René's gallery, and later recalled attending dinners with

[5] See P. Adams Sitney, *Visionary Film: The American Avant-Garde, 1943-2000,* 3rd ed. (New York, Oxford University Press, 2002), especially 270-284.
[6] Andrew Uroskie, *Between the Black Box and the White Cube: Expanded Cinema and Postwar Art* (Chicago: University of Chicago Press, 2014), 87-110. The *Floats* have appeared in recent exhibitions including *Robert Breer: Time Flies* (Sharjah Art Foundation, 2016); *Ghosts in the Machine* (New Museum, 2012); *Robert Breer; A Retrospective* (Museum Tinguely, Basel, and Baltic Centre for Contemporary Art, Gateshead, 2011); and *Robert Breer: The Floats* (CAPC, Bordeaux, 2010).
[7] Laurence Sillars, "Time Flies," in *Robert Breer,* ed. Sillars and Andres Pardey (Gateshead: BALTIC Centre for Contemporary Art; Basel: Museum Tinguely, 2011), 22.

Robert Jacobsen, Richard Mortensen, and Victor Vasarely.[8] He encountered Tinguely's work at the Galerie Arnaud in 1954 or '55, and the two artists quickly bonded over their shared interest in machines.[9] Breer's paintings from the mid-1950s conform to the geometrically abstract style of his peers: they feature slightly irregular shapes in bright, saturated colors intersected by thick black lines. The forms occupy the full surface of the canvas, largely eliminating distinctions between foreground and background. The titles of these paintings occasionally make reference to movement, as in *Tournant* (1955) and *Three Stage Elevator* (1955) [Fig. 4.1].

Like Tinguely and other kinetic artists, Breer gradually became suspicious of the compositional rigidity that he observed among certain geometric abstractionists in the Mondrian school. "Everything had to be reduced to a bare minimum, put in its place and kept there. It seemed to me overly rigid, since I could at least once a week arrive at a new absolute," he said. At the same time, he became increasingly interested in the process of painting and in the sequence of decisions that led to any particular composition, or the question of, as he put it, "Why is it this way and not another way?" In 1952, Breer began to experiment with film as a medium through which to explore these ideas. "The idea of making a film," he recalled, "was simply to make a log of the steps I took to get to a finished painting."[10] His first films employed the same kinds of geometric forms, foreground-background reversals, and permutations as his paintings, now extended in time. Having rejected the notion of an absolute composition, he began to conceive change

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[8] Robert Breer, "Paris Notes, 1949-59" [September 14, 1976], in *Paris – New York* (Paris: Centre national d'art et de culture Georges Pompidou, Musée national d'art moderne, 1977), 556. English typescript provided by GB Agency, Paris.
[9] Ibid., 556.
[10] *Frames of Mind,* directed by Ann Woodward and Keiko Tsuno (1979), video.

itself as a form of absolute. In animation, Breer later explained, metamorphosis came naturally and, indeed, was the default condition; even if he tried to trace an image exactly from one frame to the next, the tiniest variation made it seem to vibrate or breathe. "Whether I tried to hold the images absolutely still or let them fly off in every direction, metamorphosis was what was going to happen anyway," he said.[11]

Breer called his initial series of films *Form Phases*, signaling his dual interests in abstraction and duration. *Form Phases IV* (1954)*,* often considered his first mature film, is rich in references to Kazimir Malevich's Suprematist compositions, with red rectangles and black squares floating at diagonals, and to Mondrian's grids of black lines. At several moments, the film reenacts the compositional process: triangles and circles bounce around a white background, assuming and then abandoning different positions on the surface plane. These sequences resemble Tinguely's *Méta-Malevich* reliefs that similarly set an avant-garde idiom into motion. Indeed, in one interview, Breer recalled that he had initially attempted to make animated paintings, but that he found them awkward.[12] The medium of film, however, allowed the artist to go further: shapes not only travel across a background, but also merge with each other and morph freely from one form into another. The *Form Phases* also evoke the early avant-garde tradition of geometric animation established by Hans Richter, which the artist had encountered by that time.[13]

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[11] MacDonald, *Critical Cinema,* 21.
[12] *Treize minutes avec Robert Breer,* directed by Pascal Vimenet (2009), DVD.
[13] In later interviews, Breer could not recall whether he had seen Richter's films by the early 1950s, but he thought it was likely that he had. "By 1954, I must have seen Hans Richter because there are some parts of [*Form Phases IV*] which are too similar to be coincidental, but you know that artists often repress their influences," he said. Yann Beauvais, "Interview with Robert Breer" [1983], in *Robert Breer: Films, Floats, & Panoramas* (Montreuil: Oeil, 2006), 158. He also cited Len Lye as another filmmaker and artist whom he admired. Beauvais, "Interview," 164.

Richter's *Rhythmus 21* (1921) features similar sequences of squares and rectangles that appear to grow, shrink, and travel across the frame.

Yet Breer soon abandoned geometric abstraction altogether. Having adopted film, he became interested in the medium's modular structure: the way a series of frames, each slightly different from the next, could produce the impression of continuity when shown in sequence. He wondered what might happen if he subverted this basic premise of filmic language by projecting a series of frames in which each image was as different as possible from those surrounding it. The result was *Image par Images* (1954), a visual onslaught of unrelated images that flash by for a frame or two at a time. Breer showed the film as a loop, giving it no clear beginning or end; eventually, the film physically broke down from repeated playing. Breer remade his experiment in the punningly-titled *Recreation* (1956). There, a narrator reads a poem in quasi-nonsensical French, while an unlikely succession of images flashes on the screen: a cat, a pile of screwdrivers, ripped paper, and painted geometric forms. Some of the objects allude to motion, including a bendable ruler with hinges, a Swiss army knife, a wind-up toy, and an articulable paper doll. Breer intensified this technique in *Blazes,* in which he scrambled 100 distinct abstract painted images into 4,000 frames, showing them repeatedly in different orders. The film plays with memory: as it proceeds, the viewer may recall having seen certain images before, but the extremely rapid pace makes it difficult to isolate and situate these images with any specificity. Breer referred to the sequence of images in these films as an "unrelationship"; he saw them as experiences in what he called "anti-continuity."[14]

[14] Guy Coté, "Interview with Robert Breer," *Film Culture* (Winter 1962-3): 19.

Breer quickly realized the implications of these films for the spectator. "If there are lots of things moving, too many things on the screen, the spectator couldn't remember what just happened. Because he's obliged to see the new thing that's coming out," he told an interviewer in 1966. "And at the same time, he couldn't anticipate what's coming. So there's no tension, none of the operation of memory-anticipation."[15] Breer took advantage of film's unique ability to present completely unrelated images in rapid sequence in order to combat the normal operations of retention and protention. His strategy produced a sense of immediacy, one apparently unhinged from narrative or history; he noted that these films paradoxically produced "almost a static effect."[16] As I will show later in this chapter, Breer would go on to imagine a different kind of temporality in his *Floats.*

Breer continued to paint during this period and in 1956 had a solo show of his paintings at the Palais des Beaux-Arts in Brussels. By 1958, however, he abandoned his work in painting entirely. In the same year, he met Kenneth Anger, Stan Brakhage, Peter Kubelka, and Jonas Mekas, finding a community of filmmakers similarly interested in the relationship of film to the operations of perception. Although he would best be remembered as part of this 1960s filmic avant-garde, his work also moved in a second direction: toward, rather than away from, the art gallery.

Optical Toys and Early Kinetic Sculpture

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[15] Breer in *Robert Breer,* directed by André S. Labarthe (raw footage for *Hiroshima vive le cinéma),* c. 1966, DVD. This unedited footage also includes an interview of Breer by Annette Michelson, which I discuss below.
[16] Ibid.

In 1955, Breer became involved with the organization of *Le Mouvement* at Denise René Gallery.[17] He contributed a flipbook to the exhibition; titled *Image par Images (Image by Images),* it was published in an edition of 500. The cover of the book features the work's title superimposed on a rectangular shape with curved corners, recalling a film frame [Fig. 4.2]. When a viewer flips through its pages rapidly, the book gives rise to the visual illusion of a series of lines and shapes that move and change form. The sequence begins with a geometric scribble that gradually expands and breaks into two parts; the parts dance around each other and morph into different configurations, finally settling into a blocky mass and a thinly outlined square. The flipbook exemplifies Breer's tendency to merge popular mediums, such as flipbooks—normally used to convey figurative narratives—with the language of abstraction, and initiates his efforts to craft a practice located between film and visual art.

Along with the flipbook, Breer also showed films in conjunction with *Le Mouvement,* as part of a program held at the Cinémathèque Française that also included Viking Eggeling, Oskar Fischinger, Jacobsen, Mortensen, Len Lye, Norman McLaren, and others. (With Hultén, he also produced a documentary about the *Mouvement* exhibition itself.[18]) As the existence of the program shows, the organizers of the exhibition acknowledged film as a relevant context for understanding kinetic art—yet they left the terms of this relationship vague. The exhibition brochure, for instance, included a short text about film written by Roger Bordier. Bordier laments the current

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[17] See Chapter 1 for a further discussion of the *Mouvement* exhibition and the role of Breer, Tinguely, and Hultén in its organization.

[18] Hultén and Breer's film, also titled *Le Mouvement,* appeared in 1955. It shows the work of each artist in turn, accompanied by a short verbal explanation. Breer's flipbook is described as an "animation in book form."

state of film, which he says is driven by technicians rather than artists. He calls for the further development of artists' films that draw from the language of color, form, and movement. He mentions Richter, Fischinger, Eggeling, and others as important pioneers, and calls attention to Breer's recent work in "denoting the evolution of color elements."[19] Yet Bordier stops short of drawing any firm comparisons between the possibilities of film and those of kinetic art; he seems to understand them as wholly separate mediums.

Breer's work of the late 1950s and early '60s can be understood as an investigation of the question that Bordier left open. Indeed, Breer spoke during this period of his desire to "cross back and forth" between art and cinema, to "take the properties of one into the world of the other and to never get caught."[20] *Image by Images* was the first of many artworks he produced toward this end, several of which were modeled on the pre-cinematic "optical toys" of the nineteenth century—works that already combined the material quality of visual art with the illusionistic movement we now associate with film. Breer's sculptures included several *Mutascopes,* simple machines consisting of a flipbook arranged in the form of a Rolodex-like wheel that can be turned with a hand crank to give rise to the illusion of movement [Fig. 4.3].[21] He also assembled sculptures modeled on thaumatropes—objects employing a spinning disk to merge two disparate images—and additional flipbooks in the style of *Image*.

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[19] Roger Bordier, "Cinéma," in *Le Mouvement* (Paris: Denise René, 1955). My translation comes from an uncredited English-language facsimile at the Museum Tinguely Archives, Basel.

[20] Audrey Sabol papers, Archives of American Art, Smithsonian Institution. Microfilm reel 4224. It should also be noted that Breer's father was a film hobbyist who, Breer noted, made a stereoscopic camera in the 1940s. Coté, 17.

[21] Breer spelled his works "Mutascope" with an "a." The generic term is normally spelled "Mutoscope," with an "o," as in the name of the American Mutoscope and Biograph Company, the first manufacturer of these devices. See Tom Gunning, "Early Cinema and the Variety of Moving Images," *American Art* 22, no. 2 (Summer, 2008): 9-11.

Breer showed these works, especially the *Mutascopes,* in a number of exhibitions in the 1950s and '60s. He recalled that his friend Tinguely helped him construct *Mutascopes* for the 1959 exhibition *Motion in Vision—Vision in Motion* at the Hessenhuis in Antwerp.[22] Iris Clert had also promised Breer a show of the *Mutascopes* and films at her Parisian gallery toward the end of that year, although the show was ultimately postponed for scheduling reasons.[23] In the meantime, Breer moved back to the United States, where he would remain. He showed two *Mutascopes* and his film *Blazes* in *Art 1963/A New Vocabulary,* held at the Young Men's and Young Women's Hebrew Association in Philadelphia in the fall of 1962 [Fig. 4.4].[24] The artist soon obtained representation with the Bonino Gallery in New York and had a first solo show there in 1965, in which he showed the *Mutascopes* and other works involving movement. "Almost all of his examples are touched, in one way or another, by the attitudes he has brought to a new art from his film activities," Alan Solomon wrote in the exhibition brochure.[25]

Breer's optical toys share qualities with both traditional film and kinetic art. Like film, they operate on the principle of seriality: one image shown rapidly after another produces the impression of a continuously moving image. This model departs significantly from that of most kinetic art, which generally lacks a serial structure and often aestheticizes movement itself rather than employing it to create a representation.

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[22] Beauvais, "Interview," 161.
[23] The artist had planned to show *Eyewash*—one of his films experimenting with rapid-fire imagery—on the gallery's front window.
[24] In *A New Vocabulary,* Breer showed three works: *Standing Mutascope (For John Cage),* a *Mutascope,* and the film *Blazes.*
[25] Alan Solomon, "Robert Breer," in *Robert Breer: Constructions and Films,* exhibition brochure (Galeria Bonino, New York, 1965).

Even those kinetic artworks that use movement to generate illusion do not have a frame-based serial structure: their effect does not arise from a series of still images, but from the continuous movement of parts. In his recent study of expanded cinema in the postwar period, for example, Uroskie compares Duchamp's *Rotary Demisphere (Precision Optics)* (1925)—a spinning disk with a white spiral on a black background, which appears dimensional when it moves—to Breer's *Image* flipbook, both exhibited in *Le Mouvement*.[26] It is certainly true that both works demonstrate the production of visual illusion through movement and borrow from the history of optics, unlike most other works in *Le Mouvement*; it is also clear, as Uroskie points out, that Breer's work owes much to Duchamp's legacy. An important difference between these pieces, however, is that Duchamp's *Rotary Demisphere* produces its illusionistic effect through the unbroken movement of a single image, while Breer adheres more closely to the serial structure of film.

