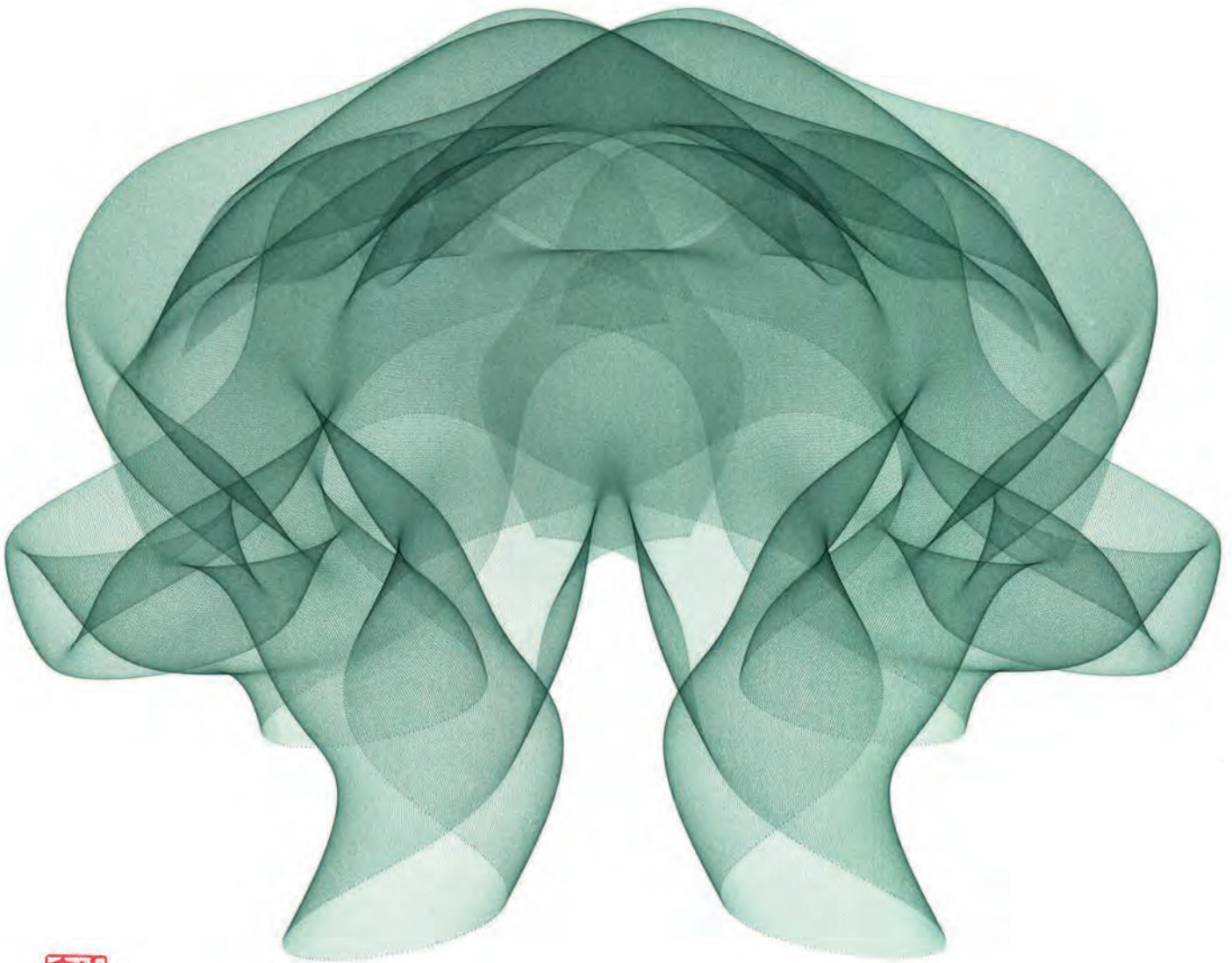


# Roman Verostko

*and the Cloud of Unknowing*







# Roman Verostko

*and the Cloud of Unknowing:  
From Ideas in Mind to Ideas in Code*

*Edited by Kerry A. Morgan and Melanie Pankau*  
Minneapolis College of Art and Design

This catalog has been published to accompany the exhibition *Roman Verostko and the Cloud of Unknowing*, Minneapolis College of Art and Design, January 22–February 24, 2019.

Exhibition curators: Kerry A. Morgan and Melanie Pankau

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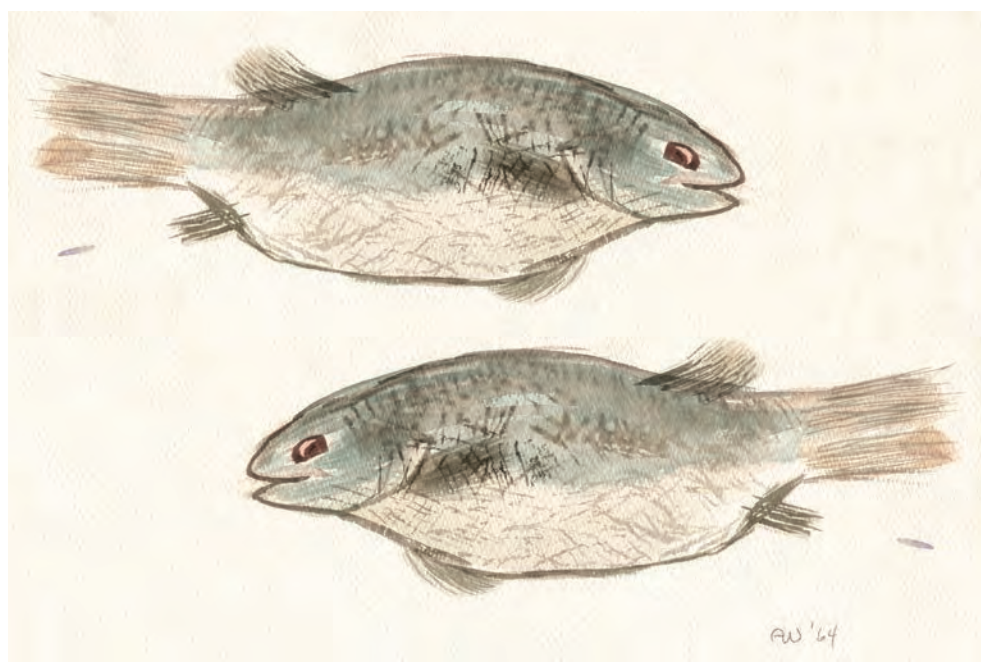
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Cover image: Roman Verostko, *The Cloud of Unknowing*, 2003, pen and ink plotter drawing, 23 x 29 in.



# The Presence of Alice

My wife, Alice Kennedy Wagstaff (1919–2009), as a client-centered psychotherapist, maintained a deep presence listening to the life experience of others. Her focus on being present for others contributed to her ability to help them discover themselves.

She taught me that we meet more than one person when we are introduced to another person. We meet some of the other people who have been involved in that person's life. Through her presence and concern for others, I learned that something of her lives on in her friends, in those with whom she worked and those she counseled.

When she died, I felt like half of myself died with her. Soon I learned that half of her lives on in me and in my work. In planning this exhibition, I felt her presence and advice at every turn. Reviewing the catalog now, I see her critical eye and understanding blended in my drawing hand, my code, and my writing.

On September 12, 2009, three months before she died, suffering with a global cognitive impairment, she struggled to write the haiku she wrote every year for my birthday. In seventeen syllables, likening us to "two fish," written in Italian, she revealed that she still had a vibrant inner life. In ten words she teaches us why we must listen to each other. As we ponder the artwork illustrated in this catalog let us listen also to Alice. She is here.

## TWO FISH

*due pesci*  
seeing the same world  
from different angles,  
often

The illustration for Alice's haiku is adapted from a watercolor painting she made in 1964. She painted the original with one fish facing to the left. For this illustration, I digitized the original and flipped it horizontally to create a second fish facing the opposite direction. See other haiku by Alice at <http://www.verostko.com/wagstaff.html>.





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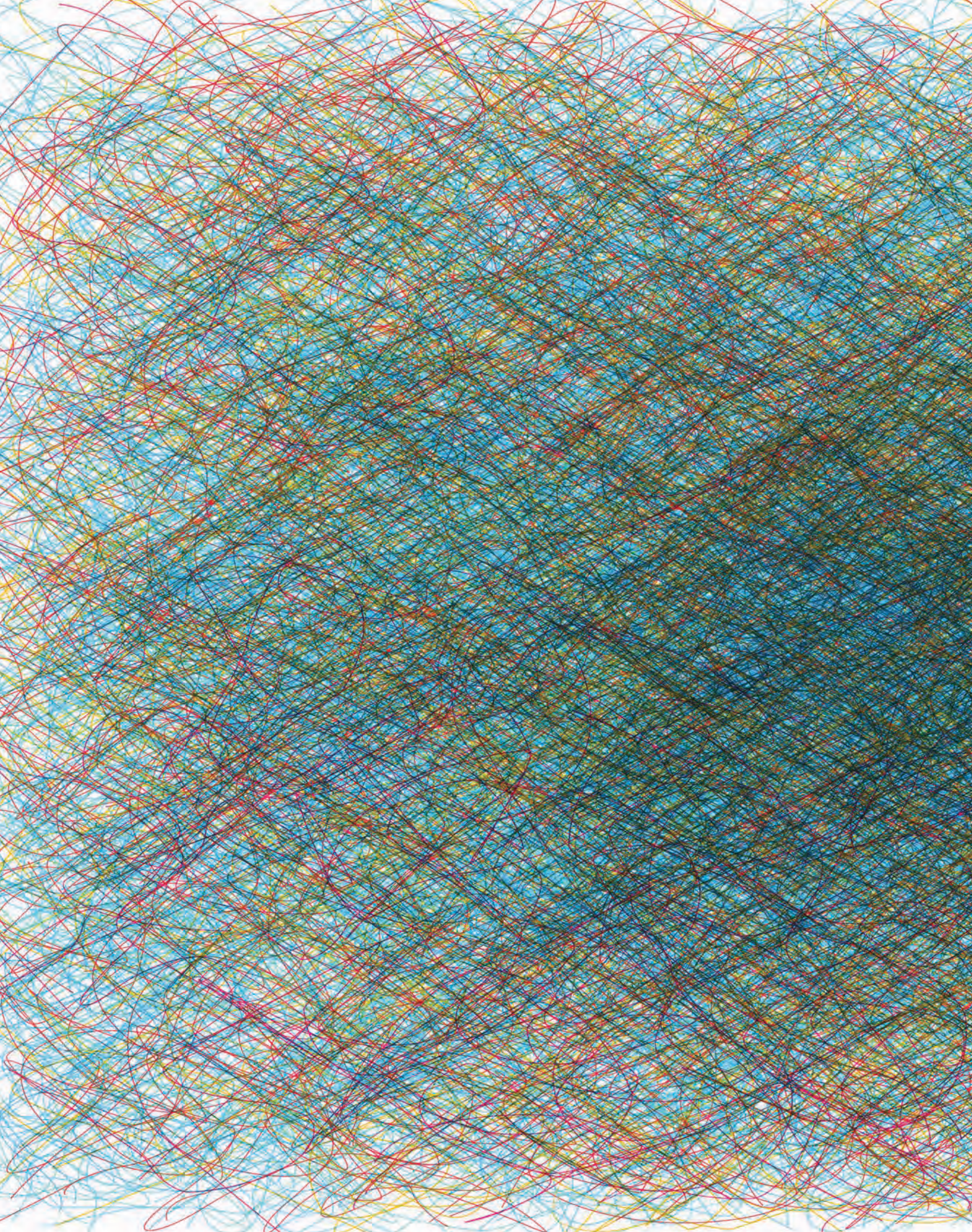
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Verostko in his New York studio with the painting *Sunrise on West 34th Street* on the easel behind him. The photograph accompanied the September 1962 *Jubilee* magazine story "Way-Out, Way-In Painter." Photo: Robert Lax.







# Essays



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# Introduction and Acknowledgments

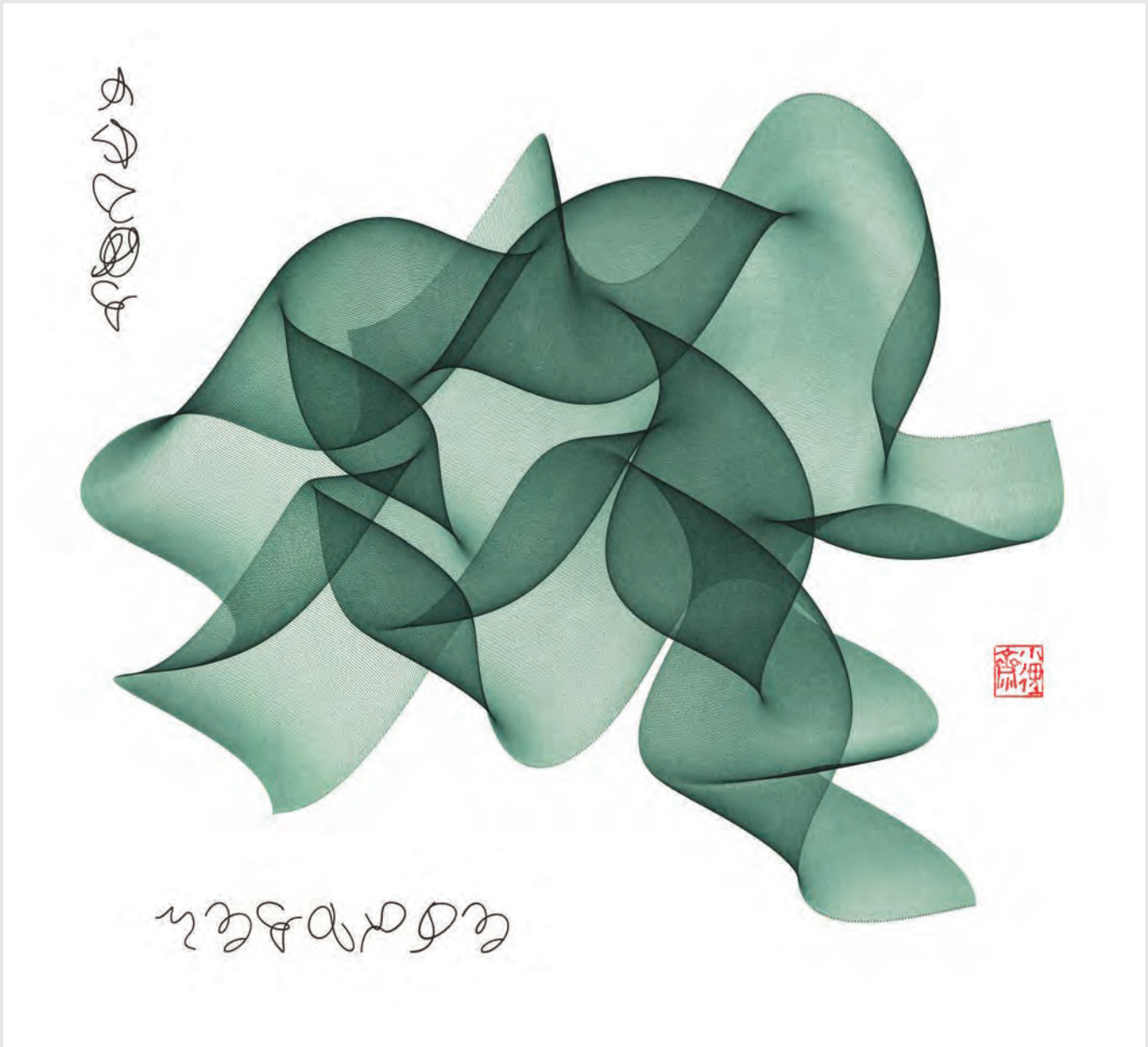
Kerry A. Morgan

*As an artist, my great interest has always been mastering a technique for creating an art object. Elementary pen plotting tools and simple programming techniques have provided me with more challenges than I can exhaust in my lifetime. After more than 50 years and thousands of drawings I have learned a lot about ink viscosities, pigments, paper surfaces, the honing of pen tips, and writing software fixes. Yet, I feel that I have only begun to explore the art of drawing with pen and paper.*

**Roman Verostko, "Imaging the Unseen:  
A Statement on My Pursuit as an Artist,"  
2004/2015**

Roman Verostko's artistic mastery was very much on view—projected thirty feet wide on the north side of the main building at the Minneapolis College of Art and Design—when his *Three-Story Drawing Machine* debuted in June 2011 at Northern Spark, the all-night Twin Cities arts festival.<sup>1</sup> Viewers could witness an eight-hour drawing session wherein the robotic arm of a pen plotter moved across the paper, drawing line by line, guided by Verostko's unique "form-generating" instructions known as algorithms. From the lawn below, it was mesmerizing to watch an elegant, undulating image slowly appear at dusk and to hear the sound of the machine as it worked tirelessly over 705 minutes. As dawn approached, the routine ended, and the machine added twelve black calligraphic pen strokes. Finally, the artist impressed the finished piece with his Pathway Studio seal. Out of this process—one that took decades to perfect—emerged an original pen and ink-plotted drawing that would later be titled *Algorithmic Poetry, Green Cloud* (Figs. 1 and 2).

**Fig. 1. *Three-Story Drawing Machine*,**  
2011, projection of drawing machine  
in real time, dusk to dawn on June 4–5,  
Northern Spark all-night arts festival,  
presented by Northern Lights.mn with  
the Minneapolis College of Art and  
Design. Photo: Dusty Hoskovek,  
courtesy NorthernLights.mn.



**Fig. 2. Algorithmic Poetry, Green Cloud**, 2011, pen and ink plotter drawing, Collection of the Minneapolis College of Art and Design.

Now in his ninetieth year, Verostko is commonly referred to as a “digital” or “computer art” pioneer.<sup>2</sup> While not untrue, such an overarching label fails to adequately encompass what makes his work so remarkable. This catalog and the retrospective exhibition that it accompanies bring special attention to the pioneering aspects of Verostko’s algorithmic drawings and projects that are innovative in both their making and meaning. Not only has Verostko mastered a complex mode of image production that is most accurately described

as “generative” in nature, but he has also developed it in tandem with a deep intellectual, artistic, and spiritual quest—what he calls a “quest for pure form.”<sup>3</sup> Unlike most of the early practitioners of computer-generated art, his interest in abstraction and geometric form has never been devoid of content.<sup>4</sup> On the contrary, his training in the visual arts, his historical scholarship undertaken as a Benedictine monk and Catholic encyclopedist, and his commitment to envisioning the possibilities of our technological future have coalesced into a search for a “world of forms never seen before,” something beyond human apprehension that incites wonder and represents a “reality” unto itself. As Verostko explains in his essay for this catalog, “my artwork, in all its phases, explores form-making ideas that often lead us to experience the inexplicable. While I can explain the coded procedures for generating the art, my experience of the art transcends the explainable.”<sup>5</sup>

The three other essays commissioned for this catalog provide different avenues for understanding Verostko’s artwork and his seminal contributions to the articulation, promotion, and documentation of particular trajectories of twentieth-century art and the evolution of digital art within it. Art historian Grant D. Taylor traces the arc of Verostko’s unusual upbringing and career, from aspiring illustrator to Benedictine monk-artist to MCAD humanities professor and global networker in the field of electronic and computer art. Commenting upon Verostko’s cross-cultural knowledge and aesthetic influences, Taylor asserts that the artist’s “academic labors would do more than any other’s to disseminate the key concepts of digital craft to a world eager for understanding.”<sup>6</sup>

Focusing on specific artworks by Verostko, professor and media arts curator Christiane Paul situates the artist’s engagement with emerging technologies in the 1960s in a wider historical context and suggests that what sets Verostko apart from his contemporaries is the way in which he “set up a dialogue between his algorithmic drawings and the mathematicians or scientists that laid the groundwork for them.”<sup>7</sup> Specifically, Paul highlights Verostko’s limited-edition book *Derivation of the Laws* (1990) and his series *Manchester Illuminated Universal Turing Machine* (1998). The first pays homage to the seminal theoretical writings of George Boole (1815–1864), and the second to that of Alan Turing (1912–1954).

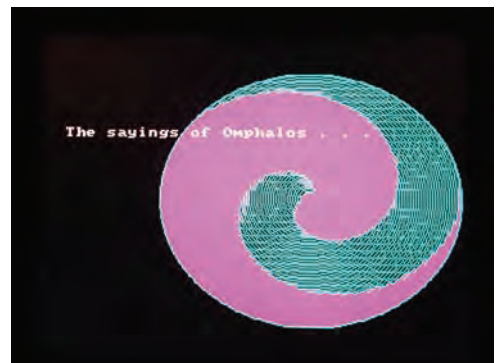
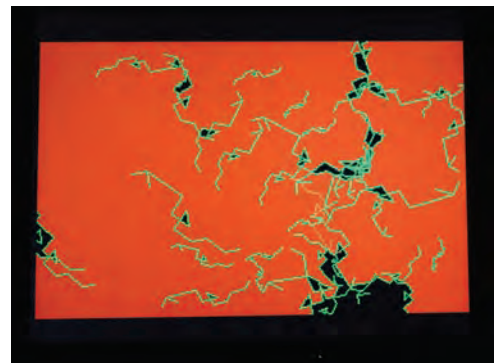
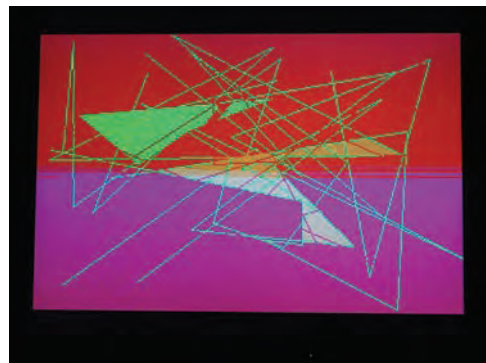
Finally, Bruce Wands, a digital artist, musician, educator, and curator, provides a more personal account of his affiliation with Verostko over the past twenty-five years. As first the curator (1993–95) and then the director of the New York Digital Salon (1998–2017), Wands gives an extended introduction to the numerous exhibitions, organizations, and publications that have been central to the development and diffusion of digital art worldwide and elucidates how Verostko has featured prominently in them.

The Minneapolis College of Art and Design is fortunate to have been a venue for many of Verostko’s artworks over the past fifty years. MCAD’s annual faculty exhibitions provided one opportunity for Verostko to showcase some of his highly experimental studio works. Most significant was the inclusion of his first generative art program, *The Magic Hand of Chance* (1982–85), in the *MCAD Centennial Faculty Exhibition* in 1986. The work was presented on

a SONY 25-inch monitor cabled to a first-generation IBM personal computer. The program ran nonstop for one month, working in real time generating a series of six visual improvisations that were displayed in dynamic sequence on the monitor. The playful nonrepetitive word and image routines "mimed automatism with lines, shapes, colors, words, syllables, and even sounds"<sup>8</sup> (Figs. 3 and 4).



**Fig. 3.** Installation view of the *Centennial Faculty Exhibition*, 1986, Minneapolis College of Art and Design. Verostko's *The Magic Hand of Chance* sits on a pedestal in the photograph at the far right.

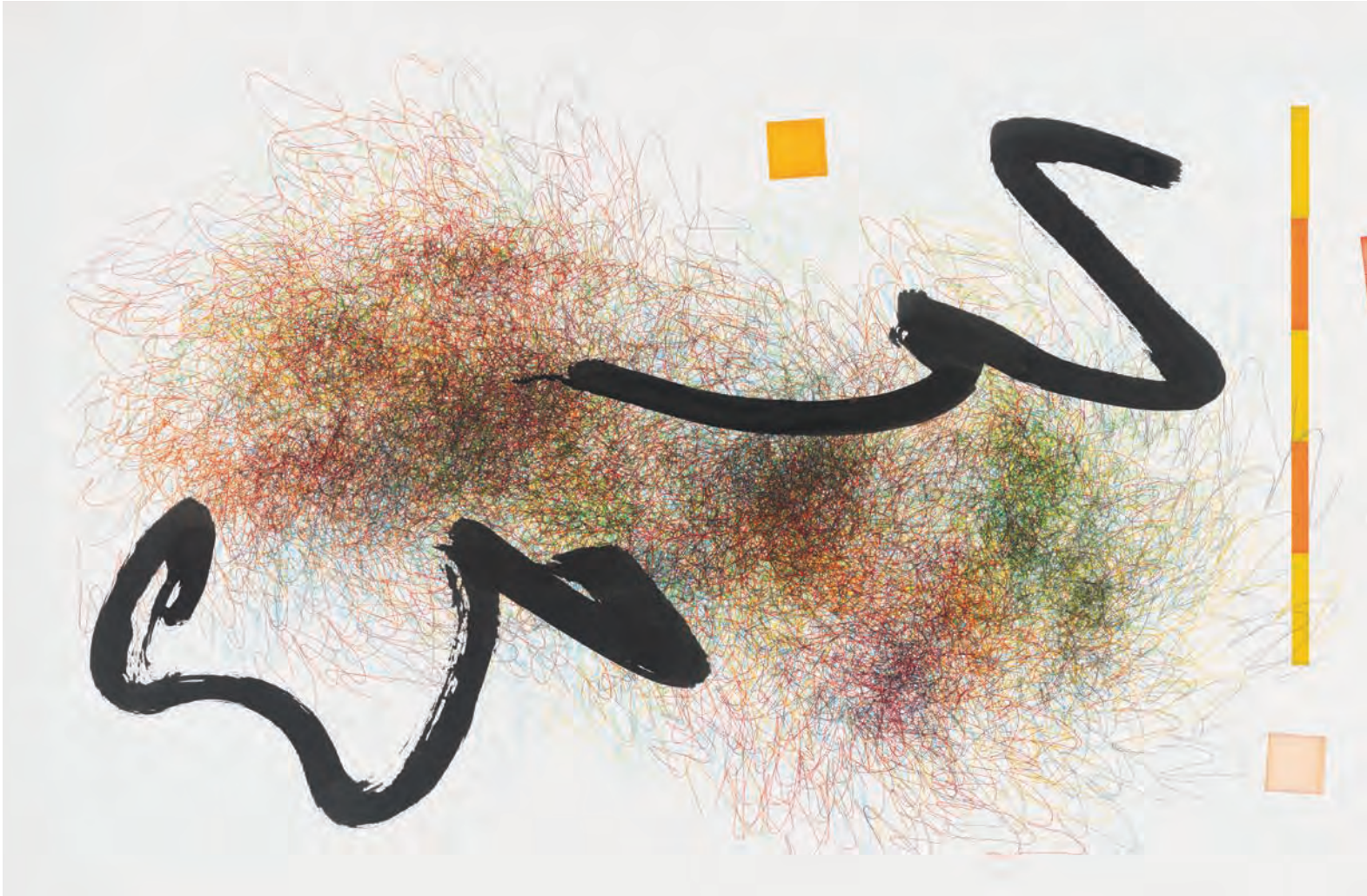


**Fig. 4.** *The Magic Hand of Chance*, 1982–85, written in BASIC with a first-edition IBM PC (5150) for a CGA color monitor. Examples of different routines.

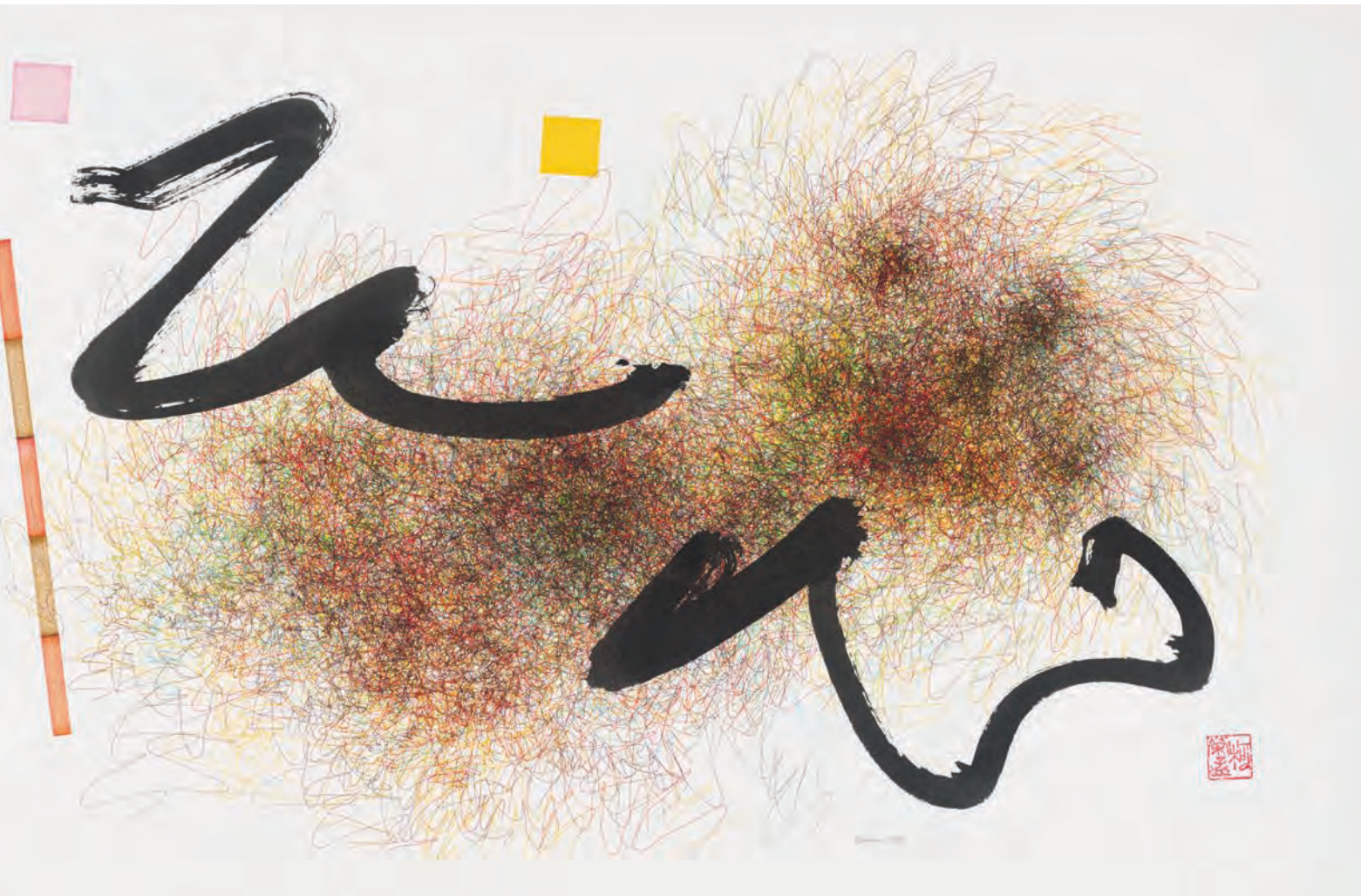
Six of Verostko's artworks were included in the ambitious 1989 exhibition *The Technological Imagination: Machines in the Garden of Art*, which showcased twelve artists from around the country in two venues, the MCAD Gallery and Intermedia Arts Minnesota. Among the works by Verostko were the monumental pieces *Lung Shan I* (acquired by the Victoria and Albert Museum) and *Lung Shan II*. Inspired by Verostko's visits to China where he became familiar with the work of influential Chinese calligraphers, they are large in terms of scale and ambition. These pieces (the titles translate to "Dragon Mountain" in English) are deft examples of how Verostko incorporated robotic brushwork into his computer-generated drawings to create spontaneous qualities that contrast the controlled arrangement of his pen and ink strokes (Figs. 5 and 6).



**Fig. 5.** Installation view of Verostko's pen-plotted drawings in *The Technological Imagination: Machines in the Garden of Art*, 1989, Minneapolis College of Art and Design.

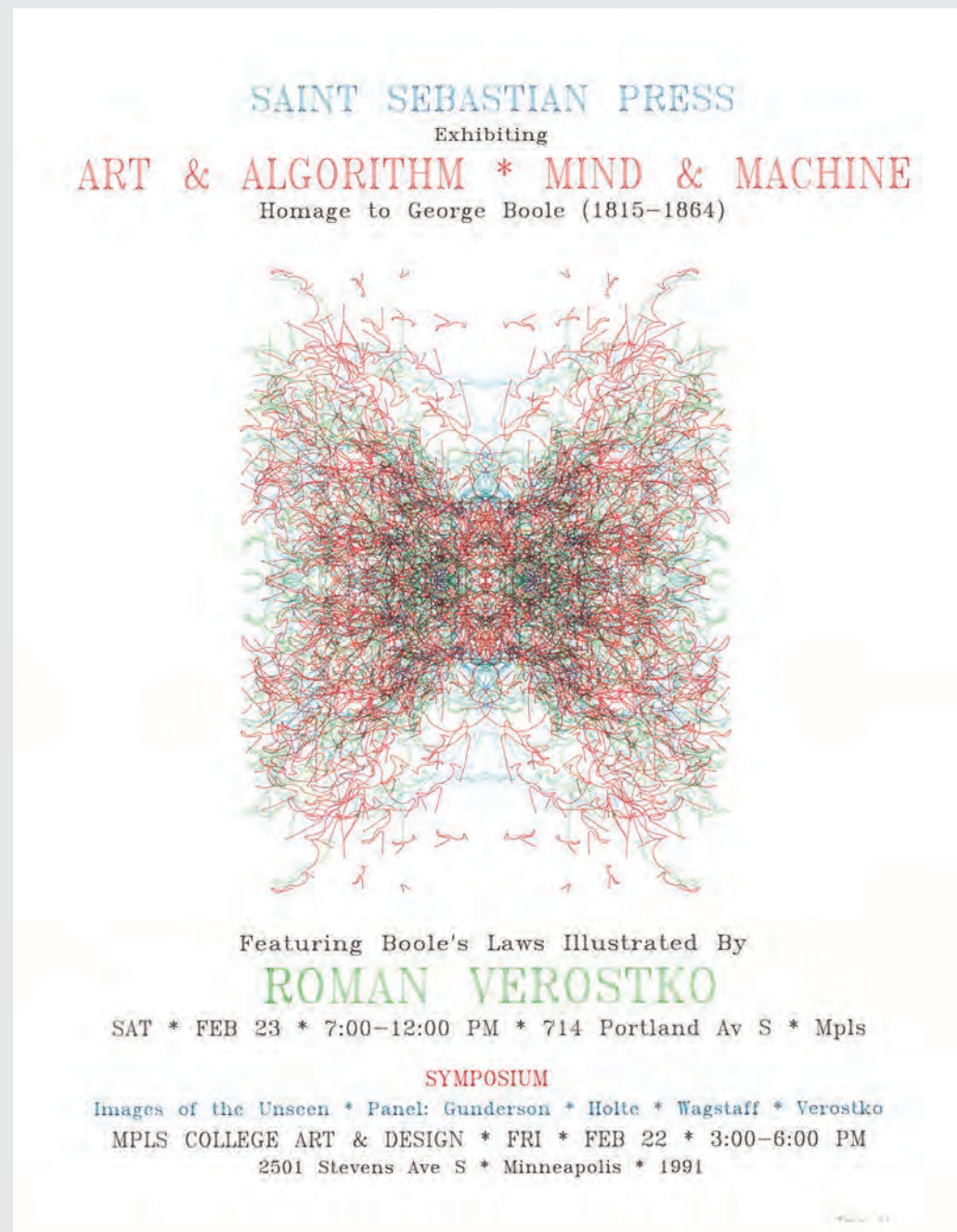






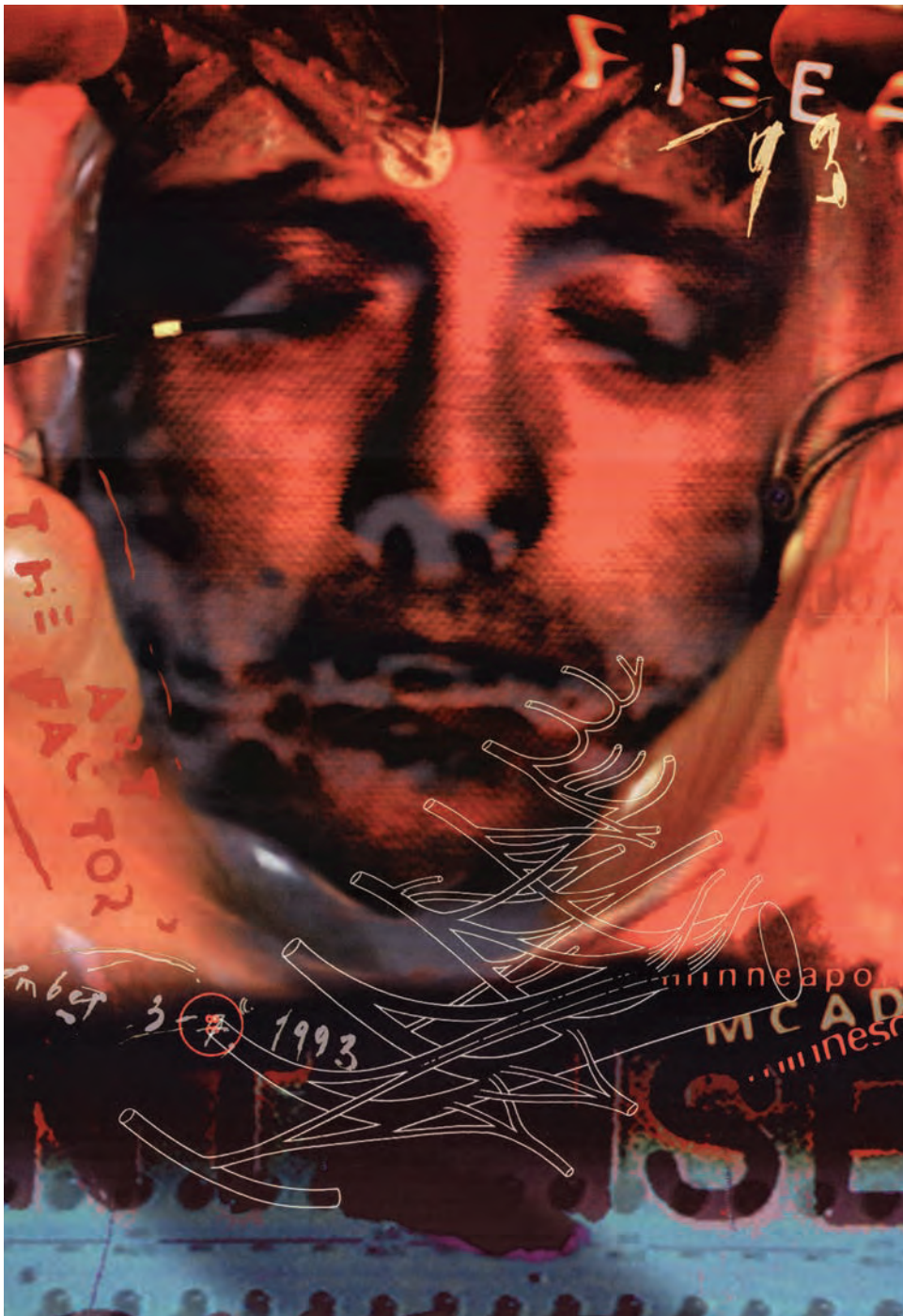
**Fig. 6. Lung Shan I (Dragon Mountain I)**, 1989, pen, ink, and brush plotter drawing, 24 x 72 in. Collection of Victoria and Albert (V&A) Museum, London.

In the early 1990s, Verostko also organized for the college two symposia that featured cutting-edge digital artists, scholars, and scientists from around the world. In 1991 Verostko planned and directed a symposium titled "Art & Algorithm – Mind & Machine," honoring the philosopher and mathematician George Boole. The first day's events were held at MCAD and featured *Images of the Unseen from the Worlds of Art and Science*, a slide and video presentation of the work of almost two dozen international artists followed by panelist remarks and discussion. It was followed the next day by an exhibition and book signing at St. Sebastian Press of Verostko's completed limited-edition book of George Boole's *Derivation of the Laws*, the posters for which were themselves original pen-plotted drawings (Fig. 7).



**Fig. 7. Poster for "Art & Algorithm – Mind & Machine" symposium and exhibition,** 1991, pen and ink plotter drawing, 24 x 18 in., Collection of the Minneapolis College of Art and Design.

Two years later, in 1993, Verostko brought MCAD into international prominence by having the college host the Fourth International Symposium on Electronic Art (FISEA). This symposium was the first to take place in the United States (the three previous symposia were in the Netherlands and Australia) and focused on "The Art Factor." As the program director, Verostko oversaw the five-day event that brought together some three hundred artists, scientists, mathematicians, and technologists from around the world to participate in exhibitions, performances, workshops, panels, and paper presentations (Fig. 8).



*Fig. 8. Poster for FISEA '93: "The Art Factor," Fourth International Symposium on Electronic Art, 1993, designed by Alex Tylevich '94.*

In 1994, after twenty-six years of teaching at MCAD, Verostko retired, but he has continued to support the teaching and learning at the college by establishing a student scholarship and contributing work to the college's art auction. Several of his original works donated to the college—*Gaia Triptych III* (1991) and *Algorithmic Poetry, Green Cloud* (2011)—are on permanent display on campus. Hosting a retrospective of Verostko's lifetime accomplishments is a fitting opportunity for the college to honor a dedicated educator, scholar, and pioneer of generative art. His dedication to "mastery," which is so visible in his original drawings and writings, is echoed in the quotation that graces Verostko's website: *ars sine scientia nihil est*. This statement, attributed to the fourteenth-century French architect Jean Mignot, has been translated as "art without knowledge is nothing." For Verostko that means "Practicing an 'art' without proper knowledge and skill accomplishes nothing." In this exhibition, knowledge and skill—true mastery—are everywhere on view.

## **With Gratitude**

By the same token, producing an exhibition and catalog "without proper knowledge and skill" from many contributors "accomplishes nothing." Luckily we have had the pleasure of working with a host of able collaborators, without whose expertise this project would not have been realized. Central to this development was the opportunity to travel to Latrobe, Pennsylvania, to be at the opening of Verostko's 2015 solo exhibition *Algorithmic Transformations* at the Saint Vincent Gallery. That show, which included more work from the late 1940s to 1960s, featured an even longer arc of Verostko's life and was focused in large part on the artwork that was already in the permanent collection of Saint Vincent College. That was an important step in thinking through the possibilities for this exhibition, and I am grateful for the memorable hospitality extended to me by so many at Saint Vincent.

This retrospective has been in the planning stages for some time with the hope of bringing it to fruition during Verostko's ninetieth birthday year. But much of the day-to-day work to realize these plans only happened thanks to the assistance of Melanie Pankau, the MCAD Gallery coordinator hired in June 2016. It was her good judgment and ability to get things done that propelled this exhibition and catalog forward. She suggested, for example, the key organizing parameters around which the physical installation and catalog section of this publication would be set. In lieu of a strict chronology, four key concepts undergirding much of Verostko's work—extending through different decades and series—are grouped together.

Another key player in moving this project along was Kate Mohn, the college's grants administrator. With her help we applied for funding for the retrospective exhibition and catalog and were thrilled that the Carl & Marilyn Thoma Art Foundation, a Chicago-based family foundation that has focused a significant portion of its resources for the acquisition and continuing scholarship on the digital arts, provided support for the publication and the programming that will accompany the exhibition. In addition, we are appreciative of David E. Moore, who also helped fund this project.

