

## INTRODUCTION

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Dorothea Rockburne's complex work comes out of her lifelong study of mathematical concepts such as set theory, topology, and knot theory—difficult topics that many art-goers understandably shy away from. Before my encounter with Rockburne's work, my last foray into abstract mathematics had ended abruptly: after flunking an exam in precalculus, I wisely decided to focus my studies elsewhere. Perhaps you, too, have been intimidated by the subject. For Rockburne, math is a description of the relationships of objects as they exist in various kinds of space, a means of portraying reality beyond its superficial appearance. In her words, math is “not hard stuff.” Still, it's all very well to invoke “relationships,” “objects,” “space,” “reality,” and “appearance,” but many of us cannot fathom how mathematicians code this research into symbols and proofs, equations and numbers.

Yet Rockburne's artwork has never been a riffing on, or demonstration of, mathematical models, though study of her practice provides necessary tools for an interdisciplinary conversation about these topics. At core, her work is deeply sensuous; it sets up rhythms in space that draw viewers into unexpected encounters with a powerful materiality that relates back to their own physical embodiment. This is undoubtedly a quixotic pairing: math, among the most cerebral of pursuits, and the exploration of materiality experienced by vulnerable, subjective, perceiving bodies. The proposition of “sensual math” troubles many assumptions about what art can or should be, and this, more than anything, has contributed to the dearth of in-depth studies about Rockburne's practice. The pioneering ways in which her work joins topology to innovative materials deployed in unconventional ways—the warping, bending, folding, and stretching of objects and spaces—have the effect of repositioning the spectator's understandings of site and form, embodiment and perception. Her engagement with space,



understood through topological understandings of the body, is what I term a "pleating of matter," that is, how the spaces of the fold refer to the interiority of her creative process, and how those processes engender and externalize a work becoming what Rockburne terms a "subject-object."<sup>1</sup>

The lack of art-historical scholarship on Rockburne does not mean she has been overlooked by other sectors of the contemporary art world. Since the late 1960s she has exhibited continuously, in group shows at New York museums such as the Metropolitan Museum of Art, the Museum of Modern Art (MoMA), the Whitney Museum of American Art, and the Solomon R. Guggenheim Museum, and internationally at Kassel, Germany's Documenta, Moderna Museet in Stockholm, Centre Pompidou in Paris, and the Stedelijk in Amsterdam, among other venues. Her work was featured on the cover of *Artforum* in 1972—a rare accolade for a female artist at that time. Yet it took until 2011 for Rockburne's work to be assembled in a career retrospective—at the Parrish Art Museum in Water Mill, New York, a show that traveled to Rockburne's home city of Montreal—belated recognition for an artist born in 1930. In 2013–14 MoMA exhibited a monographic show of Rockburne's works that focused on her engagement with drawing. In 2018–22, Dia Art Foundation, in close consultation with the artist, reassembled in five galleries Rockburne's large-scale installations of the 1970s, works that had not been seen since their inception, in addition to smaller works of the period that were also rarely shown.

Coming on the heels of Dia Beacon's restaging of Rockburne's momentous installations, this book takes a large step in correcting the significant gaps in scholarship on her work, as well as contextualizing and expanding the ways and thematic approaches we can take to understanding Rockburne's career. These themes include her training (her education as an artist and the specific technical strategies she employs); her interest in the body (in explorations of movement and dance); the physicality of her works (her use of diverse and innovative materials); her foregrounding of subjectivity and emotion as central to her practice (a position that is considered in dialogue with feminism, Minimalism, and

abstraction); and, of course, her lifelong engagement with topology and knot theory.

For the purposes of setting out the web of connections Rockburne develops between topology and materiality, in this introduction I shall, in brief, unfold this discussion. Let us consider a single, very recent work to study her proposition about how the topological study of space engenders complex exchanges between viewer and work.