If Breer borrowed film's frame-based structure in his optical toy sculptures, he was simultaneously committed to demonstrating the works' object nature—their existence in the viewer's space as material things that can be touched and operated by hand. By inviting viewers to start and stop these devices on their own, Breer allows us to seek out the precise moment in which illusion arises, when a series of still images coalesces into a flow of motion—to slow down and examine the chain of desire, gesture,

[26] Uroskie, *Black Box,* 97.

and movement that generates representation. This dynamic also permits Breer to foreground the central role of the body in the production of all visual illusion.[27]

Recent scholarship has emphasized the importance of understanding optical toys on their own terms, rather than forcing them into a teleological narrative that ends with the birth of cinema. Benoît Turquety, for instance, has argued that the specificities of these devices—whether images are printed on disks or strips, or whether the machine is moved by hand, by a crank, or by a machine—have much to tell us about how the device imagines the place of the spectator and the nature of perception.[28] When a viewer can set a device in motion purely by hand—by giving a wheel an initial spin, for example—he or she has a "punctual" relationship with it, touching it to start it and possibly again to stop it. Its motion has a natural arc, slowing gradually with the force of inertia. The crank, in contrast, allows the viewer to control the speed of movement throughout: to make it faster or slower, to give it an even or uneven pace. Along with this increased control comes the obligation to continue to turn the crank for the full period of the experience; it can thus be said that the movement the viewer perceives is really that of his own gesture.[29] The nature of motor-driven devices lies somewhere between the two modes. Such devices allow an evenness of speed similar to that which may be produced by

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[27] See Jonathan Crary's arguments regarding optical devices and embodiment in *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge: MIT Press, 1990).

[28] Benoît Turquety, "Forms of Machines, Forms of Movement," in *Cine-Dispositives: Essays in Epistemology Across Media,* ed. François Albera and Maria Tortajada (Amsterdam: Amsterdam University Press, 2015).

[29] Ibid., 290. For an earlier example of such a device, one could look to Leonardo da Vinci's designs for machines that demonstrate the conversion of motion (from linear to rotary, from one direction to another, and so on). Those objects similarly required spectators to rotate a crank continually; having control over the device would allow them to gain a better understanding of how the object functioned.

cranks, but their solicitation of the spectator's touch only at the moment of activation is akin to that of hand-driven devices.[30] Breer's *Mutascopes* are powered primarily by cranks; it is the increased control provided by this device that allows the viewer to understand how the mechanism produces moving images from a series of still ones.[31]

Indeed, Breer sought to demystify the operations of optical toys. The artist said that he began creating work for the gallery rather than the cinema to his material "into the open, to expose it, and so forth."[32] In *Homage to John Cage* (1964) [Fig. 4.5] for example, Breer presents a Mutascope consisting entirely of blank, transparent pages, unmarked except for some holes cut out from them. He cut some of the holes by hand and punctured others with a hole puncher. When activated, the work produces a number of visual effects: some holes appear to widen and contract, others to jump sporadically from one point in the field to another. Given the transparency of the sheets and the potential for pausing and restarting the device, Breer remarked, "You can see what goes into the makings of this image you're getting. At the same time that you're looking at the image."[33] Breer attributed the work's title to a chance encounter with Cage in the gallery, but it also clearly nods to the role of silence and transparency in the composer's work. Indeed, the allusion may be even more precise: beginning with his *Variations I* in 1958, Cage had begun to print musical notation on transparent plastic sheets, which performers could superimpose to generate a score.

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[30] Ibid., 292.
[31] Ibid., 291. Of course, some kinetic works deliberately mask or complicate the relationship between gesture and effect, as we have seen with the work of Gianni Colombo.
[32] Levine, "Interview," 59.
[33] Ibid., 67.

An aspect of Breer's optical toys that has been less acknowledged is the way they amplify the role of the viewer's body in constructing illusion. Breer took this feature to an extreme in 1964 with his *Mural Flip Book* (sometimes called *Linear Mutascope*), which was included in the 1965 Bonino show. The work consists of a series of colored pages mounted horizontally across the wall whose nearly four-foot length a viewer must physically traverse while pulling back the pages [Fig. 4.6]. This work sets up an uneasy relationship between the implicitly temporal form of the mural—whose details cannot be taken in all at once, owing to its large size—and the explicitly temporal one of the flipbook. It requires the viewer not only to flip the pages but also to walk while doing so, a somewhat awkward exercise that makes the requirement of bodily involvement so obvious as to be cumbersome.

Finally, it is important to note that the representational content of Breer's optical toys differs dramatically from that of their nineteenth-century predecessors. Rather than reviving these forms directly, Breer imports abstract—even modernist—vocabulary into mediums and technologies that had historically been used for popular imagery, such as peep shows. Indeed, devices such as the Mutoscope—because they were made to be seen by a single person at a time, and because they allowed the viewer to stop and start the illusion at will—lent themselves particularly well to erotic imagery.[34] Breer replaces this figurative imagery with monochrome or transparent pages and abstract imagery, such as wavy lines and geometric forms.

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[34] See Tom Gunning, "Machines That Give Birth to Images: Douglass Crockwell," in *Lovers of Cinema: The First American Film Avant-Garde, 1919-1945,* ed. Jan-Christopher Horak (Madison: University of Wisconsin Press, 1995), 340-343.

In addition to Mutoscopes and flipbooks, Breer also worked with an optical toy called the thaumatrope. Historically, the thaumatrope took the form of a two-sided disk suspended between two pieces of string. When a viewer twirled the strings, the distinct images on each side of the disk appeared to merge into one. In one common motif, for instance, a bird on one side of the disk joins together with a cage on the other side, making it look as if the bird is within the cage. Thaumatropes thus appeared to produce magical combinations of spatially separate images; many featured objects and creatures that were "caught" in a container, from animals in cages to flowers in a vase. Breer's *Dot Dash* (1964), like his other optical toy works, fuses this historically popular form with the geometric language of modernism. A white disc with a circle on one side and an elongated rectangle on the other hangs inside a circular support, mounted on a pole [Fig. 4.7]. When a viewer spins the disc, the two geometric forms appear to merge into one.[35]

How might we summarize Breer's perspective on the relationship between film and art? By modeling his sculptures on optical toys, Breer explored some alternatives to the "inexorable and unvarying forward movement" of the cinema as traditionally conceived.[36] He allowed viewers to see "how the trick is done," to experiment with different structures of time: viewers could run the devices backwards, stop and restart

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[35] Breer showed another thaumatrope, *Stars,* at Bonino in 1965; in it, stellar patterns on both sides of the central disk merge together when a viewer spins the device. In *6 and 7* (1964), he takes up an idea similar to the thaumatrope but combines it with found-object sculpture: a New York license plate with the number 2546-RI on one side and 2547-RI on the other spins, rendering the central digit uncertain. This work isolates a single "zone" of visual merging or blurring within a field that remains otherwise nearly identical.

[36] Mary Ann Doane, *The Emergence of Cinematic Time: Modernity, Contingency, the Archive* (Cambridge, Mass.: Harvard University Press, 2002), 108. Doane uses this phrase to describe the conventional understanding of film's essence, belied by the existence of optical toys and social practices such as playing films backwards.

them, or play them in an endless loop. In part, his works demystify the production of illusion. In another way, however, the works highlight how the necessary support for these illusions is the human body, with its own mysterious processes that construct movement from a series of still images.[37] Breer made a revealing comment when he said in an interview that the darkened, theatrical situation of cinema "robbed some of the mystery of film from itself."[38] That is, the artist understood the process of revealing the mechanism by which filmic illusion arises as heightening a sense of mystery by relocating it to the operation of one's own body.

In the next phase of his work, Breer turned away from optical toys to focus on kinetic works involving motors. The artist said that he made this transition because he lost interest in the kinesthetic activity of cranking and wanted to delve more deeply into questions of the visual.[39] He showed several motorized works of this kind alongside his optical toys in the 1965 Bonino exhibition. The works demonstrate a kind of humor and a parodic element that is largely lacking in his previous sculptures.

Some of these works involve wires or rods that simply revolve in place. These included *Line #2* (1964) and *Rotating Stovepipe* (1964), both shown at the gallery [Figs. 4.8, 4.9]. In these works, a bent metal element protrudes vertically from a base; a motor hidden under the base causes the element to rotate. Breer described a similar work, titled *Bent Wire,* in an interview. "When you see it in profile it looks like a wavy line and this

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[37] Doane makes a similar argument about optical toys in "The Afterimage, the Index, and the Accessibility of the Present," in ibid., 69-107.
[38] Jonas Mekas and P. Adams Sitney, "An Interview with Robert Breer," in *New Forms in Film,* ed. Annette Michelson (Montreux: Corbaz, 1974), 51.
[39] Oral history interview with Robert Breer, 1973 July 10, Archives of American Art, Smithsonian Institution.

was the way of solving the problem of kinetic drawing," he said.[40] *Bent Wire* clearly conjures an image of Naum Gabo's *Kinetic Construction (Standing Wave)* of 1920, one of the earliest motorized pieces of kinetic art.[41] Powered by an electric motor, the sculpture comprises a thin metal rod whose vibrations create the illusion of a volume in space [Fig. 0.4]. *Kinetic Construction* reflects Gabo's interest in replacing what he considered mere descriptiveness in art with direct evocations of force and energy: when the work is turned on, the material disappears altogether, dissolving into a shimmering veil. In this work and in his writing, the artist rejected the equation of sculpture with mass and opacity. Instead, he favored lightness and open, legible structures that conjured the utopian dream of transparency attached to technology in his moment. The work's title evokes the invisible waves of light or sound; while it may appear abstract, it is also an illustration of a scientific principle.[42] Breer's work, produced nearly half a century later, fails to generate a similar effect. With its banal title and extremely mild illusionism, it remains firmly in the material realm, both gently mocking Gabo's work and perhaps also drawing attention to the already elementary, bricolaged quality of its referent.

A work made in the same vein is *Rotating Broom Stick* (1964). The sculpture consists of a long, horizontal panel that attaches to the wall, with a broomstick mounted horizontally across its center line [Fig. 4.10]. A motor rotates the broomstick in place.

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[40] Ibid. It is unclear whether "Bent Wire" is an alternative title to one of the works previously mentioned or a separate work entirely.

[41] Breer met Gabo in person after his move back to the United States. Michelle Kuo, "Everything Goes: An Interview with Robert Breer," *Artforum* 49, no. 3 (November 2010): 218.

[42] Naum Gabo, "The Realistic Manifesto" [1920], in *Gabo on Gabo: Texts and Interviews*, ed. Martin Hammer and Christina Lodder (East Sussex: Artists Bookworks, 2000), 33. The "standing wave" effect of Gabo's *Kinetic Construction* appears when a wave traveling up the rod produces a second wave, which travels down the rod and "interferes" with the first.

The broomstick and the backing panel are the same brown color, and Breer noted that only some slight discoloration on the stick makes this rotation visible. "If you pay attention, you see it's rotating very slowly, quietly, on the wall," he said. "It seems to me that that's full circle. It answers all the requirements of something that's formally composed, self-contained, and so forth."[43] Here we can see Breer taking a playfully parodic attitude toward the premises of Greenbergian modernist art. His rotating broomstick satisfies the demands of modernism—it is severe in its stripped-down form, self-reflexive, inward, unconcerned with the spectator—yet it renders these qualities comical. It is at once theatrical, as it moves and exists in time, and anti-theatrical, presenting a "spectacle" lacking any sense of awe. It presents a notion of the artwork as an animated being that goes about its business with little concern for the activities of the spectators around it. Breer would proceed to offer a further critique of the formalist modernism advanced in *Rotating Broom Stick* in his central body of sculpture, the *Floats.*

In a review of the 1965 Bonino exhibition in *Arts Magazine*, Donald Judd wrote that Breer's work was "obviously… like Duchamp's."[44]Artists such as Robert Morris and Anthony Caro, he wrote, were doing better work that achieved Breer's goals in stronger ways. Judd is certainly correct that Breer shared Duchamp's optical concerns and his often-deadpan humor. Yet his assumption that Breer's aims were identical to those of Morris and Caro is erroneous; as I will discuss in my examination of Breer's *Floats,* the artist had a complex, and often ambivalent, relationship to Minimalist sculpture.

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[43] Oral history interview with Robert Breer, 1973 July 10, Archives of American Art, Smithsonian Institution.
[44] Donald Judd, "Robert Breer," *Arts Magazine* 39, no. 5 (February 1965): 60.

The *Floats*

Breer attributed his move into motorized kinetic sculpture to his friendship with Tinguely. The two had met in Paris in the mid-1950s, shortly after Breer saw the Swiss artist's work at the Galerie Arnaud, and their relationship continued after both artists moved to New York. Breer even made a film, *Hommage to Homage to New York,* documenting the spectacular, self-destructive machine performance that Tinguely held in MoMA's sculpture garden in 1960.[45] Tinguely himself had briefly experimented with self-moving kinetic sculpture in the months before *Le Mouvement*, in which he showed *Auto-Mobile* (1954), a kind of *Méta-Herbin* with limited movement on the floor. With his development of the *Floats* from the mix-1960s onwards*,* Breer undertook a much deeper and more far-reaching investigation of the possibilities of self-moving sculpture.