The catalog will live on much longer than the exhibition itself, and to this end we are grateful for the skillful work of designers Michael and Suzanne Welch, both students of Verostko's who assisted with his 2008 publication of *WIM: The Upsidedown Book*. Their ability to combine and refine ideas that we presented is much appreciated and has resulted in a finer end result than we could have imagined.

Central to any catalog are excellent reproductions, and luckily the technologically savvy Verostko was able to scan many pieces, but the framed work and 3D objects were deftly handled by Rik Sferra, who is exceptionally skilled at photographing work despite formidable obstructions, be they Plexiglas, stiff bindings, or blinking lights. Finally, copy editor Mary Keirstead did an admirable job smoothing out irregularities and ensuring there was consistency in the many different parts to this catalog.

We are very pleased that three highly esteemed professionals, who have been actively shaping our understanding of digital arts active in the field for decades, agreed to write specific essays for the catalog. They include Grant D. Taylor, professor of art history and chair of the Art and Visual Culture Department at Lebanon Valley College; Christiane Paul, professor and associate dean in the School of Media Studies at The New School, adjunct curator of new media arts at the Whitney Museum of American Art, and director and chief curator at Sheila C. Johnson Design Center (SJDC) at Parsons School of Design; and Bruce Wands, artist, writer, musician, and chair emeritus, MFA Computer Arts, School of Visual Arts, New York. Each provided a unique perspective on how Verostko's life and work have intersected with the development of digital art over more than six decades.

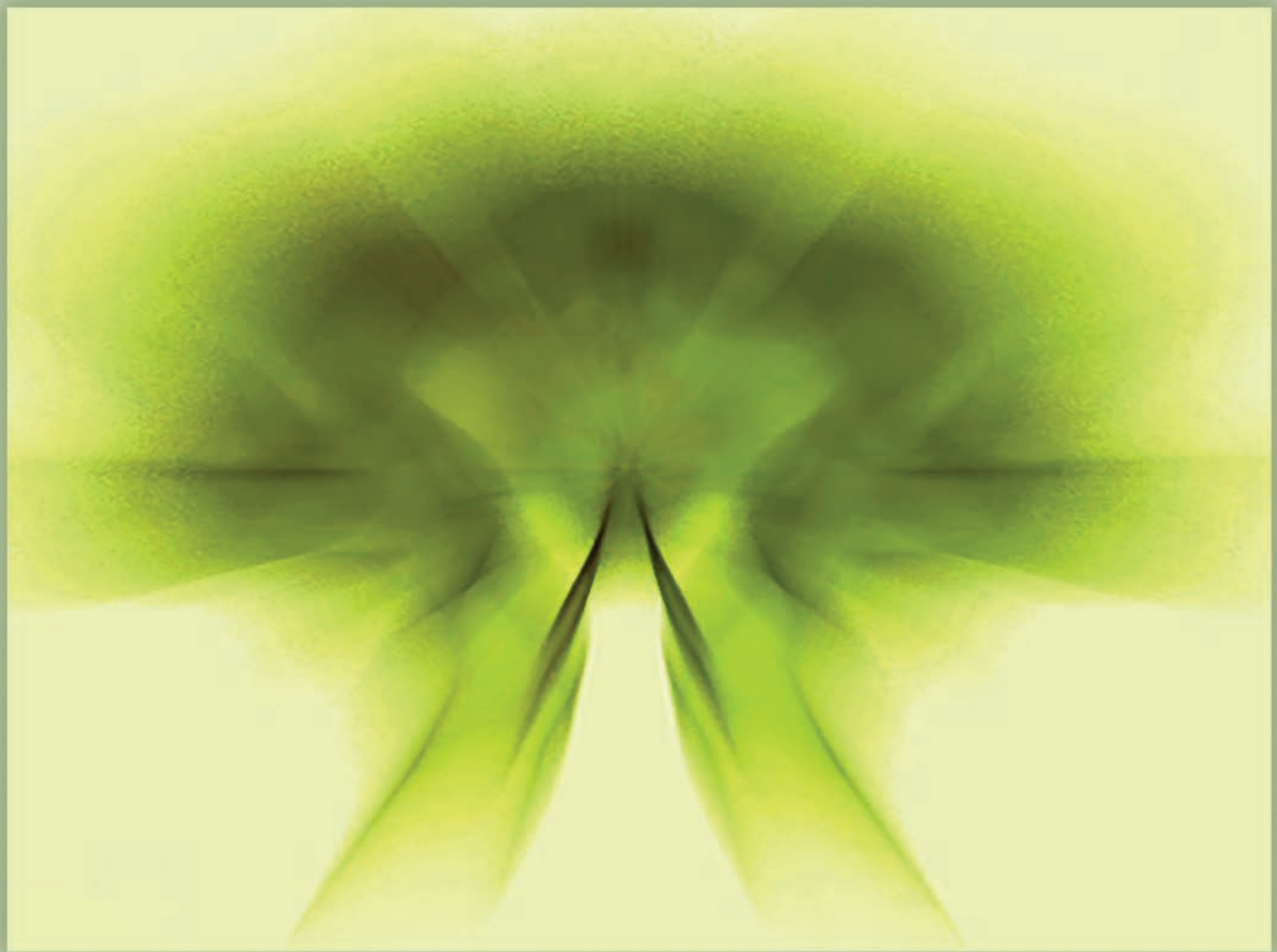
Another person whose insights, ideas, and overall enthusiasm for this project have proven so vital is Andrew Julo, curator of the Saint Vincent Art & Heritage Collections at the Saint Vincent Gallery. He arranged for several loans of key artworks and has been a sounding board for a wide range of topics over the past year. Verostko's legacy is in good hands.

Finally, I wish to thank Roman Verostko, whose work I knew only superficially a decade ago. The hours spent talking about his art, as well as topics ranging from politics to religion, have been gifts of time well spent. He has been a most generous host by fixing numerous lunches at his home, and a patient teacher by elucidating mathematical concepts multiple times. I have been moved by how freely he shares fond recollections of his dear wife, Alice, and how constantly he gives her credit for the gifts she offered him and the world. I have been awed by Verostko's prodigious memory, his ability to recall specific names and ideas, which fuels his deep understanding of history. In the intertwined making and meaning of his work, Verostko references the past as a means of ensuring the future understands its importance. As he reminds us, we are living off the shoulders of those who came before us. Perhaps what I will remember most is the sheer delight that Verostko expressed when we uncovered a drawing he had forgotten about, one that might have been buried underneath another dozen breathtakingly beautiful pieces. Or the unexpected phone calls, when Verostko explained what new insight he had just gleaned from reading about the twelfth-century Benedictine abbess and polymath Hildegard of Bingen, for example. At these times he would exclaim, "If only I had more time! One lifetime is not enough."

## NOTES

1. See Northern Lights, "Roman Verostko, Three-Story Drawing Machine," <http://northern.lights.mn/projects/three-storey-drawing-machine-working-title/>.
2. As early as 1989 Verostko was granted the title of "Computer Graphics Pioneer" from the Computer Graphic Pioneers associated with SIGGRAPH (Special Interest Group in Computer Graphics), as an acknowledgment that he had been a participant in computer graphics since 1968. Twenty years later, in 2009, Verostko and Lynn Hershman Leeson were the first recipients of the SIGGRAPH Distinguished Artist Award for Lifetime Achievement in Digital Art. In the press release for the award, Verostko is heralded as an "internationally recognized pioneer who has advanced both the aesthetics and techniques of digital art over an extraordinarily accomplished and fruitful career." See ACM SIGGRAPH, "2009 Art Award: Lynn Hershman Leeson and Roman Verostko," <https://www.siggraph.org/participate/awards/2009-art-award>. Other examples of how Verostko has been labeled a "pioneer" are numerous. See, for example, the Victoria and Albert Museum exhibition and publication *Digital Pioneers*, December 7, 2009–April 25, 2010, London, which featured artists who were creating computer-generated art from the 1960s to 1980s. Verostko is also frequently invited to participate in panels about "computer art pioneers," such as the 2012 panel at the University of Suffolk, UK, "Computer Art Pioneers on Making Art by Writing Code," which featured Verostko, Ernest Edmonds, Frieder Nake, and Manfred Mohr.
3. "Generative art" refers to a process by which a computer creates unique works from fixed parameters defined by the artist. The artist sets into motion a process that develops itself autonomously and often in an unpredictable way. Verostko writes in the notes to his article "Epigenetic Painting: Software as Genotype, A New Dimension in Art" that he had set out in 1986 in search of a term to accurately describe the art-making process whereby works were generated by the artist's own coded procedures. Computer code employing form generators had already been in use for about twenty years but had become confused with generic paint programs following the advent of personal computers. Verostko settled on the term *epigenetic* as a more accurate descriptor of the process than terms like *algorithmic* and *robotic*. In 1988 he presented a paper identifying the biological analogues for work created with fine art generators coded by artists at the First International Symposium on Electronic Art (FISEA, Utrecht). The paper was then published in *Leonardo* 23, no. 1 (January 1990). Verostko was invited to revisit this article for the 1993 Ars Electronica symposium "Genetic Art/Artificial Life," and ten years later, in 2003, for the Ars Electronica symposium "CODE—The Language of Our Time."

4. Honor Beddard, curator in the Word and Image Department at the Victoria and Albert Museum, mentions the “emphasis on form and pattern rather than content” in early computer art, and the need for practitioners to “avoid content in order to focus on the effects of their visual experiments.” See Honor Beddard, “Computer Art at the V&A,” *V&A Online Journal*, no. 2 (Autumn 2009), accessed 7 October 2018, <http://www.vam.ac.uk/content/journals/research-journal/issue-02/computer-art-at-the-v-and-a/>.
5. Verostko is a writer, scholar, and educator in addition to being an artist. He has published numerous articles and delivered over sixty paper presentations about his own work as well as the constantly evolving role of art and technology in society, with a special interest in its relationship to educational pedagogy. See the bibliography in this catalog for a select list of these publications.
6. Grant D. Taylor, “Roman, Evangelist for Art,” in *Roman Verostko and the Cloud of Unknowing* (Minneapolis: Minneapolis College of Art and Design, 2018), 29.
7. Christiane Paul, “The Logic of Arguments,” in *Roman Verostko and the Cloud of Unknowing* (Minneapolis: Minneapolis College of Art and Design, 2018), 48.
8. Verostko describes his *Magic Hand of Chance* in his published paper “Epigenetic Painting: Software as Genotype.” See Verostko’s website, [http://www.verostko.com/epigenet.html#The\\_Magic\\_Hand\\_Of\\_Chance\\_\\_\\_](http://www.verostko.com/epigenet.html#The_Magic_Hand_Of_Chance___). *The Magic Hand of Chance* was featured a second time at MCAD in June 2014 when it was shown in conjunction with the MCAD Gallery exhibition *Archive Fever*, which opened as part of Northern Spark. This time *The Magic Hand of Chance* was displayed in two ways, indoors in the second-floor Concourse Gallery on a Mac computer, and outdoors projected against the main building’s thirty-foot white brick wall for some two thousand all-night festival goers to enjoy.





# The Cloud of Unknowing: From Ideas in Mind to Ideas in Code

Roman Verostko

*When I say “darkness” I mean a privation of knowing, just as whatever you do not know or have forgotten is dark to you, because you do not see it with your spiritual eyes. For this reason, that which is between you and your God is termed, not a cloud of the air, but a cloud of unknowing.*

— *The Cloud of Unknowing*

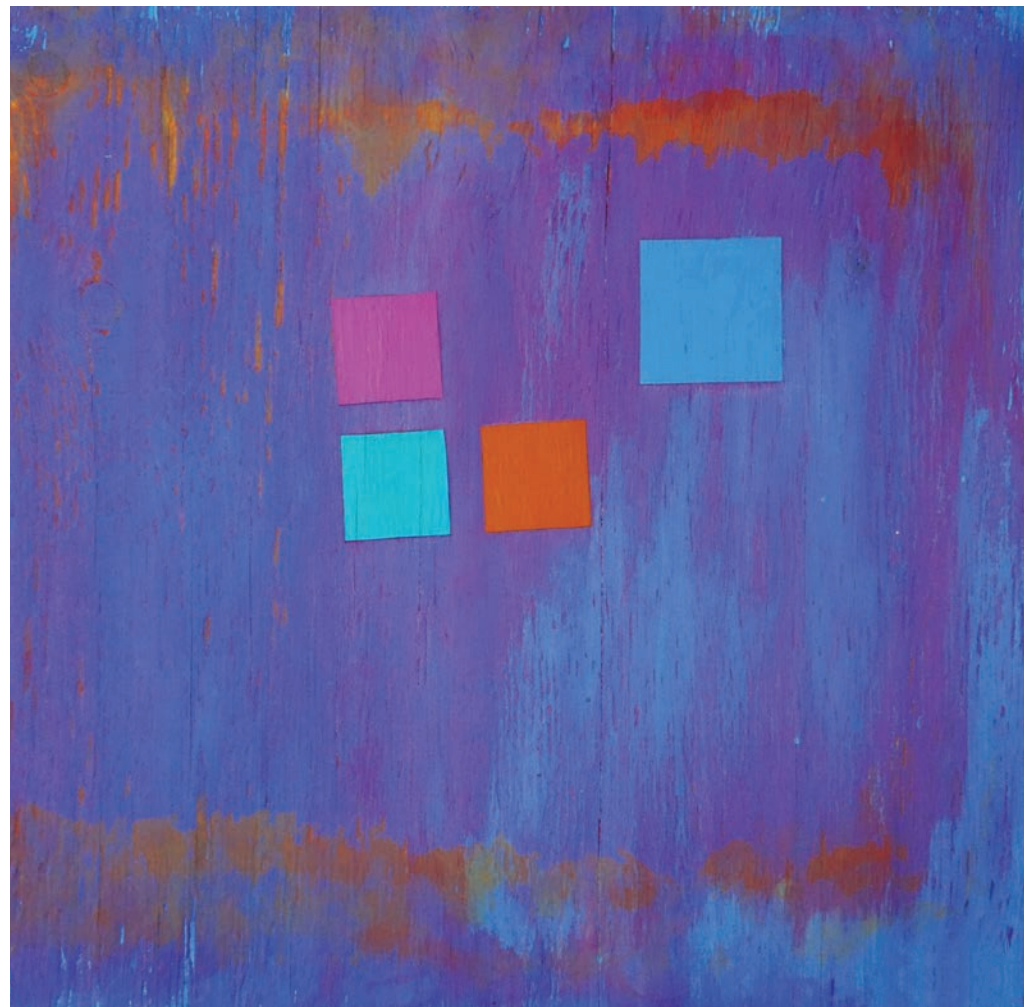
While studying Alan Turing’s work on computable numbers, I recalled how, in my monastic years, I had come upon something parallel to the “undecidable” in *The Cloud of Unknowing*, a spiritual guide written by a fourteenth-century English monk.<sup>1</sup> In rereading his fourth chapter, I came to see interesting parallels between the author’s conception of *unknowing* and my own experience wrestling with the “computable” and “non-computable.”<sup>2</sup> For this medieval monk, the cloud of unknowing is not a darkness as in a “cloud of the air”; rather the cloud is the “privation of knowing.” By recognizing the privation of knowing, one avoids getting lost in a hopeless pursuit of trying to understand that which transcends the limits of human reason, *the unknowable*. Since 1968 my own spiritual pathway has traveled outside of established faith traditions, and I have embraced my experience of life without ultimate answers. This “living within a kind of question mark” sometimes leads to experience that may be likened to an encounter with the cloud of unknowing.<sup>3</sup> In a similar way my artwork, in all its phases, explores form-making ideas that often lead us to experience the inexplicable. While I can explain the coded procedures for generating the art, my experience of the art transcends the explainable (Fig. 1).

**Fig. 1. *The Cloud of Unknowing*,** 2017, archival pigmented print, digital transformation of an algorithmic pen and ink drawing, 8 1/2 x 11 in. This is one of several digital transformations of the original 1998 drawing.

My life as an artist continues the same quest that seduced early twentieth-century purists.<sup>4</sup> Form ideas underlying the evolution of my art include Piet Mondrian's quest for *dynamic equilibrium*, Wassily Kandinsky's awakening to *inner necessity*, and Kazimir Malevich's reach for a *non-objective* world most pure, a world he imaged superbly with his *White on White* canvas created in 1918.<sup>5</sup> We could view *White on White* as a non-objective approach to "no-thing," which could be likened to the cloud of unknowing.

## The New City: Toward the New Jerusalem

My mature monastic work, in the 1960s, grew from my engagement with the resolution of opposites both in my life and in my art. My *New City* series embodied rational arrangement of geometric units in the same picture field with spontaneous brushstrokes and autonomous markings. In these works I attempted to bring opposing visual elements into a relationship where one would not dominate the other—they would be joined in a dynamic equilibrium. By merging spontaneity and rational control in the same work of art, I attempted to achieve the equilibrium I sought in my spiritual life (Fig. 2).



**Fig. 2. Sapientia:  
New City series,**

1968, acrylic with gesso base on wood panel, 24 x 24 in. In the summer of 1968, after leaving monastic life, I lived in a mountain log cabin on Chestnut Ridge near Farmington, Pennsylvania, where I had a studio, kitchen, and bedroom. During this period, as I prepared for the next phase of my life, I created several of my best *New City* paintings.

During my monastic years I viewed life as a transformative journey to fullness in the “Promised Land,” the heavenly place viewed as the “New Jerusalem” or the “New City.” I attempted to embed this vision in my artwork, as I noted in this statement published in the 1965 Westmoreland Museum exhibition catalog:

*My paintings are spontaneous emotion; they are also calculated precision; they search to resolve oppositions in a visual dialogue; they are born from the belief that we are growing to a great love that will resolve the ambiguous and deliver us to Peace.<sup>6</sup>*

My confrontations with the junction of reason and passion led me to an almost compulsive obsession with ambiguity and the “resolution of opposites.”<sup>7</sup> This ambiguity characterizes the “decisively indecisive” spirit in my studio since the mid-1960s. As in my spiritual life, the decidable and the undecidable would continue to haunt my studio work and my lifestyle (Fig. 3).



**Fig. 3. Elle passe, la figure de ce monde . . .** (*The face of this world is passing*), quoted in French from 1 Cor. 7:31, mural on the kitchen wall of log cabin, Farmington, Pennsylvania, 1968. This mural and *Sapientia* (previous page) embody the two faces of my engagement with rational control and passionate expression.

## Transition: Imaging the Unseen

In spring 1968, following changes in my spiritual experience, I departed the monastery, married Alice Wagstaff, and took a position teaching art history at the Minneapolis College of Art and Design (known then as the Minneapolis School of Art). While I had studied programming in 1970 and was working with electronics, I also maintained a studio where I continued drawing and painting.

My earlier experience with automatic drawing in Paris and my wife's experience with children drew me deeply into an engagement with childlike play and the wonders of human imagination. We were both interested in the marvelous spirit of an unencumbered free imagination. My *Images of the Unseen*, shown at the Westlake Gallery in 1972, included a statement with this observation:

*I seek to evolve an image that is unlike anything seen before, yet surprisingly believable in terms of its own reality. I believe that such imagery provides "experience clues" about the nature of realities which are outside the scope of rational consciousness.<sup>8</sup>*

Foraging on human imagination, I found myself once more in a zen-like state allowing an "unthinking free imagination" to guide my hand. In this state, "being free" is "being most joined." I continued with these *imagination drawings* until computer programming and electronics came to consume all my studio time (Fig. 4).<sup>9</sup>

**Fig. 4. Eikon #205**, 1971, acrylic with gesso base on masonite, 24 x 24 in. Saint Vincent Art & Heritage Collections, Saint Vincent Archabbey and College, Latrobe, Pennsylvania.



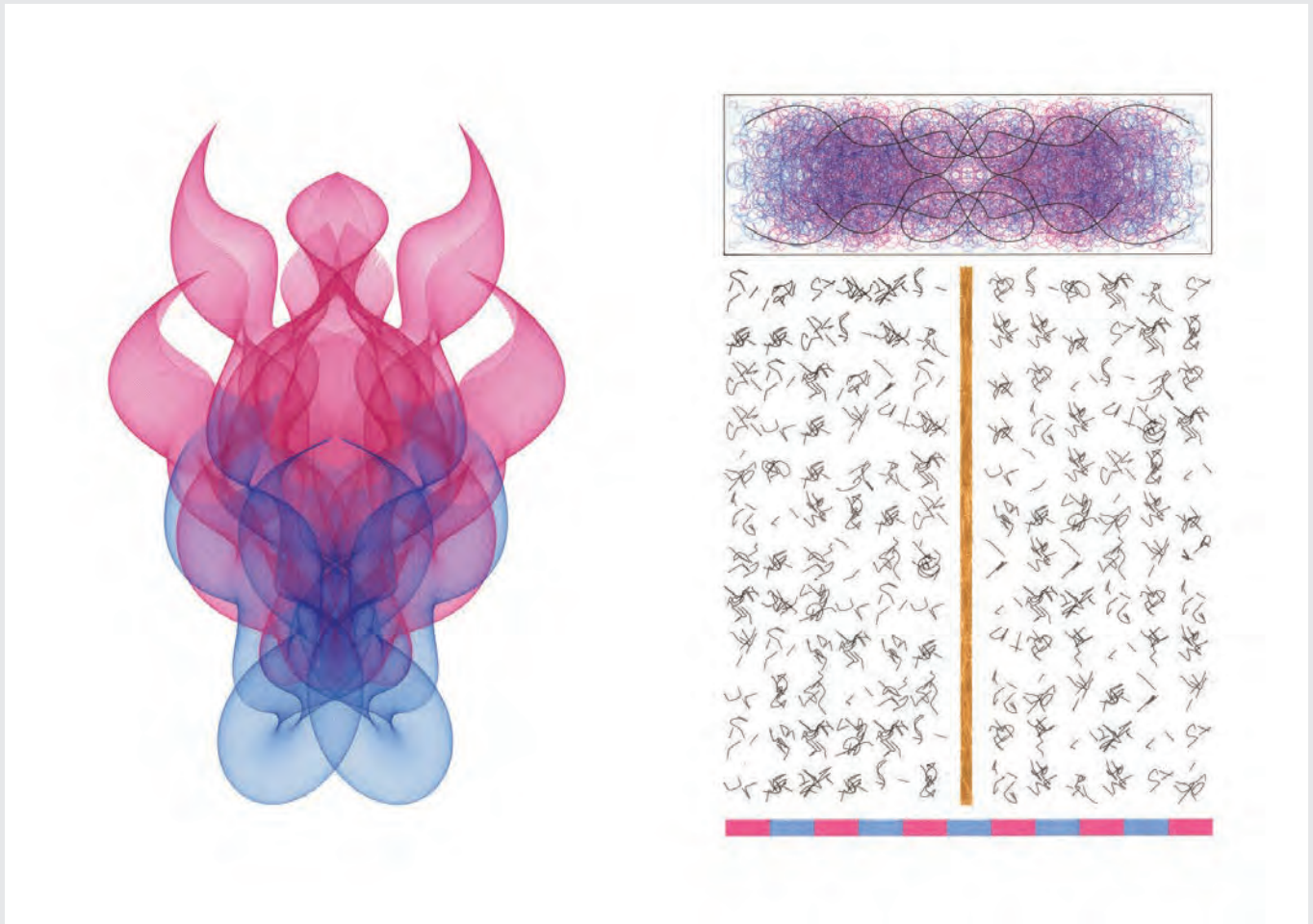
## Generative Art: Software as Genotype

While my first experience writing software for a computer dates from 1970, it was not until 1981 that I had my own studio computer, an IBM 5150 PC. I began writing algorithms for short, animated, nonrepeating, visual routines that could be viewed on a color CGA monitor. In 1982 I exhibited a selection of these routines as *The Magic Hand of Chance*, a program that would be my first example of *generative art*. It was first shown in a computer parts storefront window located in downtown Minneapolis on Hennepin Avenue.<sup>10</sup> Twenty-one years later it was shown in the *Algorithmic Revolution* exhibition at the ZKM in Karlsruhe, Germany, and again in 2014 at MCAD as part of the all-night arts festival Northern Spark (Fig. 5).



**Fig. 5. *The Magic Hand of Chance***, animated algorithmic sequence of images and texts. This generative art, first shown in 1982, was projected on the MCAD north wall as a 2014 Northern Spark “white night” event. The algorithmic form generator continuously creates new images and texts without repeating itself. This 1982 program would be one of the first examples of generative art created with an IBM PC.

By 1986, building on algorithms from my *Magic Hand of Chance*, I had achieved the first version of my master drawing program, named *Hodos*, the Greek term for “path.”<sup>11</sup> This program for drawing my form-generating ideas, along with a drawing machine, known as a pen plotter, evolved into my personal expert system. Pen plotters, designed for engineers and architects, were adapted by many active Algorists in the 1970s and 1980s.<sup>12</sup> After acquiring several pen plotters, I came to view my studio as an electronic scriptorium with my pen plotters as my “electronic scribes.”<sup>13</sup> By 1989 I was including digital scripts reminiscent of medieval manuscripts in generative series, such as *Diamond Lake Apocalypse* (Fig. 6). Many of my works are enhanced with a touch of gold or silver leaf applied by hand. On one occasion, a colleague suggested that I ship a scribe with my software as a “visiting artist.”<sup>14</sup>



My artworks are executed with a multipen plotter coupled to a PC and guided with instructions from my software. The drawing arm of the plotter, holding an ink pen and drawing on paper, bears an uncanny resemblance to the artist's drawing arm. Choosing from an array of pens loaded with inks, it draws each individual line. Most works require hundreds of lines and occasional pen changes, which are software controlled.<sup>15</sup> In 1987 I created software for an optional brush routine substituting a brush for a pen. Brushstrokes are plotted using Chinese brushes adapted to the machine's drawing arm.

**Fig. 6. Diamond Lake Apocalypse, Burning Bush,** 2000, pen and ink plotter drawing with hand-applied gold leaf, 22 x 29 in. Saint Vincent Art & Heritage Collections, Saint Vincent Archabbey and College, Latrobe, Pennsylvania. The text draws on twenty-six algorithmically generated characters. The character sequence follows syntactic rules for frequency of occurrence. The text is intended to celebrate the electronic procedures by which it was created.