Rockburne's 2021–22 solo exhibition at David Nolan Gallery in New York included an enigmatic group of sculptures using ropes, buckets, water, and mirrors. Rockburne's practice, particularly the installations she undertook beginning in the late 1960s that profoundly expanded notions of space, generally emerged out of painting and drawing practices. These new sculptures did not. These recent works nonetheless incorporate a set of concerns with topology, materiality, and identity that have been consistently explored in her more than sixty-year career. The sculpture *Interchange* (2021; p. 12) from the Nolan Gallery exhibition is noteworthy in how it distills the many interests of her long career. It is composed of three large galvanized steel buckets typically found in gardening or agricultural contexts, thick ropes used to moor ships, and a car tire. One bucket is filled with water while the other two are positioned upside down atop one another with a mirror inserted on the topmost one. These two stacked buckets rest atop a loop of rope with the tire wedged between them. Another rope winds around the single bucket, joining it to the taller pair; both ropes are closed off with PVC couplings and stainless-steel clamps. The longer rope is a loop containing a single twist, and this is what topologists call the "unknot"—a line describing the exterior of a circle. Knot theory is itself a misnomer, since all "knots" are actually lines that are opened up, linked into various arrangements, and resealed, as it were. Much of knot theory concerns identifying the crossings of these strings in order to understand whether they are merely looped, like the rope in *Interchange*, or if they are actually linked, in which case they are deemed a "knot invariant." The rationale for this study is that in topology the unknot—the line that bounds a circle—is

understood as carving a piece of three-dimensional Euclidian space, and complex knots carve ever more interesting chunks of space. When we speculate about dimensionality, these carvings become ways to postulate heretofore unimaginable relationships.

Additionally, *Interchange* contains a giant unknot, a line looped with a single twist around two cylindrical metal tubs. Topologically speaking, a cylinder is akin to a sphere, a square, a triangle, or any solid-bodied form in the sense that all of its exterior surface is continuous. Around two of these cylinders, however, is a tire, which is quite different in its topological structure in that it is a torus—having a central hole that no amount of stretching or warping can convert into a sphere. But is not the thick, looped rope a torus as well? In knot theory, it can be termed a line, but in actuality, it is a torus in three-dimensional space—the exterior of even the finest hair or thread is ultimately distinct from its interior composition.

The water and mirrors in *Interchange* likewise trouble notions of surface and interior. Mirrors are surfaces that increase the perception of space, while water often has the effect of shrinking or otherwise warping the way spatial depth is perceived. The associations of the objects Rockburne has employed in the sculpture also roam through agricultural, maritime, and automotive metaphors related to traversing or occupying space. The work is deeply tactile, its materiality activating the senses to perceive that which is wet and dry, smooth and rough, organic and metallic, industrially produced and clamped by hand.

This volume prepares art-goers to understand the main facets of Rockburne's unique project. While the presentation at Dia Beacon brought together works Rockburne undertook in the late 1960s through the early 1980s—including a selection of the *Egyptian Paintings* (1979–81), the *Golden Section Paintings* (1974–76), *Carbon Paper Installations* (1973/2018), and *Domain of the Variable* (1972/2018), among other works—this monograph addresses significantly more of her long and still-flourishing career. Among the book's offerings are several essays of newly commissioned scholarship, a selection of archival materials from

Rockburne's studio diaries from 1970 to 1973, related work sketches, as well as substantial documentation of the installation at Dia Beacon.

Though much of Rockburne's practice concerns dimensionality and space, little has been written to situate her oeuvre in discussions of work among her peers. Several essays in this volume consider her early seminal works such as *Domain of the Variable* in the context of her time: how Rockburne's practice both emerges and innovatively departs from early to mid-century ideas about site and space.