Breer debuted his *Floats* in an exhibition at New York's Galeria Bonino in 1966. Each piece consisted of a carved Styrofoam shell concealing a chassis equipped with a motor, batteries, and wheels. The *Floats* sat directly on the floor and moved slowly; the exhibition catalogue lists one as moving at a speed of six inches per minute.[46] When a sculpture bumped into a wall or another object, it paused briefly and then reversed direction. A simple feedback mechanism ensured this response: when a *Float*

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[45] In *Hommage to Homage to New York* (1960), Breer employs a number of experimental techniques, including stop-motion animation and double exposure, to document the construction and ultimate destruction of Tinguely's machine. Particularly noteworthy is his treatment of Tinguely himself: cutout photographs of the artist open up and reveal machinery inside of his body in some scenes, while in others his head appears to detach from his body and float upward, as if it were an assemblage of parts that could be rearranged at will. These sequences of images, and other double-exposed scenes that show Tinguely's body intermingling with his machine, draw on a common trope in the criticism of Tinguely—the merging of the man with his mechanical creation.

[46] *Robert Breer: Floats* (New York: Galeria Bonino, 1966). The exhibition ran from February 15 to March 5.

encountered resistance, its shell would shift backward slightly, tripping a switch that reversed the polarity of the motor and caused the object to change direction.[47] On a very basic level, the works thus responded to the physical conditions of their environments, independent of direct human input.

In the 1966 exhibition, Breer showed Styrofoam *Floats*—primarily dating to the previous year—carved into a variety of shapes, including cubes, staircases, donuts, domes, and irregular geometric forms, sometimes bearing Swiss cheese-like holes [Fig. 4.11]. Most were white, but a few were covered in pink, orange, or black paint. Breer would later recall that he initially placed the colored *Floats* in one room of the gallery and the white ones in another, and that he was surprised to see the two groups intermingling after a few minutes.[48]

In the exhibition brochure, Breer stated that the *Floats* should be viewed less as individual sculptures than as a changing constellation of mobile parts. He wrote:

> This group of self-propelled Styrofoam objects was conceived as a single composition which would constantly rearrange itself. Each 'float' reverses its direction when it encounters resistance and in this way keeps moving regardless of space restrictions. By their consistent and slow movement, I hoped to put emphasis on change of position rather than motion itself.[49]

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[47] A drawing of a set of *Floats* from 1966-67, called the *Tanks,* explains how the sculptures work. See *Films, Floats, and Panoramas,* 71. In early versions, the works had bumpers around the edges of their bases, but Breer eventually eliminated them and streamlined their form. He recalled that Jasper Johns had come to see the works in his studio: "At that early stage, they each had small bumpers that triggered them to move in the reverse direction when they bumped into something. After studying them a bit, Jasper's only comment was 'hmmm.' That night in bed, I wondered if he was as bothered as I was by those bumpers, and I came up with the brilliant solution to have the whole piece become the bumper!" Kuo, "Everything Goes," 218.

[48] Ibid.

[49] Robert Breer, *Floats* (New York: Galeria Bonino, 1966). Breer also said, "I'm not interested in the surprise the floats provide, but in your gradual awareness of their movement and their changing relationships." Grace Glueck, "Art Notes: A Wet Moore, A Dry Armada," *New York Times,* February 20, 1966.

In this sense, Breer retains a reference to "composition"—understood as construction of relations between parts—while rendering it malleable, as I discuss further below. Significantly, he defines movement in relational terms: not through the physical dislocation of a single discrete object, but through the fluctuating relationships between objects and their environments. In this model, the gallery floor itself becomes activated, serving as a kind of background or negative space whose contours change as the *Floats* navigate across it. By working with multiple discrete moving objects, Breer moves beyond the models established by Tinguely, Bury, and Colombo, who generally restricted the play of movement to the physical, discrete boundaries of their work.

In a positive review of the Bonino exhibition in *Arts* magazine, William Berkson argued that the *Floats* are both self-sufficient and meant to be understood in relation to one another. While "each shape has a very definite personality of its own," he writes, "they mixed and mingled cheerfully, holding conversations, nudging and pushing each other around—all very slowly." Berkson continues that the objects place no demands on the viewer, and that they "are aimlessly present, with their own sense of law and logic."[50] For Berkson, the formally relational quality of the *Floats* opens on to a metaphor of social relationality, as the critic attributes the interpersonal behaviors of speech and gesture to the moving sculptures.

We have previously seen how Breer's films rely on a rapid succession of unrelated images to produce their effect. The *Floats,* with their extreme slowness, take a different tack. As Kirby suggested, these sculptures create a "'shape' through extended

[50] William Berkson, "Robert Breer," *Arts Magazine* 40 (April 1966): 60.

time" in a more intense way than other kinetic works.[51] While the *Floats* move continuously, we might not initially notice their creeping movement; we then experience surprise upon seeing that they have changed position. These sculptures differ from the works previously discussed in this dissertation in that they emphasize movement and time through a change in mutually articulated configurations within their surroundings. In Tinguely's reliefs, we clearly perceive geometric elements rotating; in Bury's fields of pins, we glimpse movement partially and periodically; in Colombo's elastic reliefs, we see surfaces sink and bounce back. In the case of Breer, it is difficult to perceive the passage of time by looking at length at a single work; instead, we must attend to shifting spatial relationships. John Locke framed this problem in terms of the hands of a clock: we may not directly perceive the hour hand in motion, but we periodically notice when it has shifted and infer that movement has occurred.[52] The temporal experience of such objects is best described not in terms of retention—the involuntary, moment-to-moment recall that allows us to perceive actions, melodies, and other phenomena as continuous—but of the broader faculty of memory. This explains why Kirby found that Breer's works share something in common with traditional modes of theater and performance that implicate memory over a longer arc of time. Of course, this does not mean that Breer enacts traditional narrative structures; the artist pointedly said that he wanted to avoid the

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[51] Michael Kirby, *The Art of Time: Essays on the Avant-Garde* (New York: E.P. Dutton, 1969), 250.

[52] See a discussion of this point in Lorne Falkenstein, "Classical Empiricism," in *A Companion to the Philosophy of Time*, ed. Heather Dyke and Adrian Bardon (Malden, MA: Wiley-Blackwell, 2013), 107. Locke discusses the perception of motion in this manner in *An Essay Concerning Human Understanding,* ed. P.H. Nidditch (Oxford: Clarendon Press, 1975), 2.14.11.

"anecdotal" in his work.[53] Rather, he activates a more diffuse, open-ended temporal structure that draws attention to the changing relations between an object, its surroundings, and the viewer's body.

Despite their lack of representational content, the first group of *Floats* carried evocative titles, many of which refer to geographical places. These include references to Breer's home state of Michigan, as well as to his East Coast surroundings: *Bay City, Sarnia Beach, New York,* and *Block Island.* Like Frank Stella, who frequently named his abstract paintings after locations in New York and elsewhere, Breer adds an evocative overtone to his nonfigurative sculptures through his titles. Photographs interspersed in the brochure show Breer interacting with the *Floats* outdoors at his home in Palisades, New York. In one image, he poses on a lawn amid a group of twenty *Floats.* In another, more than a dozen *Floats* amble down a road by themselves, where, as Berkson writes, the sculptures "seem natural and wholesome parts of the landscape" [Fig. 4.12].[54] Indeed, Breer recalled that his initial mental image of the *Floats* was of a group of partly hidden sculptures in a grassy park.[55] The works' titles and their outdoor settings point to a broader tension regarding place and placelessness in Breer's work. While the *Floats* are, in some aspects, anchored to geography and landscape, they are also homeless or nomadic, shifting at random from one site to another and belonging to none. As we will see, they present a noteworthy contribution to the broader discourse around sculpture and place in their 1960s moment.

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[53] MacDonald, *Critical Cinema,* 44.
[54] Berkson, "Robert Breer," 60.
[55] Beauvais, "Interview," 162-3.

Breer seems to have shown additional work related to the *Floats* in *Museum of Merchandise,* an exhibition held in Philadelphia from May 10 to 28, 1967, which focused on artists making commercial objects, including housewares, clothing, and jewelry. Letters and insurance forms record that Breer presented three "moving paperweights."[56] While no more specific documentation or photographs of these objects exist, one might conjecture that these paperweights resembled *Floats* scaled down to tabletop size. If so, these works would further expand the variety of sites in which Breer imagined the works, from the gallery to the outdoors to the domestic sphere. They are also patently ironic, as a roving paperweight cannot hold down papers. Here, the condition of "placelessness" robs these desktop devices of their function in a particularly absurd way.

Breer held his second major exhibition of *Floats,* titled *More Floats,* at Galeria Bonino from November 14 to December 9, 1967. This show developed Breer's initial concept in several ways. First, it included a number of *Columns*, moving sculptures that took the form of tall, polygonal pilasters. These, along with a group of larger, chair-like *Floats,* lent a new sense of the architectural to Breer's work. Like the paperweights, they present a contradiction: a moving column cannot fulfill its function of providing support and stability to a built structure. Second, the exhibition included an edition of twenty identical objects called *Tanks*, small half-cylinders made from aluminum that again moved at a speed of six inches per minute. The title of these works may allude to the ongoing war in Vietnam, which Breer publicly opposed: shortly after the Bonino

[56] A newsletter written by Sabol and Joan Kron in the lead-up to the show reads, "Bob Breer is perfecting his moving paper weight." A checklist notes that three paperweights were shown with a table. Joan Kron papers, Archives of American Art, Smithsonian Institution. Microfilm reel 4224.

exhibition closed, he contributed a film to Angry Arts week, an anti-Vietnam event held in New York in January 1967.[57]

As he had before, Breer had the works photographed outdoors: a 1967 image shows the *Tanks* lined up at the edge of a country path, appearing to either decorate or block the road [Fig. 4.13]. Third, the show included a new type of work that Breer called *Rug,* consisting of a three-by-four foot sheet draped over a base with four motorized components. *Rug* sat on the floor, its parts crumpling inward and stretching back outward according to the movements of the motorized parts. More complex in form than Breer's previous work, *Rug* combined the principle of propulsive movement from the *Floats* with multipart internal movement.

Breer's interest in the relationship of his sculptures to their environments connects him clearly to the Minimalist movement, still the dominant tendency in New York's art world when the *Floats* first appeared in 1966. Robert Morris published parts one and two of his "Notes on Sculpture" that same year; the final installment appeared in 1967, along with Michael Fried's "Art and Objecthood."[58] Pioneered by Morris, Donald Judd, Carl Andre, and others, Minimalism sought to develop a form of sculpture or object-making

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[57] See Jennifer Burford, *Robert Breer* (Paris: Éditions Paris Expérimental, Re:Voir Video, 1999), 137. Breer contributed an excerpt from *Horse Over Tea Kettle* (1962). Breer's films are more overt in their politics. His stop-motion animated film *Jamestown Baloos* (1957), for instance, features clear antiwar themes. The artist was also commissioned to produce 20 political cartoons for a planned Public Broadcast Library television series in 1968, but the project ended after he had completed only two. Breer described himself as having antiauthoritarian, loosely anticapitalist views, though he did not identify as a Marxist. See MacDonald, *Critical Cinema,* 27.

[58] Robert Morris, "Notes on Sculpture, Part I," *Artforum* 4, no. 6 (February 1966): 42-44; "Notes on Sculpture, Part II," *Artforum* 5, no. 2 (October 1966): 20-23; and "Notes on Sculpture, Part III: Notes and Nonsequiturs," *Artforum* 5, no. 10 (Summer, 1967): 24-90. Michael Fried, "Art and Objecthood" [1967], in *Art and Objecthood: Essays and Reviews* (Chicago: University of Chicago Press, 1998), 148-172.

that rejected internal composition in favor of spatial confrontation with the gallery space and the viewer's body. Breer's works have an odd, oblique relationship to the movement, frequently adopting its formal logic while taking a playful and sometimes critical attitude toward its conceptual underpinnings.

Certain *Floats* seem to refer to Minimalist works directly. The tall aluminum *Columns* of 1967, for instance, immediately call to mind Morris's *Column* (1961) [Figs. 4.14, 4.15]. Morris first created the work for a performance in 1962, intending to stand concealed inside the column and tip it over with his own body weight onstage.[59] In his later Minimalist sculptures—for instance, in the works shown in his "plywood" show at New York's Green Gallery in 1964—Morris eliminated the explicitly performative element from his work. Now, the light gray plywood boxes sat motionless on the floor, hung from the ceiling, wedged into corners, or abutted the wall.

Despite the works' increased formal abstraction, their relationship to the concept of theatricality remained. As is well known, Fried's 1967 essay argued that the extreme minimalism or "literalism" of such sculptures, by redirecting attention to the room and the viewer's body, created a situation marked by physical proximity and the passage of time—a situation that the critic compared to theater. Encountering a work of Minimalist sculpture, scaled to the human body, was too much like encountering "the silent presence of another *person,*" he argued; its real-time duration robbed it of the timelessness characteristic of the best visual art.[60] For Fried, the quality of theatricality betokened the

[59] After injuring himself while rehearsing his fall, Morris decided to employ a hidden string to tip over the column during the performance. Oral history interview with Robert Morris, 1968 Mar. 10, Archives of American Art, Smithsonian Institution.
[60] Fried, "Art and Objecthood," 155.

absence of the self-sufficiency, presentness, and hence "grace" that characterize art and should remain its unique province.[61]

Breer seems to have had little personal connection to the Minimalists, although he certainly knew their work from exhibitions and art magazines, and, as Judd's review shows, they were familiar with his. It is also clear that the artist shared many of their concerns. If Minimalist sculpture of the kind made by Morris or Judd provided the basis for Fried's conceptualization of theatricality, Breer's works fulfill Fried's conditions to an extreme. Gliding across the floor, they emphasize duration through their own slow movement in time rather than exclusively through the viewer's movement. They address the body, not by mimicking its scale, but by literally encroaching on and even colliding with it in the gallery space. Finally, they possess an anthropomorphic quality, not because of their uprightness and scale, but because they appear to move of their own volition. Thus the theatricality of the *Floats* not only exceeds Fried's 1967 formulation but also goes far beyond what the Minimalist themselves would have accepted in the mid-1960s.