## Form Generators as Genotype

Form generators are algorithms that specify precise, step-by-step procedures for drawing the artist's art-form concept. Somewhat like a composer's score for a musical idea, an artist's algorithm may be viewed as a "score" for drawing. It specifies procedures for every minute detail for drawing the artist's conception for visualizing a form. Hodos consists of many integrated algorithms in a program with over a hundred variables for graphic factors such as angle, position, scale, loops, and optional subroutines (Fig. 7). Many of these variables are adjusted with random choices within parameters of "not more than" and "not less than" a given range of choices. My current program, now in its seventh version, embodies coded form-generating ideas and preferences, refined over thirty-six years. It "knows" some of my form preferences and may be viewed as a primitive form of artificial intelligence (AI).

```

COM1 LPT1      [F] FILE MANAGER PFIL=01test01.q01,0 AUTO=ANY.N      *small02.02g
                [U] Utilities (DOS, FW, HI)                        SIZE=SA-
                [O] Options Menu/Prog Settings                     MAY ON
    7           [R] Randomizer SEED / set seed                      TESS= 10 10
    SA-,0       [Z] size paper,Margins,Tess,Frame Adv              TBEG= 0 0
    1 1         [I] Inkpens, set range                              TEND= 0 0
    D-Prts= 2   [D] DRAW-PORTS, Assign (Random/Manual)           RUT$=RD
    deHse = 11 [N] DENSE, Curve step density (0=auto, 24=def)
    A-Prt = 2   [A] Activate different DRAW-PORT
                [C] CENTER a Draw Port [size options] 2 Ports
    S-Prts= 0   [S] SACRAL, assign NOTOUCH area(s)
    N,B,Q       [M] Mir (N...), Seq (N,Y,X,B), MirQ (Q,X,Y,B) <def=N,N>
    0           [L] gLyph - how many glyphs (OFF=0, MANUAL=-1 def=50)
                [P] Paint NOTOUCH port      [B] Box, draw a box.
                [G] GO - Press G when set to go!

Resolution= 1000
Paper size=   0 0 9800 7300 ( 9.8 * 7.3 in)
DruPrt 2 ON   500 0 9500 6500 ( 9 * 6.5 in)
Margins (1000 per inch)=00050 00050 00050 00050

Attractor=PATH Dir=T Brush=M PenCh/Lps= 4 1
Jnt Mx/Mn= 8 4 Strt/End Deg= 0 360 Wiggl Mx/Mn= 360 0

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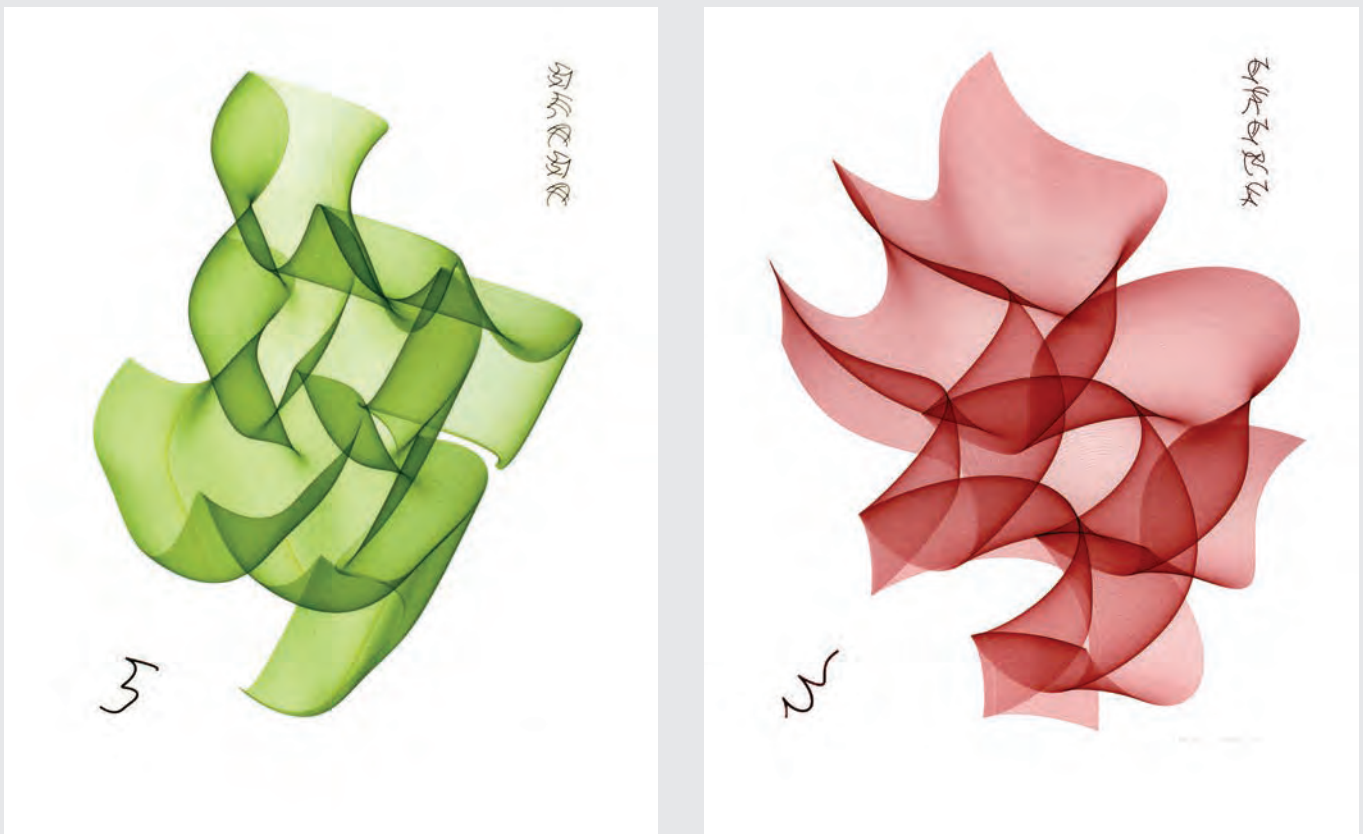
Fig. 7. Program Interface:  
HODOS-G.BAS.

Sample window interface that I built for setting up data files for my master program. Parameters and options are set with various interface windows like this one. The first interface version dates from 1986. Both the interface and programs for executing a project are written in BASIC.



Once all the parameters are set in a data file for a work of art, Hodos generates precise drawing instructions for the pen plotter. The software for generating the art form may be likened to a biological *genotype* because it contains the instructions (code) for drawing the art form.<sup>16</sup> Furthermore, once the parameters are set for a form, that code can generate a series of original forms bearing a “familial resemblance” (Fig. 8).

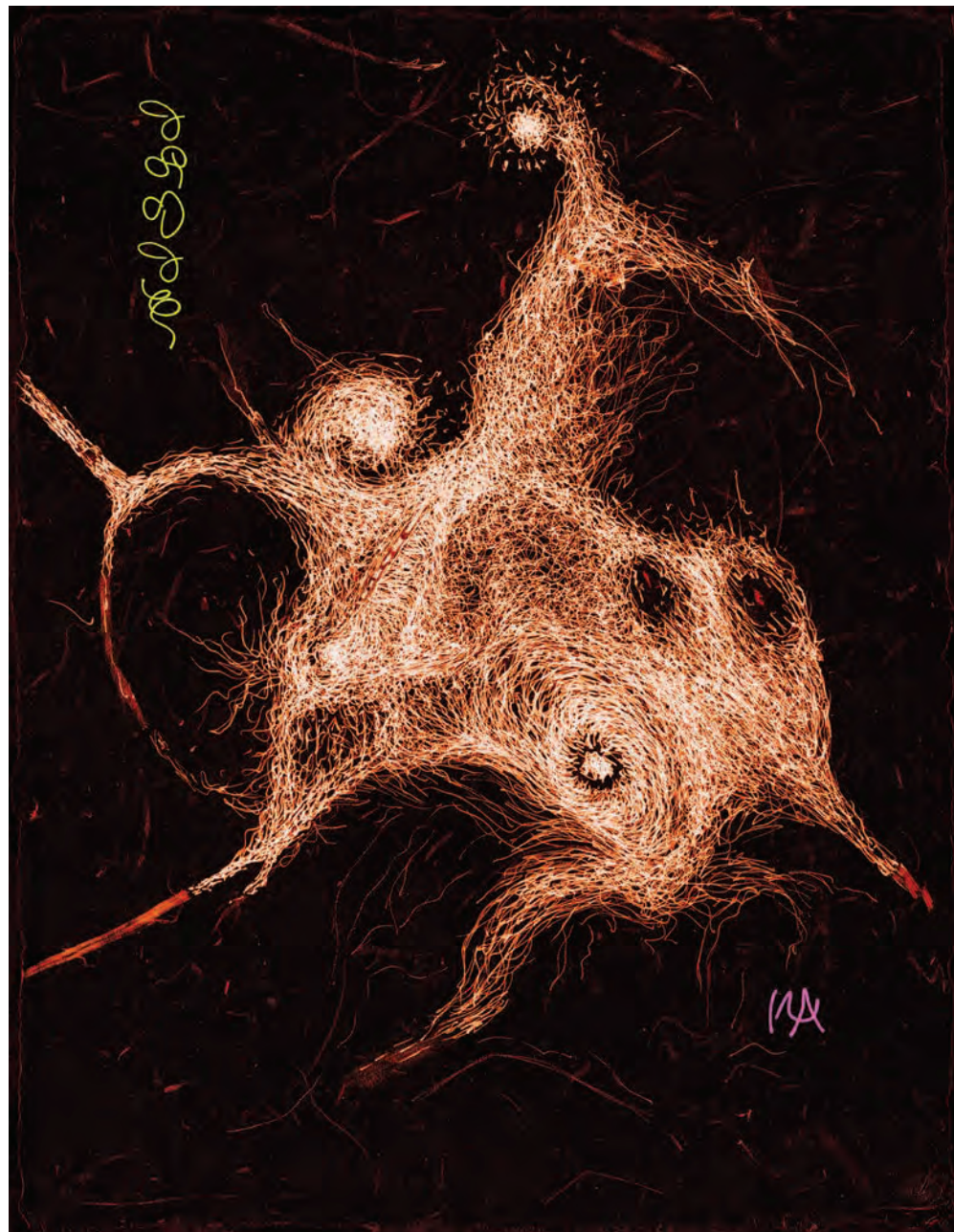
Also, the procedure for executing the code with a computer, pen plotter, paper, and pen and ink is analogous to biological *epigenesis*. From this perspective, the drawing process “grows” the art form and may be viewed as *epigenetic*.<sup>17</sup> My eight-hour video, the *Three-Story Drawing Machine*, documents this “growing” process.<sup>18</sup> The creation and control of such drawing instructions provide an awesome means for an artist to visualize “form-growing” concepts.



**Fig. 8. Cyberflower Duet,** 1999, pen and ink drawings, 29 x 23 in. each. These two cyberflowers were mounted in a single frame for the 2003 SIGGRAPH exhibition in San Diego to demonstrate generative art whereby forms, created with the same parent code, bear a familial resemblance.

## Transformations

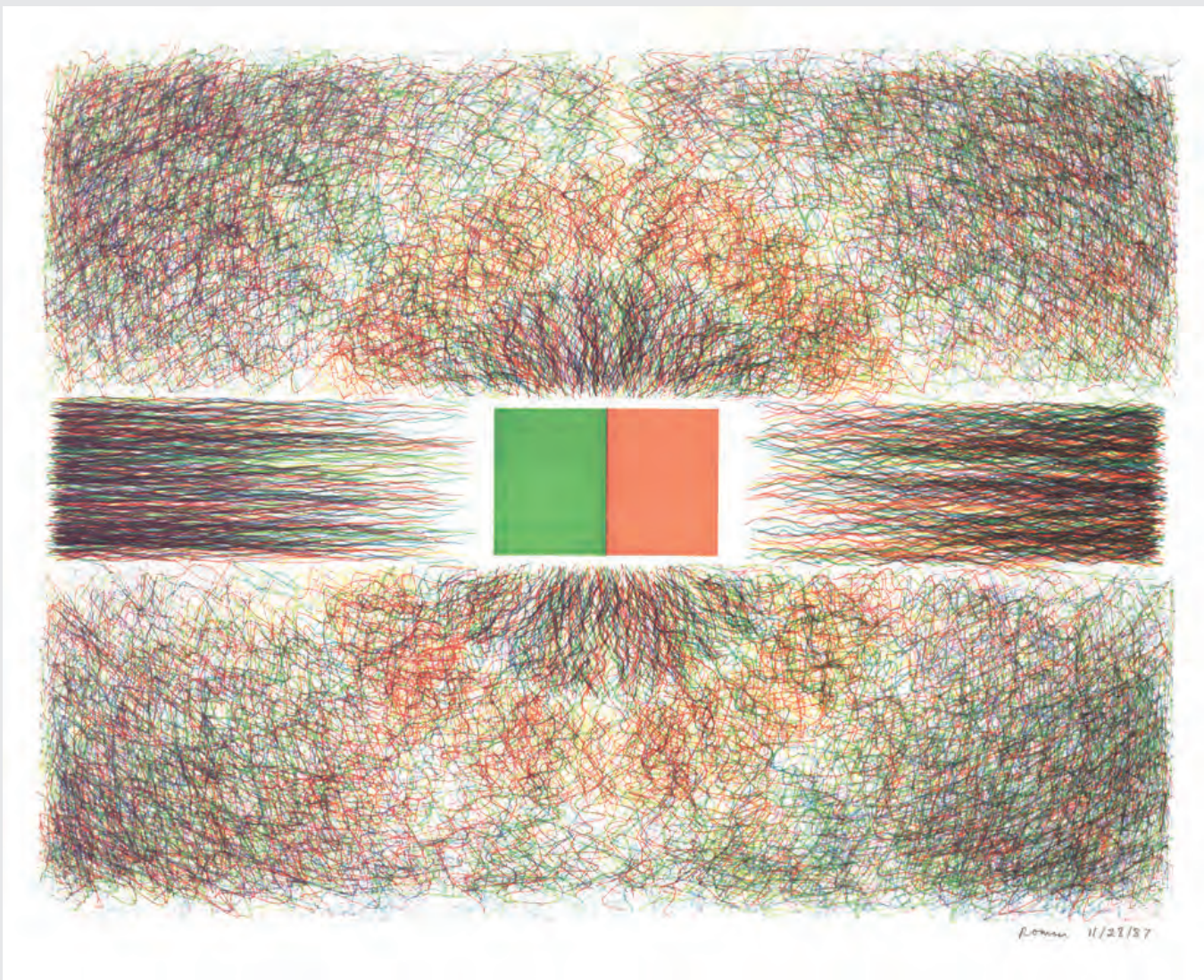
Since 2008, after digitizing my 1970s drawings for the *Upsidedown Mural* for the Fred Rogers Center, I have turned more attention to continuities between my earlier and later work. Occasionally I integrate algorithmic drawings and earlier drawings by hand with various digital procedures to create pigmented digital prints I call *Digital Transformations*. Recent works have merged drawings with paintings from the 1960s and 1970s with algorithmic scripts yielding colorful transformations for my NASA series.<sup>19</sup> This colorful series of pigmented prints continues the same quest for pure form that has coursed throughout my work over the past sixty years (Fig. 9).



**Fig. 9. Transformations:**  
**Wanderer, NASA series, 2017,**  
archival pigmented print,  
digital transformation of an  
algorithmic pen and ink drawing,  
24 x 17 in. This transformation  
evolved from an original  
drawing. I added pen strokes  
merging hand drawing with  
machine drawing. The drawing  
was then transformed with  
color inversion, algorithmic  
text additions, and other  
digital modifications.

## Content and Meaning

Over the years my software evolved by stages, yielding series of works such as *Gaia*, *Apocalypse*, *Scarab*, *Ezekiel*, and *Cyberflower*. Each series has distinctive formal qualities associated with its algorithmic form generators. Each work presents one more adventure in a world of forms never seen before, visual forms that have a life of their own. The artworks are visual analogs of the algorithms by which they grew. They provide a window on unseen processes shaping our experience of the world. They invite us to ponder how the stark logic of algorithms can yield such surprising grace and beauty. By doing so they point, in a humble way, to the marvelous nature of the codes underlying self, Earth, and cosmos. And if we are fortunate, they may help us know our not knowing, that marvelous moment at the junction of opposites, the cloud of unknowing (Fig. 10).



**Fig. 10. Cosmic Immersion,**  
1987, pen and ink plotter  
drawing, 18 x 24 in.

## NOTES

1. *The Cloud of Unknowing*, edited and introduced by James Walsh, Classics of Western Spirituality (Mahwah, NJ: Paulist Press, 1981); the passage quoted in the epigraph is on page 128.
2. Alan Turing's thesis identified a procedure for deciding "computable" propositions. In doing so he confirmed that there are propositions that are "non-computable." Alan Turing, "On Computable Numbers, with an Application to the Entscheidungsproblem," *Proceedings of the London Mathematical Society* 2 s. vol. 42 (1936): 230–65.
3. This kind of *knowing* is similar to the mystic's experience that reaches the plateau of knowing that the unknowable is indeed *unknowable*. Such experience is a state of *unknowing*. Such unknowing is similar to Nicolas Cusa's "Learned Ignorance," outlined in his *De docta ignorantia* (1440). For a translation and notes, see *Nicholas of Cusa: Selected Spiritual Writings*, translated and introduced by H. Lawrence Bond, Classics of Western Spirituality (Mahwah, NJ: Paulist Press, 1997).
4. By *purists*, I mean those abstract artists who rejected descriptive line and color entirely. Preferred terms for such art in the first quarter of the twentieth century include *concrete art*, *non-objective art*, and the *New Realism*.
5. For Malevich, the non-objective world transcends our experience of the material world of objects. His *White on White*, with a tilted white square fading into white, exemplifies this experience (*Suprematist Composition, White on White*, oil on canvas, 31 1/4 x 33 1/4 in., Museum of Modern Art, New York).
6. Exhibition catalog, Westmoreland County Museum of Art, on my website, [http://www.verostko.com/archive/shows-gr/westmoreland\\_museum\\_catalogue\\_1965.pdf](http://www.verostko.com/archive/shows-gr/westmoreland_museum_catalogue_1965.pdf).
7. This play between opposites echoes Lao Tzu's observation that "existence and non-existence give birth, the one to the other." See Lao Tzu, *Tao Te Ching*, trans. James Legge, vol. 39, Sacred Books of the East (Oxford: Oxford University Press, 1891).
8. Today I would view the experience clues as pointers to the cloud of unknowing.
9. Large folios of these drawings were resurrected in 2007, digitized, and formatted for the *Upsidedown Book* and *Upsidedown Mural* for the Fred Rogers Center at Saint Vincent College in Latrobe, Pennsylvania. For more information, see Jewelweed Impressions, <http://www.jewelweedimpressions.com>.

10. John Scobee, who taught me a lot about assembling a PC, opened one of the first PC parts stores known to me. As I recall, we ran *The Magic Hand of Chance* on a CGA monitor in a window position that attracted some attention.
11. I wanted a classical Western term for *way (tao)* for my Pathway Studio, which would explore new “pathways for drawing.” Wang Dongling carved the seal for my studio in 1989. For more information, see “Pathways Studio,” at my website, <http://www.verostko.com/seal.html>.
12. See my history of the term *Algorist* at my website, <http://www.algorists.org>.
13. My first plotters were Houston Instrument DMP52 multipen plotters with fourteen pen stalls. Later DMP62s and Summagraphics 8000 plotters had only eight pen stalls. My code was written to address a color palette for up to fourteen ink pens, but my palettes ranged from one or two pens up to about five or six.
14. On several occasions I traveled with one of my “scribes” to demonstrate Hodos or conduct a workshop. We shipped one to the Ars Electronica’s conference *CODE—The Language of Our Time*, Linz, Austria, Sept. 6–12, 2003. Both my wife and I demonstrated various routines including brushwork. We did the same for the LABoral grand opening in Spain, 2007, *FEEDBACK*, LABoral Centro de Arte y Creación Industrial, La Universidad Laboral, Gijón (Asturias).
15. See “Art and Algorithm,” ISEA’94, at my website, [www.verostko.com/alg-isea94.html](http://www.verostko.com/alg-isea94.html).
16. The biological term for a plant seed is *genotype*. The seed contains all the instructions required for growing the plant.
17. *Epigenesis*, borrowed from biology, refers to the process whereby a mature plant is grown from a seed. The seed contains the genetic code, the genotype, for growing the plant. By analogy, the software as a “form generator” contains the code for drawing the artwork. The procedure for drawing the work, analogous to “growing the plant,” may be viewed as *epigenetic*. See my 1988 paper “Epigenetic Painting: Software as Genotype,” at my website, <http://www.verostko.com/epigenet.html> (published in *Leonardo* 23: 1 [1990]: 17–23).
18. See a compressed version of this video on my website, <http://www.verostko.com/shows/n-spark/n-spark.html>.
19. I created this series in memory of my brother Charles (1931–2017), whose work with life support systems at NASA contributed to the successful flight to the moon on July 19, 1969. I considered it a great privilege to have been alive to witness the historic landing as it was broadcast live from the moon via Houston.



# Roman, Evangelist for Art

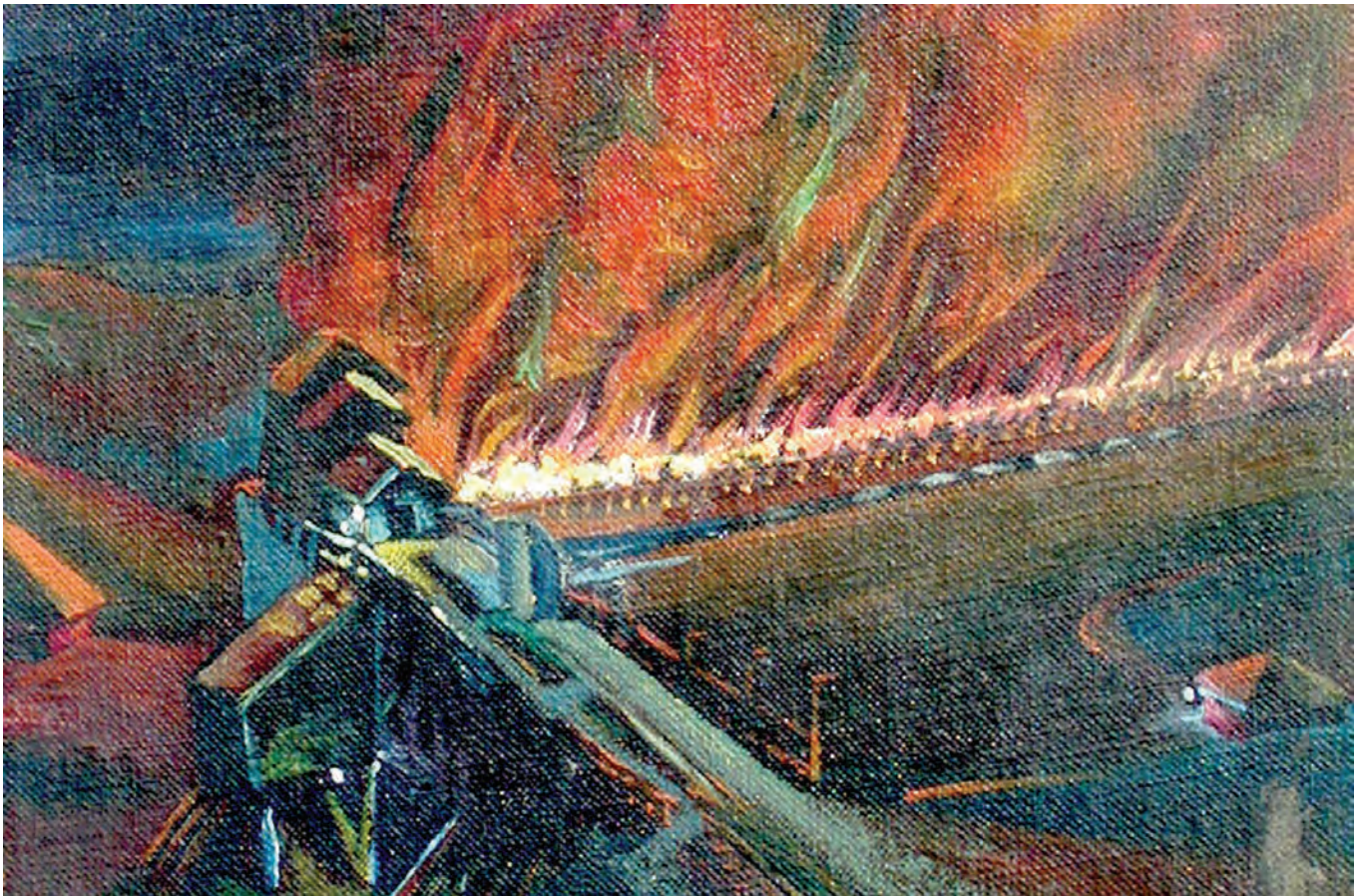
Grant D. Taylor, PhD

With a striking red brick exterior, the Saint Vincent Basilica dwarfs the majestic white oak and red maple trees that color the beautiful Laurel Highlands of southwestern Pennsylvania (Fig. 1). Positioned in the foothills west of Chestnut Ridge, near Latrobe, the Archabbey's basilica leads a collection of noble buildings that include the Saint Vincent Monastery, Seminary, and College. These buildings and the vast center of learning within their walls gave a young Joseph Verostko refuge and opportunity—along with his new monastic name, *Romanus*. Though he did not fully understand its importance at the time, the church would become a portal, a kind of global nexus that would transport him to diverse regions of the art world. His journey would eventually land him in the new and rapidly expanding territories of digital art, a terrain he would help inform and shape.

This abiding impulse to seek out new knowledge and pursue all paths of learning remains a hallmark of the artist and scholar Roman Verostko. His boundless curiosity and his uncommon drive have positioned his practice as pivotal in the history of digital art. Though his name is associated primarily with digital culture, Verostko's pre-digital artwork is vital to understanding his work, especially if we seek to interpret his diverse approach. In fact, the artist's practice is not easily delineated between digital and pre-digital periods. Common threads unite the two phases into one path that is defined by a continual quest for deep historical and theoretical understanding of his subject. Verostko's approach to media, consistent throughout his career, has always remained experimental. However, his legacy is not just that of an innovative artist. Verostko's academic labors would do more than any other's to disseminate the key concepts of digital craft to a world eager for understanding. This charismatic teacher, with a gift for describing the elusive presence of digital artistry, would expound the historical genesis and metaphysical facets of generative art. In doing so, he would influence and inspire a generation of young digital artists.

**Fig. 1. Saint Vincent Basilica,**  
Saint Vincent Archabbey,  
Latrobe, Pennsylvania.  
Photo: Alex Byers,  
Saint Vincent College.

Like all narratives associated with Verostko's life, the artist's path from Benedictine monk to digital impresario is remarkable. Verostko was born on the cusp of the Depression to a family of immigrants from eastern Slovakia. Recruited to work in the coalfields outside Latrobe, his parents were defined by hard work, resourcefulness, and perseverance. Verostko's humble origins are dramatically captured in one of his early paintings, a landscape titled *Coke Ovens Burning at Night*, 1946–47 (Fig. 2). The image vividly captures the beehive ovens as they radiate a constant orange glow from the process of converting coal into coke for the surrounding steel mills. Despite the hardships and hazards of the coalfields, the Verostkos produced children of significant talent and drive. Verostko was a precocious artist from a young age, and after finishing high school he went to the Art Institute of Pittsburgh to pursue a career as an illustrator. Verostko's decision to enter a scholastic program at the monastery of Saint Vincent in 1950, on his twenty-first birthday and less than a year after receiving his art school diploma, was significant and complex.



**Fig. 2. *Coke Ovens Burning at Night***, 1946–47, oil on canvas board, 9 x 12 in., collection of the Verostko family.



Beyond his interest in art, the young Verostko fostered an expanding interest in philosophy, language, and spirituality. His brother Bernard had entered the Benedictine order at Saint Vincent a year prior and had introduced Verostko to the learned community. There were, however, other motivating forces propelling the artist toward the cloister. With the outbreak of the Korean War in 1950, there was a growing chance of being drafted. Verostko was still haunted by his grief at losing his brother George in the waning days of World War II. As Verostko recalls,

*I witnessed the depth of my mother's grief, her moaning and wailing when she received the telegram announcing his death. I also felt . . . the silent unspeakable pain my father buried within himself. Seeing the deep hurt of killing and being killed in war, I could not imagine myself ever being a soldier. My teenage experience of the war lingered in my conscience like a deep festering sore and, I knew in my heart, that I would never be able to fight; I would never carry a gun. This made monastic life all the more attractive.<sup>1</sup>*

Verostko had also read Thomas Merton's autobiographical *The Seven Storey Mountain*, which, after its publication in 1948, emerged as a powerful recruiting tool to the monastic life and helped convince Verostko that this path was fitting for someone with his own pacifist tendencies.

Intellectually inquisitive and gifted creatively, Verostko flourished at the monastery. Combining scholarly studies with artistic pursuits emerged as his methodology. After completing his religious orders, Verostko tackled a number of ambitious mural projects, all requiring the artist to seek out further instruction in ceramics, casting, and metalwork. Highly versatile and ever the experimental practitioner, the artist looked to combine media in unimagined ways, all while penetrating the spiritual underpinnings of faith. While taking an explorative approach to media, the artist also engaged the newest idioms of art. In the ceramic tile mural for the Saint Vincent Library (1958–60), trends in figurative and abstract

painting are synthesized with Byzantine iconography, which were informed by his study of art history (Fig. 3).<sup>2</sup> In *Brother* (1967), a steel-reinforced concrete casting, the brushstroke is deftly deconstructed to reveal the weight of its three-dimensional form (Fig. 4). The brushstroke mold was cut into Styrofoam with soldering irons and then cast. The sense of brotherhood, key to monastic life, along with memories of his own brother, informed the meaning of the work. In this mural, we witness the impact of Verostko's studies in New York City and Paris, as he absorbed the latest stylistic movements and studied the traditions of the past.