Jeffrey Saletnik's essay investigates the connection between Rockburne's works of recent years and her education and training as an artist. Connecting the *Golden Section Paintings* on view at Dia Beacon and work from the past decade, Saletnik argues that Rockburne's career and lifelong interests culminate with the more recent work, joining the beaux-arts techniques she trained in as a painter to her engagement with Black Mountain College's various pedagogical influences, particularly her studies with the mathematician Max Dehn. Saletnik charts the connections between artist László Moholy-Nagy's notion of space-time, a concept Rockburne was familiar with through various mentors in Montreal and Black Mountain, and her development of new approaches to space and site. As Saletnik writes, "Imaging complexity was a concern Rockburne shared with artist László Moholy-Nagy, whose notion of 'space-time' and the 'space-time diagram' (the mastery of which could help an artist to communicate complex scientific and social phenomena) was known to Rockburne before her arrival at Black Mountain and whose understanding of transparency as revealing the 'inner structure' of an object informed her approach to painting, especially as it developed in the 1970s and 1980s."<sup>2</sup>

Carrie Lambert-Beatty examines how Rockburne came into her maturity as an artist in the late 1960s. Lambert-Beatty looks at Rockburne's activities of this period, specifically her performances with Judson Dance Theater, and the artworks she created in the period immediately following that collaboration. Arguing that Rockburne's practice initiates "a muscular model of mind," Lambert-Beatty explores how her work of the late 1960s emerges from "a dance-born understanding of plasticity,"

insisting on "a common denominator for manipulating math and art without dissolving the materiality of either one."<sup>3</sup> Lambert-Beatty considers the *Carbon Paper Installations* (1973/2018) as representing a key moment in Rockburne's explorations of space and the body that was galvanized by her participation in Judson, and the examples Carolee Schneemann and Yvonne Rainer's choreography provided to Rockburne as she moved away from dance and into installation.

Anna Lovatt's earlier writings on Rockburne's practice are among the finest available. Here, she returns to the artist's work in a new essay, pursuing further directions in her argument about the meaning and importance of materiality in Rockburne's career. As Lovatt argues, "Rockburne's work is concerned with the definition and redefinition of the way in which a subject exists—conceptualizing the self as a phenomenon that is made, unmade, and remade through direct material engagements with the world."<sup>4</sup> Probing the relationships among subjectivity and form, gender and corporeality, and Rockburne's use of space and choice of material, Lovatt brings new dimension to Rockburne's sense of a work as an extension of her mind and body, as both a woman and an artist.

A few years ago, I had a conversation with Rockburne about her meeting Robert Rauschenberg at Black Mountain College and becoming his studio manager in the 1960s, as well as her experiences with artists from that era such as Donald Judd, Sol LeWitt, and Brice Marden, among others. Understandably, Rockburne has felt overlooked in comparison to her male counterparts' stratospheric market sales and careers. Unlike the work of her male contemporaries, the procedures in which she engages dynamic notions of space have never been sufficiently studied, nor have her innovative uses of material been considered.

Closing this gap in the art-historical understanding of her work is crucial. In my essay, I write that Rockburne's work "represents a radical countermodel not merely to contemporaneous works of Minimalist art, motivated as they were by the subdivision of planar surfaces and the motif of the three-dimensional space Euclidian grid, but also to Land

artists' and Postminimalists' explorations of entropy and gravity that, with some exceptions, remained couched in the realm of metric understandings of space."<sup>5</sup> More broadly, my essay takes up the radicality of Rockburne's work in mathematics and set theory, situating her practice within theoretical projects about the aesthetic, epistemological, and ontological stakes of topology.

Rockburne's production spans more than sixty years, an accomplishment in and of itself. The past decade has seen institutions mounting long-overdue returns to the pivotal movements in her life when she began to combine her explorations of math with her artistic practice. The work she has made during recent years, the culmination of this lifelong exploration, also presents an astonishing body of work, a career arc at last explored in depth in this volume.

- 1 "It seems reasonable that paper acting upon itself through subject imposed translations could become a subject-object." Dorothea Rockburne, "Notes to Myself on Drawing," *Flash Art* (April 1974), p. 66.
- 2 Jeffrey Saletnik, "Before and Beyond Black Mountain: Dorothea Rockburne and Space-Time," in this volume, p. 22.
- 3 Carrie Lambert-Beatty, "Muscle Memory," in this volume, p. 51.
- 4 Anna Lovatt, "Making Selves: Materiality and Subjectivity in the Work of Dorothea Rockburne," in this volume, p. 70.
- 5 Eva Díaz, "Topologies of the Fold," in this volume, p. 97.