Three major factors separate Breer's sculpture from that of the Minimalists. First, the human body features in each kind of work in distinctly different ways. In the Minimalist context, viewers walk and position their bodies at different points around the fixed sculptures, much as they would around traditional sculpture. The *Floats,* in contrast, move on their own and present new visual angles to the viewer over time; the viewer may stand still or also move, so that a slow, dance-like interaction arises between him or her and the sculpture.[62] In such a situation, the human body remains clearly implicated—yet

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[61] Ibid., 168.

[62] On this aspect of the *Floats,* see Andres Pardey, "Robert Breer – Floats: On Sculpture without a Place," in *Robert Breer,* ed. Pardey and Sillars, esp. 102-103.

it is less centered, losing a measure of visual and physical mastery over the art object. Rather than encountering and instantly comprehending a single, Gestalt-like form, the viewer must constantly adjust to a changing situation.

The second factor distinguishing Breer from his Minimalist peers relates to the question of the whole and the part. The latter artists were highly opposed to the "compositional effects" that they located in European painting and sculpture.[63] Stella, for one, explicitly rejected European geometric abstraction, which he called "relational painting"—a mode in which "you do something in one corner and you balance it with something in the other corner."[64] Instead, he favored pared-down, centered, symmetrical paintings that created an immediate, forceful impact. Judd similarly spoke out against traditional sculpture, which is "made part by part, by addition, composed."[65] In the new work, he asserted, "The thing as a whole, its quality as a whole, is what is interesting."[66] For Judd and Stella, to reject the European tradition meant to reject its values: its commitment to rationalism and its reliance on *a priori* systems, which the artists felt were no longer adequate to the complexity of the contemporary world. They aimed to cast off these principles by making painting and sculpture more object-like, thereby shielding them from any claims to transcendent meaning beyond their existence as paint on a canvas or a metal cube.

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[63] Donald Judd in Lucy R. Lippard, ed., "Questions to Stella and Judd," interview by Bruce Glaser, in Patricia Hills, ed., *Modern Art in the USA: Issues and Controversies of the 20th Century* (Upper Saddle River, N.J.: Prentice Hall, 2001), 241. Originally published in *Art News* 65, no. 5 (September 1966): 55-61.
[64] Frank Stella in ibid., 240.
[65] Donald Judd, "Specific Objects," in *Donald Judd: Complete Writings 1959-1975* (New York: New York University Press, 1975), 183. Originally published in *Contemporary Sculpture,* Arts Yearbook 8, ed. William Seitz (New York: Art Digest, 1965), 74-82.
[66] Ibid., 187.

Just the Minimalists simplified their shapes, Breer aimed to reduce the formal complexity of the *Floats*. In one interview, he gestured toward Judd's and Stella's thinking by differentiating his work from earlier kinetic art: in contrast to sculptures with "articulated members that move" or revolving elements, he explains, his *Floats* are "basically inanimate objects." Their forms are "rather dumb looking... somewhat geometrical, but not too specific."[67] That is, Breer deliberately distances his work from the part-by-part construction characteristic of much kinetic art, instead emphasizing its object-like quality. He departs from the Minimalist model in his insistence on reading the *Floats* as a group, a move that retains some allegiance to the part-by-part structure those artists had shunned. Yet Breer's work clearly does not fall into the hierarchical, carefully balanced model implied by older notions of composition. Instead, the artist gives each *Float* equal weight within a flexible syntax of unstable elements.

Moreover, Breer wanted to give individual *Floats* the appearance of fragmentation. The shapes that he selected for the works often seem to be severed in half, endowing them the look of floating on or even sinking into the floor—almost as if they were "partly underwater."[68] The works may thus evoke the impression that a portion of their mass is hidden out of view, and in turn, may insinuate that the floor itself is less solid than one might assume. For Breer, this suggestion of fragmentary gestalt produced a destabilizing effect, in which the plane of the floor and the base of the work face each other, but maintain what the artist called an "insecure" relationship.[69]

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[67] Levine, "Interview," 65.
[68] Kuo, "Everything Goes," 218.
[69] Ibid.

Third, and most importantly, Breer's *Floats* propose a different understanding of site from that suggested by Minimalist objects. Morris's plywood, wedged in a corner of the gallery or hanging from its ceiling, drew viewers' attention to the particular qualities of the room. Site-specific works of this kind—including larger-scale examples such as Richard Serra's *Tilted Arc* (1981)—depended on their unique, fixed position in space to generate meaning. Such works promised to counter the notion of the modernist artwork as a self-contained, inward looking, and eminently transportable commodity that retained a stable appearance and meaning as it moved freely from one exhibition site to another; Rosalind Krauss and others have referred to such works as essentially "homeless."[70]

Seen from a certain perspective, Breer's *Floats* may appear as a conservative return to this earlier, modernist model. The sculptures may be exhibited anywhere and, moreover, literally "un-site" themselves as they move, nomad-like, across the floor or from room to room. Yet Breer's work does not so much repeat the model of modernist placelessness as it reflects on this condition, literalizing and even humorously flaunting its own mobile condition. Breer's sculpture may, moreover, propose a different understanding of site altogether. As James Meyer has argued, the Minimalist definition of site-specificity, which invites viewers to reflect on the features of the gallery space, may unwittingly reinscribe the reflexivity of the modernist paradigm by simply extending the

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[70] See Rosalind Krauss, "Sculpture in the Expanded Field," *October,* no. 8 (Spring, 1979), 34. Clement Greenberg first used this term in a slightly different context in "After Abstract Expressionism," in *The Collected Essays and Criticism, Volume 4: Modernism with a Vengeance, 1957-1969*, ed. John O'Brian (Chicago: University of Chicago Press, 1995), 121-134. Originally published in *Art International* 6, no. 8 (October 1962).

frame of the work spatially.[71] Breer's *Floats,* refusing to hold still, reject the fixity and inward-looking quality of this model. Instead, they create a fluid constellation of relationships in which unstable meanings arise from the works' always-shifting relationships to each other and the space around them; they define site through a constant process of change. Such an understanding of site could be playful—suggesting an ongoing activity of creative regeneration—or disorienting, as it refuses to provide viewers stable coordinates with which to locate themselves.

Rugs

While the *Floats* are Breer's best-known kinetic sculptures, the artist also produced a group of motorized *Rugs* akin to the one he exhibited in his 1967 Bonino show. One of these appeared in the Museum of Modern Art's 1968 exhibition *The Machine, as Seen at the End of the Mechanical Age,* where viewers failed to notice the sculpture and often stepped on it, ultimately breaking the piece [Fig. 4.16].[72] Like the *Floats,* the *Rugs* are self-propelled motorized sculptures that move on the gallery floor, and they engage many of the same issues regarding motion, site, and relation as the earlier works. With their more complex structure, however, —including their multiple motors and richly textured moving surfaces—the *Rugs* also raise new questions about form and formlessness.

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[71] James Meyer, "The Functional Site; or, The Transformation of Site Specificity," in *Space, Site, Intervention: Situating Installation Art,* ed. Erika Suderburg (Minneapolis: University of Minnesota Press, 2000), 26-27.

[72] Although Breer preferred to show his sculpture in quiet, less crowded settings, he realized he would have to adapt his work to the museum site. He made his later *Rugs* in gold and silver Mylar, rendering them more spectacular and more visible on the floor. (Interview with Annette Michelson in Labarthe.)

On one occasion, Breer compared the movement of the *Rugs* to his own artistic process. In the catalogue for the exhibition *Kinetics* at the Hayward Gallery in 1970, in which a *Rug* appeared, he wrote, "My self-propelled pieces move about slowly probing the outer limits of their environment and adjusting to formal incidents along the way. In this respect they imitate the very process that helped to conceive them."[73] Breer points to a key feature of the *Rugs*: that they not only move but also adjust the configuration of their surfaces as they do so. He attributes a kind of volition to the pieces, suggesting that the way they reach out into their surroundings and make changes to themselves is akin to the exploration and modification inherent in the artistic process. He also implies that the process of composition never ends, even when the piece is ostensibly complete.[74]

The way the *Rugs* modify their own surface appearances also amplifies the sense of unease generated by Breer's earlier sculptures. In the exhibition catalogue for the MoMA show, Hultén described the equivocal feelings that viewers experience before one of these sculptures:

> Our reactions are ambivalent. We feel incapable of stopping the inexorable, uncompromising movements of the rug; its determinism repels us and inspires a vague uneasiness. At the same time, we could easily handle the light material and small-sized rug. We become inclined to protect this helpless creature. The conflict grows acute and complete; as so often, we oscillate between disgust and sympathetic inclination.[75]

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[73] *Kinetics* (London: Hayward Gallery, Arts Council of Great Britain, 1970), n.p.
[74] On the subject of the *Rugs'* movement, Breer told Annette Michelson, "This way I'm always making this machine, I can go next door and move it and it's still being composed… and that suits me somehow, that it never gets finished. Then I can accept limitations, as long as it isn't fatal, you know? Final, that is." He understood the freedom of movement that he gave his sculptures—an element that is "unforeseen, unforeseeable or unpredictable"—as an "escape from the rigid control" that an artist generally has over his or her work. (Interview with Michelson in Labarthe.)
[75] Pontus Hultén, *The Machine, as Seen at the End of the Mechanical Age* (New York: Museum of Modern Art, 1968), 192.

Hultén notes that the impression of aliveness comes in part from the fact that Breer masks, rather than displays, the work's mechanical parts, a strategy that links the works to the pre-twentieth century history of lifelike automata. Indeed, the *Rugs* not only hide their motors but foreground a sense of "hiddenness": while the *Floats* appear to be moving themselves, the *Rugs* evoke the uncanny feeling that something is alive just *beneath* their surfaces.

A number of additional factors add to the *Rugs'* uncanny quality. First, the sculptures lack bases and sit low to the ground, their "shells" hovering by only a thin margin above the floor. They thus display a kind of horizontality that Georges Bataille, and earlier, Freud, linked to the animal world, to slime and mud, to the category-destroying operations of the formless.[76] Gone are the architectural references of the *Columns* or stepped and arched *Floats*. Instead, the *Rugs* fail to hold themselves upright and remain in constant danger of being trampled on by inattentive viewers. The sculptures' deeply creased and wrinkled surfaces, moreover, cause them to resemble pieces of discarded trash more than flat rugs. Their primary activity is to crumple their own surfaces, gradually wearing them down over time.

Of course, the horizontality of the works also connects them to Minimalist practice, as Carl Andre, Morris, and others were similarly experimenting with floor pieces in the mid-1960s. For Andre, to place bricks in rows and stacks on the floor was to emphasize the banal, material qualities of everyday objects. For Morris, to spill or scatter material directly on the floor allowed his sculpture to assume its own form through the force of gravity, with only minimal direction by the artist. Breer similarly gives the *Rugs*

[76] See Yve-Alain Bois and Rosalind Krauss, *Formless: A User's Guide* (New York: Zone Books, 1997).

an existence separate from his own subjectivity, but the continued crumpling of the sculptures' surfaces lends them an animistic quality less present in the works of these artists.

Despite their pliant surfaces, however, the *Rugs* are not completely malleable: as Hultén's language suggests, they also display a kind of "determinism" in their movements. Breer, too, noted that the formlessness of the *Rugs* is countered by their behavior, which appears to have purpose and direction—even if toward an uncertain end. In a conversation with Annette Michelson, he said of a *Rug*:

> It's random certainly, you can't predict, but it has a purpose. This thing takes off and goes in one direction, or takes off and goes in another direction. So that gives it a kind of identity. I think if it just sat in one place and writhed around it would seem like a very passive work, and arbitrary, and tiresome. So it's important that the whole thing occasionally gathers its forces and moves off in one direction or another and has a kind of, independence. The fact that it has that almost intention, its own intention, allows the rest of it to be very sloppy and very… informal.[77]

For Breer, the "almost intention" of a *Rug*, the suggestion that the sculpture has a desire to move and stores of energy that it can harness, counterbalances the haphazardness of its form. Hovering at the edges of Breer's statement is the worry that the artwork could be perceived as merely arbitrary, or unmotivated; the artist's surprising solution is to lend the sculpture itself a sense of literally acting with purpose, as illegible as that purpose may be.

The Cybernetic Connection

When viewers encountered the *Floats* in the gallery space, their reactions were ambivalent. On the one hand, the sculptures' slow meandering recalled the ludic

[77] Interview with Michelson in Labarthe.

pleasures of children's wind-up toys; their title evoked parades, swimming pools, or ice-cream sundaes. On the other hand, the *Floats'* unpredictable paths and their propensity for bumping into things lent them a slightly disturbing undercurrent, leading some viewers to refer to them as "creepies."[78] A *New York Times* review captured the works' seemingly split personality: for Grace Glueck, the *Floats* were as "harmless as big sugar candies," but she noted that one particularly determined sculpture in the 1966 Bonino show "had to be restrained from beating its way out to 57th St." She then quotes Breer, who responds, "They *are* slightly aggressive… But then I don't want them to be overlooked. Everything has to fight for attention nowadays."[79]

To explain the *Floats'* seeming aggression, Breer cites a trope surrounding kinetic art: that its movement serves as a means to capture viewers' divided attention in an increasingly frenetic media environment. Yet the artist occasionally went further, using militarized language to describe the way the *Floats* stealthily propelled themselves into the viewer's space. As we have seen, he titled a series of aluminum sculptures "Tanks" or "Self-Propelled Aluminum Tanks," and on several occasions, he described groups of *Floats* as "armadas."[80] Such references suggest a connection between this body of sculpture and the world of cybernetics, similarly concerned with the creation of self-driving, reactive machines, frequently with military applications.