**Fig. 3. Saint Vincent Library Mural**, 1958–60, ceramic tile mural, 11 x 22 ft., 6 in. units, designed and glazed at Saint Vincent Archabbey, Latrobe, Pennsylvania.

**Fig. 4. Brother**, 1966–67, permanent reinforced concrete cast relief, 8 x 8 ft., Archabbot's Conference Room, Saint Vincent Monastery, Latrobe, Pennsylvania.



Verostko's horizons were broadened considerably when he was pursuing graduate studies in New York City and was given residency at Saint Michael's rectory. The early 1960s was a culturally invigorating time to be living in Manhattan, and Verostko was able to combine his occasional pastoral work with his studies and burgeoning art practice. With incredible swiftness, he transitioned from the bucolic setting of Pennsylvania to the pace of the city. By his second year in residency he had completed his MFA at Pratt Institute and taken art history coursework under Meyer Schapiro (Columbia University) and Robert Goldwater and Harry Bober (New York University). This was an especially important growth period for Verostko. As well as pursuing his art studies, he mixed with a range of abstract expressionists, pop artists, neo-dadaists, and minimalists. These artists, varying from Barnett Newman and Ad Reinhardt to Andy Warhol (whose studies at Carnegie Mellon were contemporaneous with his own studies at the Art Institute of Pittsburgh), made an indelible impression on Verostko (Fig. 5). As he worked intensely within his studio on West Thirty-Fourth Street, Verostko's work became increasingly layered as he absorbed prevailing styles, networked, and formed mentor relationships that would shape his entire career.



**Fig. 5. "Young Americans & the well mixed party,"** *Harper's Bazaar* (August 1962), 88–89. Father Roman Verostko is conversing with John Chamberlain (center). Andy Warhol is on the right.

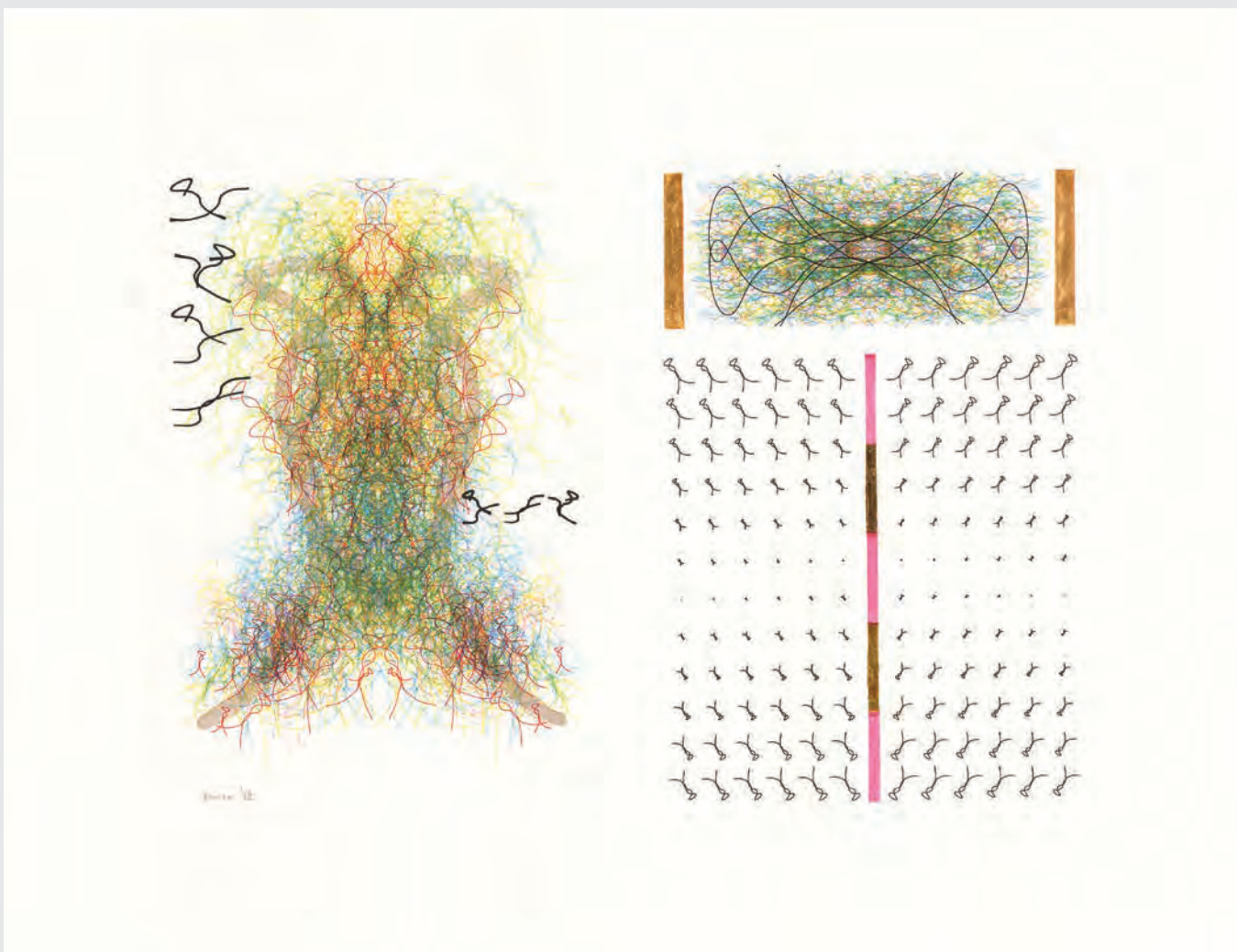
Given his increasingly cosmopolitan outlook and his fiercely independent spirit, it seemed natural for Verostko to finish his whirlwind studies in Europe. In 1962, the artist-monk began a residency at the Centre Internationale Catholique, Cité Universitaire, Paris, where he began to explore the subconscious through a series of automatic drawings. His highly expressive "experience states" drawings would inform much of his future work. Making pilgrimages to medieval monastic sites and studying under Stanley William Hayter at the famed Atelier 17 equipped Verostko for his next assignment. Known for his serious scholarly approach, Verostko was asked to assume the position of staff editor for the art and architecture section of the first edition of the *New Catholic Encyclopedia* (McGraw Hill, 1967). Stationed at the Catholic University, Washington, DC, for this important and demanding assignment, Verostko again divided his time between scholarly and studio work. The years between 1963 and 1968 were a transitional period when his experience in New York and Paris coalesced into the breakthrough series *The New City* (Fig. 6). This series would provide the foundation to the code that he later wrote to drive his pen-plotted work. Constructing from geometric forms and animating with the force and freedom of the gestural brush mark, Verostko attempted to bring harmony to the visual tension created between order and chaos.

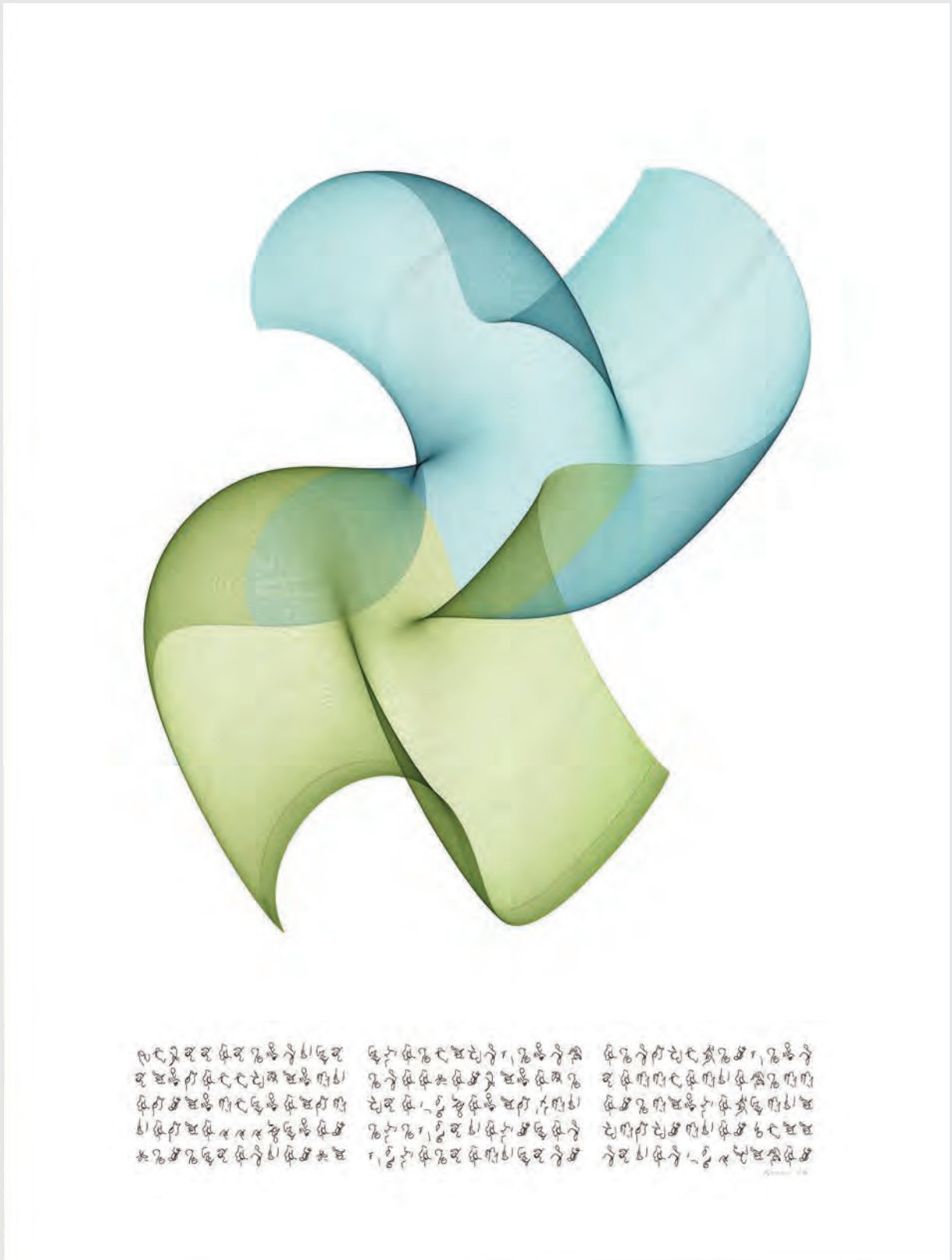


**Fig. 6. *The New City***, 1968, mixed media on wood panel primed with gesso, 48 x 48 in.

Resolving pictorial tension in Verostko’s paintings reflects a larger project of resolution in the artist’s own spiritual life. “Father Roman,” as he was known, was struggling with his own faith; in fact, he had been conflicted from almost the time he entered the cloister. A natural progressive and reformer, Verostko was always going to feel a certain dissonance with the orthodoxies of the church. His crisis of faith came to a head in 1968, the same period when the social unrest caused by the Vietnam War and civil rights movement was radically reshaping American society. During this transitional period, he met his future wife, Alice Wagstaff, and a new path opened before him. She was a psychology professor at Duquesne University and a key associate of the humanist psychologist Carl Rogers. Beyond becoming Verostko’s frequent collaborator and his studio director, Wagstaff was instrumental in redirecting the artist’s spiritual path toward nature. Together they would find restorative powers in contemplating the open-ended, cyclical, and manifold elements of the natural environment, and this would inform most of his artwork, from the *Diamond Lake Apocalypse* series (1992), *Canticles of the Sun* (1995–96), and the *Gaia* series (1989–2003) to the *Rocktown Scrolls* (2006) and *Flowers of Learning* (2006) (Figs. 7 and 8).

**Fig. 7. *Diamond Lake Apocalypse #888.n*, 1992,** pen and brush plotter drawing with hand-applied gold leaf, 18 x 24 in.





**Fig. 8. Flowers of Learning,**  
**Homer,** 2006, ink and pen  
plotter drawing, 40 x 23 in.

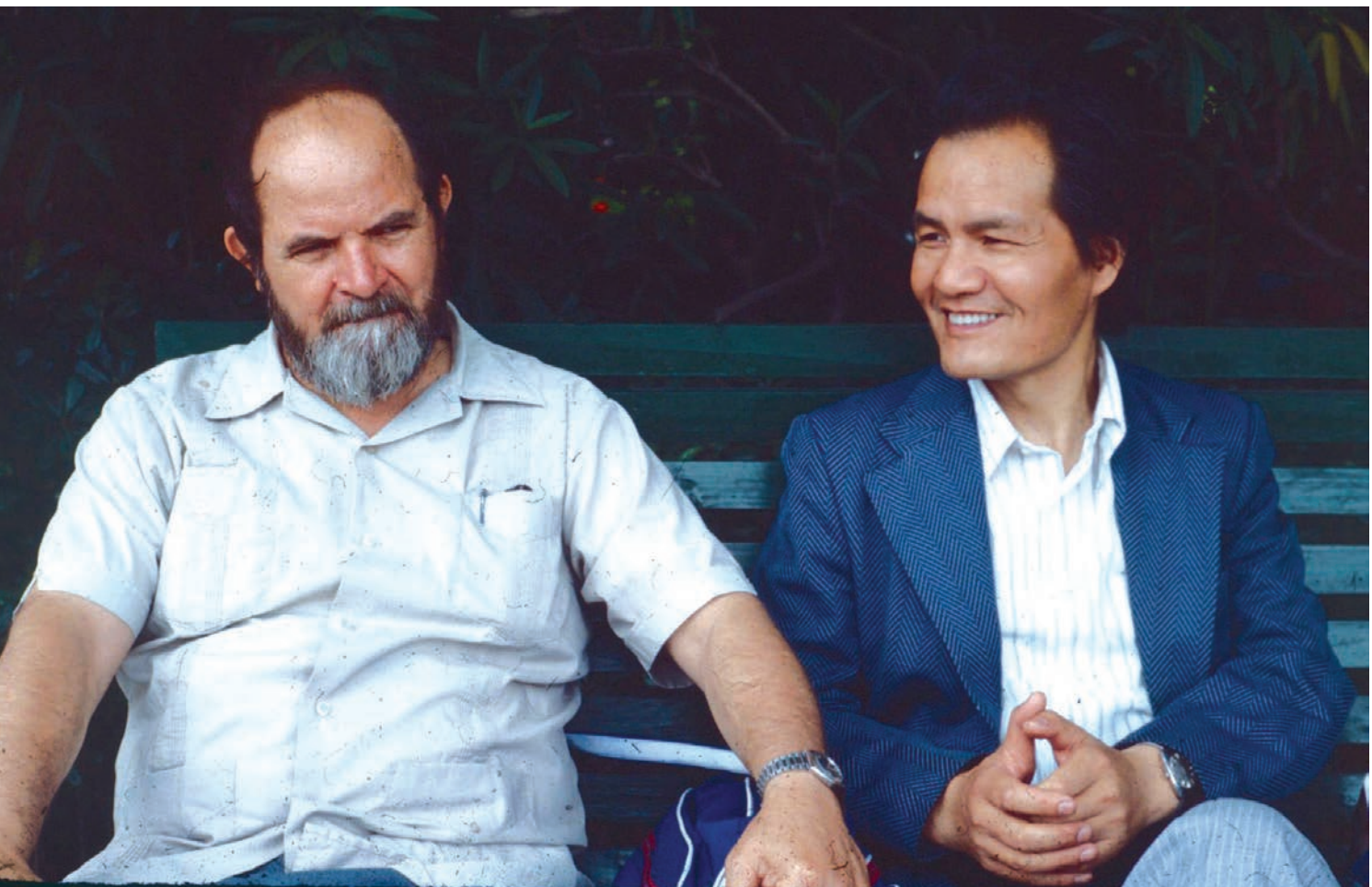
With extensive experience in the cultural arts, Verostko joined the humanities faculty at the Minneapolis School of Art (later renamed the Minneapolis College of Art and Design [MCAD]), where he taught a survey of world art, twentieth-century art, and one of the earliest courses on art and computers. While Verostko had begun experimenting with sound and image projection as early as 1966 at Saint Vincent, his relationship to art and technology would be further developed at MCAD. With digital technology beginning to permeate many aspects of society, and a public unsure and anxious about its ultimate impact, the artist felt a need to humanize our experience of emerging technologies. This culminated in 1970 when Verostko was named a Bush Foundation fellow and had the opportunity to spend a summer working alongside Gyorgy Kepes, director of the Center for Advanced Visual Studies at MIT. While he began to learn to program computers during this period—an early sign of his eventual shift to emergent media—he continued painting. The *Imaging the Unseen* series continued his exploration of automatism with an array of imaginative iconic forms springing from the artist's subconscious mind (Fig. 9). These playful forms, surfacing from the imaginative realm and suspended in self-contained space, would find direct similarities to many of Verostko's later computer-generated constructions.



**Fig. 9. *Eikon #214*, 1972,** acrylic with gesso base on masonite, 24 x 24 in.

Culturally curious and always adventurous, Verostko next turned toward China. The resulting cultural exchange from the artist's various tours became historic, and today Verostko's carefully translated course materials and slides can still be found in the Chinese archives. His China experience began in 1982 when he traveled on a seminar trip organized by Sister Baulu Kuan from the College of St. Benedict. As he surveyed the arts of China, Verostko was disheartened by the destruction of Buddhist art and other archaeological sites in the wake of the Cultural Revolution. Soon after his return, Verostko met Zheng Shengtian, who was a visiting scholar at the University of Minnesota. Shengtian was the first Chinese professor of art to come to the United States following the Cultural Revolution, and he would become a key facilitator of cultural exchange between China and the United States. As a consequence of these collaborations, Shengtian became a principal figure in the changes that would take place in contemporary Chinese art. Shengtian audited Verostko's twentieth-century art course at MCAD and invited him to teach the same course at the China Academy of Art in Hangzhou in spring 1985 (Fig. 10). This outreach was Shengtian's attempt to rebuild cultural dialogue that had been suspended for four decades. Twenty-four years later, in 2009, Shengtian noted that "Verostko's introduction of Western modern art is considered today to be one of the key events that contributed to the emergence of the New Art Wave movement in 1985 in China."<sup>3</sup>

**Fig. 10. Roman Verostko and Zheng Shengtian,** 1985, Shanghai, People's Republic of China.





Shengtian must have immediately recognized he had in Verostko someone entirely original. As a lecturer, Verostko had extensive experience in the history of Western art and the development of modernism. As an artist, Verostko had a deep and authentic interest in Eastern art, and by the 1980s, he was an emerging pioneer in digital art. Such a convergence in one individual was rare. In 1985, when Shengtian invited Verostko to teach a course on modern Western art, it was the first to be taught in China since 1949. Modernism had been considered reactionary and decadent by authorities during the Cultural Revolution, and only after the death of Mao had the authorities started to relax restrictions on outside influences. Young art teachers and graduate students from other Chinese art academies were invited to attend Verostko's course in Hangzhou. The course was strictly limited, but following its conclusion many of these students invited him to visit art academies in other cities and give one-week-long summary lectures. Extending goodwill and fellowship, a natural outgrowth of his pastoral experience, Verostko befriended artists and educators. During the Cultural Revolution, artists had suffered greatly, ranging from being humiliated or even imprisoned. Verostko was acutely aware of their anguish, and sensing the importance of his mission, he agreed to extend the lecture tour to as many art academies as possible. In Hangzhou, Verostko's lecture "The Future of Art and the Artist" became his most important and the only one open to all (Fig. 11). To augment his lecture, Verostko procured two PCs from the university's computer science department and demonstrated elementary computer graphics and his *Magic Hand of Chance* (1982–85).<sup>4</sup>



**Fig. 11. Poster advertising Verostko's lecture, "Art and the Future," 1985, Hangzhou, People's Republic of China.**

When Verostko returned thirteen years later, to teach a one-week seminar in Hangzhou, much had changed. China had modernized, and contemporary Chinese art had found a global audience. Verostko's new lecture series centered on algorithmic art, its historical development, and how the artist can shape individual style through generative systems. Between his China tours, in 1987 Verostko achieved one of his most important creations when he adapted Chinese brushes to fit the drawing arm of his pen plotter. For the first time, an artist was able to achieve a stroke with the expressive energy and human sensibility of the hand, rather than the mark of cool precision that had dominated computer art from its inception. Since the 1980s, Verostko had become a connoisseur of Chinese brushwork. The master calligrapher Wang Dongling, who followed Verostko's course in Hangzhou, lived with Verostko for several months when he was a visiting artist at the University of Minnesota. The artists influenced each other's work in significant ways (Fig. 12).<sup>5</sup> During this period of creative exchange, Wang Dongling carved the *Pathway Studio* seal used in many of Verostko's works.<sup>6</sup> Ultimately, Verostko would successfully build a transcultural aesthetic by including the chop that was essential to the East Asian aesthetic, and the gold leaf that gave visual power to the West's illuminated manuscript.

Verostko became one of the most original and most recognizable digital artists, largely a result of his calligraphy-inspired robotic brushwork complemented with his painterly use of color with his multipen plotter palette. With previous experience as an artist-scholar in the Benedictine order and as a traveling lecturer in Asia, Verostko was well positioned to take a leadership role championing the digital arts. He became a fixture at major digital arts conferences and festivals (such as ISEA, Ars Electronica, and SIGGRAPH). In 1993, he was program director of the Fourth International Symposium on Electronic Art (FISEA) conference hosted by MCAD, which was the first ISEA conference to be held in North America. The event brought digital artists and theorists from all around the world to the Twin Cities. During this period, Verostko was one of the first artists to build a web presence, constructing his own website in early HTML language. Today, the artist's website is both an important archive for scholars and an artifact that records the first forays into the worldwide network. The website's architecture allows for a type of navigation not unlike an archaeological excavation, with each link opening another path within Verostko's layered narrative.

In addition to his leadership efforts in promoting digital art, Verostko became an important theorist. At the first ISEA in 1988, held at Utrecht, Netherlands, he presented a seminal paper that would turn out to be a classic in the annals of digital art history. Published in the journal *Leonardo*, "Epigenetic Painting: Software as Genotype" provided an overview of Verostko's practice and its theoretical implications. As the title suggests, Verostko understood the "generative" power of computation in terms of a biological analogy, and he was the first to do so. Major concepts of randomness, recursive and self-similar behavior, the centrality of the algorithm, and the mechanical craft of the plotter were all illuminated. While Verostko gave shape and clarity to these concepts, it was his speculative exploration of the metaphysical element of computer-generated practice that was so consequential. Strengthened by his knowledge of spirituality, Verostko provided a new frontier for this epoch-defining machine.



**Fig. 12. Follow the Way of Yin and Yang**, 1988, pen and ink plotter drawing by Verostko and calligraphy by Wang Dongling, 24 x 21 7/8 in.

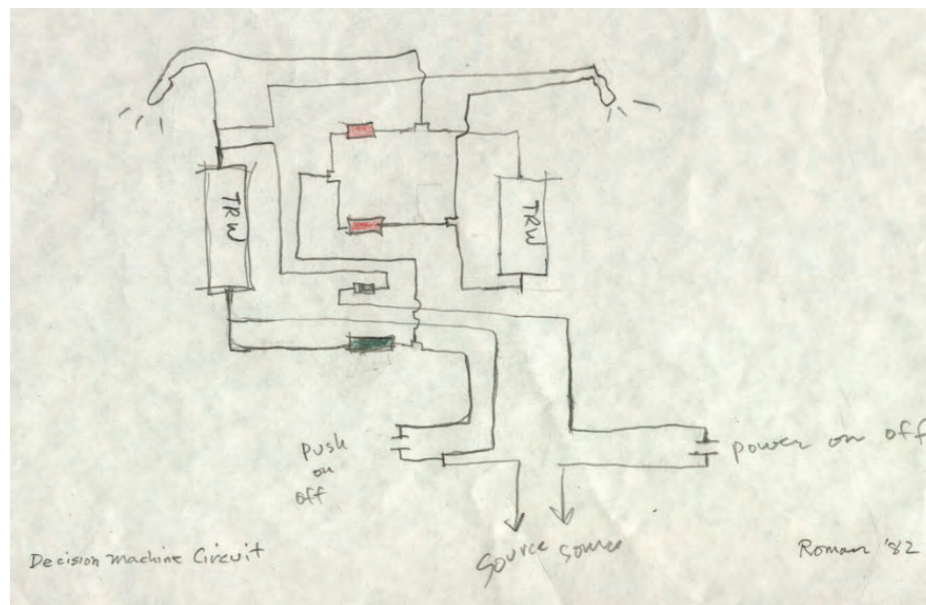
Computation and its protean form-generating powers would give artists access into previously unseen worlds of visual form. Verostko's art was an invitation to journey to these new metaphysical frontiers in search of previously unimagined forms.

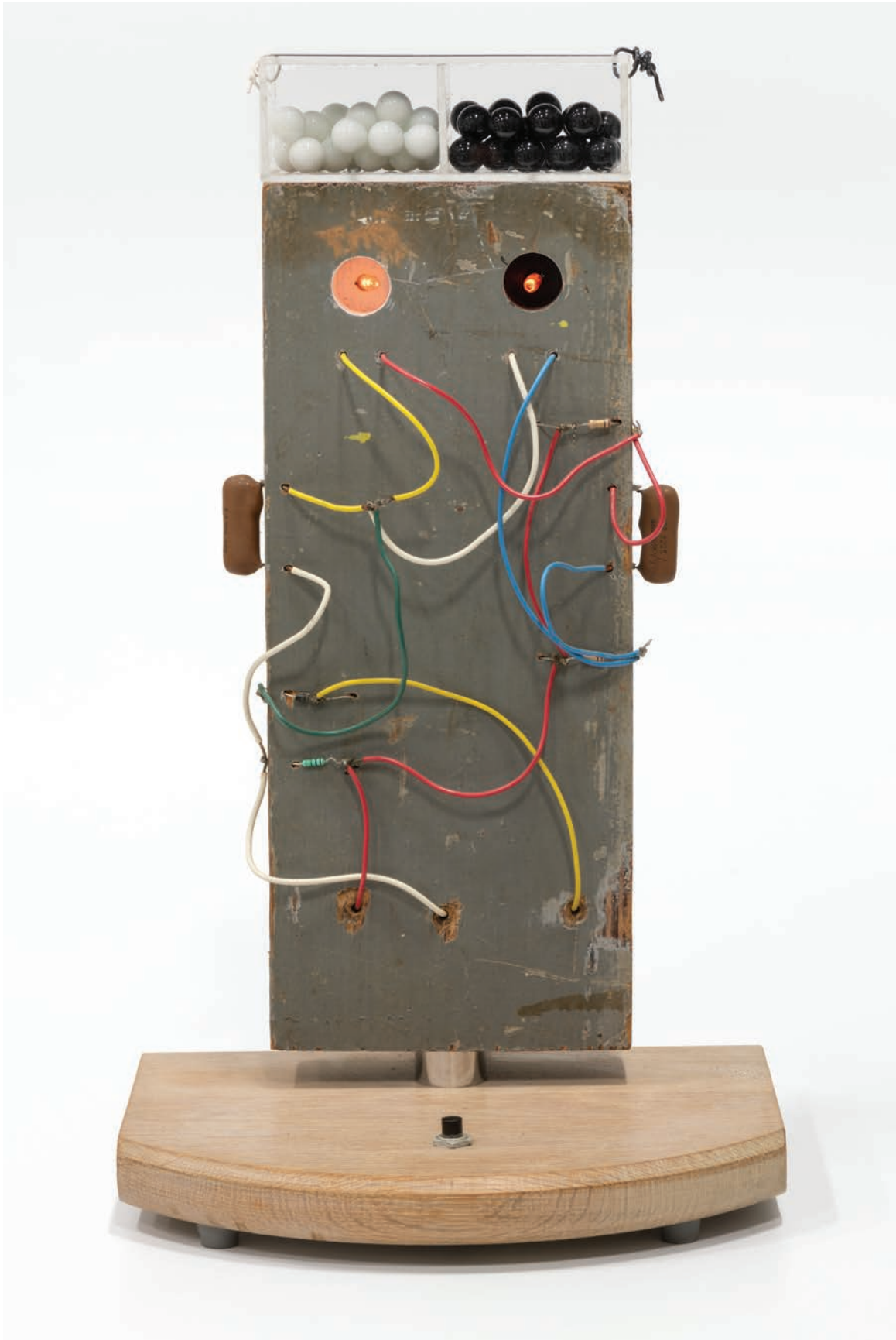
In addition to introducing the biological analog of generative art, Verostko advanced a deeper theoretical understanding of the algorithm, which became a driving concept in digital practice. By 1995 Verostko, in close partnership with Jean-Pierre Hébert, helped form the Algorists, a group of like-minded practitioners who also programmed their own art-making systems. While the group coalesced around Verostko, Jean-Pierre Hébert, Ken Musgrave, Charles Csurí and Manfred Mohr, it was Verostko who took a leading role in historicizing the algorithm. His experience as an encyclopedist allowed him to carefully trace the complex etymology of the word *algorithm* and build an understanding of algorithmic art as a cluster concept that included a vast array of practices. Verostko spearheaded conference panels, organized exhibits, and promoted the group's online presence.

His scholarly work also gave him a deep appreciation of those individuals who had contributed to the development of the modern computer. Verostko was the first artist to embark on a series of works that recognized and honored these notable figures. While the homage has an important place in modern art (artists have often paid tribute and acknowledged the influence of those who came before), Verostko created artworks that celebrated individuals from the disciplines of mathematics and engineering. Verostko's *Decision Machines*, which began in 1979 (Figs. 13 and 14), is his first homage series. This early interactive project in electronics and systems, which explored chance, randomness, and control, paid tribute to Norbert Wiener, the father of cybernetics. Wiener's theories fused the interrelationship between communication, control, and statistical mechanics, whether in biological or mechanical form. This theory was influential in much of the early computer art. In the 1990s, Verostko also paid homage to the nineteenth-century mathematician George Boole and the theorizer of modern computing Alan Turing. A testament to the artist's broad appeal, these homage series have received significant recognition in the sciences.

**Fig. 13. Decision Machine Circuit**, 1982, graphite and colored pencil on paper, 8 1/2 x 11 in.

**Fig. 14. Decision Machine: The White House** (Homage to Norbert Wiener), 1985, mixed media, 18 x 10 x 7 3/4 in. Photo: Rik Sferra.





The artist's legacy, like his career, is manifold in nature. As a practitioner, Verostko has a style that is one of the most recognizable in the digital art canon. Perhaps this is because his presence in the field has remained global. East or West, capital city or province, his transcultural aesthetic has become iconic. His various homage series, with their cross-disciplinary appeal, stand as a testament to a practice deeply rooted in the history and philosophy of computing. From this historical consciousness, the artist has been able to shape much of the discourse on algorithmic praxis. Verostko's metaphysical musings and the heterodox possibilities that flow from his practice have captivated a new generation of artists interested in combining computers and art. Verostko's role as one of the first ambassadors of digital art allows us to see a deeper quest for interconnectedness and the celebration of human dignity that has animated his entire career. Taken in its entirety, the artist's story—including all the fascinating divergent and transitional points—makes for a career of extraordinary scope and achievement.

## NOTES

1. See Verostko's website: <http://www.verostko.com/archive/statements/journal.html>.
2. See Verostko's account of the project at <http://www.verostko.com/history/sv/svc50-59/library.html>.
3. Zheng Shengtian, "East/West Dichotomy: Is There a Middle Way?," paper presented at the Fourth International Sculpture Symposium, University of Minnesota, Minneapolis, February 18–22, 2009. A pdf of the article is also available on Verostko's website: <http://www.verostko.com/china>.
4. Whereas Western humanities courses were met with some resistance from authorities, the Chinese were very eager to see developments in Western technology. Roman Verostko, communication with the author, September 7, 2018.
5. See Shao-Lan Hertel's study of the cross-cultural influences between Wang Dongling and Verostko: Shao-Lan Hertel, "Lines in Translation: Cross-Cultural Encounters in Modernist Calligraphy, Early 1980s–Early 1990s," *Yishu: Journal of Contemporary Chinese Art*, 15, no. 4 (July/August 2016): 6–28.
6. Both Verostko and his wife, Alice Wagstaff, have a number of seals. For illustrated explanations, see <http://www.verostko.com/seal.html>.