Cybernetics emerged in the wake of the Second World War, when scientists and engineers sought to develop machines that could respond not only to direct human

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[78] See Barbara Rose, "Man Ray: The Photographer As Genius," *New York Magazine,* August 6, 1973: 53. See also Levine, "Interview," 64.
[79] Glueck, "Art Notes: A Wet Moore, A Dry Armada."
[80] Breer himself used the term "armada" in Glueck's *Times* article. A photo caption refers to the sculptures as a "flotilla."

commands but also adjust themselves independently to changing external circumstances. Such research was largely directed toward military aims: engineers wanted to produce, for instance, guided missiles that could direct themselves to an enemy's target. The field developed through a series of gatherings called the Macy Conferences, held in New York from 1946 to 1953. Its participants, most notably the mathematician Norbert Wiener, defined cybernetics as the study of communication and control in both machines and animals, or as an attempt to understand the flow of information between a self-contained entity and the outside world.[81] The human body, with its sense organs and nervous system providing feedback and communication, served as a frequent paradigm to discuss self-regulating cybernetic machines.

In effect, cybernetics raised questions about where the essential differences lay between machines and living beings. In a classic article titled "Behavior, Purpose, and Teleology," Wiener, Arturo Rosenblueth, and Julian Bigelow outlined a behavioristic approach to studying machines and organisms that largely disregards the ontological differences between the two realms. Their essay aims to describe and classify patterns of behavior from lesser to greater complexity. They begin by making a distinction between active and passive objects—for instance, between a bird that flies and a ball that has been thrown. Next they distinguish between purposeful behavior, or that which is directed toward a goal, and non-purposeful, or random, behavior; importantly, they specify that machines can be random, such as a roulette wheel, or purposeful, such as a target-seeking

[81] See especially Norbert Wiener, *Cybernetics; or, Control and Communication in the Animal and the Machine* [1948], 2nd ed. (New York, M.I.T. Press, 1961), and *The Human Use of Human Beings: Cybernetics and Society* [1950], rev. ed. (London: Free Association, 1989).

torpedo.[82] This notion leads to a several further divisions, between objects that respond to feedback and those that do not, and between those that extrapolate future changes in their environment and those that do not, with varying degrees of complexity. While the structure of living organisms and artificial machines may differ, the authors argue, their behavior is "largely uniform," and for many purposes they may be treated identically.[83] As N. Katherine Hayles has written, among all the suggestions of such cybernetic theory, "perhaps none was more disturbing and potentially revolutionary than the idea that the boundaries of the human subject are constructed rather than given."[84]

The early history of cybernetic science is filled with experimental models in the form of acting machines, many of which recall toys or small animals. One of the best known is the information theorist Claude Shannon's mechanical "mouse" that could navigate a maze. Unveiled at the 1951 Macy conference, the mouse would travel through the maze once, trying out different routes, sensing the walls around it, and ultimately learning a successful path; on a second attempt, it could navigate the maze in a seemingly effortless manner. If any part of the maze were changed, the mouse would "forget" the previous solution and seek a new one.[85]

Breer's *Floats* resemble one experimental model in particular: the small robots developed by the neurophysiologist William Grey Walter. Grey Walter, who studied

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[82] Although a roulette wheel does respond exactly to the force applied to it, it cannot be said that it "intends" its final resting place in the same way that a target-seeking missile does.
[83] Arturo Rosenblueth, Norbert Wiener, and Julian Bigelow, "Behavior, Purpose, and Teleology," *Philosophy of Science* 10, no. 1 (January 1943): 18-24.
[84] N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: University of Chicago Press, 1999), 84.
[85] John Johnston, *The Allure of Machinic Life: Cybernetics, Artificial Life, and the New AI* (Cambridge: MIT Press, 2008), 28.

brain waves and had worked on radar and scanning technologies during the war, turned his attention toward robotics in the postwar years. His robots, which he built beginning in 1948 and called "tortoises," demonstrated goal-seeking and scanning behaviors. The structure of a tortoise—like that of a *Float*—consisted of a small chassis with wheels, motors, and batteries covered by a dome [Fig. 4.17]. Yet the tortoises functioned in much more complex ways. Built to seek out and move toward sources of light, they would return to their charging stations when their batteries ran low. Grey Walter gave the tortoises the "species" name *Machina speculatrix,* emphasizing their autonomy, unpredictability, and tendency toward "speculative" behavior.[86] He wrote that the machines were meant to display "the uncertainty, randomness, free will or independence so strikingly absent in most well-designed machines."[87] Observers quickly anthropomorphized the robots, named Elsie and Elmer: the French journalist Pierre de Latil wrote that, on one visit, "Elsie was afflicted with a very unstable, very feminine mood; her regulating mechanism was hypersensitive… Elmer, on the other hand, has been given a very stable, very bourgeois character.[88] For Grey Walter, the fact that these minimally programmed tortoises demonstrated behaviors that read to us as those of animals—or even humans—showed that more involved programming may eventually produce machines that approximate those of more complex beings.

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[86] Ibid., 50. Later versions of the tortoises, called *M. docilis,* gained a capacity to learn basic reflexes.
[87] William Grey Walter, "An Imitation of Life," *Scientific American,* May 1950, 44. See also Grey Walter's sequel to this article: "A Machine That Learns," *Scientific American,* August 1951, 60-63.
[88] Pierre de Latil, *Thinking by Machine: A Study of Cybernetics*, trans. Y.M. Golla (Boston: Houghton Mifflin, 1957), 213.

What might we make of the resemblance between Breer's *Floats* and cybernetic models? In *Beyond Modern Sculpture,* Jack Burnham argued that Breer's conception of the mobile *Floats* as exhibiting a constantly changing group of relations—that is, as a *system*—linked them to the systems orientation of cybernetic thought.[89] Yet for Burnham, discussions of kinetic work such as Breer's served primarily to support his broader—and highly questionable—thesis: that sculpture, augmented by new technology, was following a teleological path that would conclude with the production of artificial life. Burnham stops short of considering that Breer, and other kinetic artists working with similar themes, might take a critical attitude toward the technology that they employed or emulated.

How might we locate such a critical position in Breer's work? One key difference between Breer's *Floats* and models such as Grey Walter's tortoises is that although the *Floats* appear self-directed, they lack goal-seeking behavior. We may read their movements as purposeful—as if they were trying to escape the confines of the art gallery, for instance—but they do not aim to reach a particular place. They fit uncomfortably into Wiener's model of behavioral patterns: they are closer to random machines than to purpose-driven ones, yet they respond to feedback by reversing course when they encounter obstacles. Perhaps the key feature of the works' behavior is that they display what looks like purposiveness even while they lack a real purpose. As Breer said of the related *Rugs*, the sculptures pursue an aim that does not resemble human goals: they do not seek food or even light, but appear to be moving toward *something.* It may be that Breer's use of such forms does not extend the cybernetic analogy between living

[89] I discuss Burnham's text at greater length in my introduction.

organisms and machines, but reminds us of the otherness between these entities. While cybernetics promised a key to understand and master the behavior of both machines and living beings, Breer's sculptures reintroduce an element of unknowability to the self-driven object.

Indeed, Breer wanted the experience of watching the *Floats* to be a somewhat disturbing one. In a 1967 newspaper article, he remarked that he aimed to generate "optical anxiety" for viewers in the presence of the *Floats*.[90] We initially perceive the works as still, then notice upon second glance that they have changed their position; we may try unsuccessfully to predict their ultimate paths.

How might we reconcile this "optical anxiety" with the clearly playful, even toy-like, aspect of the *Floats*? Theorists of play have long considered the way ludic practices may transform objects drawn from the social realm. Giorgio Agamben, for example, writes that the process of "profanation," which may take place through play, "deactivates the apparatuses of power and returns to common use the spaces that power had seized."[91] The *Floats* may also subvert the active violence associated with some cybernetic machinery, instead using self-driven movement and feedback to construct moving objects whose purposes are opaque.

Linoleum

Given their impression of purposeful movement, it is appropriate that the *Floats* served at least once as actors in a larger performance: a 1966 dance piece by Robert

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[90] Paul Richard, "Artist's New Show Features White Shapes That Creep," *The Washington Post,* April 9, 1967.
[91] Giorgio Agamben, *Profanations,* trans. Jeff Fort (New York: Zone Books, 2007), 77.

Rauschenberg titled *Linoleum.* Rauschenberg first staged *Linoleum* at the NOW Festival in Washington D.C., then restaged it for television at WNET studios in New York in the same year, varying the performers and sequence slightly.[92] The performance incorporated human, animal, and machine participants, including dancers, live chickens, and *Floats*. Scholars have generally understood the work as an exploration of different modalities of movement.[93] The dancer Alex Hay stood in the middle of a bedframe, his legs surrounded by metal springs, and haltingly attempted to walk forward. Steve Paxton lay on his stomach in a wire chicken coop and dragged himself forward with his arms, while live chickens paced around nervously inside of the coop; at a certain point, he began to eat fried chicken. Simone Forti—or Trisha Brown, in the televised version—sat frozen in a chair, while Deborah Hay pushed her along a path she had traced with strands of spaghetti. In the middle of these disparate activities, nine *Floats*—including small cubic versions and a taller one in the shape of an arch—glided slowly across the floor.[94]

In addition to presenting a compendium of kinetic modes, *Linoleum* also sought to blur the lines between the different categories of performers on stage. Indeed, the roles of objects and people often appeared reversed: the *Floats* moved easily while Paxton lay prone in his cage and Forti remained the perfect image of fixity in her chair. At times, the categories seemed to collapse: Hay, wearing a costume in the form of a papier-mâché egg, read more as an object than a person and even bore resemblance to a *Float.* In the

[92] For a description of the Washington performance, see Leroy F. Aarons, "Avant-Garde 'Happening' Both Amuses, Bores Audience," *The Washington Post, Times Herald,* April 28, 1966. The performance would later be staged for a third time in 1968.
[93] Nancy Spector, "Rauschenberg and Performance, 1963-67: A 'Poetry of Infinite Possibilities,'" in *Robert Rauschenberg: A Retrospective*, ed. Walter Hopps and Susan Davidson (New York: Guggenheim Museum, 1998), 235.
[94] Photographic contact sheets from the performance reveal that there were nine *Floats* in *Linoleum.* Robert Rauschenberg Foundation, New York.

cast list for the televised *Linoleum*, Rauschenberg gave the *Floats* credit alongside Brown and the other dancers.

Rauschenberg's use of Breer's *Floats* in *Linoleum* resonates with his work with non-human performers more broadly. In an interview with Richard Kostelanetz, the artist discussed his performance *Spring Training* (1965), in which he had strapped lights to the backs of 30 turtles. In that performance, Rauschenberg says, he enjoyed "the idea of light being controlled by something literally live and the incongruity of having an animal actually assume that responsibility."[95] He specifies that he is less interested in animals that share human qualities—like the dog Lassie, for example—but prefers those whose interior beings are more foreign and seem to resist efforts at human empathy. "It is very hard to empathize with a turtle," he says. "Once you accept it as a turtle, it doesn't become a surrogate human being."[96] That is, Rauschenberg is fascinated by things and beings that have—or appear to have—their own agency, but that retain a quality of otherness that counters our efforts to assimilate it fully to human models.

As we have seen, Breer, too, was drawn to categories of being that exceeded familiar modes. In the catalogue for *The Machine, as Seen at the End of the Mechanical Age*, he explains of his *Rug*, "The only way I can think of it in relation to a machine is that since it's not an animal, it must be a machine."[97] For Breer, neither category suffices to describe the sculpture: it exhibits animal-like behavior, yet must be a machine by virtue of its non-biological structure. Both he and Rauschenberg were drawn to

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[95] Richard Kostelanatz, *The Theatre of Mixed Means: An Introduction to Happenings, Kinetic Environments, and Other Mixed-Means Performances* (New York: Dial Press, 1968), 87.
[96] Ibid., 87.
[97] Hultén, *The Machine,* 192.

nonhuman performers that complicate familiar divisions between the agentic and nonagentic, between the organic and inorganic.

Yet in *Linoleum,* the two artists' visions also came into conflict. During the performance, Rauschenberg drew outlines around the *Floats* in chalk; as the sculptures moved, they exited the contours that had been traced around them, making their movement more visible than it would normally be in a gallery setting [Fig. 4.18]. Rauschenberg explained that he intended to make the sculptures' movement evident to the audience, to "dramatize their dislocation."[98] He foreclosed any doubts regarding the sculptures' movement; the outlines functioned as proof, physically marking distance and the passage of time. For Breer, part of the allure of working with inanimate objects was the potential for uncertainty and doubt regarding whether his sculptures moved at all.

Osaka

The development of the *Floats* peaked in 1970, when Breer designed large-scale versions of the sculptures for the Expo '70 world's fair in Osaka, Japan. Breer produced seven fiberglass-covered domes in total, each six feet high and six feet wide, and weighing about 800 pounds. Located on a terrace outside the Pepsi Pavilion, the *Floats* meandered about the edges of an artificial cloud of fog by the artist Fujiko Nakaya [Fig. 4.19]. Breer collaborated with an engineer to confront the mechanical problems presented by these new, larger *Floats* that required more substantial motors and batteries and

[98] Burford, *Robert Breer,* 82.

presented safety issues as they roamed freely among crowds at the terrace.[99] He also decided to add an audio component to the works that he created by mixing the sounds of wood being sawn, a truck driving, a conversation, and birds singing. Each *Float* played an identical 20-minute loop incorporating these sounds. The audio component added a new layer of complexity to the group of sculptures that now generated shifting soundscapes as they moved into new spatial configurations.

Breer had first heard about the pavilion project from a neighbor who worked for the Pepsi Company. While he initially hesitated to work with a large corporation, he ultimately became excited by the project and convinced the Pepsi organizers to bring in Experiments in Art and Technology (E.A.T.) to coordinate the pavilion. Breer was particularly drawn to the idea of showing his work in Japan. Specifically, he began to see a link between his slow-moving *Floats* and the rocks in Japanese temple gardens, which, he had heard, appear to move if one focuses on them for long periods of time.[100] He considered a number of ideas for the sculptures' placement and arrangement, including positioning the sculptures in a moat that the visitor could cross over via a bridge, before choosing the terrace location.[101]

Breer's collaboration with Pepsi was not without conflict. Company executives, concerned that visitors would not notice the subtle movements and sounds of the *Floats*, asked Breer to increase the speed and turn up the volume of the sculptures. The artist

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[99] Nilo Lindgren, "Into the Collaboration," in *Pavilion, Pavilion: By Experiments in Art and Technology,* ed. Billy Klüver, Julie Martin, and Barbara Rose (New York: E.P. Dutton & Co., 1972), 52.
[100] Calvin Tomkins, "Outside Art," in Klüver, Martin, and Rose*, Pavilion*, 108. Breer said, "It just occurred to me that maybe I could make my own little Japanese contemplation garden over there, the difference being that my rocks really *would* move."
[101] Lindgren, "Into the Collaboration," 8.

maintained that it was essential that the works operate at the threshold of perception.[102] "It was difficult for me to explain to them that the idea was more of creating a presence, rather than some kind of spectacle, some kind of jazzy situation," Breer recalled in an interview.[103] Echoing Bury's analysis of slowness, the artist argued that the sculptures' unhurried pace ensured that viewers would be unable to predict their paths. The muted quality of their movement would also ensure that viewers perceived the sculptures not as independent attractions but as a group whose appearance depended on its members' shifting relationships to one another. In this scenario, Breer said, "motion itself is something that is outside of them, not as part of them… what I hope happens is that their movement is an essence like the air around them."[104] The artist ultimately attained his vision for the *Floats* despite Pepsi's early objections.[105]

The increased size of the *Floats* changed the relation to the human body present in their small Styrofoam and aluminum predecessors. With their newly imposing scale, the sculptures now threatened not to bump into a person's ankles but to knock him or her over entirely. On their return from Japan, one of the Osaka *Floats* made a final major appearance in the Sculpture Garden of the Museum of Modern Art, where it was on loan starting in the fall of 1970. A newspaper article described a viewer's encounter with the *Float*:

> As the visitor—a tall man—stepped outdoors into the sculpture garden at the Museum of Modern Art, a large white dome propelled itself toward him… slowly but deliberately. The man stood rooted, staring at the oncoming dome – six feet

[102] Tomkins, "Outside Art," 159.
[103] Levine, "Interview," 65.
[104] Ibid.
[105] A press release from MoMA, which later borrowed one of the sculptures, described it as moving at a rate of about two and a half feet per minute. Press Release no. 93, August 25, 1970, Museum of Modern Art, New York.

> high and six feet in diameter. A collision seemed inevitable, but inches away from the man the dome bumped into a small post and backed off.[106]

The passage points to the increased risk of violence implied by the Osaka *Floats.* The anecdote also contains a second interesting feature: as Breer's sculpture moves, the man remains "rooted" in place, seemingly paralyzed by the moving object. It is only through the *Float*'s incidental collision with a post that the threat is averted. The man reenacts the Medusa-like dynamic that recurs in discussions of kinetic art, in which the moving object renders the human viewer still and object-like.[107]

Drawings and Unrealized Works

In addition to the *Floats* and *Rugs,* Breer left behind a number of drawings for proposed kinetic works that were never realized. Among the most interesting of these drawings are several imaginative proposals for works that likely could never have been constructed in practice. In contrast with the abstract forms of the existing sculptures, these drawings tend to contain more representational subject matter—sometimes incorporating social commentary—and dovetail in surprising ways with the main body of the artist's kinetic work.

In one drawing dated to 1969, Breer sketched an image of a large-scale kinetic environment employing the same self-moving principle as the *Floats* [Fig. 4.20]. The work took the form of a cubic conference building that would travel slowly across the landscape over the course of a day. "At the end of a conference, people leaving [the] building would emerge into a different environment," Breer wrote on the drawing. In this

[106] "Art on the Move," *New York Sunday News,* October 18, 1970.
[107] Gross, *Dream of the Moving Statue,* 202.

proposal, Breer points to the "placelessness" inherent in office life: the self-contained business of the conference goes on unaffected by the environment that surrounds it. At the end of the day, however, the work would produce an experience of disorientation for conference attendees who exit the building in unfamiliar surroundings, potentially quite far from the site at which they entered.

In a second, undated drawing, Breer expanded this concept even further, depicting an entire town in which objects constantly move around [Fig. 4.21]. Alongside moving cars and animals, the drawing shows a moving tree, fire hydrant, and an Elks Lodge, their trajectories indicated by arrows; at the center a building rises upward, as if growing a hazy second story. Breer explains in a caption: "It doesn't matter where you leave things, they aren't there when you come back. Fish swim by overhead. Street signs change names every five minutes. The sun does loop the loop. Like Miami? L.A.?" As in the conference room drawing, Breer equates the idea of kineticism with that of disorientation. Residents of the kinetic town would be unable to locate themselves securely on the city grid, to estimate the time of day from the position of the sun, or to keep track of their own belongings. The artist's passing mentions of Miami and Los Angeles add a further dimension to the drawing: Breer suggests that the rapid growth of these city centers, with the concomitant destruction and rebuilding of the urban fabric, has already produced a kinetic experience of disorientation. With its playful and potentially disturbing aspects, Breer's imaginary city hovers between the New Babylon imagined by Constant Nieuwenhuys—in which humans satisfy their play instincts by constantly reconfiguring their environments—and the urban landscape of the postwar period, with its rapid and

potentially overwhelming rate of change.[108] These two drawings, in particular, pick up on the *Floats'* reframing of site as a fluctuating and unstable entity, and they translate this idea into the terms of social experience—giving it an ambivalent valence in the process.

Other drawings by Breer imagined variations of the *Floats* and *Rugs* that would take on more figurative forms. In one sketch from 1971, the artist shows an American flag scrunched up like one of the *Rugs*, amid additional images of a seagull and clouds in the sun, bushes swaying in the wind, and daisies in different stages of blossoming [Fig. 4.22]. The image of the flag rolled up into a ball—exhibiting the formless, even pitiable quality of the *Rugs*—points to an element of political critique only hinted at in earlier sculptures such as the *Tanks*. Rather than flying heroically, the flag lies apparently discarded, its movement limited to a pathetic crumpling.[109] Breer's drawing can be understood as biting commentary on the patriotic rhetoric surrounding the Vietnam War, which, as I have noted, the artist publicly opposed.

The images in this sketch clearly depart from Breer's abstract kinetic sculptures. In their references to real-world objects, they are much closer to the kinetic work of Claes Oldenburg, a close friend of Breer.[110] In his activities with LACMA's Art & Technology

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[108] On Constant, see Mark Wigley, *Constant's New Babylon: The Hyper-Architecture of Desire* (Rotterdam: Witte de With, Center for Contemporary Art, 1998).

[109] Of course, Breer was not alone in playing with the dual nature of the flag as object and as symbol: Jasper Johns had covered much of the same ground in his flag paintings of the previous decades. See Leo Steinberg's reflections on Johns' flags in "Jasper Johns: The First Seven Years of his Art," in *Other Criteria: Confrontations with Twentieth-Century Art* (New York: Oxford University Press, 1972), 17-54.

[110] The two artists met in 1961, likely through Klüver, and collaborated on a film in 1962. In 1965, Oldenburg began to prepare for an exhibition at Sidney Janis Gallery and became interested in the Chrysler Airflow car, designed by Breer's father in the 1930s. Oldenburg visited Carl Breer in Detroit and studied one of the cars in detail, eventually making works based on its internal parts. Oldenburg also incorporated two miniature *Floats* into his Mouse Museum. See Michelle Kuo, "Passages: Robert Breer, 1926-2011,"

program, for which he was paired with the Disney company, Oldenburg proposed to build a group of sculptures called the *Theatre of Objects* or *Oldenburg's Ride*; as the artist said, "they moved or they broke or they reconstituted themselves, or they peeled themselves—they went through simple motions."[111] In some works, objects would fall apart and reassemble themselves: a cup would shatter and come back together; eggs would be cracked and scrambled on a plate, then reconstituted; pies would disappear from a case as if being eaten and then reappear.[112] Others simply involved movement, such as a wiggling Jello mold. In a final category, things metamorphosed, as in one example in which a banana was turned into a fan, the wings of the fan becoming the peel of the fruit (Oldenburg called this a "fanana") [Fig. 4.23]. In a sense, Oldenburg's kinetic projects resemble film run backwards to produce logically impossible strings of events. The artist understood these works to be about "the tragedy of brokenness" and its opposite, "as in a dream... where your teeth fall out, but on awakening you find out they didn't."[113] They give sculptural form to a fantasy of return to a lost origin.

Although Oldenburg's actual production of kinetic art was limited, his ideas present an interesting picture of a road largely not taken in the main body of kinetic art. Oldenburg's ideas are suffused with reference and narrative, displaying the

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Artforum 50, no. 5 (January 2012): 33-34. Breer later reported that Oldenburg, after having seen one of his *Rugs,* wanted to collaborate on a moving sculpture of a fried egg; Breer declined (Burford, *Robert Breer,* 84).

[111] Oldenburg had first sketched out many of these objects around 1965. Ultimately, he realized a second kinetic project, *Giant Ice Bag,* a large bag that twists, rises and balloons back down. It was shown at Expo '70, at the U.S. Pavilion, while Breer's *Floats* were at the Pepsi pavilion. See Maurice Tuchman, *Art & Technology: A Report on the Art & Technology Program of the Los Angeles County Museum of Art, 1967-1971* (Los Angeles: Los Angeles County Museum of Art, 1971), 242.

[112] Ibid., 244.

[113] Ibid., 247.

metamorphosis of one object into another as often as they demonstrate more abstract principles of movement. If Oldenburg intervenes in playing with the structure of narrative, Breer abandons it entirely, exploring distributed forms of place and time constituted by multiplicity and fragmentation.

Conclusion

Discussion of the *Floats* in previous scholarship on Breer has largely focused on their juxtaposition with the artists' films: one body of work is dizzyingly fast-paced, the other exceedingly slow. From another perspective, the films foreground discontinuity, while the sculptures follow deliberate, continuous paths. Yet this division is perhaps too simplistic. As visually fragmented as any Breer film may be, it is also linear, always running in the same order; and part of the surprise of the *Floats* is that we may perceive their movement only when we notice, all of a sudden, that they have changed position.

Even more than speed and continuity, the *Floats* address the themes of place and placelessness. If the historical logic of sculpture is that of the monument—which "sits in a particular place and speaks in a symbolical tongue about the meaning or use of that place"—the logic of the *Floats* constitutes its opposite.[114] The idea of the mobile place appears in the titles and shapes of the sculptures: *Floats* carrying the names of cities move like floating islands; functionless moving columns fail to give support; seats, rather than providing a resting place, drift across the floor. Seeming to follow a purpose of their own, the *Floats* refuse to mark any place at all. They make frequent reference to architecture and landscape, but occupy neither realm comfortably.

[114] Krauss, "Sculpture in the Expanded Field," 33.

Finally, both Breer's films and his *Floats* create situations that disrupt the normal operations of memory. The frenetic pace of *Recreation* or *Blazes* attempts to complicate both recollection and anticipation in order to suspend the viewer in a rapidly changing present. Breer relies for this effect on the particular qualities of film that allow a succession of unrelated images to flash on the screen. His *Floats* are materially continuous; with their slow movement, they activate memory over long spans of time. More than the other artists examined in this dissertation, Breer imagines movement within a relational model involving other objects and bodies situated in a spatial horizon. The *Floats,* declining to serve any monumental function of permanence or stability, instead create a new understanding of site as permanently in flux.

CONCLUSION

In January 1969, the Greek kinetic artist Takis entered the Museum of Modern Art, located his *Tele-sculpture* (1960), and unplugged it from the wall [Fig. 5.1]. He carried the work to the Sculpture Garden, where he and his friends camped out until members of MoMA's staff agreed to meet with them. Takis was protesting the inclusion of his sculpture in the exhibition *The Machine, as Seen at the End of the Mechanical Age*; he had wanted the museum to display a more recent work, and felt that artists should have more say over their representation in museum settings.[1] In the following months, the episode led to the formation of the Art Workers' Coalition, a group that advocated for expanded artists' rights, increased gender and racial diversity in exhibitions, and greater accessibility to the public, particularly the working class.[2]

Takis's gesture of unplugging his sculpture constituted a suitable finale to *The Machine,* Pontus Hultén's show held at the museum from November 1968 until February of the following year. Hultén's thesis was that the "mechanical machine"—which employed physical forces analogous to human muscles—was becoming increasingly obsolete, replaced by "electronic and chemical devices" whose operations are closer to those of the nervous system.[3] The exhibition was something of an elegy to the machine: it opened with images of devices designed by Leonardo Da Vinci and eighteenth-century

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[1] "Sculptor Takes Work Out of Modern Museum Show," *New York Times,* January 4, 1969.