# The Art of Logical Arguments

## Roman Verostko's *Derivation of the Laws and Manchester Illuminated Universal Turing Machine*

Christiane Paul

Over the past decade, media archaeology has emerged as an increasingly established discipline, analyzing the historical layers of media in their aesthetic, cultural, and political singularity. Rather than writing a linear, often technologically deterministic history of media's evolution, media archaeology focuses on the range of factors that influence the formation of media culture at any given time. Within the field of digital media art, artists such as Paul DeMarinis and Toshio Iwai, among others, had already taken media-archaeological approaches in the 1990s to engage with the evolution of technologies and their related concepts in form and content. Roman Verostko's computer drawings occupy a unique position in this context: neither explicitly engaging in a media-archaeological investigation nor taking their mathematical and scientific roots for granted, the drawings often reinterpret and pay homage to the work of the mathematicians and scientists—from George Boole to Alan Turing—that made them possible. More than other early coded works, they are testaments to their origins and the ways in which philosophy and science have shaped visual expression.

While Verostko did not exhibit his first coded program, *The Magic Hand of Chance*, until 1982, his interest in algorithmic work started much earlier, at a time when early digital art began to emerge. A year after graduating from the Art Institute of Pittsburgh in 1949, he entered monastic life at Saint Vincent Archabbey, studying philosophy and theology and pursuing his art practice, which early on included electronics. After departing from monastic life in 1968, he joined the humanities faculty at the Minneapolis College of Art and Design (known then as the Minneapolis School of Art). He filmed an algorithmic visual sequence from a monitor at UNIVAC for one of his public lectures on TV in 1969 and, the following year, took a computer concepts course that included FORTRAN at the Control Data Institute (CDI), a technical vocational school created by Control Data Corporation in the mid-1960s. Verostko said, "I had come to understand the power of algorithmic leverage and the technology of electronic circuits."<sup>1</sup>

**Fig. 1. Manchester Illuminated  
Universal Turing Machine**  
(detail of UTM binary code),  
1998, pen and ink plotter drawing  
with hand-applied gold leaf.

Verostko's interest in technology aligned with the emergent art forms of the time. During the 1950s and 1960s there was a surge of participatory and technological art, created by artists such as Ben Laposky, John Whitney Sr., and Max Mathews at Bell Labs; John Cage, Allan Kaprow, and the Fluxus movement (named and loosely organized in 1962); and groups such as Independent Group (IG) (1952–54; Eduardo Paolozzi, Richard Hamilton, William Turnbull, et al.); Le Mouvement (Galerie Denise René in Paris, 1955); ZERO (1957–59; Otto Piene, Heinz Mack, et al.); Groupe de Recherche d'Art Visuel (GRAV) (1960–68; François Morellet, Julio Le Parc, et al.); New Tendencias (1961–73); and the Systems Group (1969; Jeffrey Steele, Peter Lowe, et al.). The fact that the relationship between art and computer technology at the time was often more conceptual was largely due to the inaccessibility of technology. Only a few artists were able to get access to or use discarded military computers.

While computers and digital technologies were still by no means ubiquitous in the 1960s and 1970s, there was a sense that they would change society. It is not surprising that systems theory—as a transdisciplinary and multiperspectival domain comprising ideas from fields as diverse as the philosophy of science, biology, and engineering—became increasingly important during these decades. The systems approach during the late 1960s and the 1970s was broad in scope and addressed issues ranging from notions of the art object to social conditions but was deeply inspired by technological systems. Concepts of systems surfaced in Fluxus and the conceptual art of the 1960s and 1970s, which both incorporated variations of formal instructions and focused on concept, event, and audience participation as opposed to art as a unified object.<sup>2</sup> This emphasis on instructions connects to the algorithms that form the basis of any software and computer operation—a procedure of formal instructions that accomplish a “result” in a finite number of steps. The first two exhibitions of computer art were held in 1965: *Computer-Generated Pictures*, featuring work by Béla Julesz and A. Michael Noll at the Howard Wise Gallery in New York in April 1965; and *Generative Computergrafik*, showing work by Georg Nees, at the Technische Hochschule in Stuttgart, Germany, in February 1965.

It was not until the 1990s that Verostko, along with the pioneers who had started using mathematical functions to create “digital drawings” on paper in the 1960s and 1970s—among them Harold Cohen, Charles “Chuck” Csuri, Herbert Franke, Jean-Pierre Hébert, Hiroshi Kawano, Manfred Mohr, Vera Molnár, Frieder Nake, Joan Truckenbrod—started calling themselves “algorists” (a term coined by Jean-Pierre Hébert). Although their works resembled abstract drawings and seemingly replicated aesthetic forms of expression that were familiar from traditional media, they captured essential aesthetics of the digital medium in outlining the basic mathematical functions that drive any process of “digital drawing.” In the statement for his limited-edition book *Derivation of the Laws* (1990), Verostko draws parallels between the practice of artists such as Wassily Kandinsky, Paul Klee, Naum Gabo, and Barbara Hepworth—who explore a universe of visual forms that do not “re-present” the world but “make visible the invisible”—and that of mathematicians, physicists, and computer artists.<sup>3</sup>

Verostko's work differed from that of many of his algorist peers in that it set up a dialogue between his algorithmic drawings and the mathematicians or scientists that laid the groundwork for them. His book *Derivation of the Laws* was created in honor of the nineteenth-century mathematician George Boole (1815–1864). Boole became famous for creating a symbolic language that became crucial for the development of modern circuit boards and had an impact on programming languages. Systematizing Aristotle's theory of logic,

Boolean algebra does not set variables to numbers but to just one of two values, true or false, and operates on variables with AND, OR, and NOT, the search operators now common in search engines. Boolean algebra made it possible to connect the electricity flowing through the switches in the physical components of a computer to the logical tasks that computers perform.



**(a) Edition #52**, Collection of the Tama Art University Museum, Tokyo, Japan.

**(b) Edition #74**, Collection of the artist's Pathway Studio archive, Minneapolis, Minnesota.

**(c) Edition #87**, Collection of ZKM Center for Art and Media, Karlsruhe, Germany.

**(d) Edition #61**, Collection of Pratt Institute, Brooklyn, New York.

**Fig. 2. (a–d) Frontispieces from *Derivation of the Laws of the Symbols of Logic from the Laws of the Operations of the Human Mind: An Excerpt from the Writings of George Boole*, 1990, limited letterpress edition artist book, 6 x 20 in. (open). These algorithmic pen and brush drawings were bound into the books and demonstrate the power of a generative algorithmic procedure to create a “family of forms” from a parent code.**

Verostko's *Derivation of the Laws* is a limited edition (125 copies) of chapter 3 from Boole's *An Investigation of the Laws of Thought on Which Are Founded the Mathematical Theories of Logic and Probabilities*, one of the founding texts for symbolic logic, published in London in 1854. It includes a preface by Roger Malina, executive editor of *Leonardo*, and a statement by Verostko.<sup>4</sup> For each of the books, Verostko created unique frontispieces and end pieces, pen- and brush-plotted drawings made with a pen plotter driven by the artist's software. The individual drawings for the frontispieces are generated from one "parent code," and the ones for the end pieces from a second "parent code." Through variations, these codes produce unique expressions for each book in the edition while still maintaining a "family of forms" (Figs. 2 and 3). The internal color illustrations accompanying the text were printed

**(a) Edition #52**, Collection of the Tama Art University Museum, Tokyo, Japan.

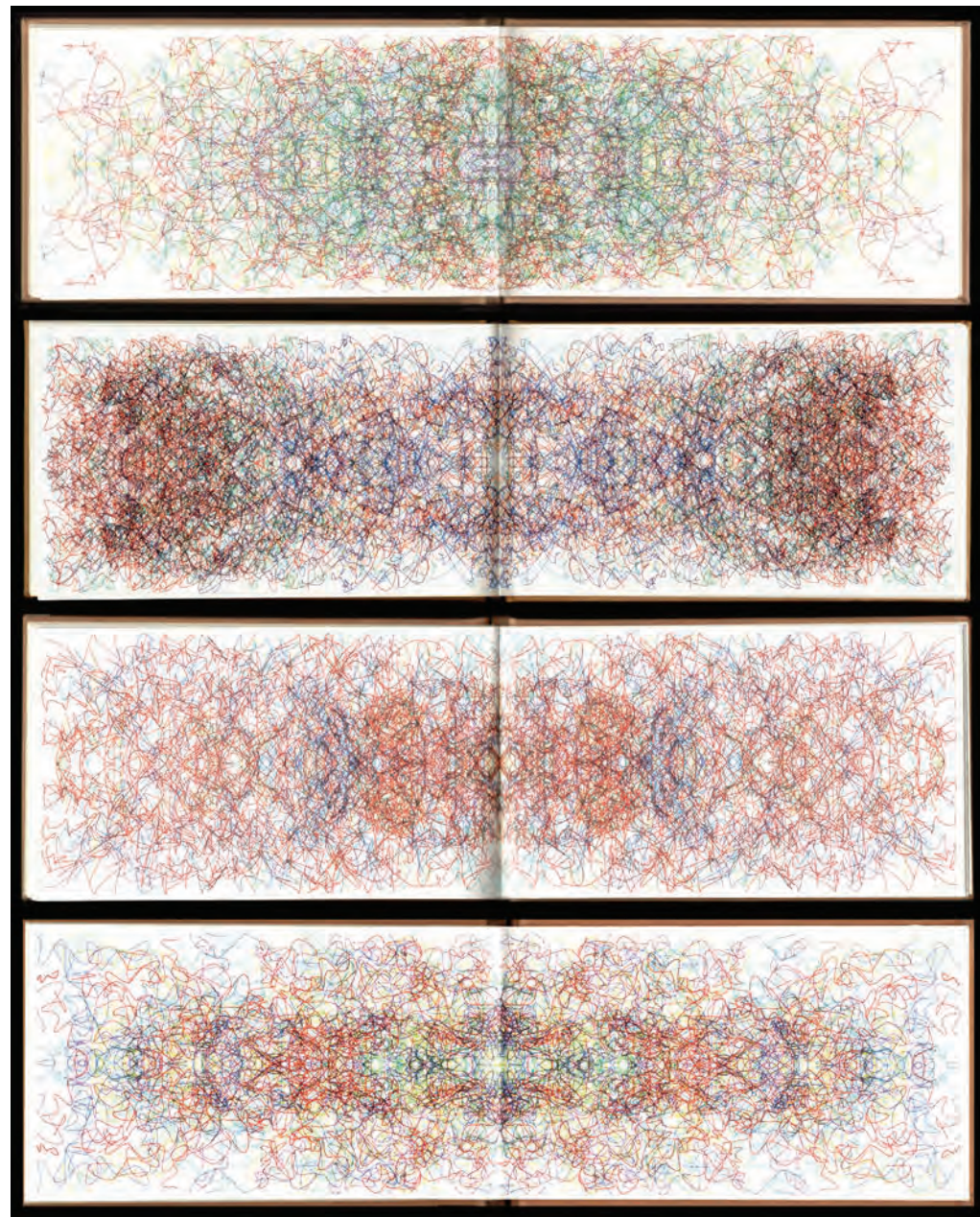
**(b) Edition #74**, Collection of the artist's Pathway Studio archive, Minneapolis, Minnesota.

**(c) Edition #87**, Collection of ZKM Center for Art and Media, Karlsruhe, Germany.

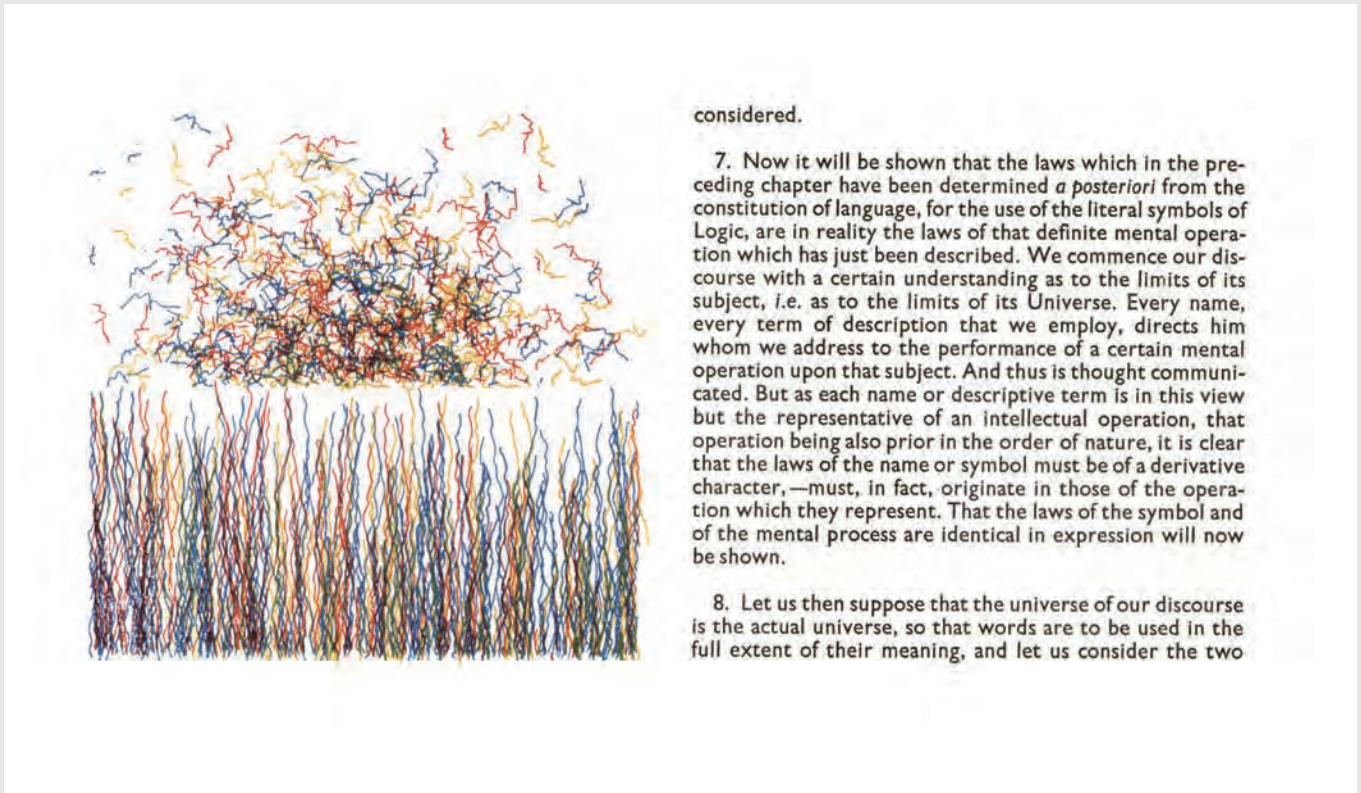
**(d) Edition #61**, Collection of Pratt Institute, Brooklyn, New York.

**Fig. 3. (a–d) End pieces from *Derivation of the Laws of the Symbols of Logic from the Laws of the Operations of the Human Mind: An Excerpt from the Writings of George Boole*, 1990, limited letterpress edition artist book, 6 x 20 in. (open).**

These algorithmic pen and brush drawings were bound into the books and demonstrate the power of a generative algorithmic procedure to create a "family of forms" from a parent code.

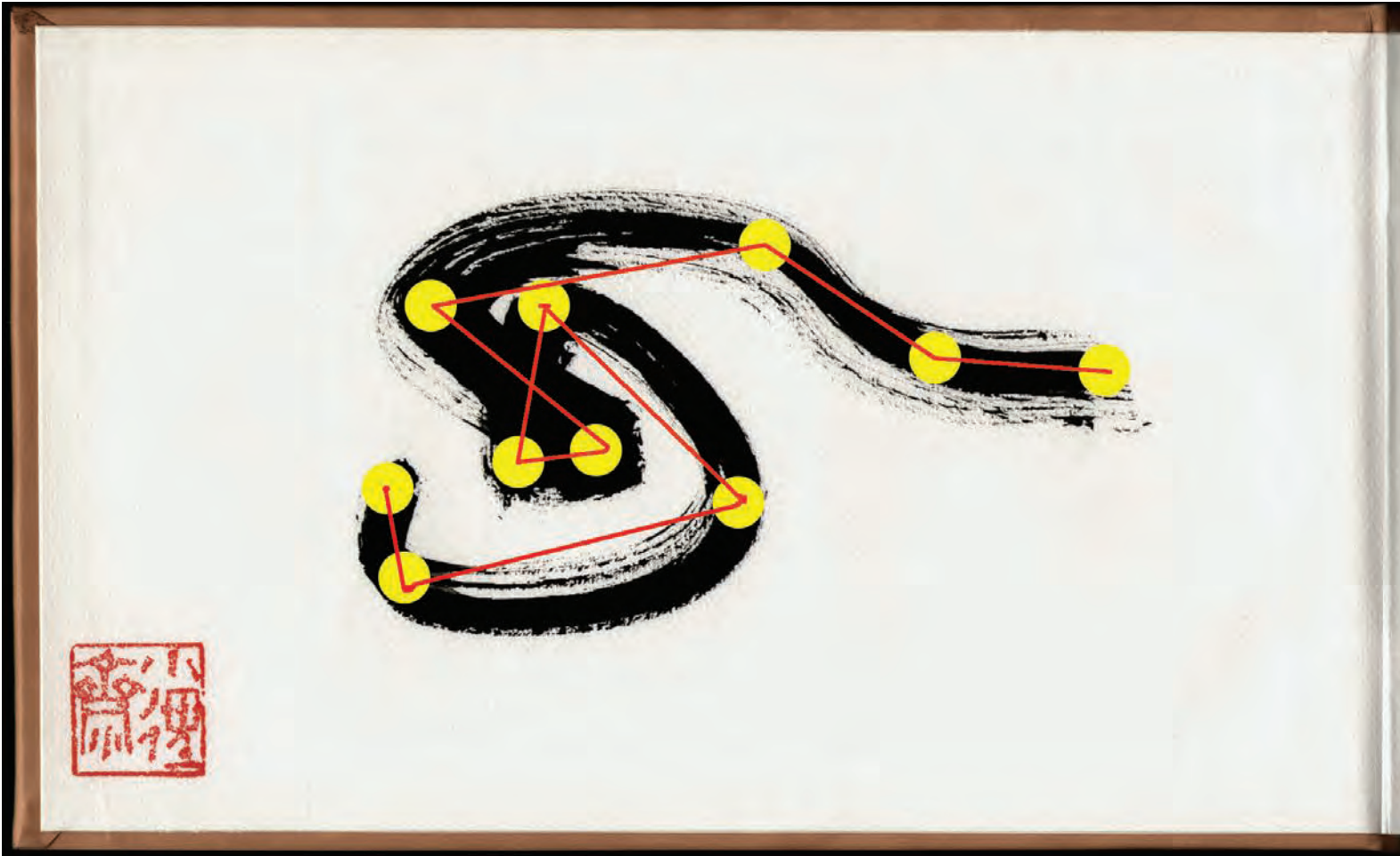


in four colors using four line-cut zinc plates, and the plates were etched from algorithmic pen-and-ink drawings also generated by Verostko's software (Fig. 4). All of them have their roots in procedures enabled by Boolean logic: Verostko used terms from Boole's symbolic logic for the algorithms creating his graphic improvisations. The digits 1 and 0 were randomly distributed around a center of attraction to express the dynamism inherent in logical systems through visual effects (Fig. 5). Verostko's *Derivation of the Laws* is also remarkable for being a predecessor of the bound art books that use algorithms for generating unique copies within a limited edition, a practice that has gained traction in the past decade.



**Fig. 4. Book page 20 with text and four-color letterpress illustration,** from *Derivation of the Laws of the Symbols of Logic from the Laws of the Operations of the Human Mind : An Excerpt from the Writings of George Boole*, 1990, limited-edition artist book.

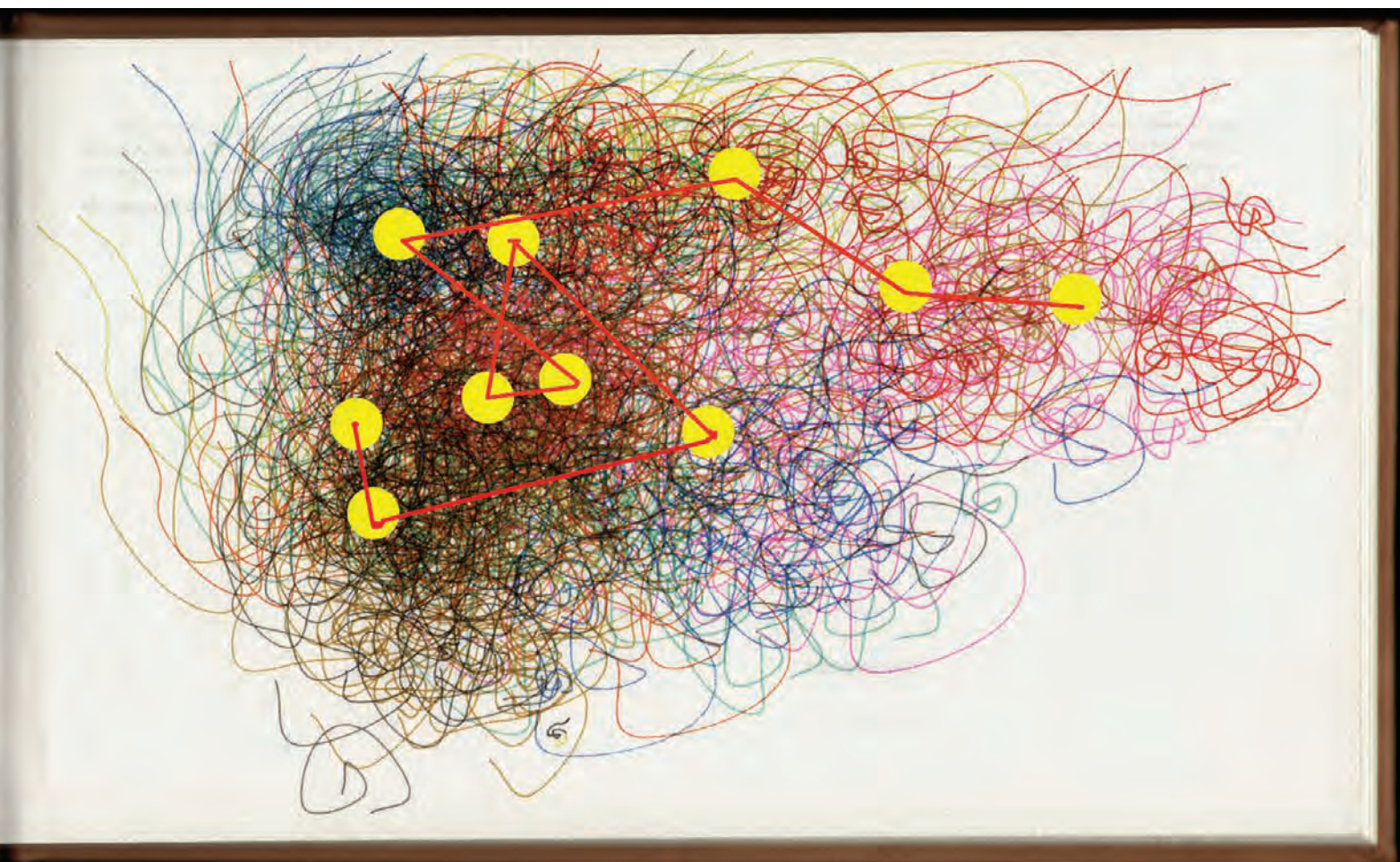
**Fig. 5.** Full-page four color, letterpress illustration printed with line-cut zinc plates etched from algorithmic pen and ink plotter drawing, from *Derivation of the Laws of the Symbols of Logic from the Laws of the Operations of the Human Mind: An Excerpt from the Writings of George Boole, 1990*, limited-edition artist book.



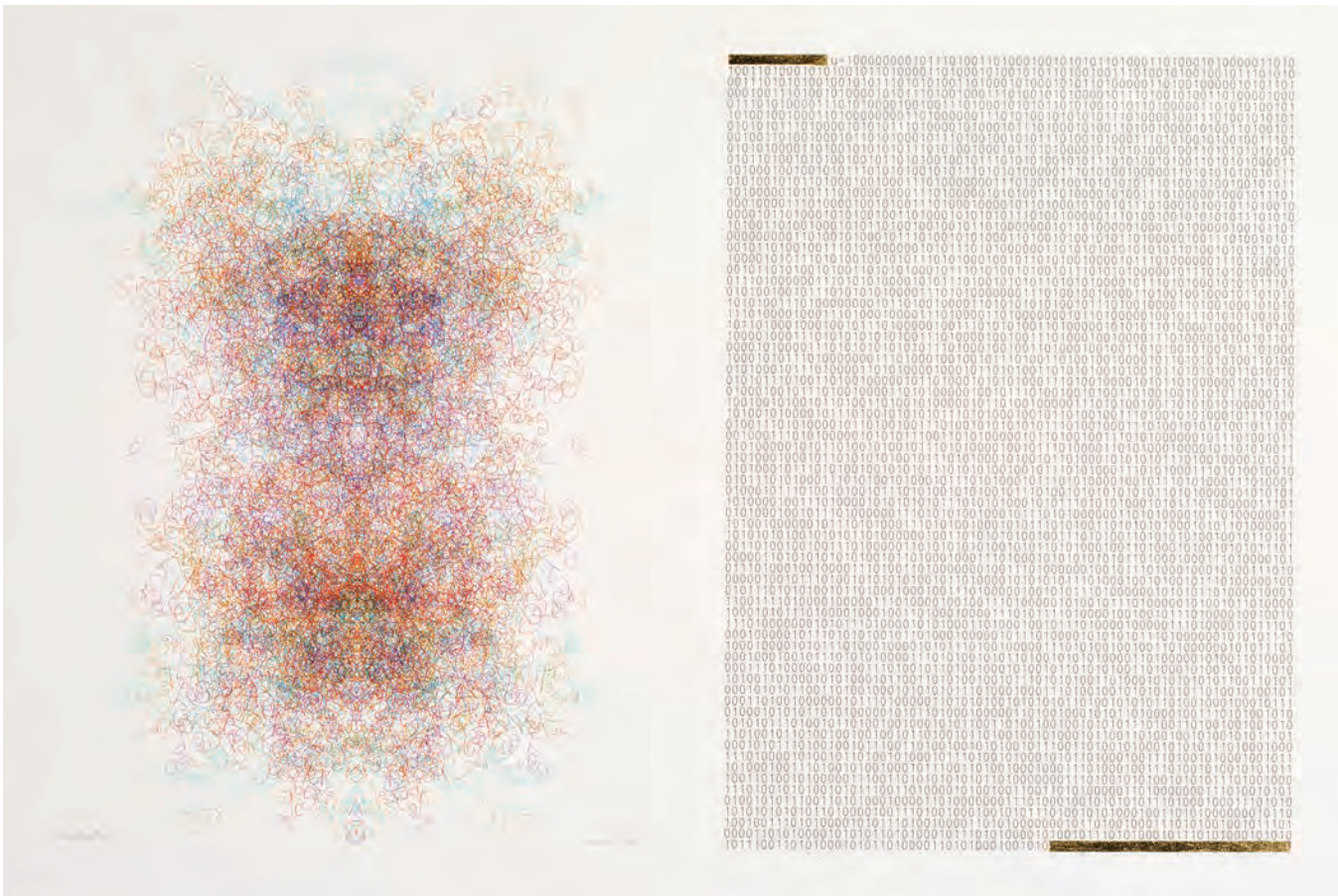
The drawings in the *Derivation of the Laws* strike a delicate balance between their foundation in a logical system and an almost organic quality of intricate forms (Fig. 6). As Verostko puts it, computers allow him to “explore visual analogues of probability, forms which were hidden from view before we had these machines.”<sup>5</sup> With his wife, Alice Wagstaff, he had investigated the form-generating power of algorithms executed with computing power since acquiring studio PCs in 1981, and they repeatedly found themselves returning to comparisons between biological processes and coded procedures. Wagstaff, who had studied biology, guided Verostko’s understanding of epigenesis—the process whereby a mature plant, the phenotype, grows from a seed, the genotype. While Verostko spelled out the details and structured the software, the concepts outlined in the article “Epigenetic Painting: Software as Genotype” (1988) were a joint effort between Verostko and his wife.<sup>6</sup>

**Fig. 6. Diagram of coded coordinates in *Derivation of the Laws*.** Edition #82, Anne and Michael Spalter Digital Art Collection.

The ten coordinates controlling the brushstroke on the left are identified in the ten golden orbs shown in the diagram on the right. The smaller strokes present variations and distributions based on the brushstroke curve.



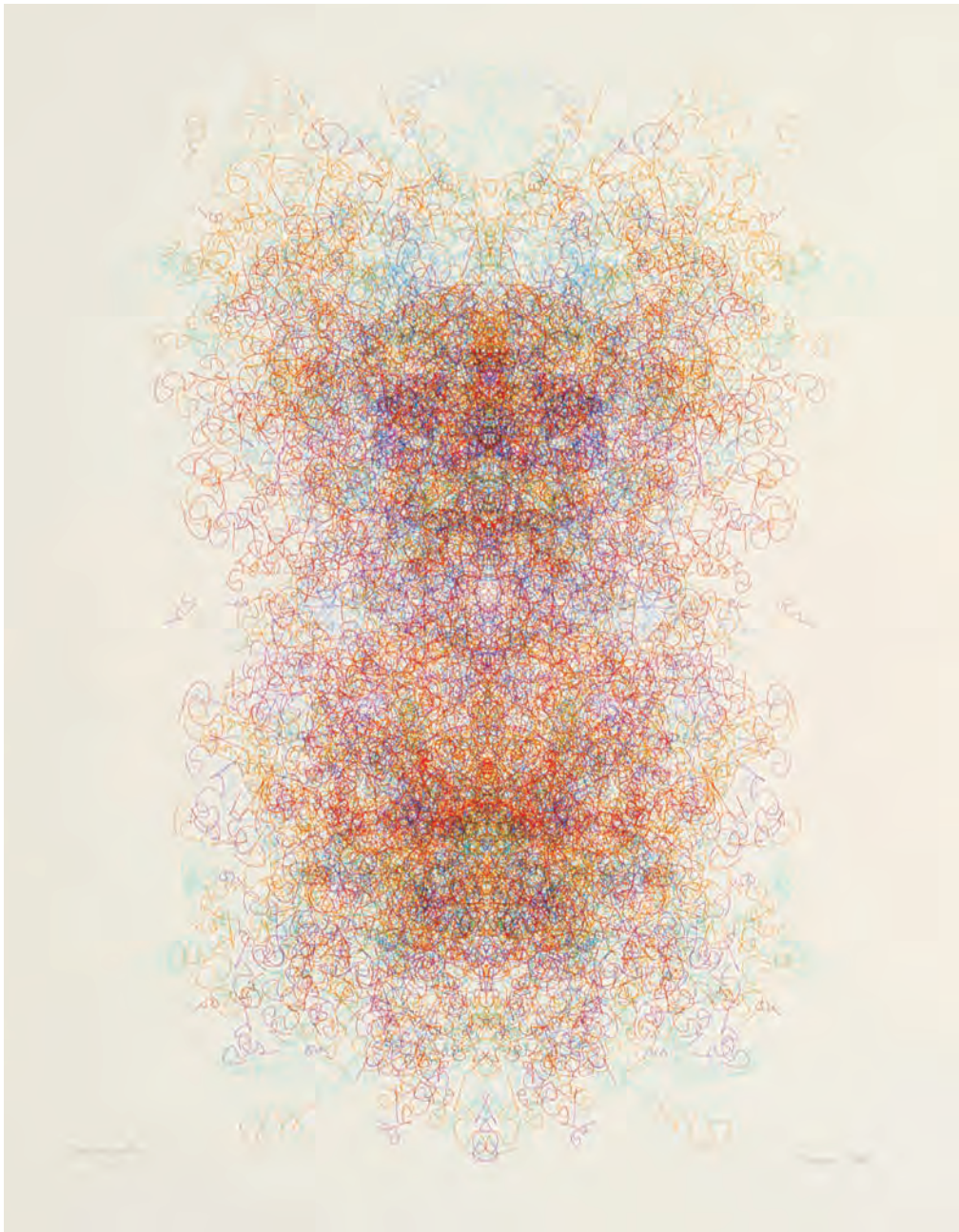
In the 1930s, Alan Turing demonstrated that it was possible to solve any computable problem using Boolean algebra alone, performing mathematics by using just two values, 0 and 1, or true and false. His Universal Turing Machine, introduced as an idea in 1936–37, posited a mathematical tool equivalent to a digital computer, a single machine that could be used to compute any computable sequence. When Verostko encountered the underlying logic of the Universal Turing Machine (UTM) while reading Roger Penrose’s book *The Emperor’s New Mind: Concerning Computers, Minds and the Laws of Physics* (1989), he was struck by the authority of the UTM’s text, an algorithm written in binary, which to him captured a universal language like a medieval biblical text. He remembered the profound impact of viewing the illuminated manuscripts in London’s British Library—which seemed to emanate an aura of the medieval world—and decided to illuminate Universal Turing Machines to celebrate their effect on culture. As Verostko said, “These illuminations are works of art and not exercises in computer science. They are intended to celebrate the value and significance of the UTM in shaping cultural change in the late 20th century.”<sup>7</sup>



**Fig. 7. Manchester Illuminated Universal Turing Machine #1,** 1998, pen and ink plotter drawing with hand-applied gold leaf, Collection of V&A Museum, London.



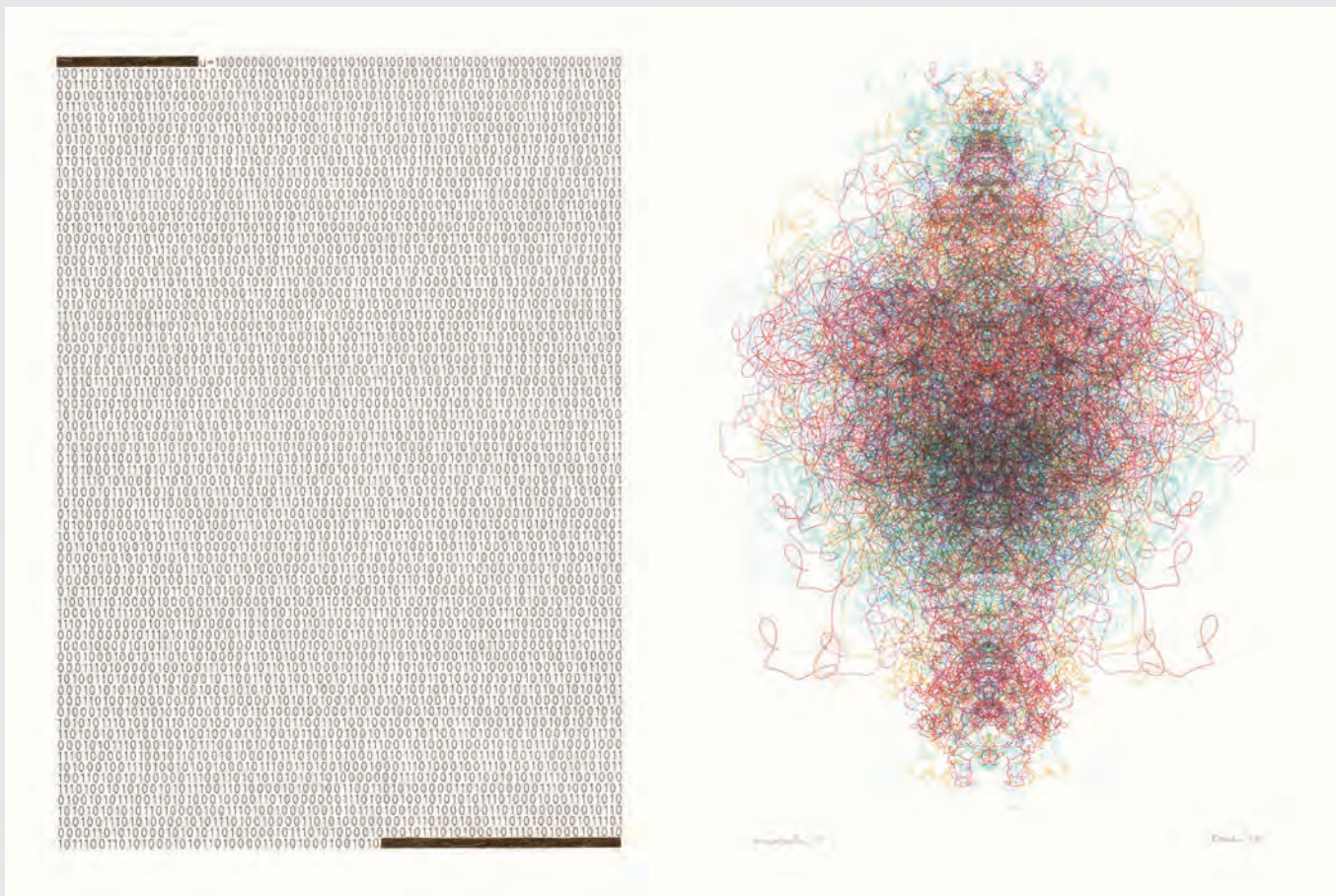
Originally created for an exhibition at the University of Manchester as part of ISEA (International Symposium on Electronic Art) 1998, Verostko's *Manchester Illuminated Universal Turing Machine* resembles the two-page spread of an illuminated medieval manuscript: one page features the algorithm for a UTM in a binary text format; the other, an algorithmically generated drawing, with both of them drawn by a pen plotter (Figs. 7 and 8). Demonstrating the possibilities of epigenetic art, Verostko used the same parent code to produce the algorithmic drawings in each of the fifteen versions of the *Manchester Illuminated*



**Fig. 8. *Manchester Illuminated Universal Turing Machine #1*** (detail), 1998, pen and ink plotter drawing with hand-applied gold leaf, Collection of V&A Museum, London.

*Universal Turing Machine* (Fig. 9). As in the *Derivation of the Laws*, the drawings in the *Manchester Illuminated Universal Turing Machine* give unique expression to a logical construct, rendering it in forms that stay true to their origins yet transcend them in their expression of visual potential.

Verostko's *Derivation of the Laws* and the *Manchester Illuminated Universal Turing Machine* both create a unique conversation by incorporating "source texts" by Boole and Turing into artworks that execute, translate, and reinterpret the texts by using procedures introduced by these mathematicians. The works are homages but also offer a poetic view of the power of logic and its arguments: they capture the power of these arguments by highlighting their creative potential, infinite variability of form, and singular expression.



**Fig. 9. Manchester Illuminated Universal Turing Machine #17,**  
1998, pen and ink plotter  
drawing with hand-applied  
gold leaf.

## NOTES

1. Roman Verostko, email exchange with author, February 1, 2018.
2. Verostko and George Brecht became friends, and in 1963, Verostko assisted curator Steven Joy in staging Brecht's "Sundown Vehicle Event" at Saint Vincent Archabbey. See details with a historic photo at "Algorithmic Art," on Verostko's website, <http://www.verostko.com/algorithm.html>.
3. "G. Boole's *Derivation of the Laws . . .*," on Verostko's website, <http://www.verostko.com/boole.html>.
4. *The Derivation of the Laws of the Symbols of Logic from the Laws of the Operations of the Human Mind: An Excerpt from the Writings of George Boole*, computer illustration by Roman Verostko, preface by Roger F. Malina, printing and typography by Michael Tomaszewski, hand-pulled with a Vandercook proof press and hand-bound by Michael Norman, limited edition of 125 (Minneapolis: St. Sebastian Press, 1990), ISBN: 1-879508-08-7. A paperback reproduction litho edition was also published in 1991: ISBN: 1-879507-9.
5. "G. Boole's *Derivation of the Laws . . .*," on Verostko's website, <http://www.verostko.com/boole.html>.
6. See "Epigenetic Painting: Software as Genotype," on Verostko's website, <http://www.verostko.com/epigenet.html>.
7. "Universal Turing Machine Illuminated," on Verostko's website, <http://www.verostko.com/manchester/manchester.html>.

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# Roman Verostko and the Algorithmic Revolution

Bruce Wands

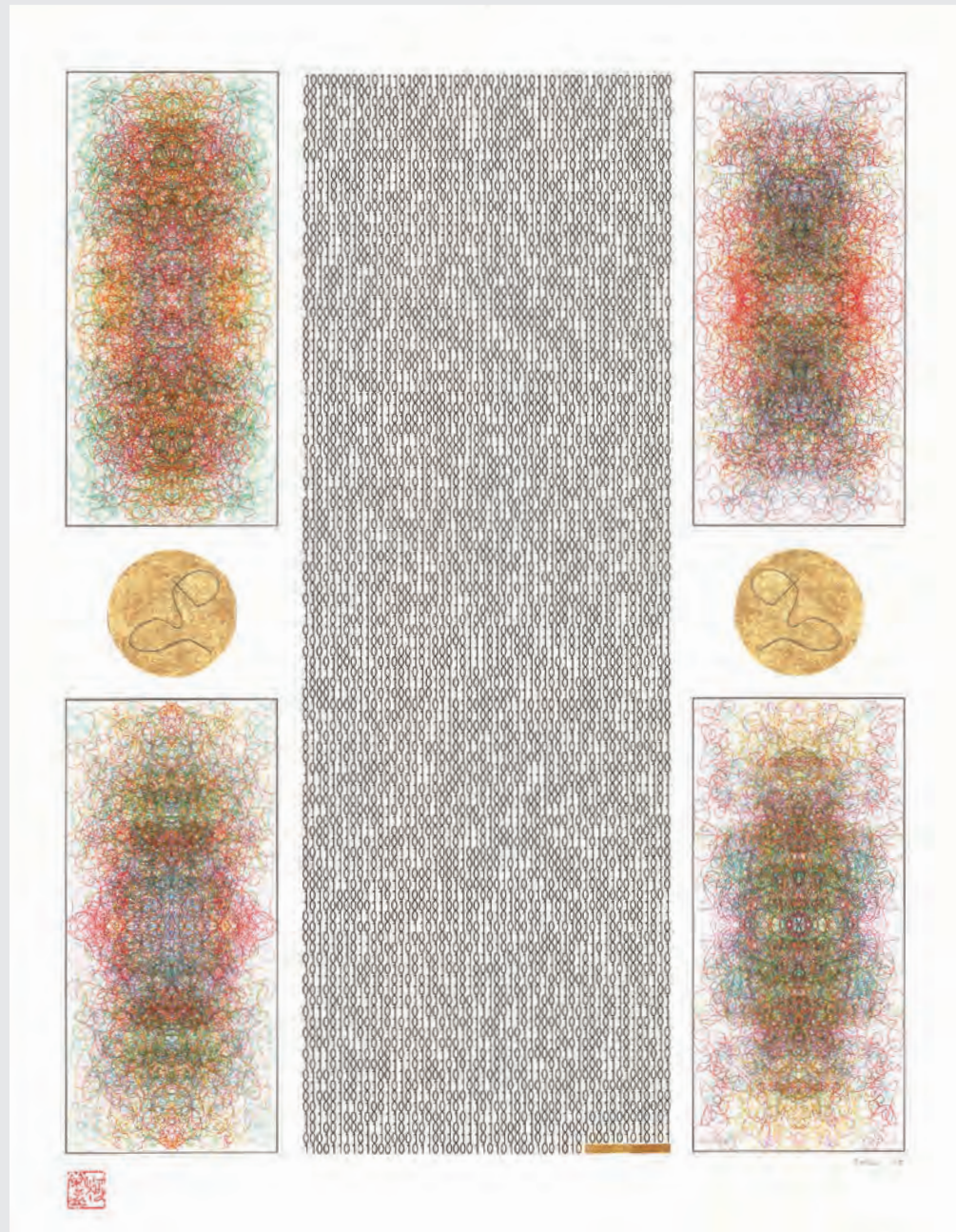
My introduction to curating digital art began twenty-five years ago with the New York Digital Salon (NYDS). The exhibition was started in 1993 by the New York City chapter of ACM SIGGRAPH to provide a New York venue for digital art at a time when it was rare for museums and galleries to exhibit this new form of creative self-expression.<sup>1</sup> What began as a small exhibition at the Art Directors Club grew into an annual event that drew over four hundred people to the New York openings and traveled internationally to Spain, Italy, Korea, Beijing, and numerous other venues. We also published eight issues of *Leonardo: Journal of the International Society for the Arts, Sciences and Technology* as a catalog of the exhibition between 1994 and 2002. This publication helped promote awareness of digital art and included artist statements and essays by experts in the field.<sup>2</sup> Documentation of the exhibitions, along with videos and other panel discussions held as part of the Tenth New York Digital Salon Art & Culture Symposium in 2003, are available online at [nydigitalsalon.org](http://nydigitalsalon.org).

## Pen Plotter Artists and the NYDS

I first became aware of Roman Verostko's creative work as curator of the First New York Digital Salon. We had several hundred entries, and Verostko's submission from the *Gaia II* series (Fig. 1) stood out from the rest with its unique imagery achieved with intricate pen and ink strokes that incorporated a strong use of color arranged in a beautiful symmetrical composition. A jury panel selected the artworks to be included in the first three exhibitions that I curated, and that format continued in subsequent years. Interestingly, no matter who was on the jury, Verostko's work was always chosen for the exhibition.

**Fig. 1.** *Gaia II*, 1996, pen and ink plotter drawing, 30 x 22 in. This is one in a family of "three sisters" that were created as a celebration of Mother Earth using the same parent code.

While his imagery was unique, Verostko was not the only artist at the time creating drawings with a drawing machine known as a pen plotter. Mark Wilson was also selected to exhibit in the first salon, and he and Manfred Mohr were included in the Third New York Digital Salon. But Verostko's presence in the Third, Fourth, and Fifth New York Digital Salons (1995–97) is particularly notable as they featured images from several of his important series from the 1990s: a 1994 *Ezekiel* with a gold-leafed roundel, the 1992 *Diamond Lake Apocalypse*, *Maitreya*, and a 1995 *Illuminated Universal Turing Machine* (Fig. 2).



**Fig. 2. *Illuminated Universal Turing Machine***, 1995, pen, ink, and brush plotter drawing with hand-applied gold leaf, 40 x 30 in.

It bears recollecting that when artists like Verostko and Mohr began working with computers, there was no imaging software available to them. They wrote their own coded procedures to create their art. Their algorithmic procedures would control pen plotters, and for Verostko, they would guide Chinese brushes he adapted for his plotter's drawing arm. These algorithms could also generate images to display on monitors or generate raster files for digital prints.

## From Brush in Hand to Brush in Machine

When Verostko wrote his first lines of code in 1969, he already had years of experience as a practicing, exhibiting artist. In 1965, the Westmoreland County Museum of Art invited him to present a solo exhibition of recent paintings and drawings. This exhibition featured Verostko's vibrant *New City* series with geometric form structures and interactive color, which would inform his future algorithmic work (Figs. 3 and 4).



**Fig. 3. *The New City Grows*,** 1965, mixed media on wood panel primed with gesso, 36 x 36 in. Saint Vincent Art & Heritage Collections, Saint Vincent Archabbey and College, Latrobe, Pennsylvania.

**Fig. 4. Roman Verostko  
Paintings and Drawings,**  
installation images from 1965  
solo exhibition, Westmoreland  
County Museum of Art,  
Greensburg, Pennsylvania.  
The curator and art critic  
Stephen Joy (1916–2001)  
curated and installed this  
exhibition on Verostko’s behalf.



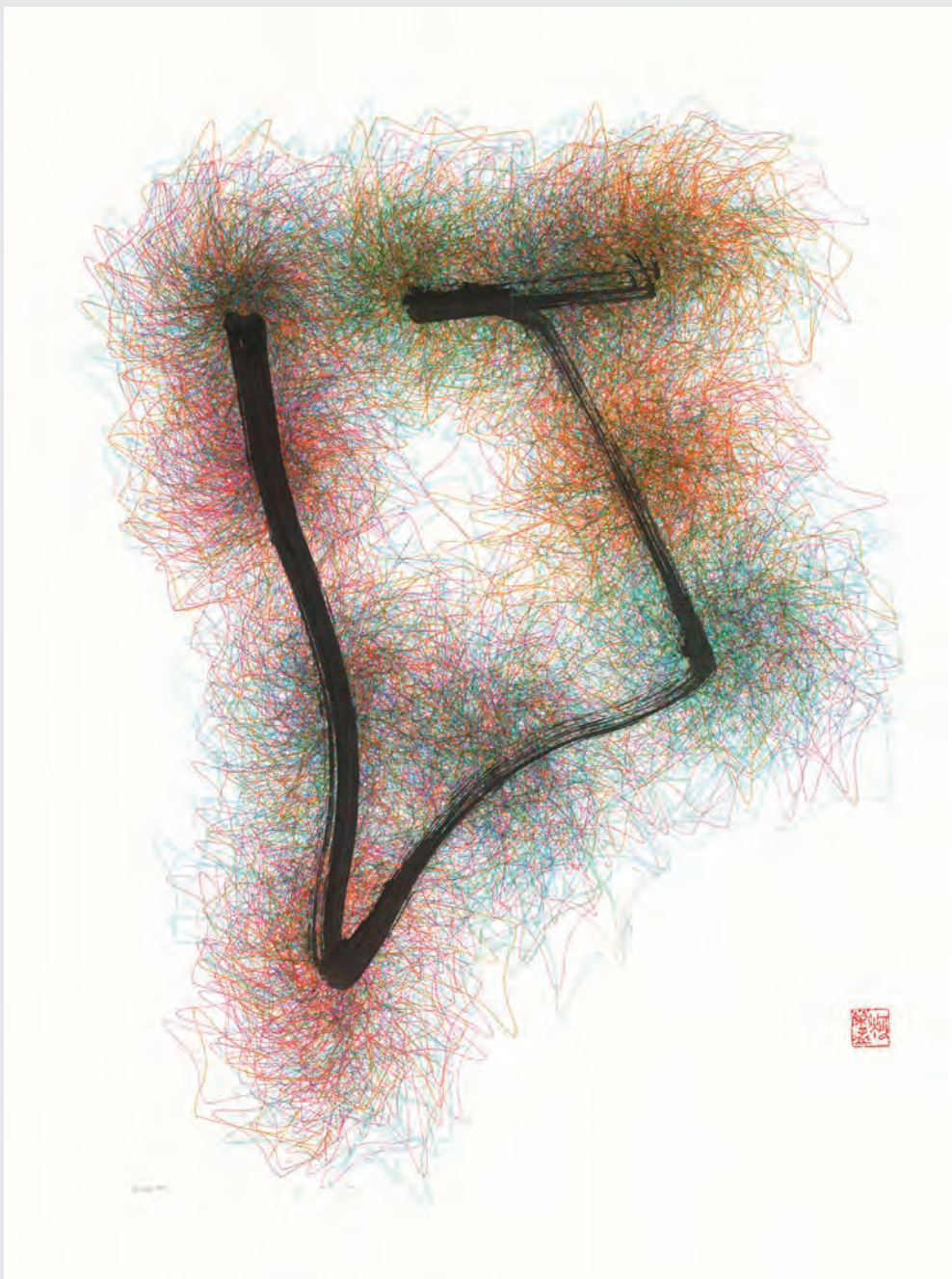
Later, when Verostko set out to write a master program for creating art, the coded form-generating ideas grew from his experience as a painter. This program, Hodos, along with his pen plotters, allowed Verostko to create an intelligent drawing program capable of generating unique art-form ideas. With a multipen plotter and a palette of ink pens, the software could control and innovate the color relationships that he had learned as a painter. In this manner, Verostko’s traditional art background contributed to the unique color fields and the robotic brushstrokes he achieved with his algorithmic art.

In addition to Verostko and Mohr, other first-generation artists writing their own code included Harold Cohen, Hiroshi Kawano, Vera Molnár, Frieder Nake, and many others. These artists played a significant role in the “algorithmic revolution” that radically changed global culture and commerce in the twentieth century. Peter Weibel described this revolution in the announcement for the *Algorithmic Revolution* exhibition at the Center for Art and Media (ZKM) in Karlsruhe, Germany, which opened in 2004:

*A revolution normally lies ahead of us and is heralded with sound and fury. The algorithmic revolution lies behind us and nobody noticed it . . . there is no longer any area of social life that has not been touched by algorithms. Over the past 50 years, algorithmic decision-making processes have come very much to the fore as a result of the universal use of computers in all fields of cultural literacy—from architecture to music, from literature to the fine arts and from transport to management. The algorithmic revolution continues the sequencing technology that began with the development of the alphabet and has reached its temporary conclusion with the human genome project. No matter how imperceptible they may be, the changes this revolution has wrought are immense.<sup>3</sup>*



Weibel had an interest in Verostko's artwork as well as his theoretical writings on "epigenetic art."<sup>4</sup> For the *Algorithmic Revolution* exhibition, Weibel included an early IBM PC with a monitor displaying Verostko's 1982 *Magic Hand of Chance*. Written in BASIC, this program displays a series of nonrepeating animations that may be viewed as an early example of generative art created with a PC. He also exhibited copies of Verostko's limited edition of George Boole's *Derivation of the Laws*, which feature unique frontispieces and end pieces for each book and are exemplary of Verostko's generative art. Most importantly, he included an image from the *Struggle* series to demonstrate the expressive energy that Verostko was able to achieve with his robotic brushstrokes (Fig. 5).<sup>5</sup>



**Fig. 5.** *Struggle*, 1995, pen, ink, and brush plotter drawing, 42 x 30 in.

## The American Algorists: Linear Sublime

When the twentieth anniversary of the New York Digital Salon was upcoming in 2013, I was pondering what would be an appropriate exhibition to mark this milestone. My first thought was to do a retrospective, but when I looked at the hundreds of artists we had featured over the years and the huge diversity of their creative work, the prospect of mounting such an exhibition was daunting. I then learned of an exhibition titled *The American Algorists: Linear Sublime*, which would open at the Suzanne H. Arnold Art Gallery at Lebanon Valley College in Pennsylvania in August 2013. The exhibition, curated by Grant D. Taylor, featured four American artists who were dedicated to making work from their own original algorithmic codes: Jean-Pierre Hébert, Manfred Mohr, Roman Verostko, and Mark Wilson. I was familiar with all the artists, as I had included their work in my book, *Art of the Digital Age* (Thames and Hudson, 2006). Taylor had done considerable research on the work of Verostko and Hébert, who led the way in clarifying the usage of the term *algorist*. I decided that we would present this exhibition in 2013 after its showing at the Suzanne H. Arnold Art Gallery (Fig. 6).



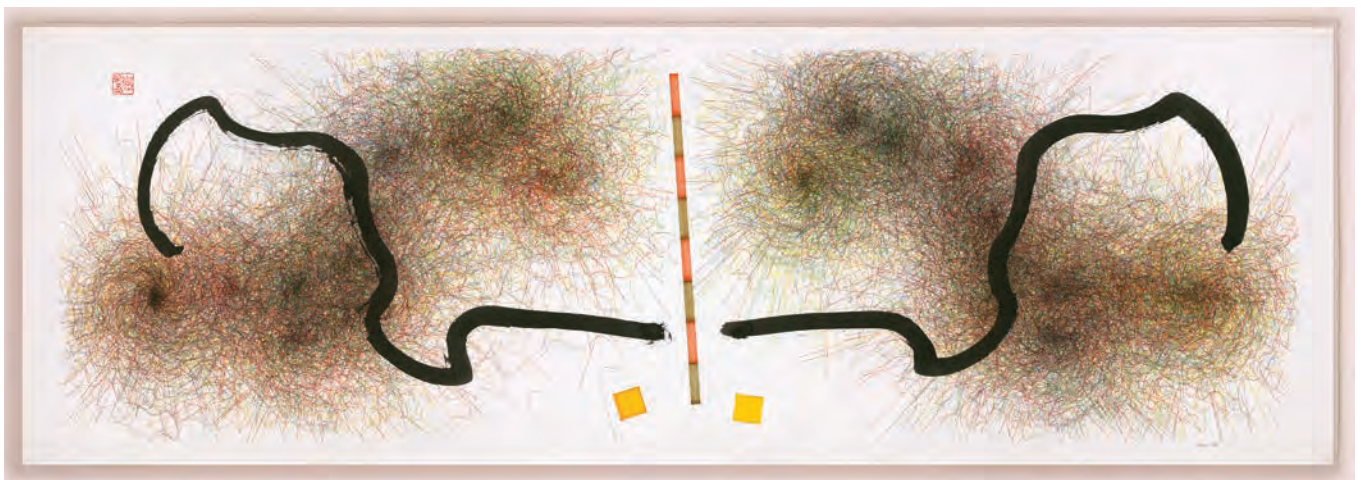
**Fig. 6. *The American Algorists: Linear Sublime*,** installation images of Verostko's work from the 2013 four-person exhibition that opened first at the Suzanne H. Arnold Art Gallery at Lebanon Valley College, Pennsylvania, then traveled to the New York Digital Art Salon 20th Anniversary, School of Visual Arts, New York City. Photo: Suzanne H. Arnold Art Gallery, Lebanon Valley College.

The New York Digital Salon is proud to have presented this exhibition of American algorists who have been honored by their peers for their contributions to the algorithmic revolution and digital art. The exhibition included three algorists who received the SIGGRAPH Distinguished Artist Award for Lifetime Achievement in Digital Art. SIGGRAPH has been the world's most important annual conference showcasing computer graphics pioneer research, technology, and art. Verostko received the Distinguished Artist Award in 2009, the year the award was initiated. Hébert would follow in 2011, and Mohr in 2013. I was a member of the jury from 2009 to 2011, and the award chair from 2012 to 2014.

The international jury that reviewed nominations for the award from the worldwide community of digital artists, art historians, and the general public recognized Verostko's contributions in both theory and practice. His award citation confirms that he had created an important body of work that significantly advanced aesthetic content in digital art internationally for more than twenty years. The citation notes that the award was presented to Verostko

*for his seminal contributions to the creation and promotion of digital art. Fusing his knowledge of computer programming with a long engagement with diverse cultural and philosophical traditions, Roman developed a highly personal approach to using a pen plotter to layer elegant lines into astoundingly beautiful compositions. His work stands as a monument to the aesthetic power of algorithmic art and continues to inspire artists to take charge of their own tools in exploring new media.*<sup>6</sup>

The annual SIGGRAPH Art Gallery has featured several of his pioneering works. With attendees reaching over 48,000 at the 1997 Los Angeles conference, these annual exhibitions provided valuable exposure for digital artists. Verostko's works were often selected for the SIGGRAPH Traveling Art Show for additional international exposure. A notable example is the expressive robotic brushwork in his two-by-six-foot *Dragon Mountain II* (also known as *Lung Shan II*) featured at the Dallas SIGGRAPH Art Gallery in 1990.<sup>7</sup> This work traveled first to the Computer Museum in Boston (1991),<sup>8</sup> and on to Barcelona, Frankfurt, and other sites in Europe in 1992–93 (Fig. 7).



**Fig. 7. *Lung Shan II (Dragon Mountain II)*, 1989, pen, ink, and brush plotter drawing, 24 x 72 in.**

Verostko played a major role, with Peter Beyls, in setting up the historic 1995 SIGGRAPH panel on "Algorithms and the Artist." This panel led to a more focused effort by Hébert and Verostko to use the term *algorist* to identify artists who used their own algorithms in the process of creating art.<sup>9</sup> At this conference, Verostko also exhibited the first version of his *Illuminated Universal Turing Machine (UTM)*. Later, his illuminated UTMs became better known in the series he presented at the University of Manchester, England, for the 1998 ISEA International art exhibition.

For the 1997 SIGGRAPH exhibition *Ongoing: The Fine Arts Gallery* in Los Angeles, the jury selected Verostko as one of six artists to present a large number of works. Verostko provided seven of his best works ranging from 1987 to 1996. The earliest work, a 1987 pen-and-brush work that was highly suggestive of Chinese calligraphy, was titled *Woo Way*, a wordplay with "Wu Wei," a traditional Chinese expression suggesting that something shall be achieved without effort (Fig. 8).<sup>10</sup>



**Fig. 8. *Woo Way*** (also referred to as *Pathway* series), 1989, pen, ink, and brush plotter drawing, 30 x 22 in.

Perhaps surprisingly, one of Verostko's most important works included in the exhibition was a one-sixth scale model of his mural *Epigenesis: The Growth of Form* created in 1996. This model displayed how his proposed forty-foot-long installation for the University of St. Thomas Science and Engineering Center would appear when completed (Fig. 9). The finished model itself, drawn to scale and executed with the same masterstroke employed for the full-scale mural, was unique in the history of models. For Verostko, both the model and the finished installation exemplified the coalescence of his best efforts to join theory and practice in a major project. He had outlined that theory and practice in his invited paper for the 2003 Ars Electronica symposium *CODE—The Language of Our Time*, which was also published in the Ars Electronica catalog that same year.<sup>11</sup>

## Verostko as Art Historian

In 2013, I invited Roman Verostko to give an artist talk to my MFA Computer Arts students at the School of Visual Arts. I wanted them to hear firsthand about his experience writing code from scratch. In addition, he brings enormous art historical knowledge to the classroom and the art community in general. Along with being a pioneer of digital art, Verostko is also an art historian whose websites and publications document the history of the algorists and algorithmic art reaching back to prehistoric basket weaving.<sup>12</sup> Art history will look back upon Roman Verostko as an artist and visionary who helped define and document the evolution of contemporary art in the digital age.

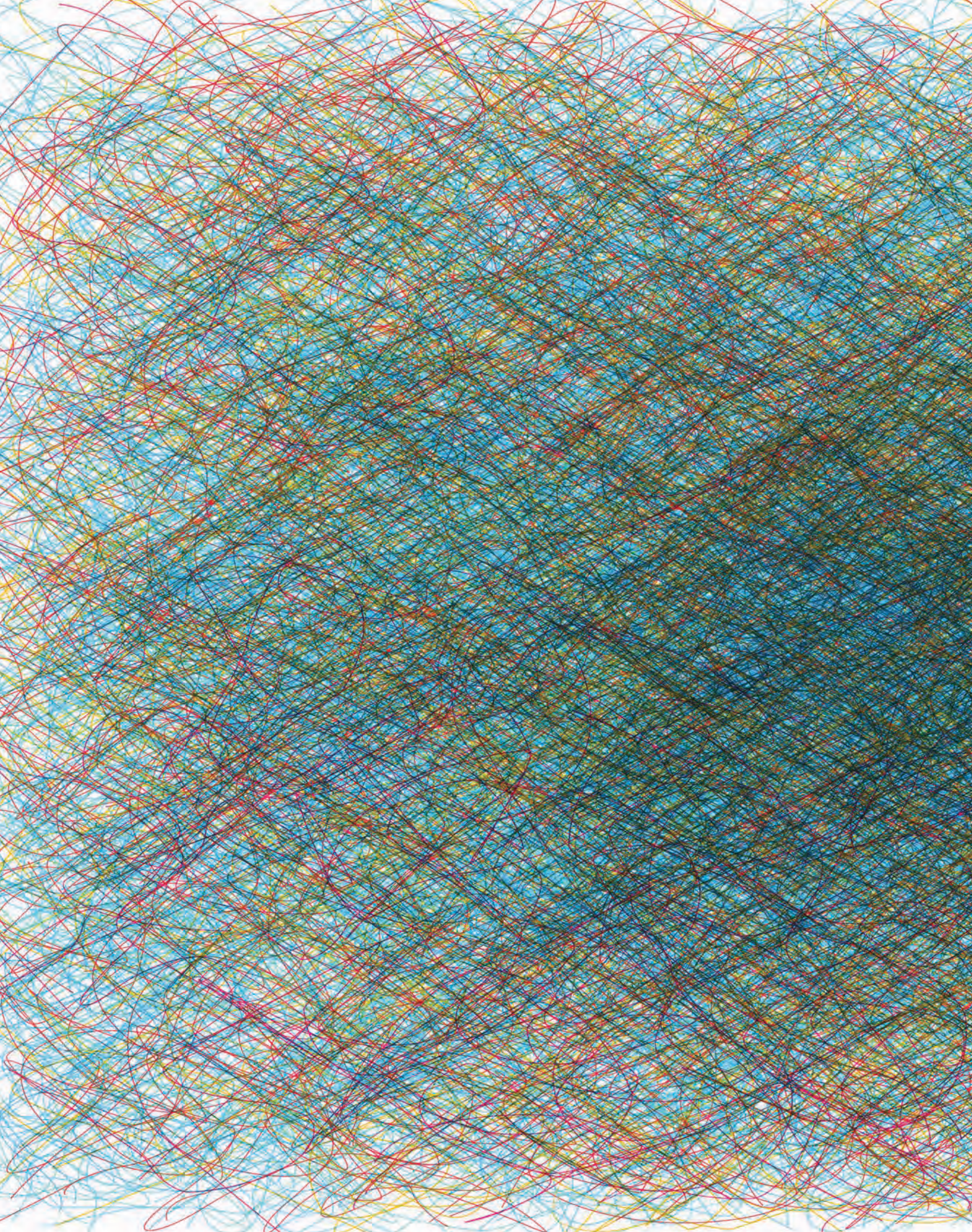


**Fig. 9. *Epigenesis: The Growth of Form*** (model), 1996, eleven pen and ink plotter drawings with hand-applied gold leaf, commissioned by and installed in the Frey Science and Engineering Center, University of St. Thomas, St. Paul, in 1997.

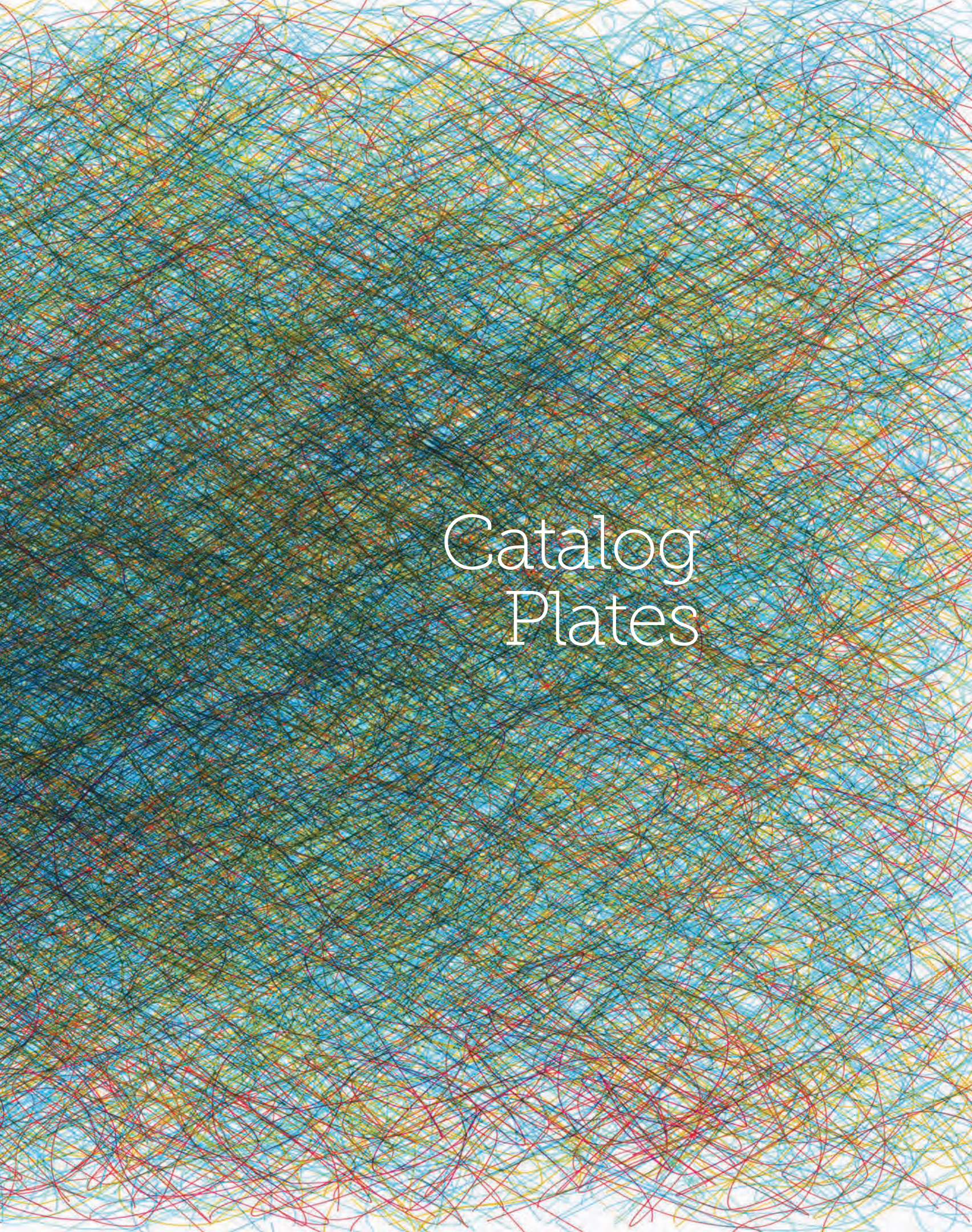
## NOTES

1. The Association for Computing Machinery (ACM) is the world's largest educational and scientific computing society, uniting educators, researchers, and professionals to inspire dialogue, share resources, and address the field's challenges. ACM SIGGRAPH is a special interest group within ACM that serves as an interdisciplinary community for members in research, technology, and applications in computer graphics and interactive techniques. The Special Interest Group in Graphics (SIGGRAPH), established in 1974, is the leading international conference with annual meetings promoting advances in computer graphics research and technology. The SIGGRAPH Art Gallery, established in 1981, is one of the earliest continuing annual exhibitions of digital art in the United States.
2. For the *Leonardo* archive, see <https://muse.jhu.edu/journal/116>.
3. *The Algorithmic Revolution*, exhibition catalog Zentrum für Kunst und Medientechnologie (ZKM), Karlsruhe, 2004, 1. See also Peter Weibel, "Algorithmic Revolution: On the History of Interactive Art," ZKM, <https://zkm.de/en/media/audio/peter-weibel-algorithmic-revolution>.
4. Peter Weibel, director of the ZKM in Karlsruhe, Germany, became familiar with Verostko's work when Weibel was an advisor and catalog editor for the 1993 Ars Electronica symposium "Genetic Art and Artificial Life," held in Linz, Austria. Verostko's generative art was included in the gallery exhibition at the symposium, and a revised version of Verostko's paper "Notes on Epigenetic Art: The Ezekiel Series" was published in their 1993 catalog *Genetic Art – Artificial Life* (Genetischje Kunst – Kunstliches Leben) (Vienna, 1993): 334–37.
5. *Struggle #13*, 1994, was shown at the ZKM. Later versions included calligraphic scripts that reflected aspects of oriental brushwork more directly. Four works from Verostko's *Struggle* series were also curated into the ARTEC '95 exhibition in Nagoya, Japan.

6. 2009 SIGGRAPH Distinguished Artist Award, *Leonardo* 42, no. 4 (2009): 297. Also at Verostko's website: <http://www.verostko.com/archive/roman/awards/2009%20Award-pic-txt.pdf>.
7. *Leonardo* 23, Supplemental Issue, *Digital Image, Digital Cinema* (New York: Pergamon Press, 1990), 114.
8. The Computer Museum opened in Boston in 1979 and featured the history of computers until 2000, when it was disbanded; many of its holdings were transferred to the Computer History Museum in California.
9. Peter Beyls and Verostko planned the panel in Minneapolis in 1993 during the Fourth International Symposium on Electronic Art (FISEA). The following year, the panel was held in Helsinki at the Fifth ISEA, followed by the 1995 SIGGRAPH Conference in Los Angeles. See Verostko's website: <http://www.algorists.org>.
10. This work was included in the 1988 CRASH exhibition at the Wright Museum, Beloit, Wisconsin.
11. Gerfried Stocker and Christine Schöpf, eds., *Ars Electronica 2003: CODE—The Language of Our Time* (Germany: Hatje Cantz Verlag, 2003): 156–67. See also Verostko's website: <http://www.verostko.com/archive/writings/epigen-art-revisited.html>.
12. Verostko maintains a website documenting the history of the usage of term "algorist" in the twentieth century along with notes on its deep history: <http://www.algorists.org>.







# Catalog Plates



CONCENTRATED  
GEL &  
DIRECTOR

NEW FORMULA  
ACRYL

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Higgins  
100 Cc 3.54 fl. oz.

STONE G

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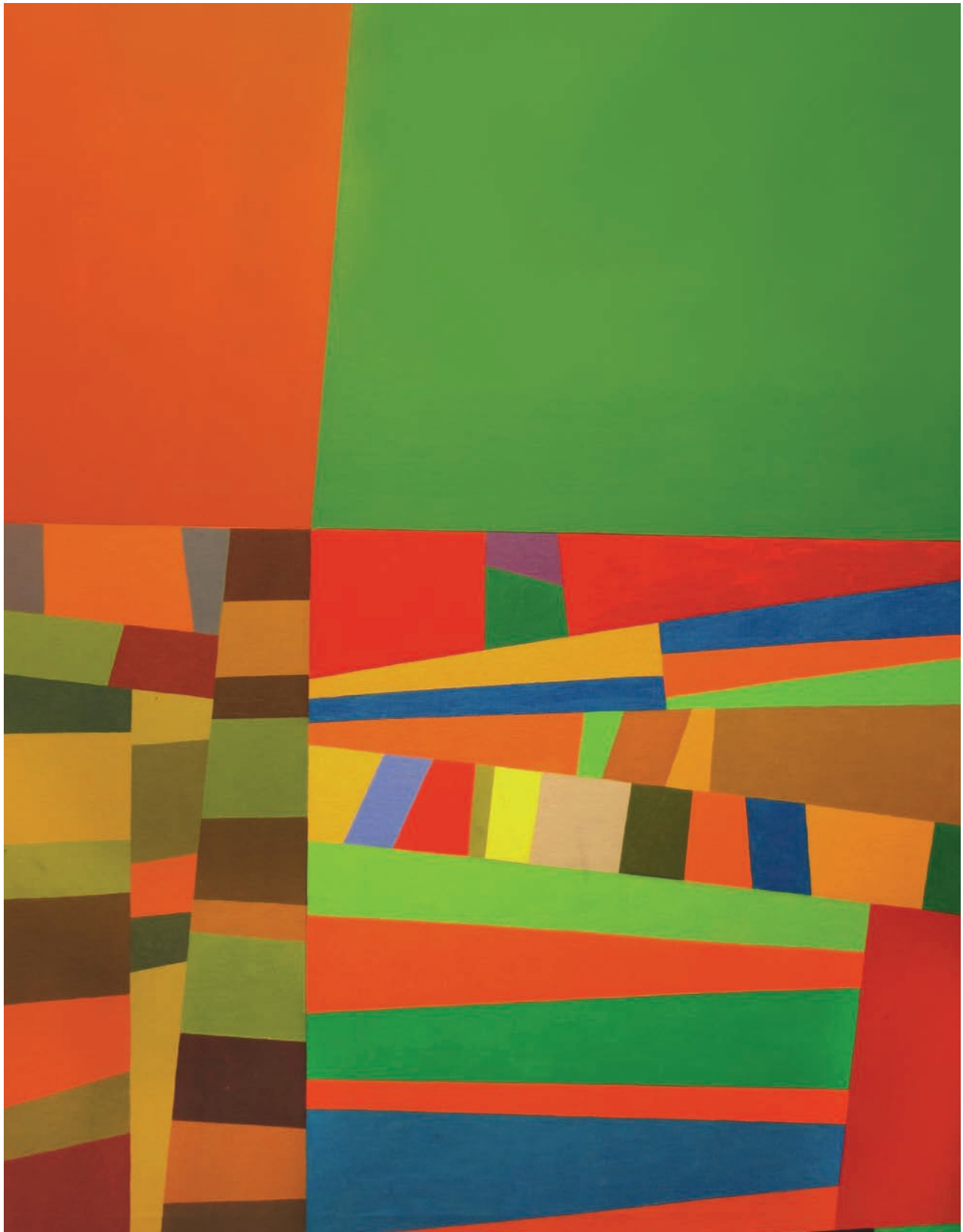
# The Resolution of Opposites: Chance and Control in the Search for Pure Form

*I'm interested in the philosophy of chaos. Chaos and apparent chaos, the random and the pseudo-random elements. I like to juxtapose the stable and the chaotic.*

Verostko, 1989

One of the most salient characteristics of Verostko's life-long engagement with art as a maker and historian is his understanding of human experience vacillating between the poles of chance and control. His exploration of spontaneous automatic drawing techniques and rational mark making that began in the early 1960s when he was living in New York City and Paris played a key role in his attraction to and application of emerging audiovisual and computer technologies to the art-making process. The harmonizing of visual opposites in the *New City* series, the oscillation of non-repeating routines in *The Magic Hand of Chance*, and the improvisation within strict parameters written into Verostko's master algorithmic code are not superficial aesthetic choices. Rather, they represent for the artist a spiritual struggle, an acknowledgment that peace and unity lie in the balance between reason and feeling—between all the interior forces that push and pull in opposite directions.

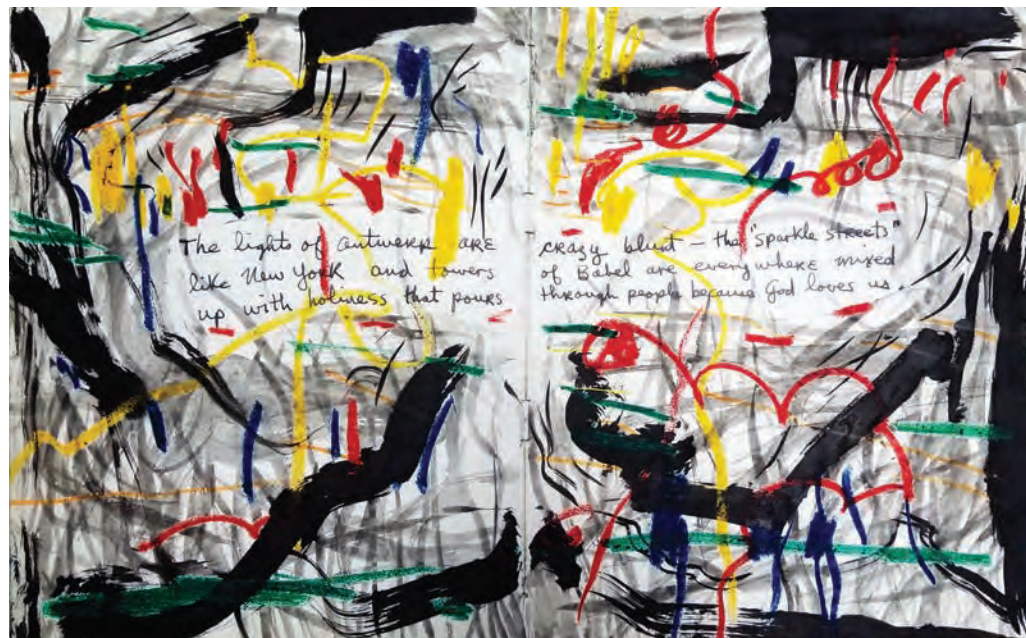