[2] See Julia Bryan Wilson, *Art Workers: Radical Practice in the Vietnam War Era* (Berkeley: University of California Press, 2009), esp. 13-39, and Art Workers' Coalition, "Statement of Demands" [1969], in *Conceptual Art: A Critical Anthology,* ed. Alexander Alberro and Blake Stimson (Cambridge: MIT Press, 1999), 88-89.

[3] Pontus Hultén, "Foreword and Acknowledgments," *The Machine, As Seen at the End of the Mechanical Age* (New York: Museum of Modern Art, 1968), 3.

automata, surveyed depictions of machines by Giacomo Balla and Marcel Duchamp, focused at length on motorized kinetic art, and even included examples of functional machines such as cars and cameras. One centerpiece of the show—which comprised more than 200 artworks—was Tinguely's *Rotozaza, No. 1* (1967), a machine that rapidly spit out balls that viewers then had to feed back into it [Fig. 5.2]. Hultén interpreted the work as a commentary on overproduction and waste.[4] The show ended with winning examples of technology-based art from a contest staged by Experiments in Art and Technology (E.A.T.), an organization encouraging collaboration between artists and engineers; the remainder of the entries appeared in a related exhibition at the Brooklyn Museum.

Hultén's exhibition was one of several surveys of kinetic art that appeared in 1968, including Frank Popper's book *Origins and Development of Kinetic Art* and Guy Brett's *Kinetic Art*. Critics and curators seemed to agree that kinetic art had peaked. Dematerialized art, in the form of conceptualism and transitory performance events, was taking its place. In both Europe and the United States, many kinetic artists had moved on from creating discrete motorized sculptures to other forms, from large-scale environments to public art. Tinguely had been staging spectacular performances with self-destructing machines as early as 1960; by the middle of the decade, he was making public sculptures and large-scale installation art. Bury, with his most inventive period behind him, had begun to design jewelry and public fountains. Colombo had expanded his interest in perceptual instability to create walk-in kinetic environments, whose uneven ramps and stairs confused viewers' sense of bodily orientation. Working with E.A.T.,

[4] Ibid., 174.

Breer had increased his *Floats* to a gigantic scale for the Osaka pavilion at the Expo '70 world's fair; he would later make a "rider float" designed to carry a spectator on its back.

In the turbulent years of the late 1960s—with the Vietnam War raging and social unrest spreading across Europe and the United States—kinetic art also came under fire for lacking an explicit political message. In the Paris-based journal *Robho*'s second issue, published in the fall of 1967, the critic Jean Clay fended off charges that kinetic art had become overly academic. In Frank Popper's recent exhibition *Lumière et Mouvement,* he argued, good work was lost in a sea of mediocrity, as artists jumped on the trend of the "little motor, the little vibration, the little reflection."[5] Borrowing the appearance of kinetic art without engaging with its theoretical underpinnings, he said, these artists turned museum rooms into "trade fairs." Kinetic art's increasing academicism threatened to equate the motorized artwork with the gadget, to position art as little more than a form of amusement drained of its semantic force. According to Clay, the most powerful works, in contrast, led viewers to "systematically question the fixity of matter, the stable, concrete, permanent givens of the world," and thus to counter "the general philosophy of a society founded on consumption, accumulation, possession."[6]

Despite Clay's impassioned defense of kinetic art, however, *Robho*'s attention would soon shift away from kinetic sculpture to more dematerialized art forms. The journal's fourth issue, published toward the end of 1968, featured a special section on Lygia Clark. In the Brazilian artist's recent work, Clay writes, "the questioning of the

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[5] Jean Clay, "Le cinétisme est-il un académisme?," *Robho,* no. 2 (November-December 1967): n.p.
[6] Ibid.

object arrives at its final phase: it disappears."[7] Artworks such as *Caminhando (Walking)* (1963), in which viewers create Möbius strips out of paper, and *Abyssal Mask* (1968), in which they wear a blindfold and breathe into a bag to modify their senses, demonstrate that artistic meaning now lies in one's "participation in the real." In Clark's work, we partake in "a dilution… of the idea of art in the idea of praxis." The journal's cover image reiterated this merging of art and praxis; it carried an image of the track-and-field athlete Tommie Smith giving the Black Power salute at the Olympics and bore the headline, "Guerilla Theater."[8]

At roughly the same time that Clay complained about kinetic art's association with the "gadget," Baudrillard published *The System of Objects,* a text surveying the changing landscape of domestic furnishings and everyday things in the era of postwar mass production. Baudrillard observed the rise of "gizmos," obsessively specialized devices, such as "the toaster with a nine-level browning control," "the electric cocktail swizzle-stick," and "the electrical whatsit that extracts stones from fruit."[9] On the one hand, such objects satisfy a fantasy in which any human need or desire finds instant gratification by means of a corresponding product. On the other hand, while gizmos are totally functional, they are also totally useless: they epitomize the fact that technological development, far from being a singular march toward ever-greater efficiency and rationality, responds on a deep level to human absurdity and irrationality.

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[7] Clay, "Lygia Clark: Fusion generalisée," *Robho,* no. 4 (late 1968): 12-15.
[8] For a discussion of *Robho*'s history, with a particular emphasis on its attention to Latin American artists, see Isabel Plante, "Les Sud-américains de Paris: Latin American Artists and Cultural Resistance in *Robho* Magazine," *Third Text* 24, no. 4 (July 2010): 445-455.
[9] Jean Baudrillard, *The System of Objects* [1968]*,* trans. James Benedict (New York: Verso, 1996), 115-116.

Clay's and Baudrillard's comments on the "gadget" or "gizmo" suggest one reason for kinetic art's decline. Certainly, as Clay argued, many of the genre's latecomers borrowed their predecessors' form but not message, producing superficial copies of earlier art. Yet the cultural context was changing as well. As devices of questionable utility proliferated in household settings, kinetic art's idea of the "useless machine" may have lost some of its critical force. Previously, artworks such as drawing machines and objects that crawled on the floor could be understood as a critique of technology's excessive rationality or instrumentalization. Yet the rise of the "gadget" demonstrated that this condition was not as clear-cut as it might seem.

Critics have also charged that the art of the immediate postwar period failed to confront the recent past.[10] This accusation could certainly be leveled against kinetic art, whose spokespeople often made a virtue of the genre's detachment from history. Guy Brett, for instance, wrote in 1968: "Because they are always being renewed, afresh from the beginning, [kinetic artworks] suggest a kind of liberation from historical time and from the oppression of past accumulation of material."[11] Even the name of the German Zero group—whose members declared their search for "pure possibilities for a new beginning"—seemed to affirm the point.[12] Yet the strongest kinetic art did, in its own way, grapple with past and present social contexts. Tinguely's early work took up the

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[10] See Benjamin Buchloh, "Plenty or Nothing: From Yves Klein's *Le Vide* to Arman's *Le Plein*," in *Neo-Avantgarde and Culture Industry: Essays on European and American Art from 1955 to 1975* (Cambridge: MIT Press, 2000), 260-262.
[11] Guy Brett, *Kinetic Art* (London: Studio-Vista, 1968), 91.
[12] Otto Piene, "The Development of Group Zero," *The Times Literary Supplement*, September 3, 1964: 812-813. Some have argued that the Zero artists did, indeed, grapple with the legacy of World War II. See Eleanor Jess Atwood Gibson, "The Media of Memory: History, Technology and Collectivity in the Work of the German Zero Group 1957-1966" (PhD diss., Yale University, 2009).

legacy of modernism, not to institutionalize it, but to subject it to operations of fragmentation and disintegration; his drawing machines engaged questions of labor and the illusion of consumer choice in an increasingly automated economy. Bury, as contemporary viewers understood in relation to his *Cinétisations*, alluded to the nuclear imagination by constructing works whose action was tensely anticipated but constantly deferred. Colombo grappled with questions of planning and newness that bore clear social implications; Breer constructed sculptures whose forms resembled, and perhaps parodied, experiments in cybernetics. Yet, especially as kinetic artists settled into their signature styles, these approaches read all too easily as amusing gags, on the one hand, or as uncritical embraces of technology, on the other.

From our present viewpoint, it is easy to find kinetic art's politics naïve. While artists tried to "liberate" art by making it more variable and open in its forms, they failed to see the way these very qualities of flexibility, mobility, and constant adaptation would become sometimes-oppressive requirements for workers in the contemporary economy. Similarly, Clay's description of kinetic art as a contestation of "having" signaled his rejection of the era's rampant consumerism. But this point, too, looks different in hindsight, as the rise of cloud storage, streaming, and sharing services leads us toward what some have called "the end of ownership"—an outcome that leaves consumers in an uncertain position. As goods increasingly take digital form, private corporations are positioned to withdraw users' ostensible belongings at any time.[13]

The hopes that attached to kinetic art in its moment, however, are an important part of the story. In many ways, the genre can be understood as a point of transition: from

[13] For a discussion of this shift, see Aaron Perzanowski and Jason M. Schultz, *The End of Ownership: Personal Property in the Digital Economy* (Cambridge: MIT Press, 2016).

material objects to transitory acts, from motivated compositions to chance-based outcomes. Artists working with moving objects rejected the idea that any one viewer could absorb or master an artwork in its entirety; by making works that changed over long spans of time, they asked spectators to understand that their viewpoints were only ever partial. The nature of their objects' movement was rarely dramatic; more often it was slow and incremental, and sometimes barely visible, laying emphasis on the limits of perception. Finally, kinetic artists turned away from what they considered the solipsism of Abstract Expressionism and the Informel, seeking sources of meaning beyond individual human intention. In doing so, they revealed the potential of material itself—of seemingly animate objects—to generate new ideas and perspectives.

ILLUSTRATIONS

Images have been withheld for copyright reasons.

Figure 0.1
Cartoon from *The New Yorker,* April 24, 1965

Figure 0.2
Marcel Duchamp, *Rotary Glass Plates (Precision Optics),* 1920
Painted glass, iron, electric motor, and mixed media (largest blade damaged in 2007 and replaced by facsimile in 2011). 65 ¼ x 62 x 38 in. (165.7 x 157.5 x 96.5 cm)

Figure 0.3
Duchamp, *Rotary Demi-sphere (Precision Optics),* 1925
Painted papier-mâché demisphere fitted on velvet-covered disk, copper collar with plexiglass dome, motor, pulley, and metal stand. 58 ½ x 25 ¼ x 24 in. (148.6 x 64.2 x 60.9 cm)

Figure 0.4
Naum Gabo, *Kinetic Construction (Standing Wave),* 1919-20, replica 1985
Metal, wood and electric motor. 24 ¼ x 9 ½ x 7 ½ in (61.6 x 24.1 x 19 cm)

Figure 0.5
László Moholy-Nagy, *Light Prop for an Electric Stage (Light/Space Modulator),* 1930
Aluminum, steel, nickel-plated brass, other metals, plastic, wood and electric motor. 59 ½ x 27 ½ x 27 ½ in. (151.1 x 69.9 x 69.9 cm)

Figure 0.6
Alexander Calder, *Black Frame*, 1934
Wood, sheet metal, wire, and paint, with motor. 37 x 37 x 24 in. (94 x 94 x 61 cm)

Figure 1.1
Jean Tinguely, *Méta-Malevich,* 1954
Painted wood with painted sheet-iron elements, wooden wheels, iron axles, rubber belts, electric motor. 24 ¼ x 19 ¼ x 4 in. (61.5 x 49 x 10 cm)

Figure 1.2
Tinguely, *Méta-Malevich,* 1954, including view of mechanism on reverse
Painted wood with painted sheet-iron elements, wooden wheels, iron axles, rubber belts, electric motor. 24 x 19 ¾ x 7 ⅞ in. (61 x 50 x 20 cm)

Figure 1.3

Joan Miró, *Relief Construction,* 1930

Figure 1.4
Yaacov Agam, *White and Black on Black,* 1953, seen in four different arrangements

Figure 1.5
Auguste Herbin, *Minuit,* 1953

Figure 1.6
Tinguely, *Trois Points Blancs,* 1955
Colored wood panel with eight differently shaped metal elements of different colors. Backside: wood pulleys, rubber belt, metal fixtures, electric motor. 24 ⅝ x 19 ¾ in. (62.5 x 50 cm)

Figure 1.7
Piet Mondrian's studio in New York, photographed in the mid-1940s

Figure 1.8
Tinguely, *M II* (from the series *Blanc sur noir*), 1956
Black wood panel with 13 differently shaped metal elements, painted white. Backside: wood pulleys, rubber belt, metal fixtures, electric motor 220 V. 29 ⅞ x 39 ⅜ x 11 ¾ in. (76 x 100 x 30 cm)

Figure 1.9
Ellsworth Kelly, *Neuilly*, 1950

Figure 1.10
Tinguely, *Méta-Kandinsky I,* also called *Wundermaschine,* 1956
Wood panel with 9 differently shaped metal elements in different colors. Backside: wood pulleys, metal rods, rubber belts, electric motor 110 V. 15 ⅝ x 40 ⅝ x 13 in. (39.8 x 103.2 x 33 cm)

Figure 1.11
Francis Picabia, *Dada Movement,* 1919
Ink on paper. 20 ⅛ x 14 ¼ in. (51.1 x 36.2 cm)

Figure 1.12
Tinguely, *Relief méta-mécanique sonore II,* 1955
Wood panel painted black with 17 differently shaped cardboard, wood, and sheet-iron elements painted white, iron rods and wires, two bottles, a funnel, a saw, two cans, and three electric motors. 32 ¼ x 136 ⅝ x 18 ⅛ in. (82 x 347 x 46 cm)

Figure 1.13
Electrical cord visible below a relief shown in *Automates, sculptures, et reliefs mécaniques de Tinguely,* Studio d'architettura b. 24, Milan, 1954

Figure 1.14
View of a large relief in *Automates, sculptures, et reliefs mécaniques de Tinguely,* Studio d'architettura b. 24, Milan, 1954

Figure 1.15
Tinguely, *Swiss Made,* 1955/61, seen in its current state (left) and as previously installed in a grandfather clock (right)

Figure 1.16
Tinguely, *Stabilisation Definitive No. 1* (from the *Oeuf d'Onocrotale* series), 1958
Black wood panel with seven differently shaped metal elements, all painted white. Backside: wood pulleys, rubber belt, metal rods, electric motor 115 V. 39 ½ x 34 ⅝ x 7 ⅞ in. (100.2 x 88 x 20 cm)

Figure 1.17
Alberto Giacometti, *Suspended Ball,* 1930-31

Figure 1.18
Tinguely, *Yokohama II,* 1956
White wood panel with 17 differently shaped, black metal elements. Backside: wood pulleys, rubber belts, metal fixtures, electric motor 110 V. Ca. 49 ½ x 59 in. (125 x 150 cm)

Figure 1.19
Tinguely, *Machine à dessiner No. 1,* 1955
Black wood panel, revolving disk, metal rods and fixtures, wood pulleys, rubber belts, electric motor. 29 ½ x 46 x 14 ⅝ in. (75 x 117 x 37 cm)

Figure 1.20
Tinguely, *Machine à dessiner No. 2,* 1955
Wood board painted black, metal plate, five differently shaped metal elements, painted white. Backside: wood pulley and electric motor

Figure 1.21
Tinguely, *Méta-Matic No. 10,* 1959
Iron tripod, sheet-iron elements, wooden wheels, rubber belts, metal rods, everything painted black with a round white element, electric motor. 41 x 50 ¾ x 2 ⅝ in. (104 x 129 x 55 cm)

Figure 1.22
Tinguely, *Méta-mécanique (Méta-Herbin),* 1954
Painted steel and electric motor. 68 ½ x 32 ⅛ x 42 ¾ in. (174 x 81.7 x 108.7 cm)

Figure 1.23

Tinguely/Hansjörg Stoecklin, Drawing produced by *Méta-Matic No. 11,* 1959(?)
Felt-tip pen on folded paper, 8 ⅝ x 6 ½ in. (22 x 16.5 cm)

Figure 1.24
Jean Tinguely: Kinetic Constructions and Drawing Machines, Staempfli Gallery, New York, 1960. Drawings produced by the machine can be seen pinned on the wall at left.

Figure 1.25
Tinguely, *Metamatic No. 12 (Le grand Charles),* 1959
Iron rods, wood pulleys, rubber belts, felt pen and paper, electric motor, painted black. 78 ¾ x 59 in. (200 x 150 cm)

Figure 1.26
André Masson, *Automatic Drawing,* 1924
Ink on paper. 9 ¼ x 8 ⅛ in. (23.5 x 20.6 cm)

Figure 1.27
Tinguely, *Banc des amoureux* (also called *Machine à faire des sculptures* and *L'appareil à faire des sculptures*), 1960
Iron parts, oil drum, tractor seat, bicycle, motorcycle and baby-carriage wheels. 84 ¼ x 88 ⅝ x 144 ⅞ in. (214 x 225 x 368 cm)

Figure 2.1
Pol Bury, *Untitled,* 1949
Linocut. 9 x 12 in. (23 x 30.5 cm)
Printed as cover of the magazine *Cobra* no. 2, Brussels, March 1949

Figure 2.2
Bury, *Composition*, c. 1952
Oil on canvas. 39 ⅜ x 76 ¾ in. (100 x 195 cm)

Figure 2.3
Bury, *Composition N°11,* 1952
Oil on canvas. 4⅜ x 31 ½ in. (11 x 80 cm)

Figure 2.4
Jean Hélion, *Equilibrium*, 1933-34

Figure 2.5
Bury, *Plans mobiles,* 1953
Three aluminum plates. 49 ¼ x 43 ¼ x 5 ⅞ in. (125 x 110 x 15 cm)

Figure 2.6
Gyula Kosice, *Röyi,* 1944

Figure 2.7
Works by the Argentinian Madí group at the Salon des Realités Nouvelles in Paris, 1948

Figure 2.8
Raúl Lozza, coplanal, reproduced in *Arte Concreto Invención,* no. 1, August 1946

Figure 2.9
Bury, *Relief mobile 5,* 1954
Painted metal. 17 ⅜ x 21 ¼ x 2 ⅜ in. (44 x 54 x 6 cm)

Figure 2.10
Bury, *Plans mobiles,* 1953
Metal

Figure 2.11
Denise René manipulating a transformable relief by Yaacov Agam, c. 1955

Figure 2.12
Bury, *Multiplans*, 1957
Multicolored wood slats, metal casing, electric motor. 39 x 46 x 6 ¾ in. (99 x 117 x 17 cm)

Figure 2.13
Bury, *Ponctuation,* 1959
Sheet metal plate, Masonite plate, electric motor. 19 ¾ x 15 ¾ in. (50 x 40 cm)
Produced in an edition of 100 for Edition MAT

Figure 2.14
Bury, *Untitled (Ponctuation noire ronde),* 1965
Painted Masonite, wood, electric motor. 23 ¼ x 3 ½ in. (59 x 9 cm)
Produced in an edition of 100 for Edition MAT

Figure 2.15
Bury, *Ponctuation,* 1959
Panel, piano wire, electric motor. 11 x 11 in. (28 x 28 cm)

Figure 2.16
Maurice Henry, cartoon of Pol Bury printed in *Iris Time,* November 1963

Figure 2.17
Bury, *Entité erectile,* 1962 (in two different positions)
11 ¼ x 11 ¼ in. (28.5 x 28.5 cm)

Figure 2.18
Bury, *2270 points blancs sur un losange,* 1965

Wood, nylon, electric motor. 49 ¼ x 33 ⅛ in. (125 x 84 cm)

Figure 2.19
Bury, *Chicago,* c. 1969
Gelatin silver print. Sheet: 11 5/8 x 6 1/8 in. (29.6 x 15.5 cm); mount: 15 3/4 x 11 7/8 in. (40 x 30.1 cm)

Figure 2.20
Bury, *Petit Meuble,* 1964
Wood, electric motor. 32 ⅝ x 19 ¼ x 19 ¼ in. (83 x 49 x 49 cm)

Figure 2.21
Bury, *Neuf Boules sur cinq plans,* 1964
Wood, nylon, electric motor. 39 ½ x 8 x 16 ¾ in. (100.3 x 20.3 x 42.5 cm)

Figure 3.1
Gianni Colombo, *0.1 Grigio,* 1958
Felt on Masonite. 35 ⅛ x 39 in. (89.23 x 99 cm)

Figure 3.2
Colombo, *0.6 Grigio,* 1959
Felt on Masonite. 35 ⅞ x 47 ⅝ in. (91.14 x 121 cm)

Figure 3.3
Colombo, *Rilievi intermutabili,* 1959
Rubber over spheres and mechanical animation on wood structure. 9 ¾ x 10 ¼ x 1 in. (22.86 x 26 x 2.54 cm)

Figure 3.4
Colombo, *Superficie in variazione,* 1959
Plush, metal, and mechanical animation on wood structure, foam rubber and string. 39 x 39 x 3 ⅞ in. (99 x 99 x 9.86 cm)

Figure 3.5
Gabriele Devecchi, *Superficie in vibrazione,* c. 1960
Front and back views

Figure 3.6
Colombo, *In-Out. Strutturazione modulare espansibile,* 1960-62
Metal, plastic, and mechanical animation on wooden base. 18 ⅞ x 17 ⅝ x 5 ⅜ in. (48 x 44.78 x 13.67 cm)

Figure 3.7
Colombo, *Rotoplastik,* 1960
Mobile wooden elements

Figure 3.8
Osvaldo Borsani's reclining furniture on the cover of *Domus,* no. 303 (February 1955)

Figure 3.9
Bruno Munari, *Scultura da viaggio,* 1959
Plastic and wood. Height 27 ½ in. (70 cm)
As published in *Domus* 359 (Oct. 1959)

Figure 3.10
Colombo, *Strutturazione pulsante* (manual version), 1959
Foam rubber and mechanical animation on wood and metal. 7 x 10 ⅝ x 1 ¼ in. (17.78 x 27 x 3.18 cm)

Figure 3.11
Colombo, *Strutturazione pulsante*, c. 1960
Polystyrene foam core and electromechanical animation on wood structure, foam rubber and metal. 31 ⅞ x 31 ⅞ x 6 ⅜ in (81 x 81 x 16.2 cm)

Figure 3.12
Piero Manzoni, *Achrome with Bread Rolls,* 1961

Figure 3.13
Colombo, *Strutturazione fluida,* c. 1960
Steel, glass, and electromechanical animation on metal base. 23 ⅜ x 17 ⅝ x 5 ⅞ in. (59.4 x 44.78 x 14.94 cm)

Figure 3.14
Jean Arp, *Two Heads,* 1927

Figure 3.15
Colombo, *Superficie pulsante N. 11*, c. 1961
As reproduced in the *Almanacco Letterario Bompiani 1962: Le applicazioni dei calcolatori elettronici alle scienze morali e alla letteratura,* ed. Sergio Morando (Milan: Bompiani, 1961)

Figure 3.16
Colombo, graphic work reproduced on the cover of *Almanacco Letterario Bompiani*
In successive moves, four circles travel across a square.

Figure 3.17
Colombo, *Strutturazione acentrica,* 1962
Paint on wood, 19 ½ x diameter 20 ¾ in. (48.26 x diameter 50.8 in)

Figure 3.18

Colombo, *Spazio Elastico*, 1967
Environment: Elastic cord, black light, electromechanical animation. 156 x 156 x 156 in. (396.2 x 396.2 x 396. 2 cm)

Figure 4.1
Robert Breer, *Three Stage Elevator*, 1955
Oil on canvas. 60 ¼ x 45 ⅝ in. (153 x 116 cm)

Figure 4.2
Breer, *Image par Images (Image by Images*), 1955
Produced in an edition of 500 for Denise René Gallery

Figure 4.3
Breer, *Mutascope*, 1962
Plastic, metal. 20 ½ x 15 in.; base 9 ½ x 9 ½ in. (52 x 38 cm; base 24 x 24 cm)

Figure 4.4
Installation view of *Art 1963/A New Vocabulary,* Philadelphia, Pennsylvania, 1962. A mutoscope by Breer is visible at right.

Figure 4.5
Breer, *Homage to John Cage*, 1964
Plastic, metal, acrylic paint. 44 ⅛ x 9 ⅞ in. (112 x 25 cm)

Figure 4.6
Breer, *Mural Flip Book*, 1964
Wood, metal, paper. 46 x 22 x 4 ⅞ in. (117 x 56 x 12.5 cm)

Figure 4.7
Breer, *Dot Dash*, 1964

Figure 4.8
Breer, *Line #2,* 1964
86 in. (218.4 cm)

Figure 4.9
Breer, *Rotating Stovepipe,* 1964
82 in. (208.3 cm)

Figure 4.10
Breer, *Rotating Broom Stick,* 1964
Wood, motor, and metal. 7 ½ x 18 ⅞ x 1 ⅝ in. (19 x 48 x 4 cm)

Figure 4.11
Breer, *Zig*, 1965

Painted styrofoam, wheels, and motor. 6 ¼ x 7 ⅞ x 13 ¾ in. (16 x 20 x 35 cm)

Figure 4.12
Photograph of *Floats* by Frances Breer, 1965. Printed in the exhibition catalogue for *Floats,* Galleria Bonino, New York, 1965.

Figure 4.13
Breer's *Self-Propelled Aluminum Tanks* in a 1967 photograph

Figure 4.14
Breer, *Column,* 1967
Aluminum, motor. 66 ⅛ x 14 ⅝ in. (168 x 37 cm)

Figure 4.15
Robert Morris, *Column,* 1961

Figure 4.16
Breer, *Rug,* 1967
Shown in different configurations in the catalogue for *The Machine, as Seen at the End of the Mechanical Age,* Museum of Modern Art, New York, 1968.

Figure 4.17
Images of William Grey Walter and his family with the "tortoises," Elmer and Elsie.

Figure 4.18
Still from Robert Rauschenberg, *Linoleum* (televised version for WNET)*,* 1966
Rauschenberg draws a chalk contour around a *Float.*

Figure 4.19
The Pepsi Pavilion at Expo '70. Five *Floats* are visible in the foreground.

Figure 4.20
Breer, untitled drawing, 1969

Figure 4.21
Breer, untitled drawing, no date

Figure 4.22
Breer, *Untitled*, 1971
Drawing. 12 x 17 ⅞ in (30.5 x 45.5 cm)

Figure 4.23
Claes Oldenburg, drawing for "fanana," 1969

Figure 5.1

Takis carries parts of his *Tele-sculpture* (1960), after having removed it from the Museum of Modern Art's exhibition *The Machine, as Seen at the End of the Mechanical Age.*
Photo from the *New York Times,* January 4, 1969

Figure 5.2
Jean Tinguely, *Rotozaza, No. 1*, 1967
Reproduced in the catalogue *The Machine, as Seen at the End of the Mechanical Age* (New York: Museum of Modern Art, 1968)

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