The tension between carefully thought-out "line-making" decisions and the spontaneous flow of the pen or the expressive gesture of the brush is evident in works ranging from his *Eikons* to his coded algorithmic procedures in *Heaven and Earth* to his newest *Digital Transformations*. These works represented a quest for art objects that could lead to an interior experience that transcends the material object. Just as the goal of the paintings and drawings in Verostko's pre-algorist work was to bring forth images of the "unseen" from those segments that lay hidden from our conscious self, similarly his algorist works attempt to create visual worlds that can stand on their own without reference to other reality.





***Sunrise on West 34th Street,***  
1962, oil on canvas, 42 x 30 in.  
Painted when Verostko was  
living in New York City, this  
is one of Verostko's earliest  
non-referential works. Saint  
Vincent Art & Heritage  
Collections, Saint Vincent  
Archabbey and College,  
Latrobe, Pennsylvania.

***Crucifix,*** 1962, acrylic,  
clay, wood, 14 x 14 in.  
Photo: Rik Sferra.

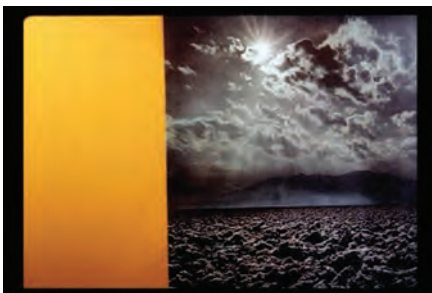


**Paris Notebooks, 1963:**  
**Cave Drawings,**  
 mixed media on paper,  
 19 1/8 x 27 3/8 in. (open);

**Womb Drawings,**  
 mixed media on paper,  
 13 x 20 1/5 in. (open).



**Elle Passe**, 1965, pencil, crayon, gouache on paper, 22 x 30 in.



***Psalms in Sound & Image:***  
***Lovesong***, 1967, electronically  
synchronized audiovisual  
presentation with sound  
track by Daniel Lenz.  
Soprano: Phyllis Bryn Julson  
recorded at Tanglewood  
in 1966. This video conversion  
was recorded in 2018 from a  
playback of the original slides  
and synchronized soundtrack.





**The New City**, 1968,  
mixed media on wood panel  
primed with gesso, 48 x 48 in.



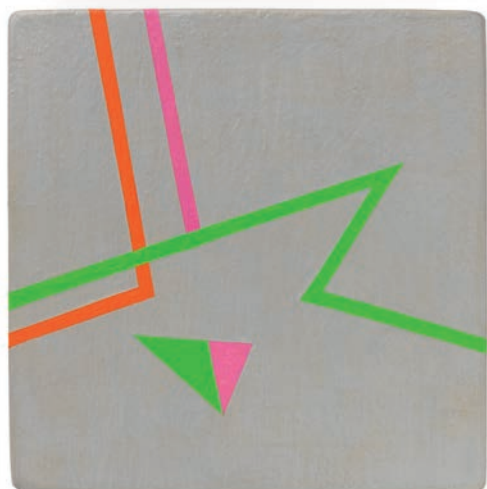
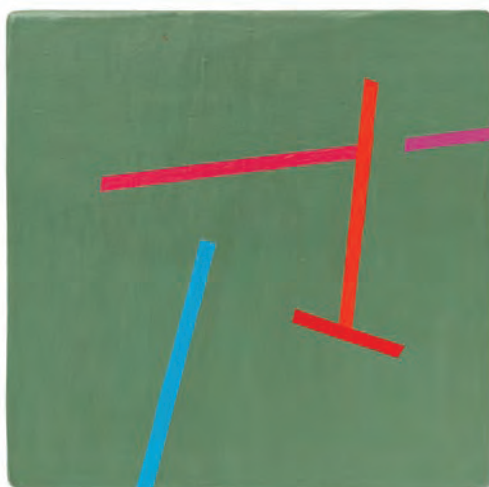
***Mother and Child***, 1969-70,  
driftwood, acrylic paint, nylon,  
brass fitting, 16 x 21 x 4 in.  
Photo: Rik Sferra.



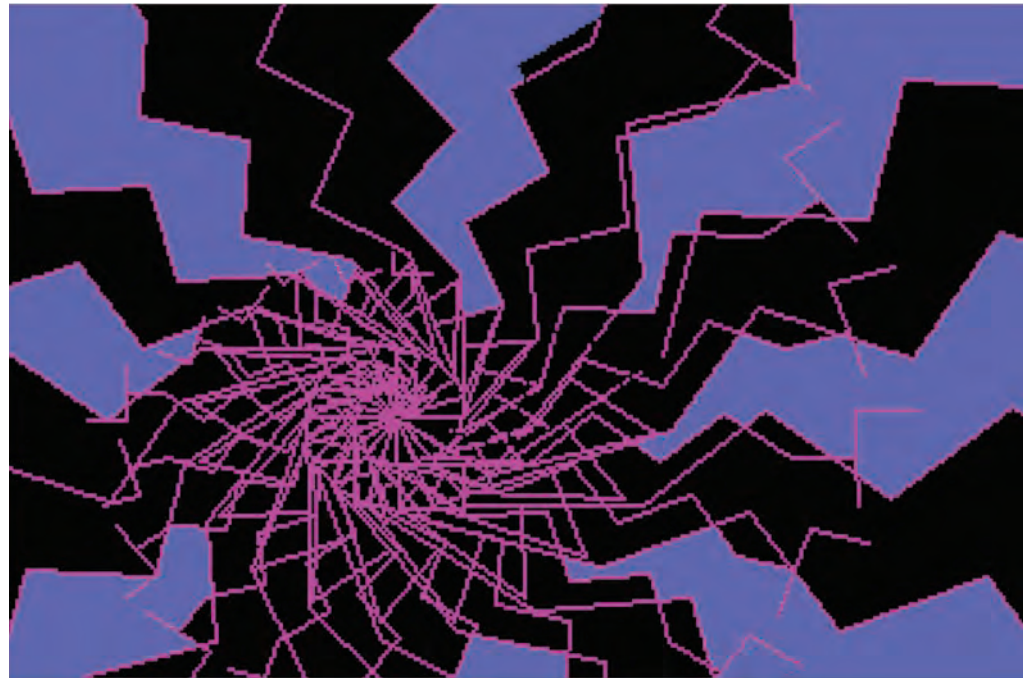
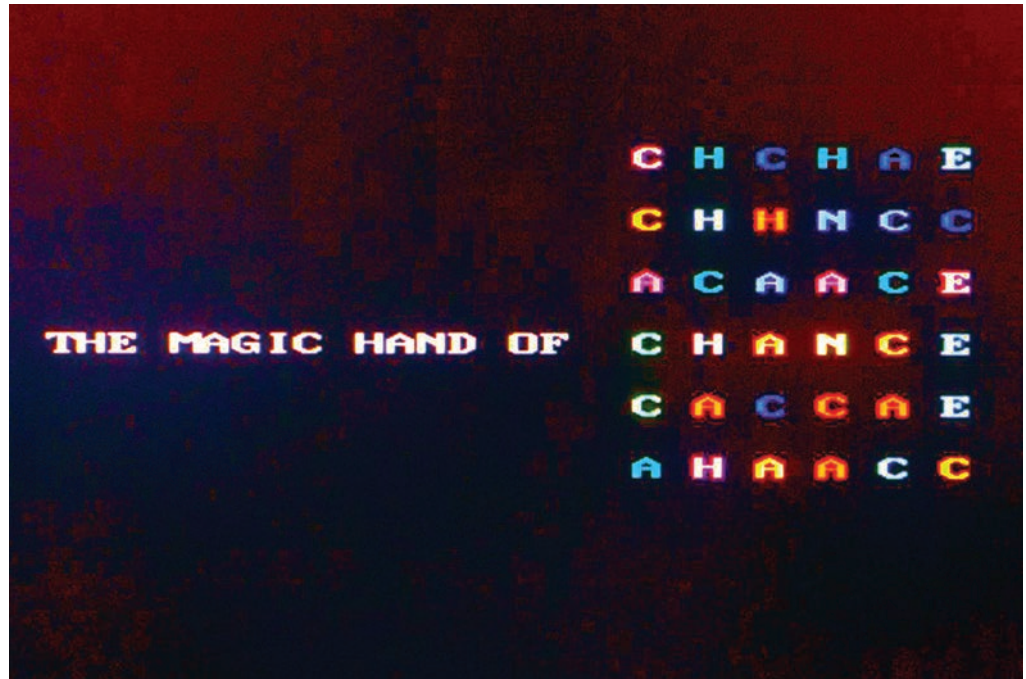
**Eikon #202**, 1971, acrylic with gesso base on wood, 24 x 24 in. Collection of Lorna McLeod.



**Eikon #216**, 1972, acrylic  
with gesso base on wood,  
24 x 24 in.

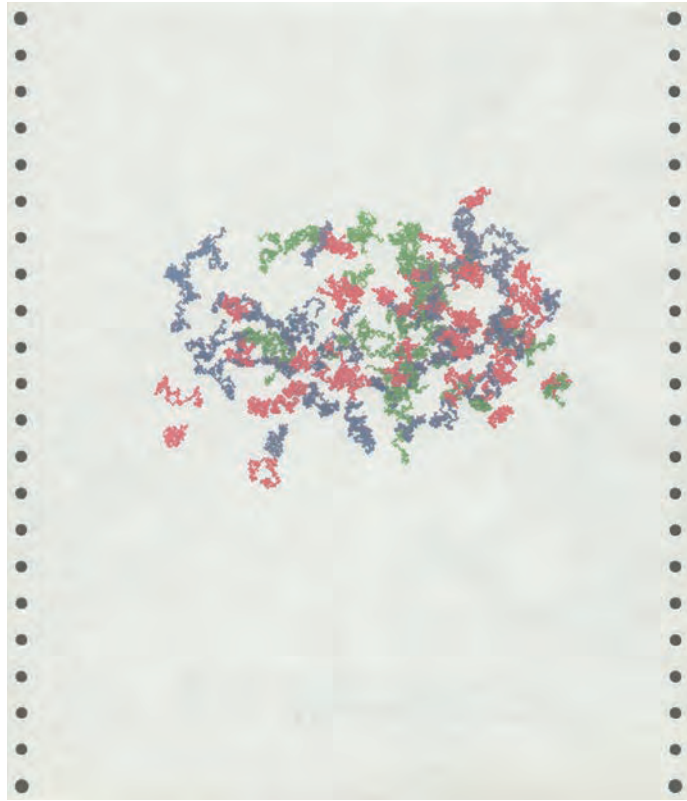


**Eikon series** (left to right: #111, #102, #110, #100, #106, #108), 1970s, acrylic on wood, 6 x 6 in. (each). Photo: Rik Sferra.



*The Magic Hand of Chance,*  
1982, algorithmic routines  
written in BASIC with a  
first-edition IBM PC for a  
CGA color monitor.

**Untitled dot matrix prints,**  
1981–83, bond paper,  
11 x 8 1/2 in.



# The Magic Hand of Chance, 1982

## History

While the earliest electronic computers date from the 1940s, it was not until the Apple II in 1977 and the IBM 5150 in 1981 that mass-produced PCs became practical and affordable for individual users. With no software available for artists, Verostko set out to create an intelligent program capable of executing his own art-form ideas. *The Magic Hand of Chance* would be one of the first examples of generative art programmed with a PC. Its first public showing took place in a Minneapolis computer parts storefront window in 1983. It has been shown many times since, including MCAD's 1986 *Centennial Faculty Exhibition*, the 2003 exhibition the *Algorithmic Revolution* at the Center for Art and Media Technology (ZKM) in Karlsruhe, Germany, and as a projection for Northern Spark all-night arts festival held in the Twin Cities in 2014.

## The Program

*The Magic Hand of Chance* was written in BASIC with a first-generation IBM PC; the master program occupies only 32kb of space, the size of a thumbnail digital photo. Limited to a 320-by-200 pixel screen and three colors per frame in its graphic mode, the *Magic Hand* generates surprisingly colorful bits of charm and humor with non-repeating visual improvisation and textual invention.

The core program presents four visual improvisations:

1. Notable mathematicians praised with constructivist forms
2. Word titles with random segments transforming into spirals
3. A jokester nonsense sequence playing with title and form
4. "Omphalos" dreams something in random pixel walks

Several cyberflower forms follow the improvisations, marking the transition to a new *Magic Hand* cycle. In addition, the improvisations are interspersed with "The Sayings of Omphalos," which pop up randomly with a date and time stamp. A full cycle requires about ten minutes of viewing time.

No two windows are ever alike. They are different for each discreet loop as well as for each cycle. This is achieved with algorithms that make random selections, in real time, from all available options such as color, scale, and position. For titles and "The Sayings," random selections from specially designed lexicons are sequenced with a syntax that also has optional formats.

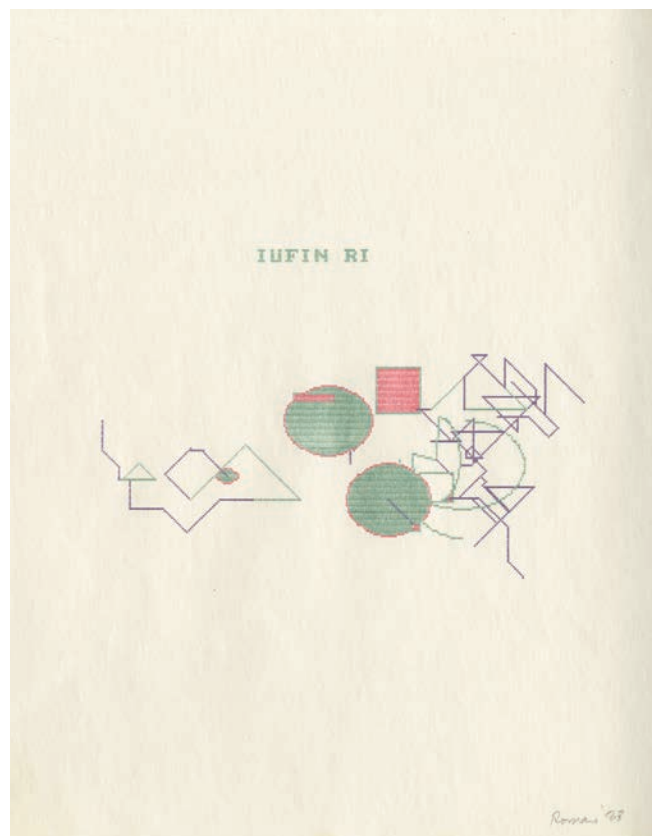


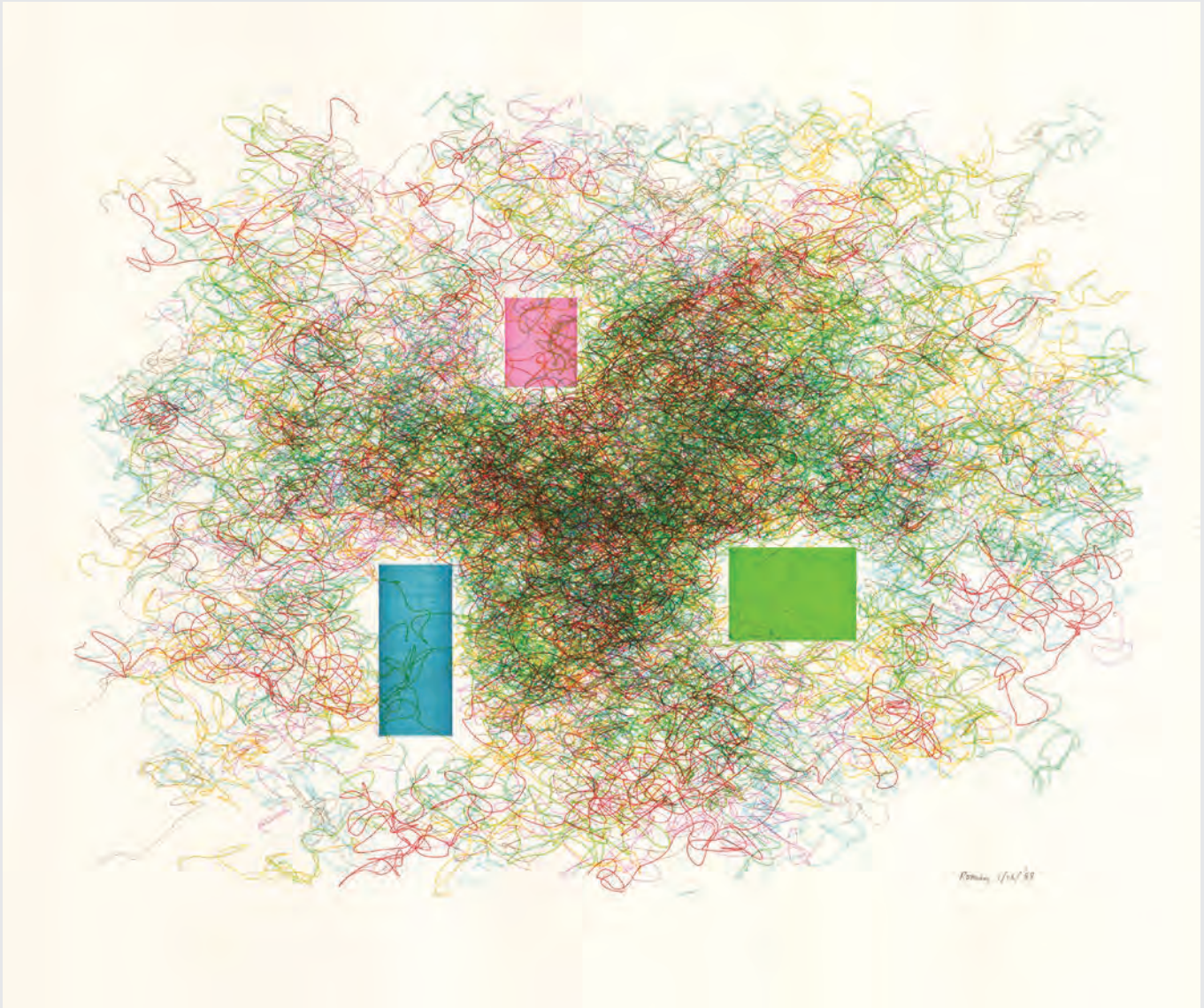
The title *The Magic Hand of Chance* is borrowed from the poem "When I Have Fears" by John Keats (1795–1821). This poem, written toward the end of Keats's life when he was ill with tuberculosis, ponders the intersection of human experiences and "chance," the elusive nature of human choice, chance, and the course of life itself. The first eight lines:

*When I have fears that I may cease to be  
Before my pen has glean'd my teeming brain,  
Before high piled books, in charact'ry,  
Hold like rich garners the full-ripen'd grain;  
When I behold, upon the night's starr'd face,  
Huge cloudy symbols of a high romance,  
And think that I may never live to trace  
Their shadows, with **the magic hand  
of chance.***

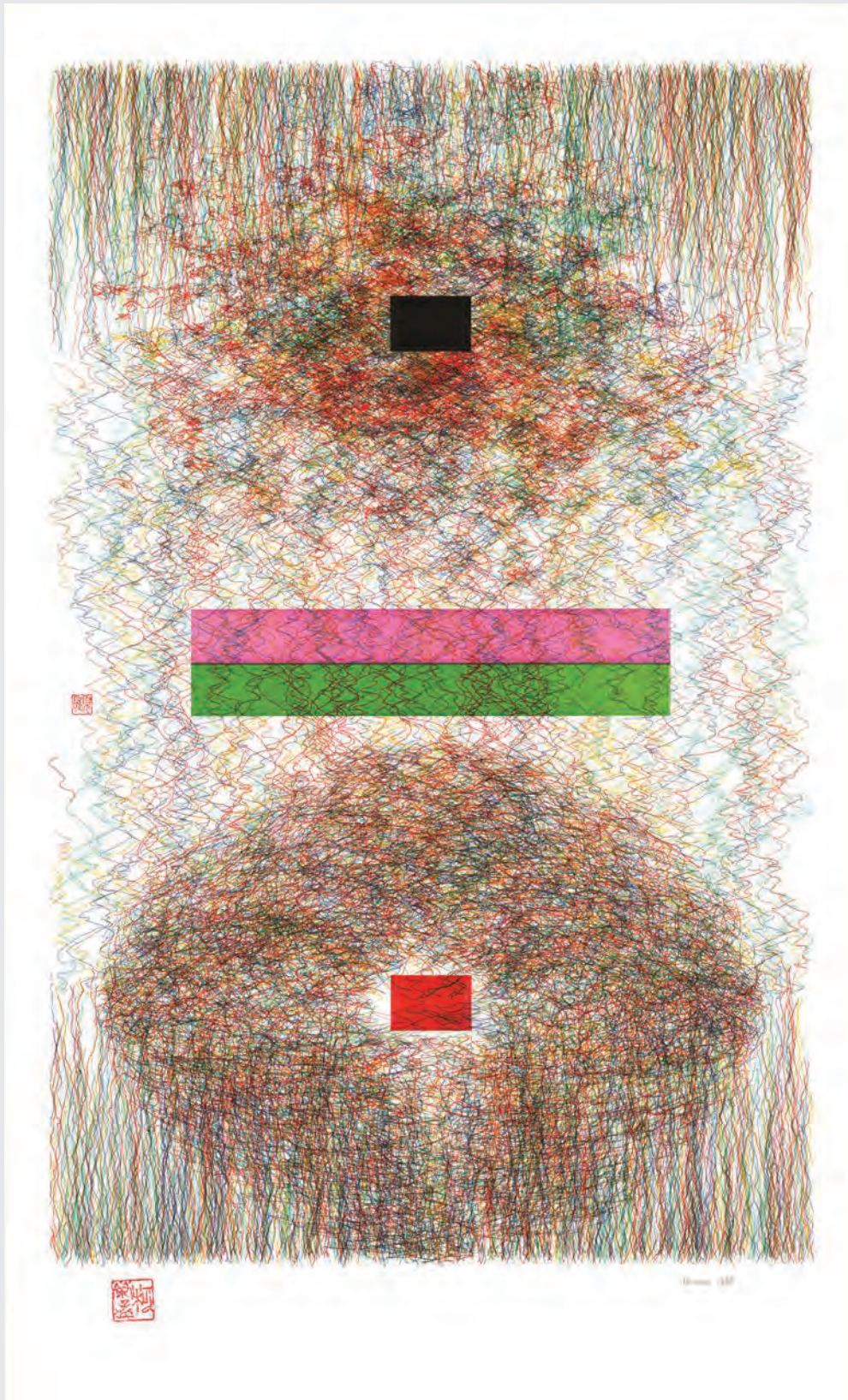
*Omphalos*, is the Greek word for "navel" (belly button). The sacred oval or hemispherical stone in the center of the temple of Apollo in Delphi is also called Omphalos. The ancient Greeks considered Delphi to be the "navel" of the earth. Verostko named his first studio computer Omphalos, the belly button of an exciting new digital landscape. The sayings play with words alluding to wisdom literature in general with a nod to the then popular *Quotations from Chairman Mao Tse-Tung*.

Between 1981 and 1986 Verostko became interested in "hard copy" or printed versions of his *Magic Hand of Chance* routines that mimed aspects of his own work as a painter. He made several prints from screen files and began to write software for building pictorial elements with lines and brushstrokes. *The Magic Hand of Chance* provided the kind of logic from which Verostko's pen-plotted painting program would grow.





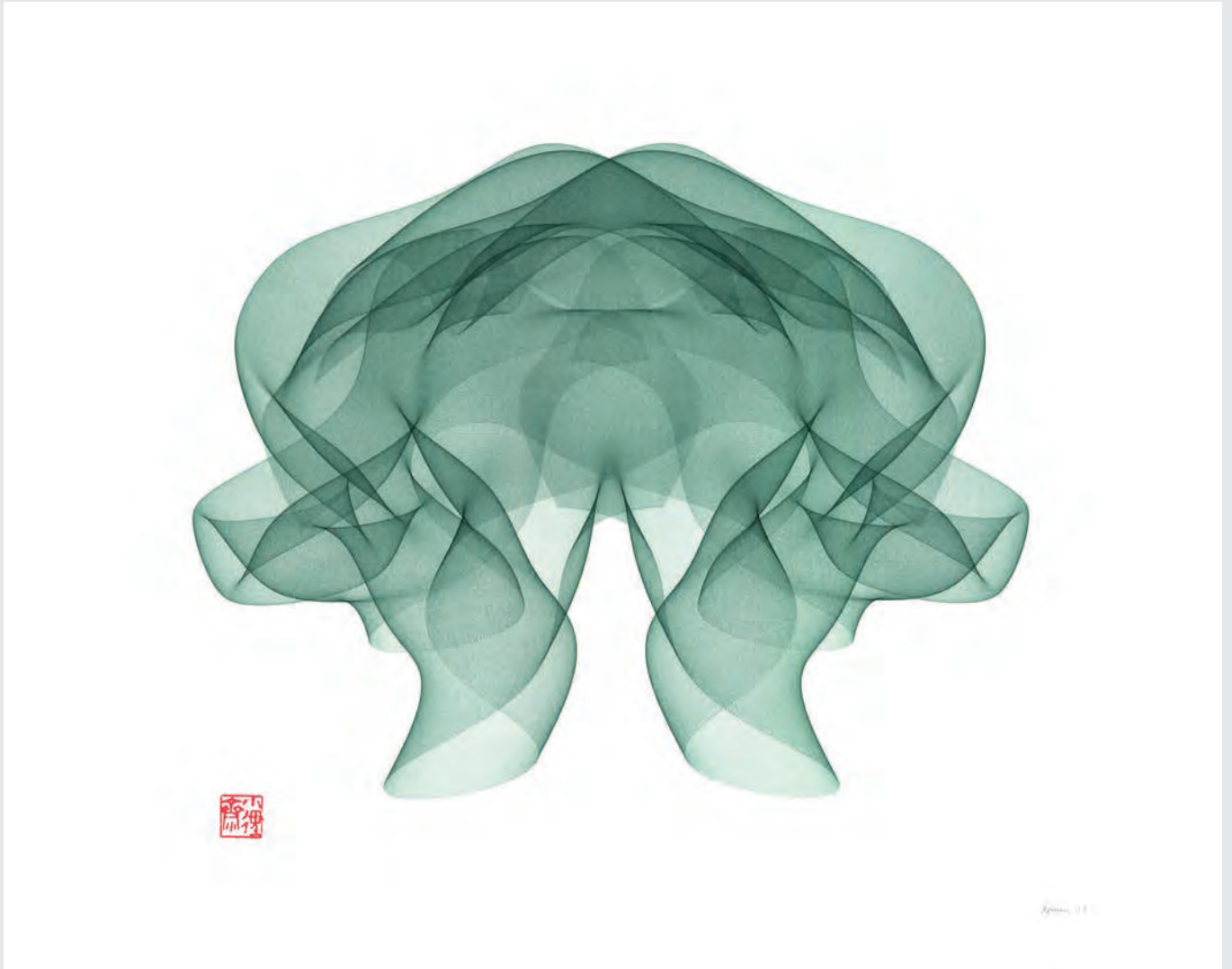
**Untitled**, 1988, pen and ink  
plotter drawing, 22 1/4 x 24 in.



**Untitled**, 1988, pen and ink  
plotter drawing, 39 1/4 x 24 in.



***Heaven and Earth***, 1991,  
pen and ink plotter drawing,  
43 x 26 in. (in artist's made  
frame). Photo: Rik Sferra.

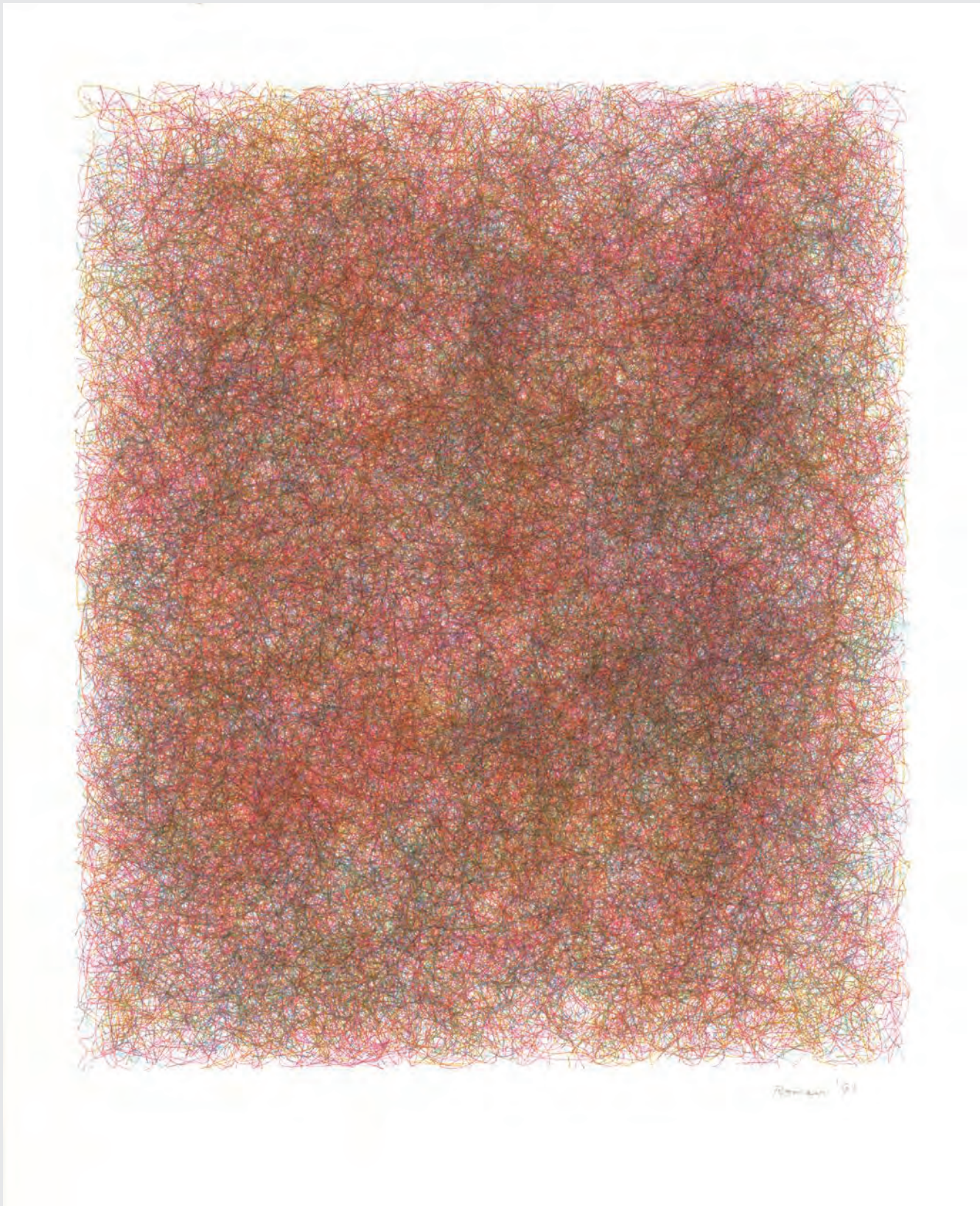


***The Cloud of Unknowing.***  
2003, pen and ink plotter  
drawing, 23 x 29 in.



**Sun Canticle**, 1996, brush, pen, and ink plotter drawing with hand-applied gold leaf, 19 x 13 in. The central pen stroke was plotted with a fine brush, and the gold leaf enhancement was applied by hand. The radiant algorithm for this drawing dates from 1986.

**Untitled**, 1996, pen and ink plotter drawing, 19 x 13 in. The coded parameters for this drawing were set by Verostko's wife, Alice.

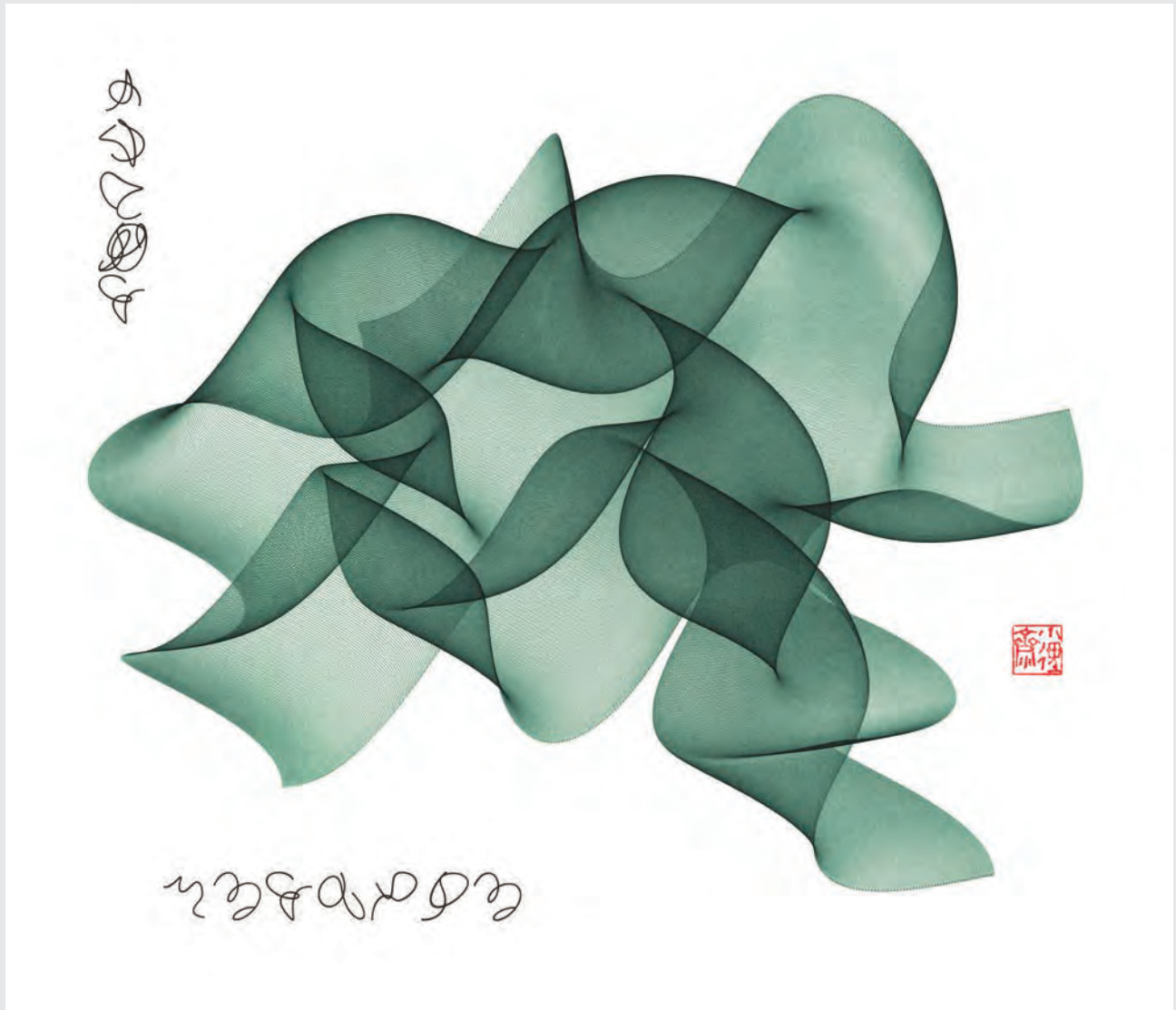








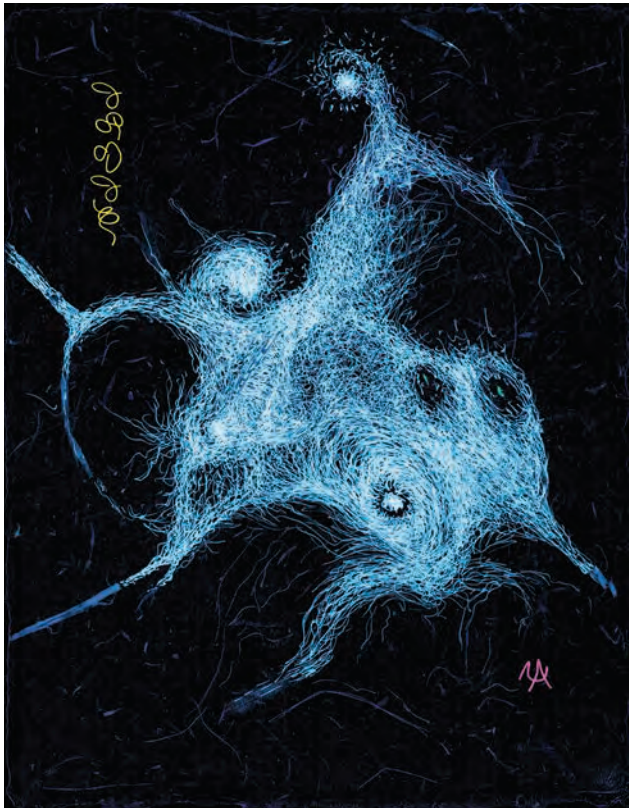
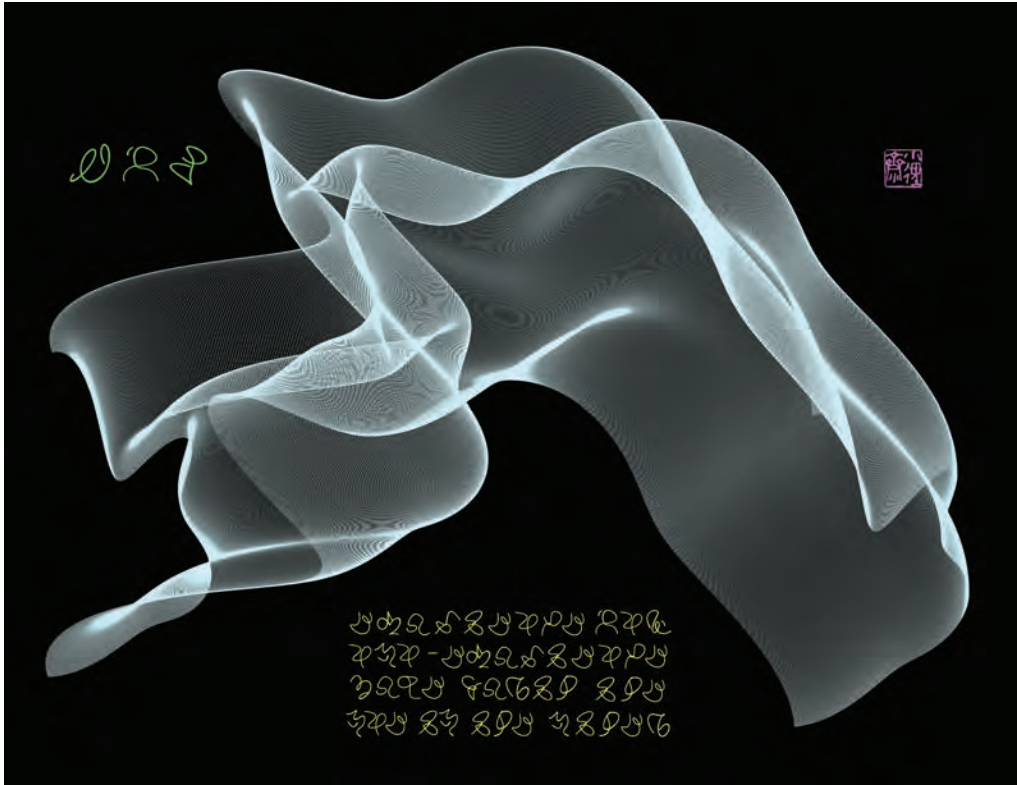
**WIM: *The Upsidedown Mural***, 2008/2018, archival digital prints, scaled from original 18 x 26 ft. mural installed at the Fred Rogers Center, Saint Vincent College, Latrobe, Pennsylvania. Photo: Saint Vincent Archabbey and College.



**Algorithmic Poetry, Green Cloud,** pen and ink plotter drawing, 23 x 27 in. Collection Minneapolis College of Art and Design.

**Three-Story Drawing Machine,** 2011, eight-hour video projection, presented by Northern Lights.mn as part of Northern Spark, Minneapolis College of Art and Design. Photo: Dusty Hoskovek, courtesy NorthernLights.mn.

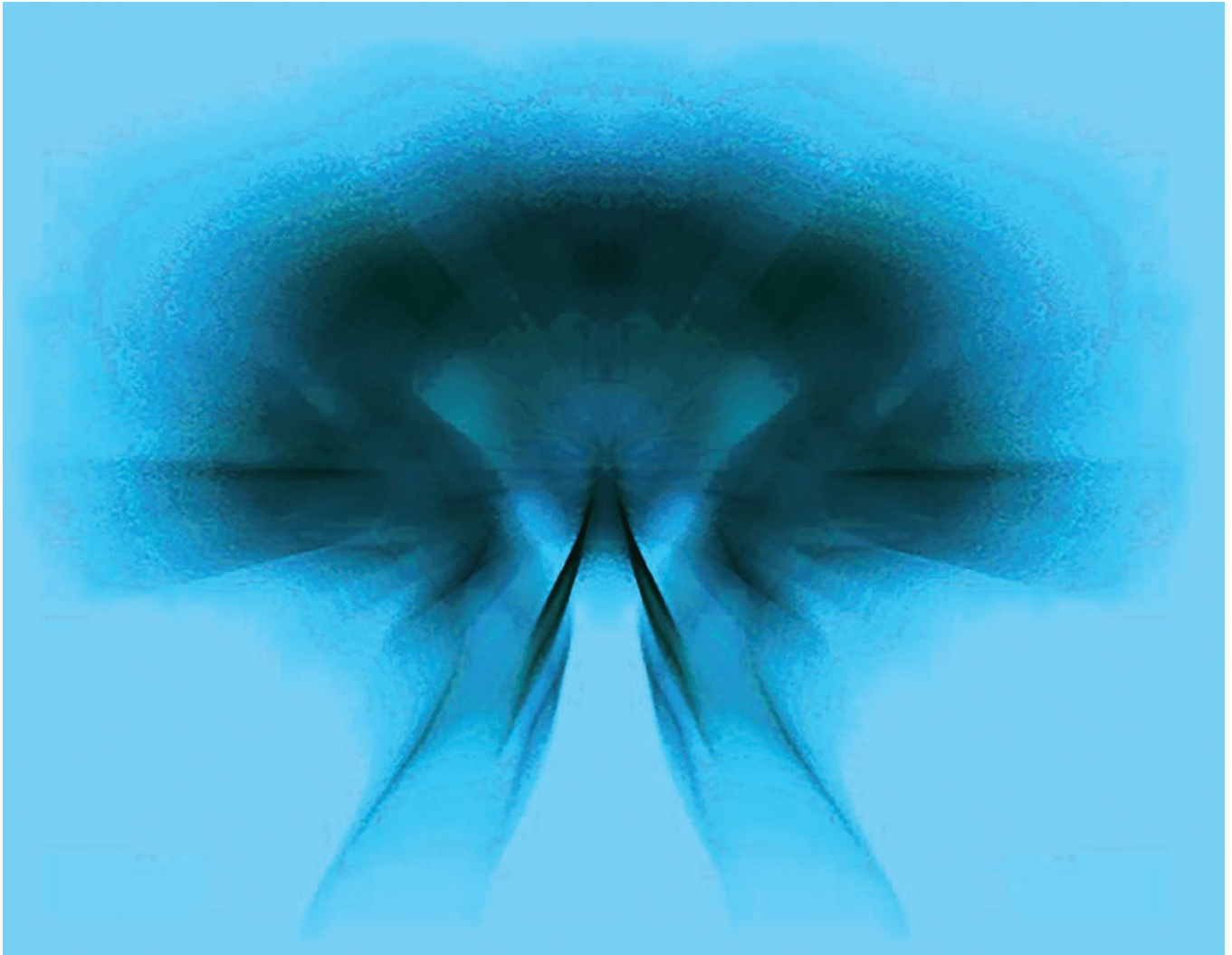




**Transformations: Apocalypse of San Marco**, 2016, archival pigmented print, 17 x 22 in.

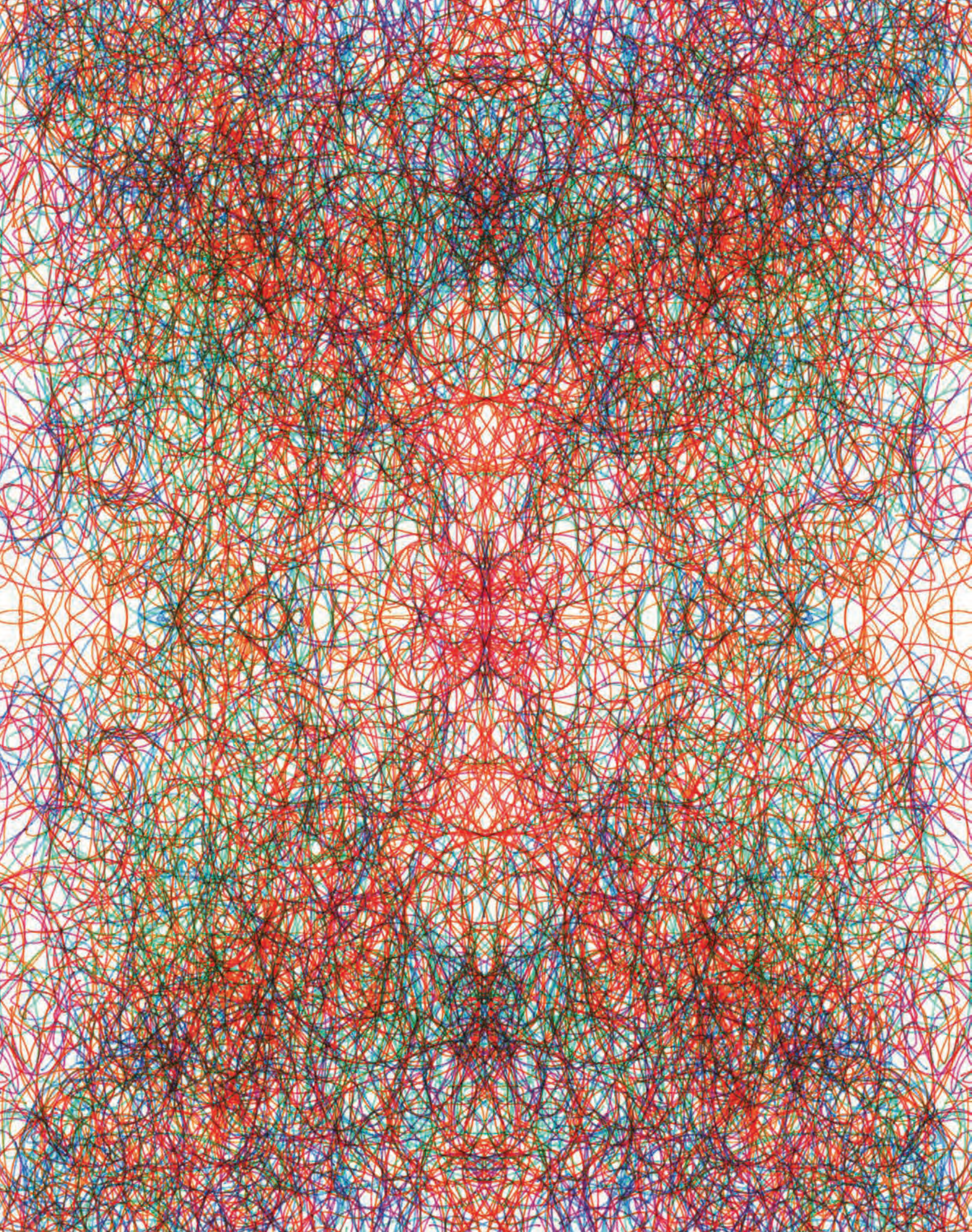
**Transformations: Wanderer, NASA series**, 2016, archival pigmented print, 22 x 17 in.





***Transformations: Celebrating  
Apollo 11, NASA series,***  
2017, archival pigmented print,  
22 x 17 in.

***Transformations:  
The Cloud of Unknowing,***  
2018, archival pigmented  
print, 17 x 22 in.



# Art, Logic, and the Decision Problem

*I do not approach my work as a mathematician.  
I create my algorithms as an artist with certain  
experienced ideas about how to create my art.  
And this ultimately leads me to the nature of  
the computing machine as well.*

Verostko

Verostko's interest in art and technology, which in the early 1960s had been nurtured by the art critic and curator Stephen Joy, was cemented when he moved to Minnesota in August 1968. The metro area included the international headquarters for Control Data, Honeywell, and Cray Supercomputer. In addition, UNIVAC, along with others specializing in electronic type setting, digital animation, and medical graphics, made the Twin Cities an attractive computer center in the U.S. With the growing national influence of E.A.T. (Electronics Art and Technology), Verostko was drawn further into this experimental milieu.

Between 1969 and 1971 Verostko served as a humanities consultant at Tetra Corporation, an electronics startup company, where he could visit, observe, interact with engineers, and learn about the industry. That experience introduced him to circuits and led him several years later to construct a series of *Decision Machines* in honor of Norbert Wiener, the mathematician who established the field of cybernetics. Responding to Wiener's observation that "the functional part of physics cannot escape considering uncertainty and the contingency of events," Verostko built specialized machines symbolizing several of the most difficult decisions humans have to make, decisions made at times with the burden of uncertainty. They work with an electronic trigger that yields a random "one bit" event symbolizing "yes" or "no." These playful machines provide an electronic "flip of the coin" for that decision moment when one is unable to arrive at a decision following reasoned consideration based on available information.

These interactive works honoring Norbert Wiener were the first of Verostko's projects to pay homage to pioneers who contributed to the twentieth-century information revolution. The development of electronic circuit logic and the human control of digital machines has a very deep history that reaches back to early counting systems and Aristotelean logic. As a student of philosophy, Verostko was seduced by Aristotle's principle of contradiction: "It is impossible for any being to possess a quality and at the same time not to possess it" (*Metaphysics*, Book III). Many years later, he found that Boolean operators—the words AND, OR, and NOT that form the basis of mathematical sets and database logic—embodied the same ancient principle of contradiction. This then led him to read George Boole's 1854 book *The Laws of Thought* and, eventually, to create a limited-edition book honoring his work.

The final homage, to Alan Turing and his Universal Turing Machine, coincided in 1995 with Verostko's assistance in coining the term "algorist" to define the artists who were making art by writing their own code. Verostko's extensive research and writing on the topic "Who are algorists?" ranges from the ninth-century mathematician Muhammad al-Khwarizmi, from whose name derives the word "algorithm," to a host of Verostko's contemporary "computer pioneers." In this regard Verostko has established an essential understanding of a historical continuum of which he is a part.

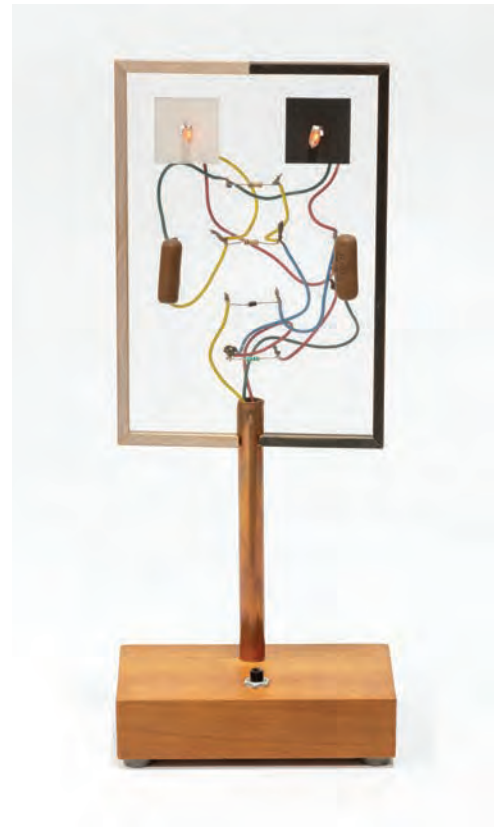
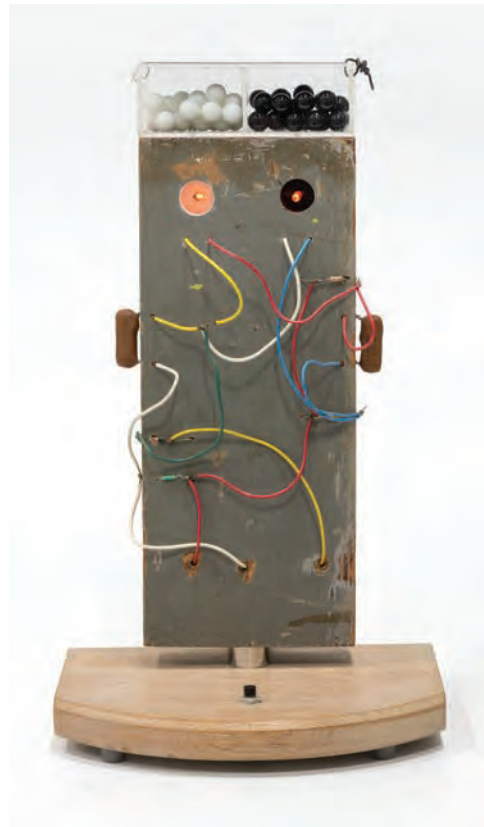
**Decision Machines**

**The White House,**

**Yea or Nay?**, c. 1982–85,

wood salvaged from the 1949–52 White House renovation (preserved by Alice Wagstaff's uncle, Henry Barr), diodes, transistors, capacitors, neon lamps, a "single pole" input switch, and a push button decision switch. Power supply is 120 AC household current, 18 x 10 x 7 3/4 in.

Photo: Rik Sferra.



**Hamlet, To Be or Not To Be?**

c. 1982–85, wood, diodes, transistors, capacitors, neon lamps, a "single pole" input switch, and a push button decision switch. Power supply is 120 AC household current, 16 x 6 x 4 in.

Photo: Rik Sferra.

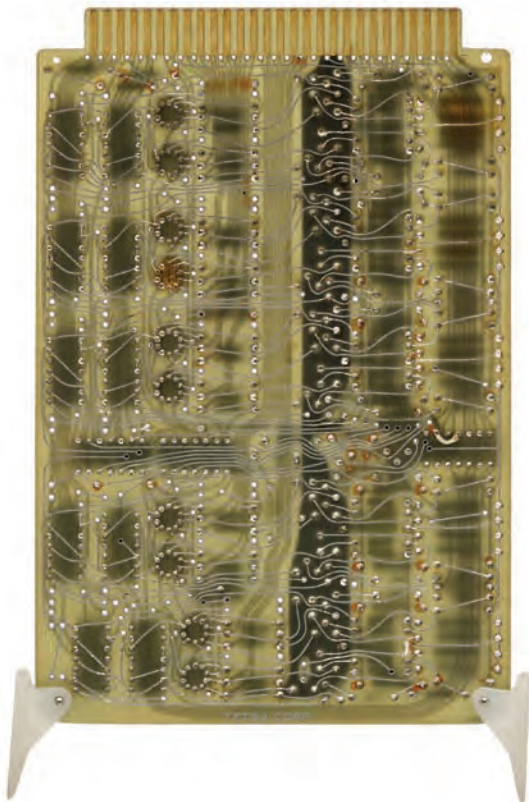
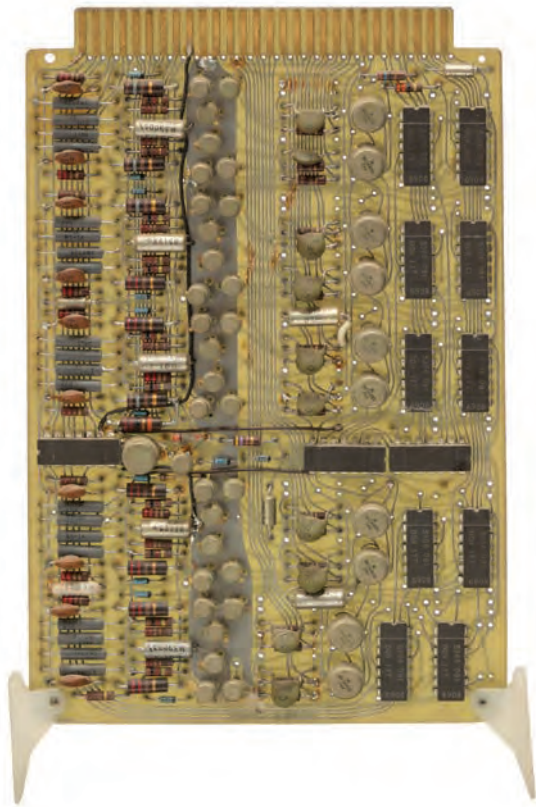


**Wall Street, Buy or Sell?**

c. 1982–85, wood, paint, Wall Street newspaper, diodes, transistors, capacitors, neon lamps, a "single pole" input switch, and a push button decision switch. Power supply is 120 AC household current, 16 1/8 x 12 x 5 1/8 in.

Photo: Rik Sferra.



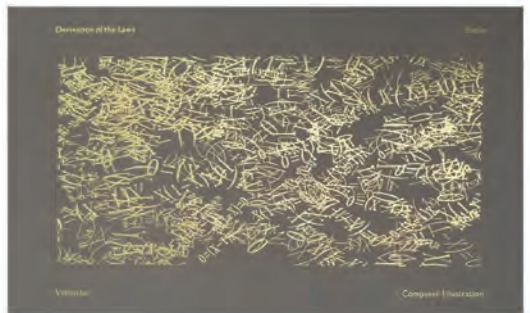


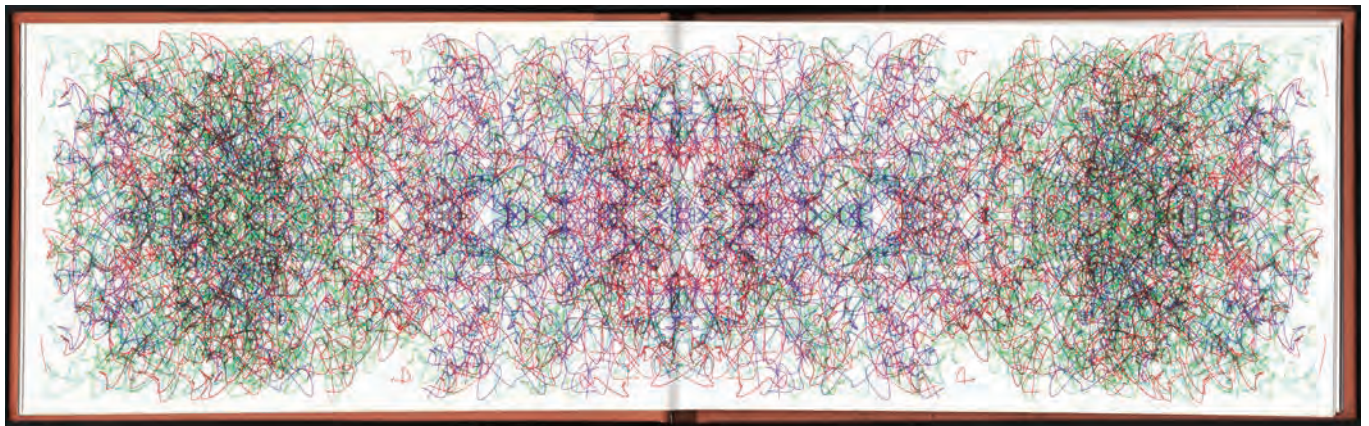
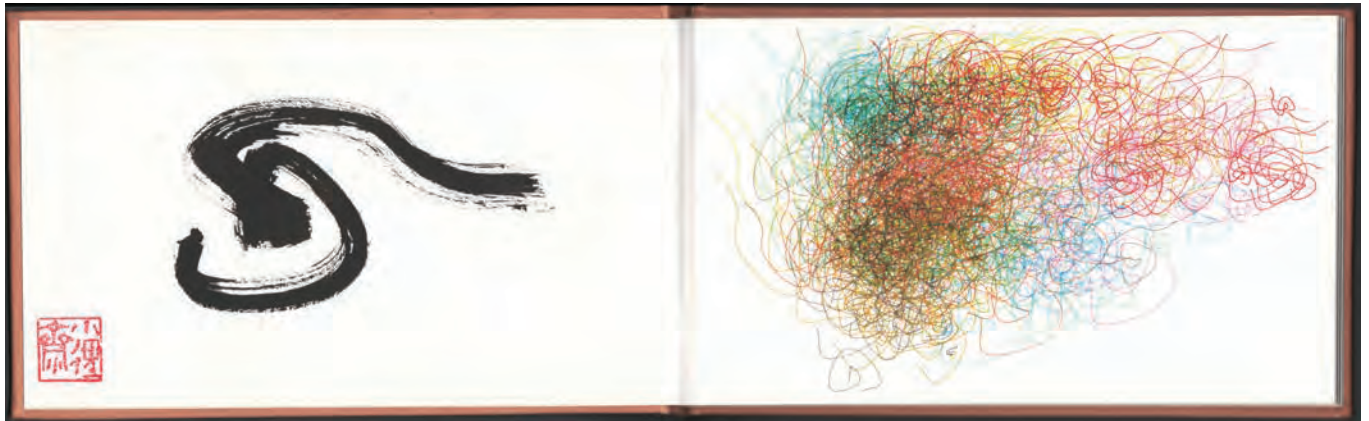
***Circuit Mind,***  
***Tetra Corporation Memorial,***  
1971, circuit board mounted  
in wood frame on wood base,  
15 1/2 x 8 1/2 x 5 1/4 in.  
Photo: Rik Sferra.

For more details please see:  
[http://www.verostko.com/  
history/mpls/pre-alg/pre-alg.html](http://www.verostko.com/history/mpls/pre-alg/pre-alg.html)



**Derivation of the Laws of the Symbols of Logic from the Laws of the Operations of the Human Mind : An Excerpt from the Writings of George Boole,** computer illustration by Roman Verostko, preface by Roger F. Malina, 1990, limited letterpress edition artist book with two original works bound in. Edition #13/20 with Moroccan leather, collection of the Minneapolis College of Art and Design. Photo: Rik Sferra. A paperback reproduction litho edition was published 1991. Both 6 x 20 in. (open); 6 x 10 in. (closed).





***Derivation of the Laws,***  
Edition #82, Anne and Michael  
Spalter Digital Art Collection.

# Artist's Statement in *Derivation of the Laws*

**The following statement was published in the limited edition of George Boole's *Derivation of the Laws*, which is chapter 3 from Boole's classic work: *An Investigation of the Laws of Thought* (Macmillan, 1854).**

Early in this century a number of artists became intensely interested in unfolding a universe of visual form which did not "re-present" the world we see around us. Wassily Kandinsky strove to create "improvisations" based on "inner necessity," something like the structure of harmony in music. Paul Klee observed that he wished to "make visible the invisible"—perhaps the process of a flower blooming. And Piet Mondrian sought a "dynamic equilibrium" through the visual equivalence of opposites—an opposition he observed most profoundly in the relationship of the vertical and the horizontal elements in the landscape. These and many others—Frantisek Kupka, Kasimir Malevich, Barbara Hepworth, and the pioneering constructivist brothers Naum Gabo and Antoine Pevsner—all shared one thing in common—they sought to make visible a reality which was not visible.

Each in his personal way searched for forms which some have called the "*new reality*"—a world of forms without reference to the visual vocabulary of our everyday world. Terms such as "non-objective art," "concrete art" and more generally "abstract art" have been used to refer to this work. Within the first generation of these artists, we have experienced many marvelous moments: recall the lyrical biomorphic forms in the sculpture of Jean Arp—the vibrating power of interacting colors in the work of Joseph Albers and Victor Vasarely—and the expressive wonder in the organic worlds sculpted by Isamu Noguchi.

## II

Within the past fifteen years, experiments with worlds of unseen visual form have crossed a new threshold. The pioneers who opened our eyes to such forms have been mathematicians and physicists whose images of complex dynamic systems have amazed the discoverers themselves.

This new world of visual adventure, which lay largely unseen before computers, received its first unveiling in the work of Benoit Mandelbrot. Surprisingly this hidden world emerged from the need for a geometry for measuring and describing the forms of nature. How do we describe mathematically the shape of a cloud, a coast line, or a mountain? Not with the cones and spheres of Euclidian geometry! Mandelbrot identified a new geometry of fractal shapes. This geometry, aided by a computer, can be used to visualize the form of the phenomenon it defines. This revolutionary new geometry, still in its infancy, has seized the imagination of many artists involved with computer graphics.

For now, it is clear that new geometries coupled with the power of the computer have sown the seeds for a revolution in the arts. The next generation will see magnificently articulated improvisations as artists learn how to use dynamic iterative techniques. Both the frontispiece and the end piece in this book are hard copy examples of such improvisation.

Each is an original "one of a kind" in a "family" of forms. For example, the brushstroke, in the frontispiece, presents the key shape which controls all the other "self-similar" strokes. No other book in this edition has a frontispiece evolved from the same shape. Thus the final form is unique in every book. On the other hand, every frontispiece, sharing the same parameters and instructions, belongs to the same form family—each has a true "familial" resemblance to every other work in the edition.

## III

There are many remarkable analogues between computing processes and biological processes, e.g. software generations, computer viruses. We can expect these analogies to become more apparent as computers evolve further. We assume that the "rulebook" in our universe is the same for

every information processing system whether it be the mind of a human or a chimpanzee, an abacus or a Disk Operating System (DOS).

This “rulebook” fascinated George Boole. He was convinced that if the laws of logic “are really deduced from observation, they have a real existence as laws of the human mind independently of any metaphysical theory . . .” He sought to identify those rules of thought and give them algebraic expression.

In Proposition IV he identified “the fundamental law of thought” as Aristotle’s principle of contradiction—that “it is impossible for any being to possess a quality and at the same time not to possess it.” George Boole argues from its algebraic equivalent that “what has been commonly regarded as the fundamental axiom of metaphysics is but the consequence of a law of thought, mathematical in its form.”

From this foundation, he evolved a symbolic logic for the “essential laws of human language.” He achieved the first successful application of algebraic methods to logic, an achievement which provided the foundation of all subsequent developments in the field. “Boolean” Logic, refined by his successors and essential to switching theory, has been the cornerstone for developing the circuitry and software for the modern computer.

If George Boole were living today, he would stand in wonder and amazement pondering the magnificent machine language that has evolved since the publication of the *Laws* in 1854. I think especially that he would be transported to near ecstasy seeing the binary 1s and 0s in computer assembly language which symbolize the “on” and “off” bits. This is his Proposition IV evolved into a machine language that controls the electronic circuits in everything in our daily world from cash registers, airplanes, and washing machines to Cray supercomputers.

The illustrations in this book have evolved from procedures made possible by Boolean logic. For several illustrations, I adjusted my algorithms to use terms from Boole’s symbolic logic for the graphic improvisation. In those cases, the 1s and 0s were distributed randomly around a center of attraction. The visual effects are intended to suggest the dynamism inherent in logical systems. It is a tribute to Boole who perceived the value of a symbolic language of logical equivalence in advance of computer languages.

## IV

As a final note, I want to place this work in historical context. In the early 15th century Filippo Brunelleschi developed linear perspective and Leon Battista Alberti documented its theory and practice in his work *Della Pittura* (1435). The perspective of the 15th century was more than a re-tread of the perspective practiced in the Roman empire. Alberti’s treatise emerged along with the growth of empirical observation as a learning method and an interest in the study of optics as a key to that learning.

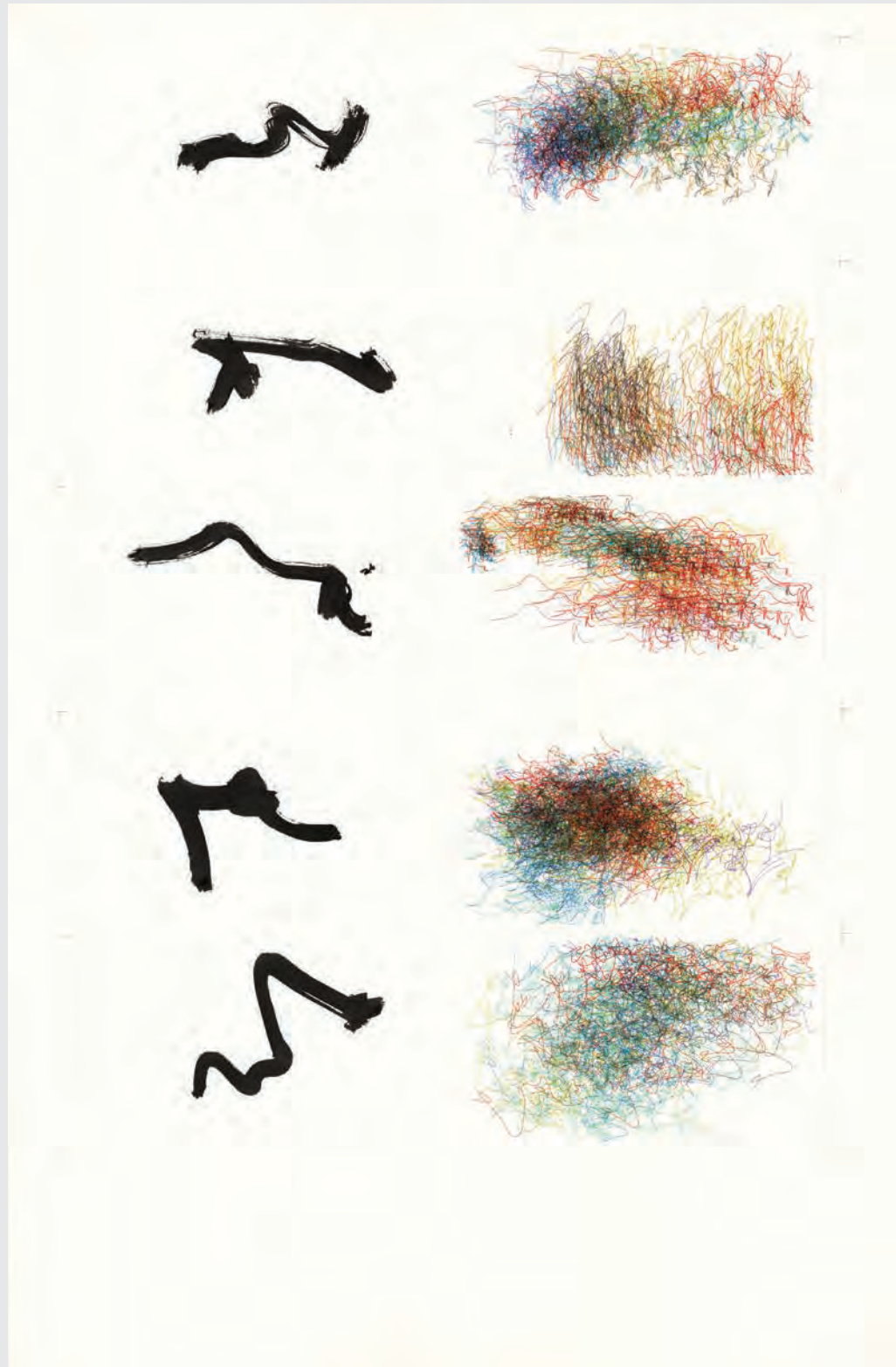
Furthermore, Alberti believed that mathematics and logical order were essential for the practice of art. Subsequent development in the theory and practice of perspective altered the art of western culture. Indeed, Renaissance perspective provided the tools of visualization essential for the development of modern western civilization.

I think that we stand at a similar threshold today as we face the future. The computer provides the artist with a seemingly limitless power to transform and improvise. And, like Renaissance perspective it provides us with a new window on our world—one that is altering the way we perceive that world.

Over the years I have gained a respect (and even affection) for the machines I use. My plotters, named Alberti and Brunelleschi, are with my computer, my excellent companions in exploring these new perspectives. They help me explore visual analogues of probability, forms which were hidden from view before we had these machines. Through the computer we have gained access to a visual domain filled with mystery, a domain that was invisible before. For many the energy and growth patterns of these forms echo processes lying at the core of the unfolding universe. My work explores a faint echo of this cosmic landscape. For me, the computer and its companion plotters provide a new pathway to “making visible the invisible.”

Now, in the summer of 1990 we recognize that electronic art is still in its infancy. But, as in the early 15th century, there are artists now wrestling with the problems of the transformation and creation of art forms with computers. The new geometries and new technologies will surely bring a revolution as we approach the next century. This book is a tribute to George Boole whose work helped make this new adventure possible.

Roman Verostko, Minneapolis, June 1990



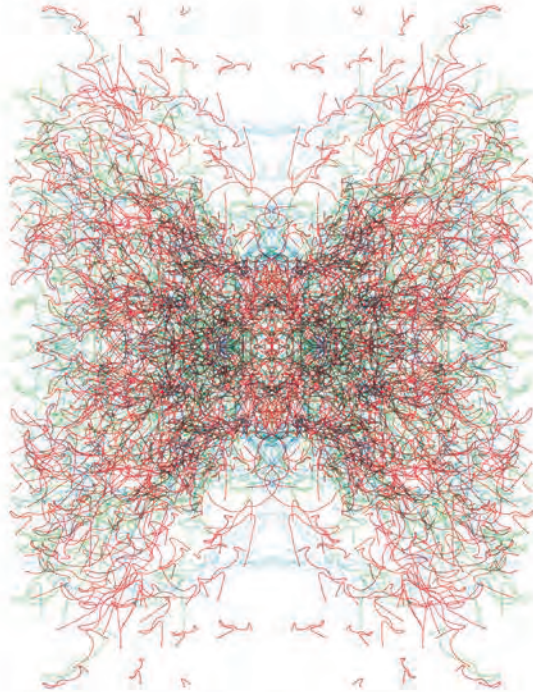
***Derivation of the Laws***  
(frontispiece proof sheet), 1990,  
pen, ink, and brush plotter  
drawing, 37 x 24 1/4 in.

SAINT SEBASTIAN PRESS

Exhibiting

ART & ALGORITHM \* MIND & MACHINE

Homage to George Boole (1815-1864)



Featuring Boole's Laws Illustrated By

ROMAN VEROSTKO

SAT \* FEB 23 \* 7:00-12:00 PM \* 714 Portland Av S \* Mpls

SYMPOSIUM

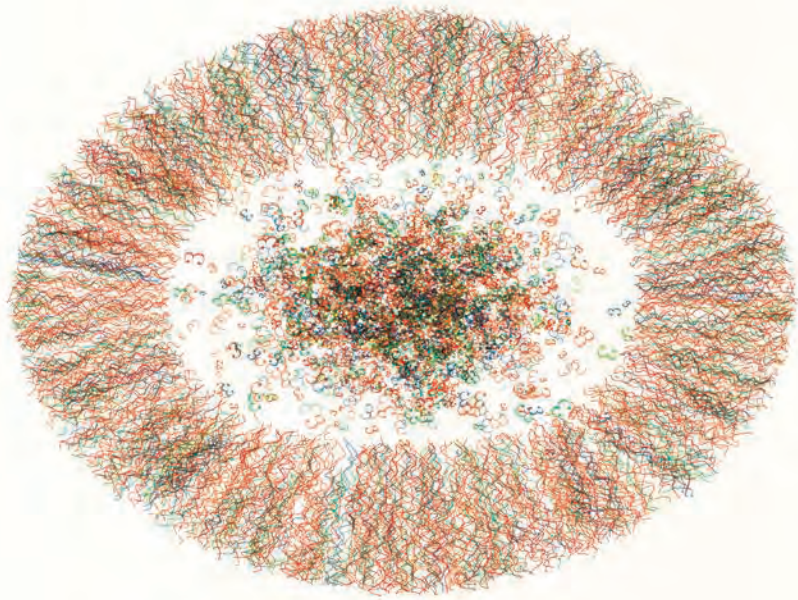
Images of the Unseen \* Panel: Gunderson \* Holte \* Wagstaff \* Verostko

MPLS COLLEGE ART & DESIGN \* FRI \* FEB 22 \* 3:00-6:00 PM

2501 Stevens Ave S \* Minneapolis \* 1991

Poster for "Art & Algorithm – Mind & Machine" symposium and exhibition, 1991,

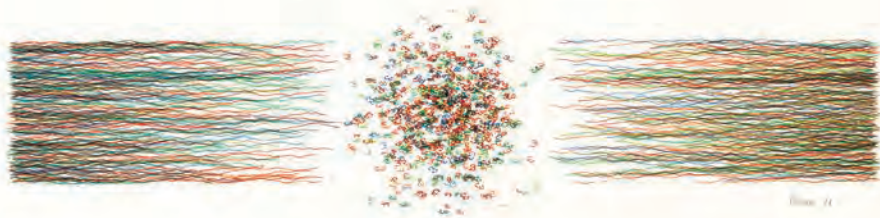
pen and ink plotter drawing, 24 x 18 in., Collection of the Minneapolis College of Art and Design.



**S**ONNET TO THE NUMBER THREE

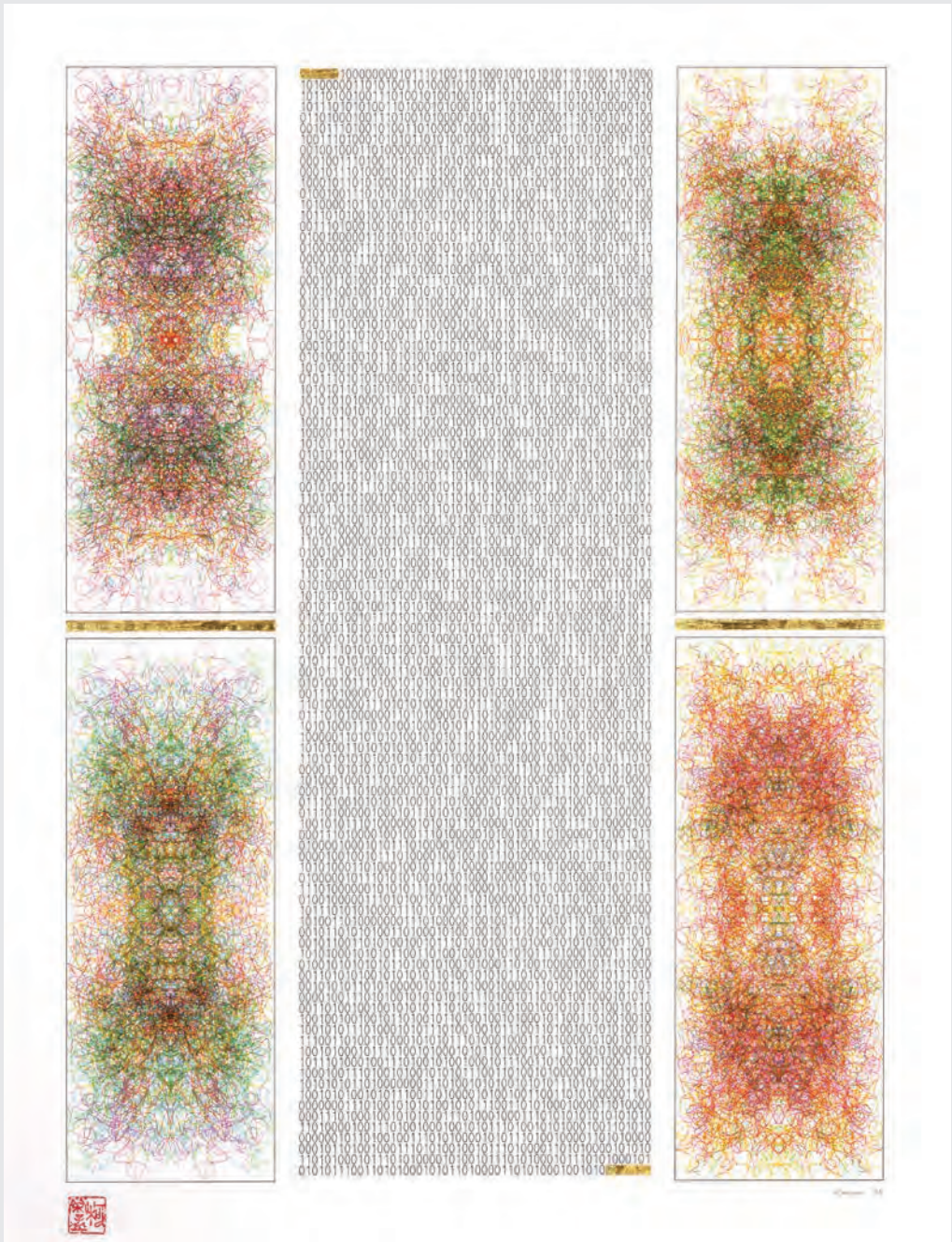
When the great Maker, on creation bent,  
Thee from thy brethren chose, and framed by thee  
The world to sense revealed, yet left it free,  
To those whose intellectual gaze intent  
Beyond the veil phenomenal is sent,  
Space diverse, systems manifold to see  
Revealed by thought alone; was it that we,  
In whose mysterious spirits thus are blent  
Finite of sense and infinite of thought,  
Should feel how vast, how little is our store —  
As yon excelling arch with orbs deep fraught  
To the light wave that dies along the shore —  
Till from our weakness and our strength may rise  
One worship unto Him, the only wise?

—George Hoolic

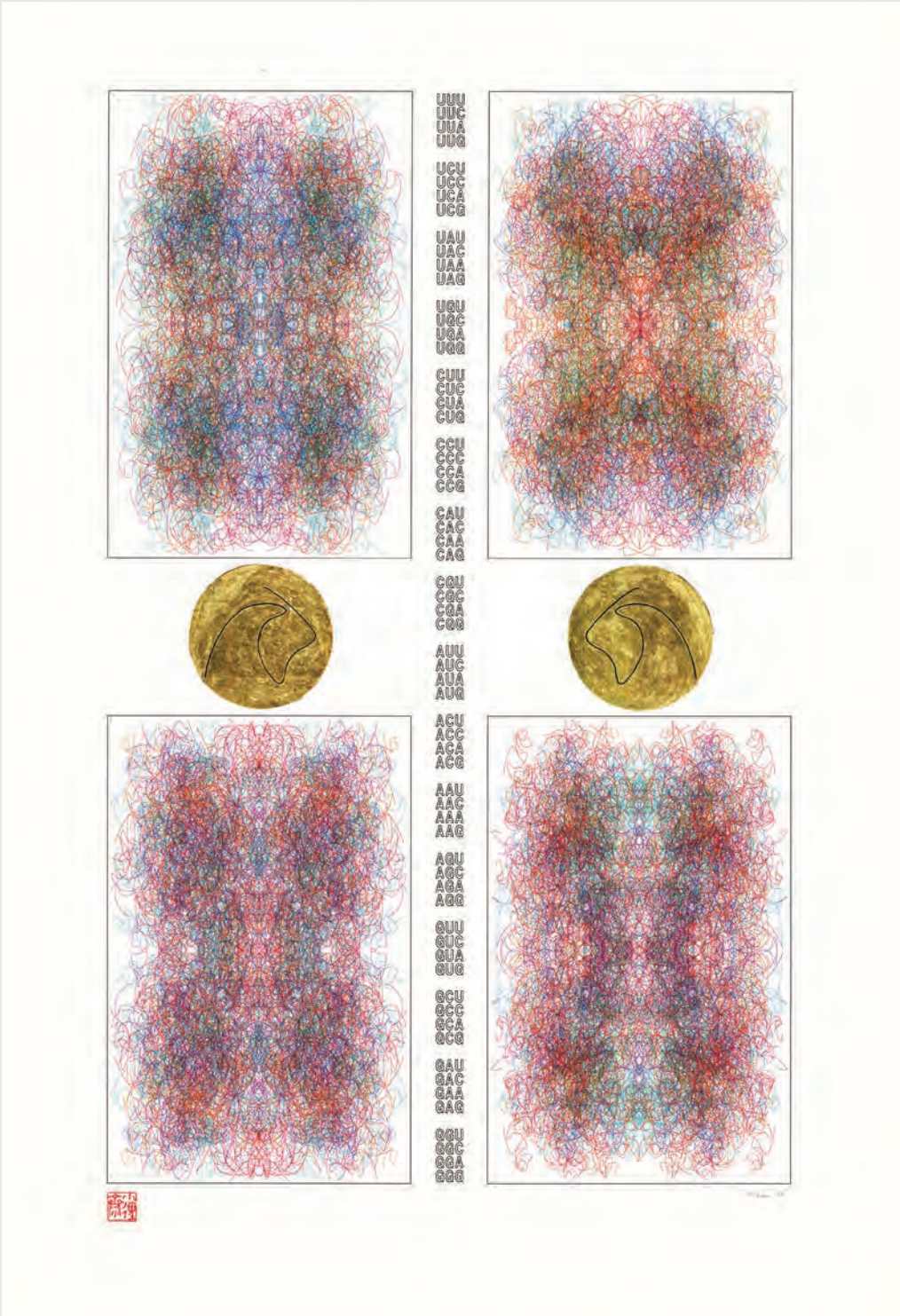


**Sonnet to the Number Three,**  
1991, pen and ink plotter drawing  
with hand-applied gold leaf,  
40 x 28 in. Collection of the  
Minneapolis College of Art  
and Design.





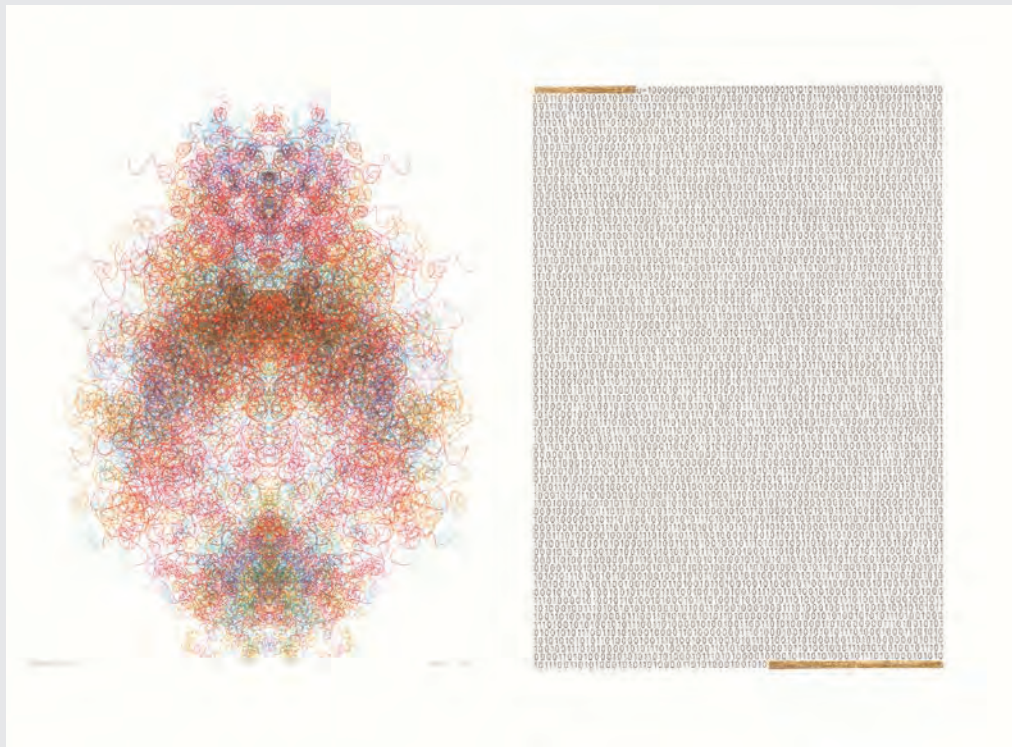
***Illuminated Universal Turing Machine***, 1995, pen and ink plotter drawing with hand-applied gold leaf, 40 x 30 in. Photo: Rik Sferra.



**Genetic Code**, 1996, pen and ink plotter drawing with hand-applied gold leaf, 44 x 30 in.



***Epigenesis: The Growth of Form*** (model), 1996, pen and ink plotter drawings with hand-applied gold leaf, 18 x 76 in. The finished 9 x 40 ft. mural was installed in 1997 in the Frey Science and Engineering Center, University of St. Thomas, St. Paul. Photo: Rik Sferra.



***Manchester Illuminated Universal Turing Machine #23***, 1998, pen and ink plotter drawing with hand-applied gold leaf, 22 x 30 in.



# The Global Exchange of Art and Aesthetics

*The Lung Shan work is more than expressionist brushwork. It includes the conjunction of both rational and non-rational elements: control and un-control, something akin to yin-yang, light and shadow, hard and soft, sweet and sour—the Chinese genius for the marriage of opposites.*

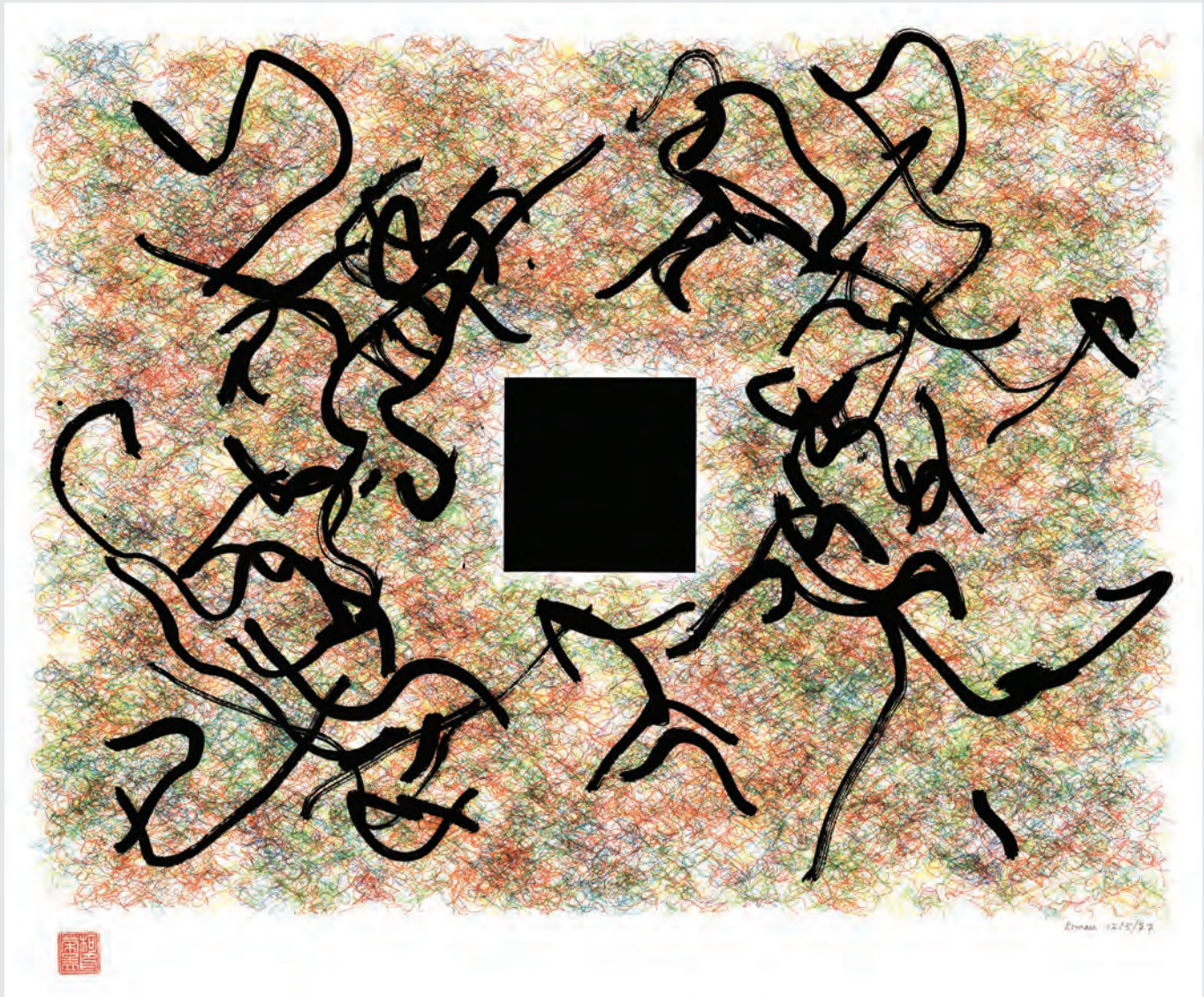
## Verostko, "Dragon Mountain: East & West joined in Algorithmic Art"

Verostko's travels to China, first in 1982, and again in a teaching capacity in 1985 and 1998, had a remarkable influence on his development as an artist. And he, in turn, introduced twentieth-century Western art to a group of young Chinese artists eager to expand their understanding of different aesthetic traditions. The academic exchange initiated by the Chinese artist Zheng Shengtian introduced Verostko to the master calligrapher Wang Dongling, who followed Verostko's course. The subsequent friendship and artistic interchange between Verostko and Wang resulted in each artist's unique combination of different media, materials, and methods for producing brush lines.

While in New York in the early 1960s, Verostko practiced brushwork influenced by abstract expressionists whom he had known personally, such as Franz Kline, George McNeil, Barnett Newman, and Robert Richtenburg. In this regard, he was familiar with Eastern thought and aesthetics that had a profound effect on the New York School after World War II. Verostko was particularly interested in the magazine *It Is*, published by Philip Pavia between 1958 and 1965, which

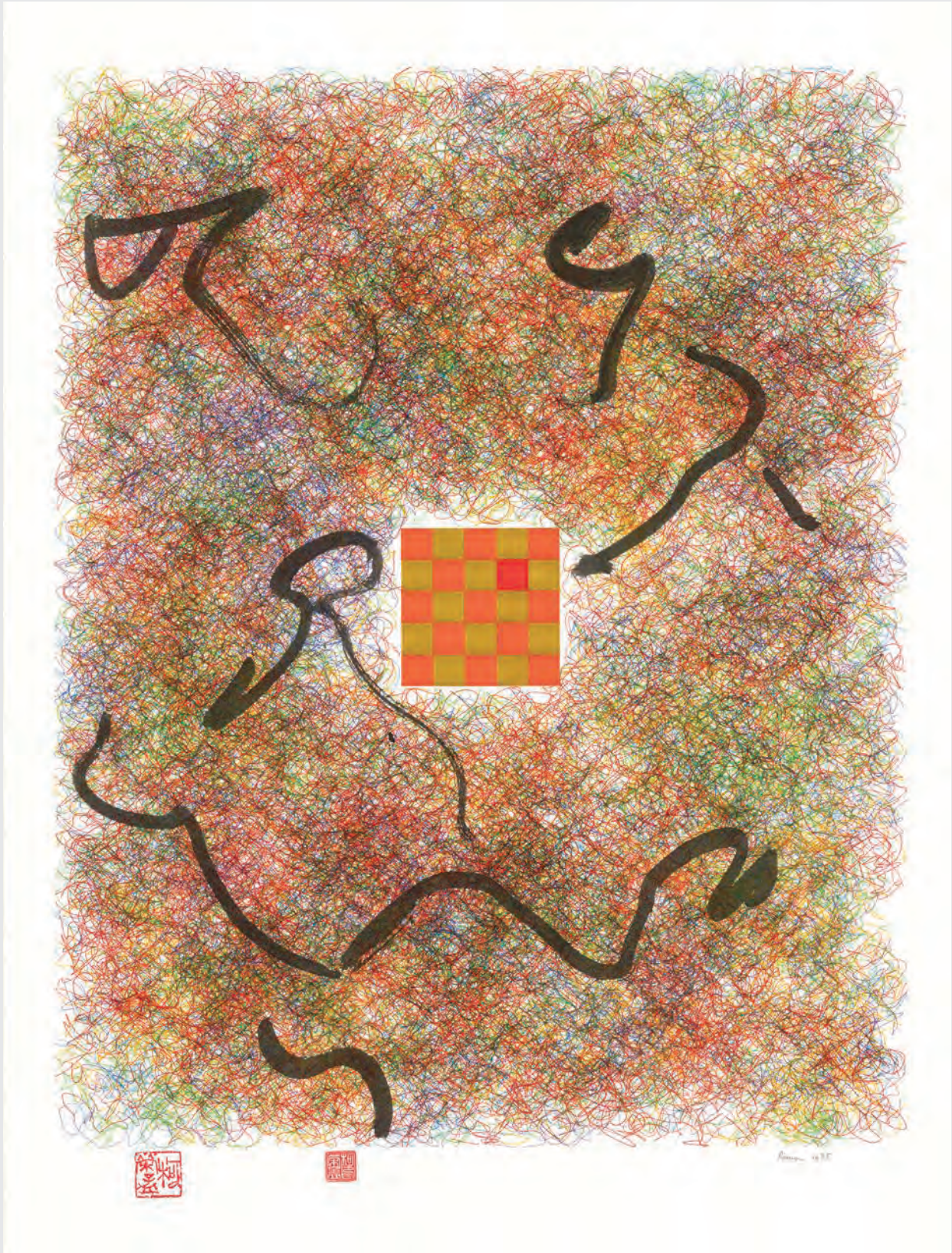
featured art, poetry, and other writing focused on the pure phenomenon of the concrete work itself. The presence and physical reality of the picture field were everything. It was not until the 1980s, however, when Verostko learned more about medieval Zen through his travels and personal China connections, that he came to realize the kinship between the concept "it is" and the Chinese calligraphic brushstroke.

After returning from China in 1985, Verostko established what he would call his "Pathway Studio." He gained access to his first pen plotter, a HI DMP52 with fourteen pen stalls, and began translating his algorithms for computer monitors into routines for guiding the drawing arm of his pen plotter. The idea of coding for the brush soon followed as he adapted Chinese brushes to fit the drawing arm of the plotter. His first algorithmic brush painting, *Untitled #81*, executed with a brush he brought from China, dates from early 1987. The *Pathway* series that followed in 1988 couple brushstrokes with clusters of pen strokes based on similar form structures. The influence of calligraphy is evident in the vertical orientation of brushstrokes in *Woo Way* as well as the "no-character" calligraphic mark making (*feizi*).



**Untitled #81**, 1987,  
pen, ink, and brush plotter  
drawing, 19 x 24 in.

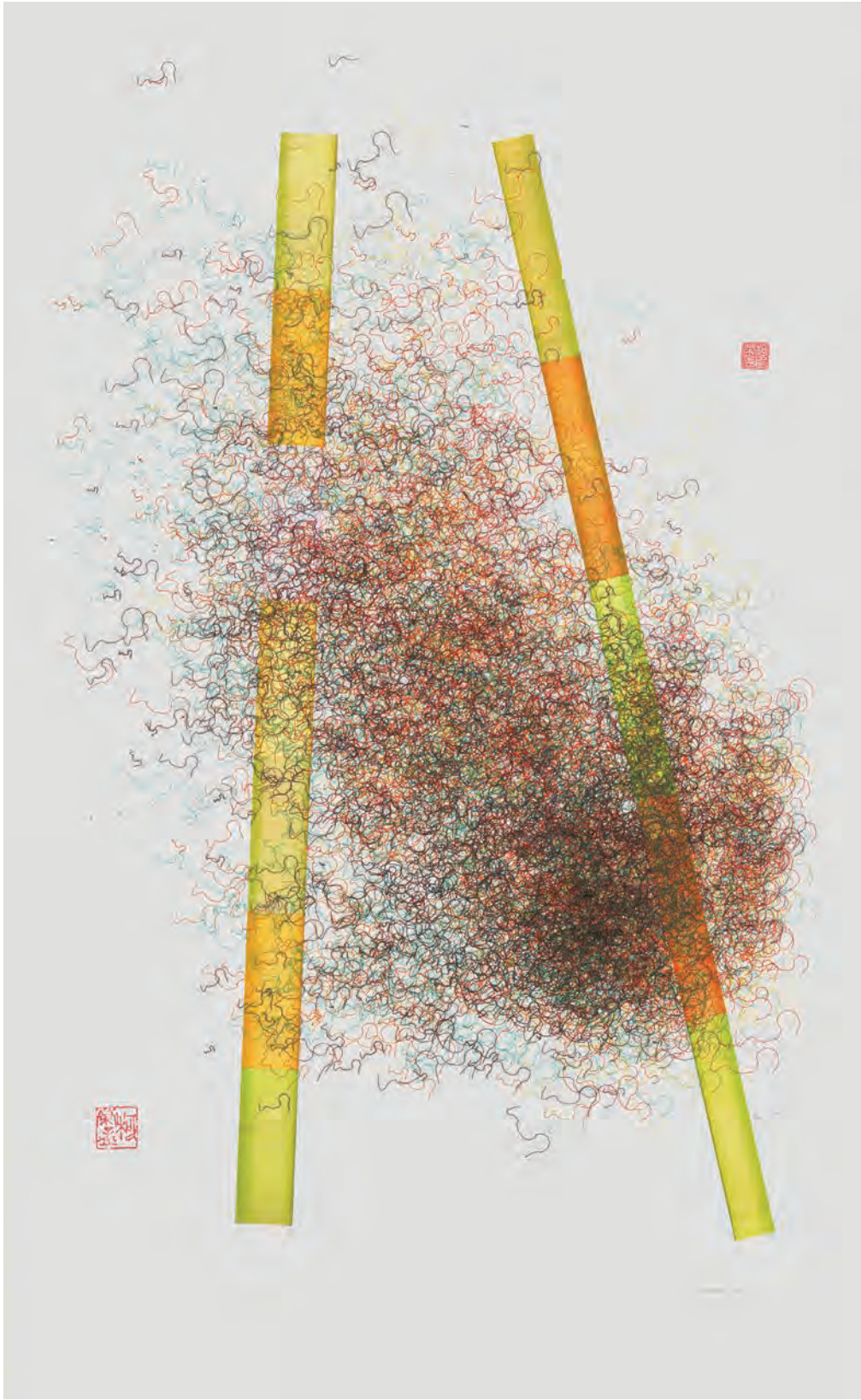
**Pathway series**, 1988,  
pen, ink, and brush plotter  
drawing, 42 x 30 in.





**Pathway series**, 1988,  
pen, ink, and brush plotter  
drawing, 32 1/4 x 24 1/4 in.



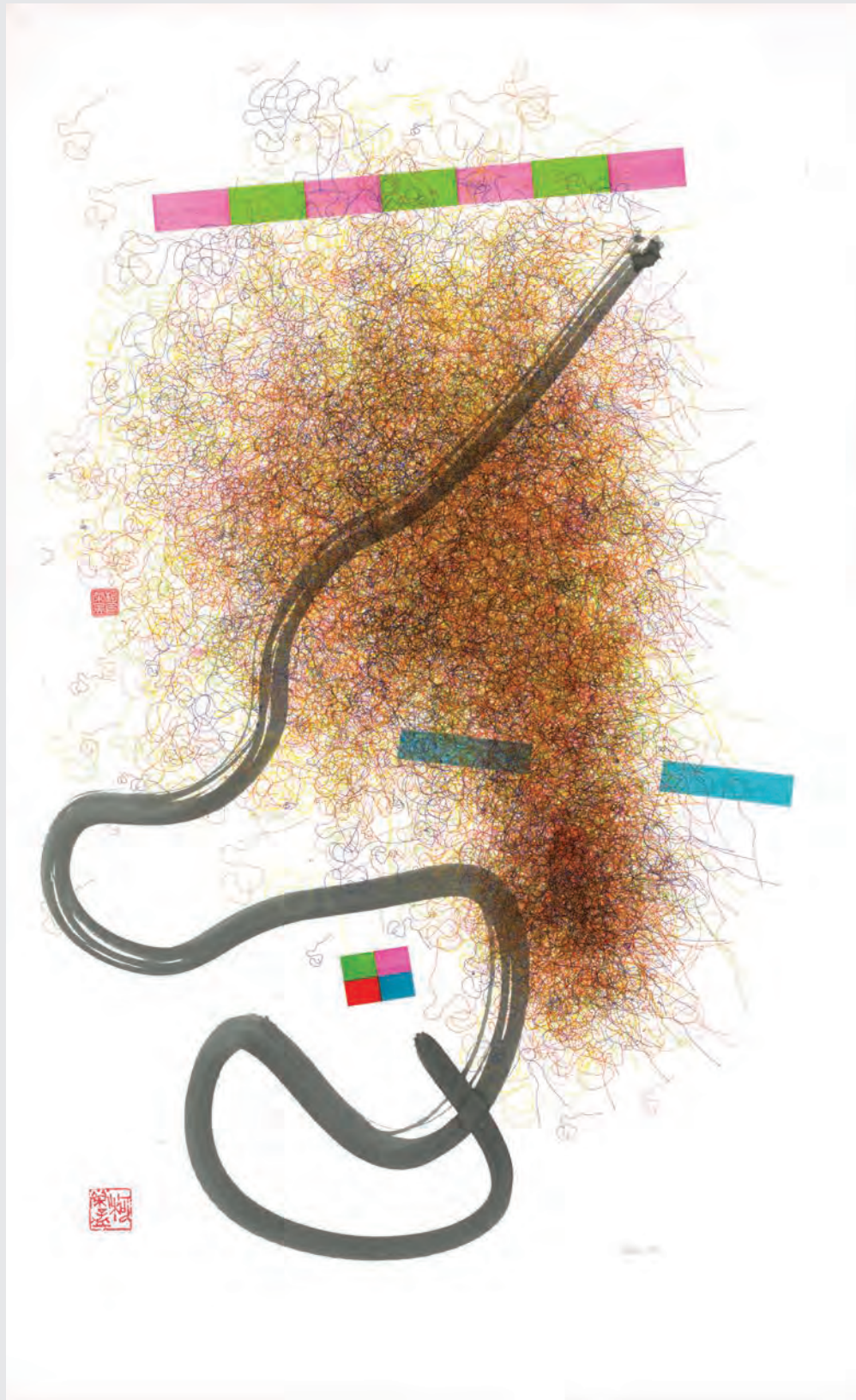


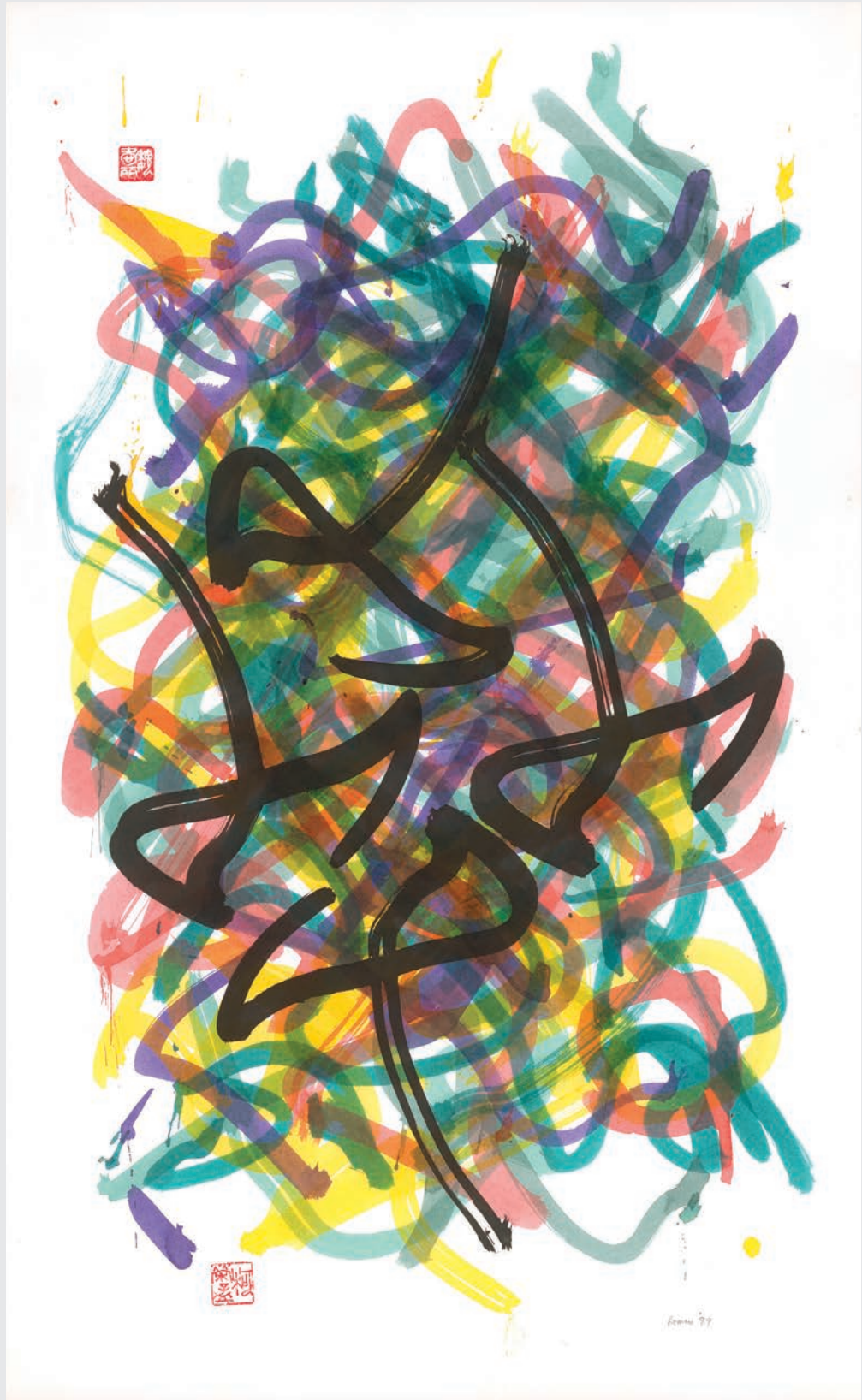
**Masquerade**, 1988,  
pen and ink plotter drawing,  
39 1/4 x 24 in.



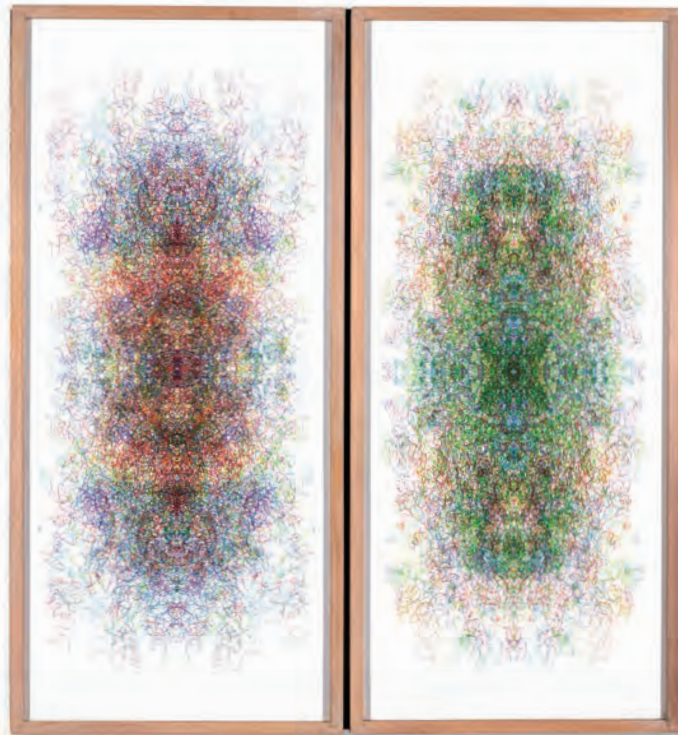
***Lung Shan II  
(Dragon Mountain II),***  
1989, pen, ink, and brush  
plotter drawing, 24 x 72 in.

***Carnival,*** 1989, pen, ink,  
and brush plotter drawing,  
40 x 24 in. Saint Vincent  
Art & Heritage Collections,  
Saint Vincent Archabbey and  
College, Latrobe, Pennsylvania.





**Untitled**, 1989, brush,  
acrylic, and black ink plotter  
drawing, 40 x 24 in.



**Gaia Triptych III**, 1991, pen, ink, and brush plotter drawing with hand-applied gold leaf, 41 x 38 1/4 in. (closed); 41 x 79 in. (open). Collection of the Minneapolis College of Art and Design. Photo: Rik Sferra.

# Studio Seals/Signatures

## Pathway Studio®



*xiao jing zhai* (little footpath studio)

小徑齋 (simplified Chinese)

小徑齋 (traditional Chinese)



Alternate: 小徑齋 (*little footpath studio*)  
carved at the Xi Ling Society,  
Hangzhou

**PATHWAY STUDIO.** This seal, bearing the characters *Little Footpath Studio*, was carved by Wang Dongling in 1989. Wang carved it in an old style that he considered appropriate for the studio with an *electric brain* (a computer in Chinese is called an "electric brain": 电脑). Most of Verostko's work has been signed "Roman" followed by the year of execution. The studio seal appears frequently after 1989. Some major projects and a few other works include the seal of Verostko's wife, Alice, as she assisted him and collaborated in developing ideas and procedures. The use or non-use of seals has been arbitrary, but the most frequently used studio seal is the first one shown above. Other seals have been used occasionally:



Wang Dongling executing a calligraphic painting for Verostko and Alice, Hangzhou, People's Republic of China, 1985.

## Name Seals for Roman Verostko

*kē róng-mèng,*

柯荣孟 (simplified Chinese)

柯榮孟 (traditional)

Name given to Verostko by the teacher who oriented him to Chinese language and culture in 1981.

"*ke*" 柯, has a root related to tree or growth similar to the root for Verostko in Slovak, *vyrást'* (grow, growth).

"*róng mèng*" in its pronunciation alludes to "Roman." *Róng* identifies with a strong and glorious one.

"*Mèng*" (孟) refers to the Chinese philosopher Mencius, *Mèng zǐ*, 孟子, 372–289 BCE, the follower of Confucius. The Pinyin for Mencius is Meng Zi (Meng Tzu in Wade Giles).

This seal was carved by the Shufa Master, Lu Jiang, at the *Xi Ling* Society when Verostko taught at the Art Academy in Hangzhou in 1985.©



*kē róng mèng*, 柯荣孟

Carved by a Chinese teacher who followed his course in China.©



*kē róng mèng*, 柯荣孟

This seal was carved in Beijing in 1981 during Verostko's first trip to China.©

## Name Seal for Alice Wagstaff (Verostko)

*wèi ài lì,*

魏爱丽 (simplified)

魏愛麗 (traditional)

Alice Wagstaff, wife and studio director (1919–2009). Skilled in watercolor and silversmithing, Alice occasionally assisted in the pen-plotting process. Her seal was carved in 1985 at the Academy in Hangzhou when she was in residence there with Verostko.

"*wèi*" (as in *Wei* dynasty) for Wagstaff

"*ài lì*" for Alice meaning the "most beautiful one."

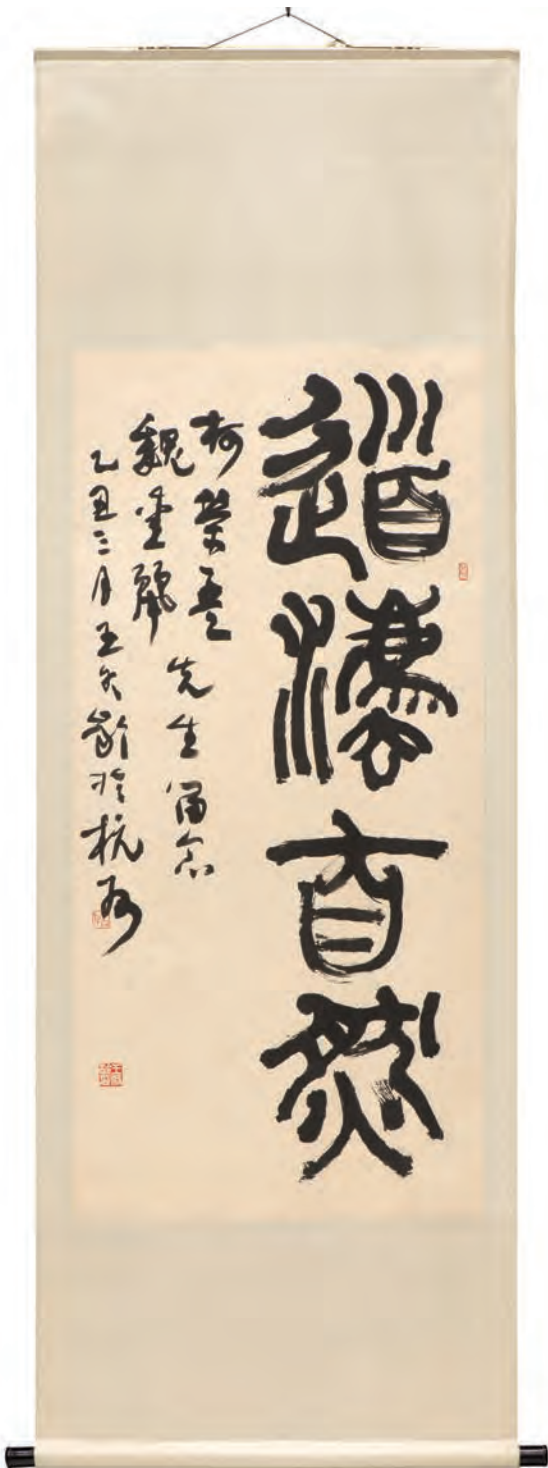




Text translation of Wang's calligraphy: *Those who follow the way of Yin and Yang are righteous; those who accomplish it carry its nature within themselves. Those who are benevolent see its benevolence; those who have knowledge within themselves perceive its knowledge.*  
 Quoted from the *I Ching*, or *Book of Changes*.

**Follow the Way of Yin and Yang,**  
 1988, pen and ink plotter drawing  
 by Verostko and calligraphy by  
 Wang Dongling, 24 x 21 7/8 in.

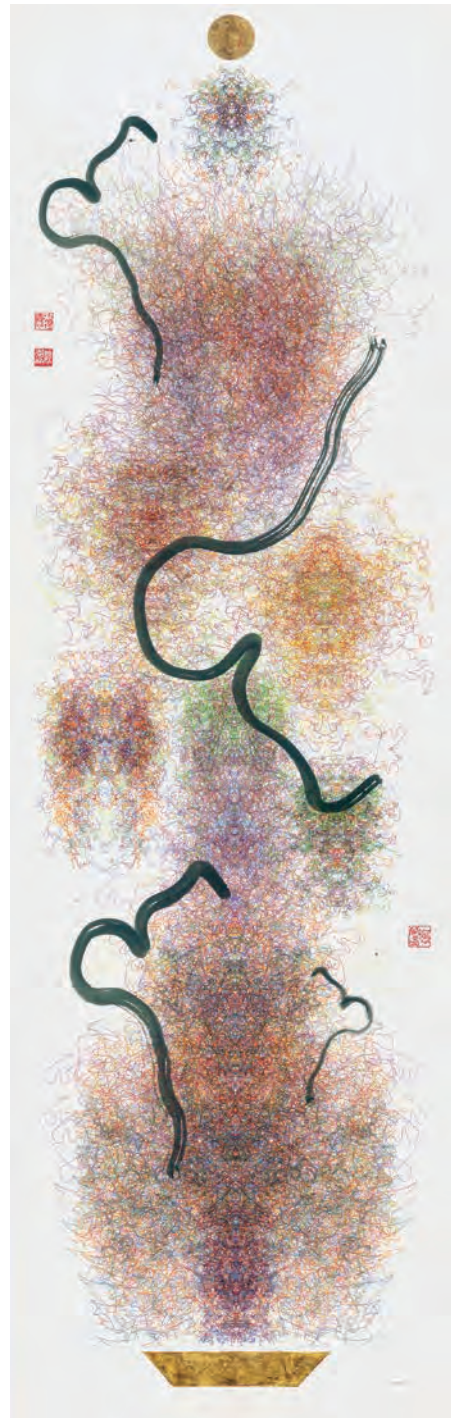




**Wang Dongling, Untitled,**  
1985, ink on paper, mounted  
on silk, 85 1/4 x 29 5/8 in.  
(scroll); 52 1/2 x 25 in. (paper).  
This scroll was created for  
Verostko and his wife, Alice,  
toward the end of Verostko's  
teaching session at the China  
Academy of Art in spring 1985.  
Photo: Rik Sferra.

Text translation:  
(column far right)

道 Tao  
法 follows  
自然 Nature



**Aladdin's Lamp,** 1991,  
pen, ink, and brush plotter  
drawing with hand-applied  
gold leaf, 84 x 29 1/2 in.



# Icons of the Digital Age

*For me this was the new scripture, opening  
up areas of visual form and knowledge that  
weren't accessible to us before . . .  
I saw them as a form of revelation.*

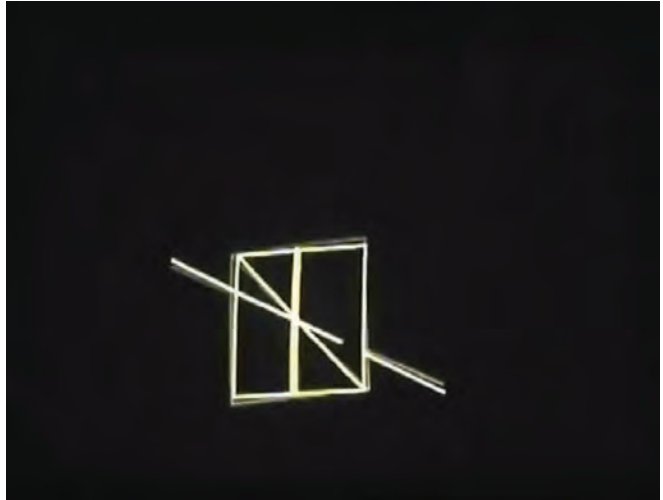
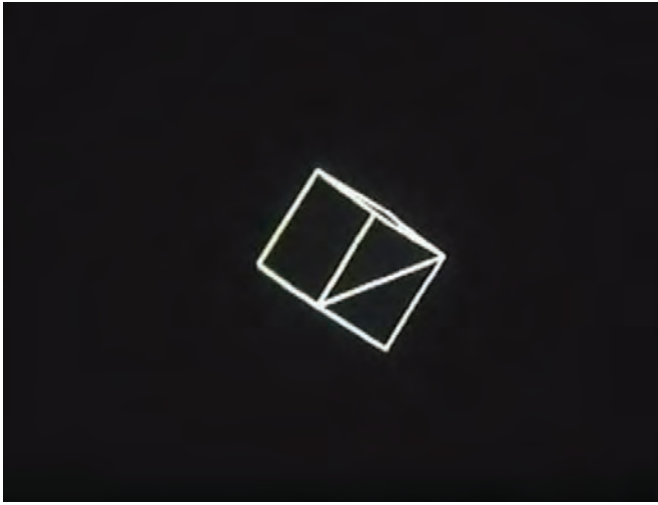
Verostko, *Star Tribune*, 2014

Verostko's studio archives include a film he made in 1969 at UNIVAC showing an algorithmically generated cube spiraling to infinity. He coupled this film with electronic music for a public television presentation where he compared the emerging new media with medieval manuscript illumination. He envisioned how emerging electronic technology would become an art medium in our times similar to medieval manuscript illumination in its time.

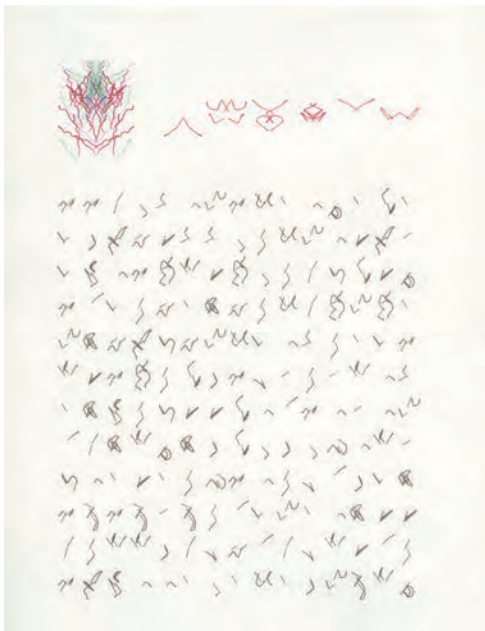
By the end of the 1980s, Verostko came to view his studio as an "electronic scriptorium" with a network of electronic scribes. The "scribe" is essentially a personal expert system consisting of a multipen plotter coupled to a PC driven by original drawing instructions coded by Verostko. Before inkjet and laser technology, pen plotters were the drawing machines commonly used in architecture and engineering offices. With its drawing arm choosing from a bank of technical pens loaded with acrylic inks, the scribe literally "grows" visual forms by carrying out Verostko's instructions and drawing each line precisely on rag papers. Occasionally, using brushes adapted to fit its drawing arm, the scribe executes paint strokes.

*Hodos*, the title that Verostko gave his software, means "path" or "road" in Greek. The algorithms in *Hodos* describe "paths" that are the "method" for achieving the painting. *Hodos* as the "path" or the "way" is the Western equivalent of the Chinese term *Dao (Tao)*, a key concept in ancient Chinese wisdom. The strokes follow whatever path the chaotic system makes. Whatever way unfolds in the context is just fine. A simple routine, similar to tossing dice, initiates the path. From then on the process has a remarkable life of its own following its own unique way.

Verostko's interest in manuscript illumination led to various formats that appear in his *Hodos Correspondence*, *Diamond Lake Apocalypse* series, the *Badland Scrolls*, and the *Ezekiel* series. They feature glyphic texts that mime the visual qualities of language without being one (this is also referred to as "asemic" writing). Later, in the 1990s, Verostko built a code routine for generating characters assigned to an alphabet. Texts were then presented in artworks with characters that could be translated, such as his *Flowers of Learning*, the *Rocktown Scrolls*, and most of the *Pearl Park Scriptures*.

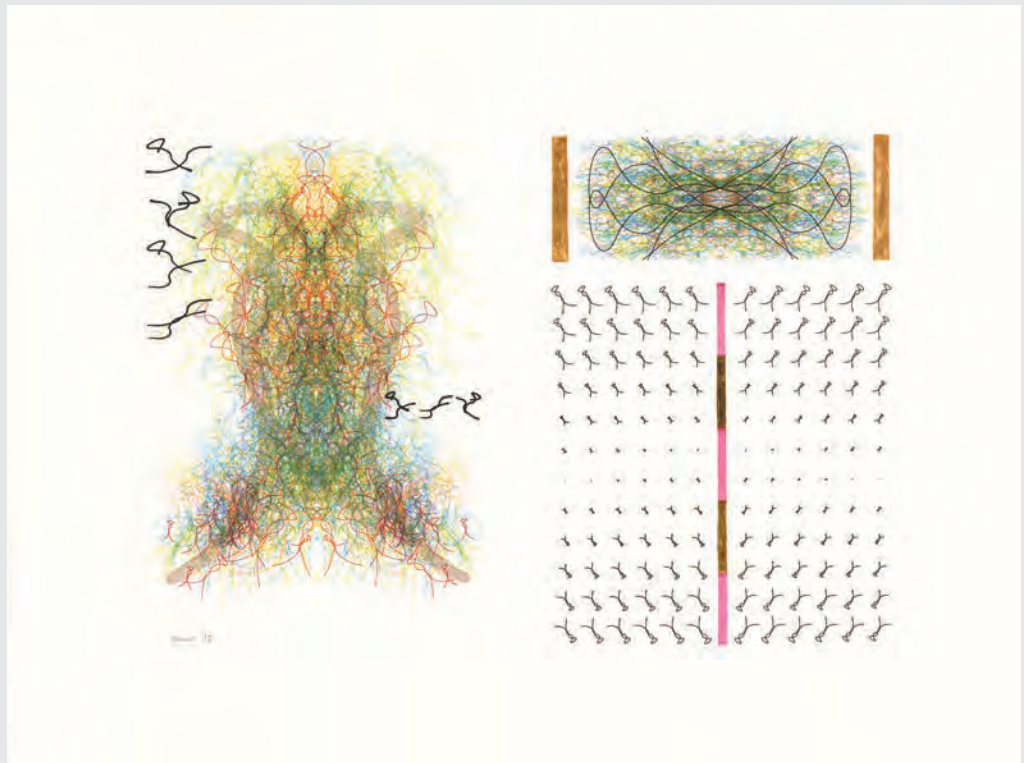


*Echoes from the Cloister,*  
1968–69, algorithmic animation,  
6:08 min. Created on  
UNIVAC computer.

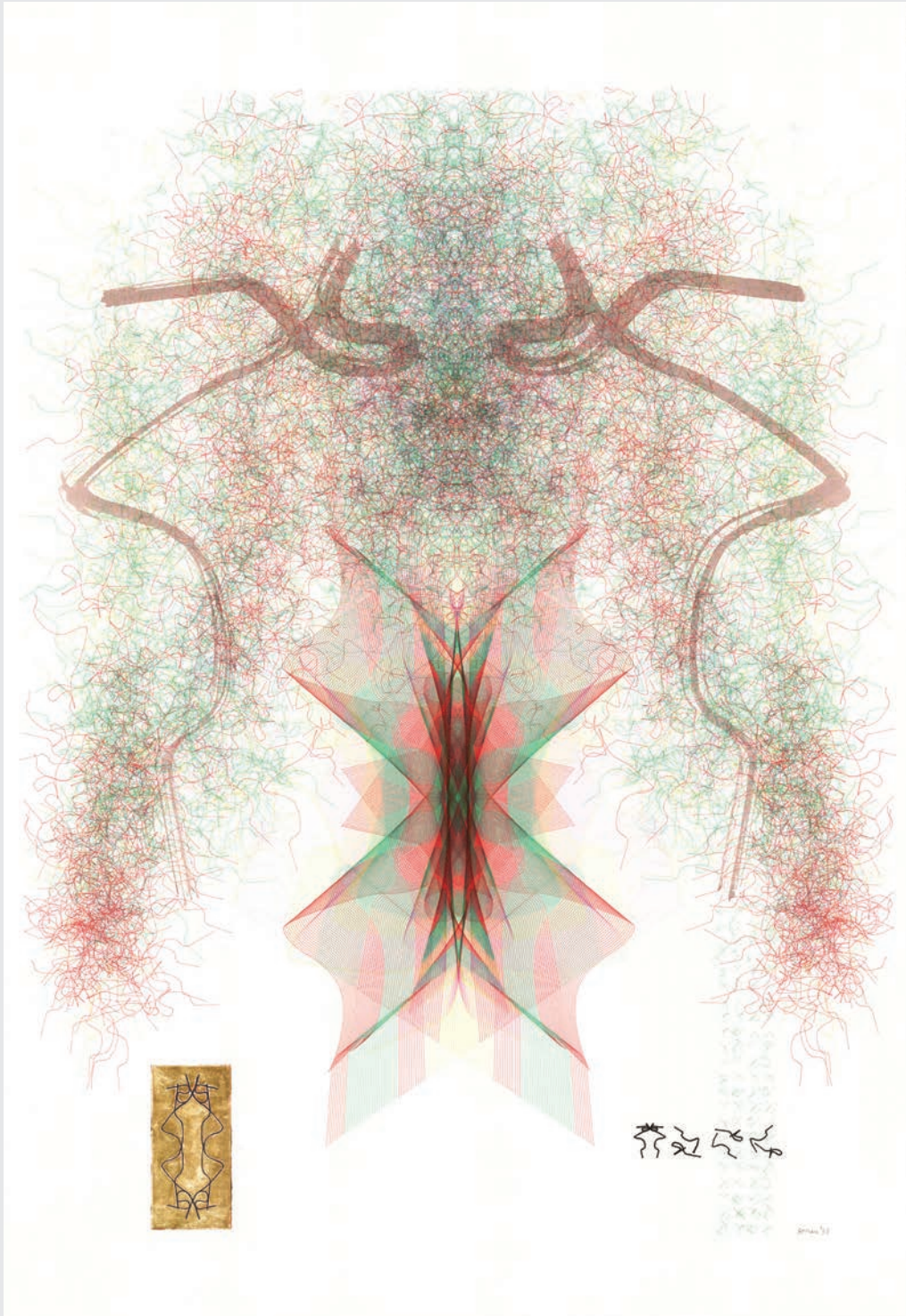


**Hodos Letters and Chart,**  
1988–89, pen plotter drawings,  
11 x 8 1/2 in. (each);

**Hodos Envelope,** 1988–89/2018,  
pen plotter drawing with  
handwritten ink and stamps.  
Approximately thirty single-page  
letters were created and intended  
for friends and colleagues.  
Verostko did send some of this  
correspondence to friends and  
colleagues as a form of "mail  
art," which was stamped at the  
Diamond Lake post office near  
his home in Minneapolis.



**Diamond Lake Apocalypse:**  
**#222.n** (top) and  
**#888.n** (bottom), 1992, pen,  
 ink, and brush plotter drawings  
 with hand-applied gold leaf,  
 18 x 24 in. (each).

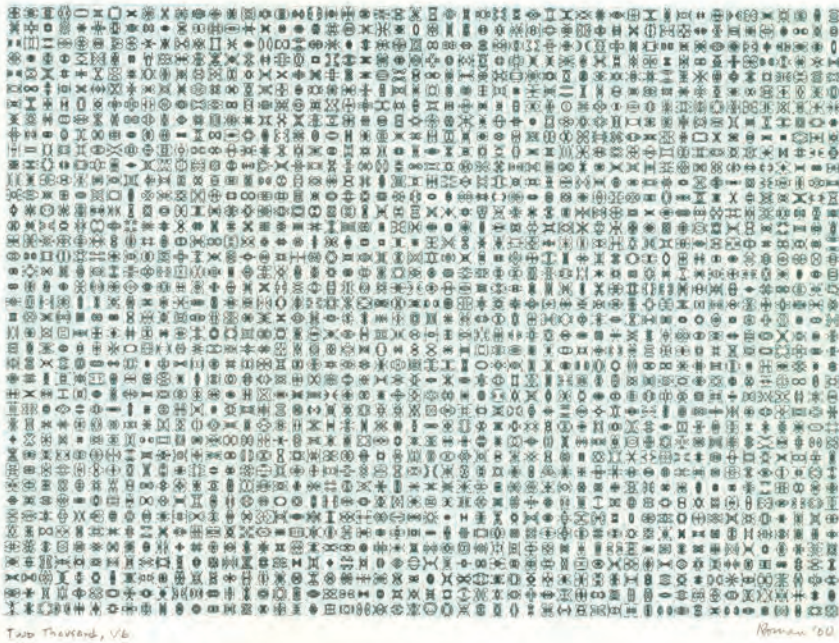


**Ezekiel series: Vision 2**, 1993,  
pen, ink, and brush plotter  
drawing with hand-applied  
gold leaf, 40 x 30 in.



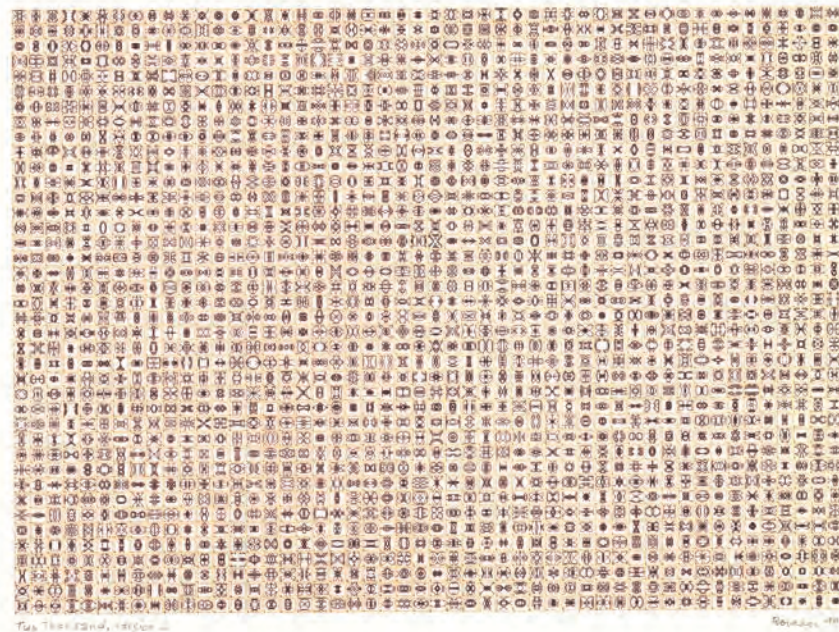
**Badlands Scroll**, 1994, pen and ink plotter drawing with hand-applied gold leaf, 72 x 24 in.





Tad Thorsand, V6

Norman '00

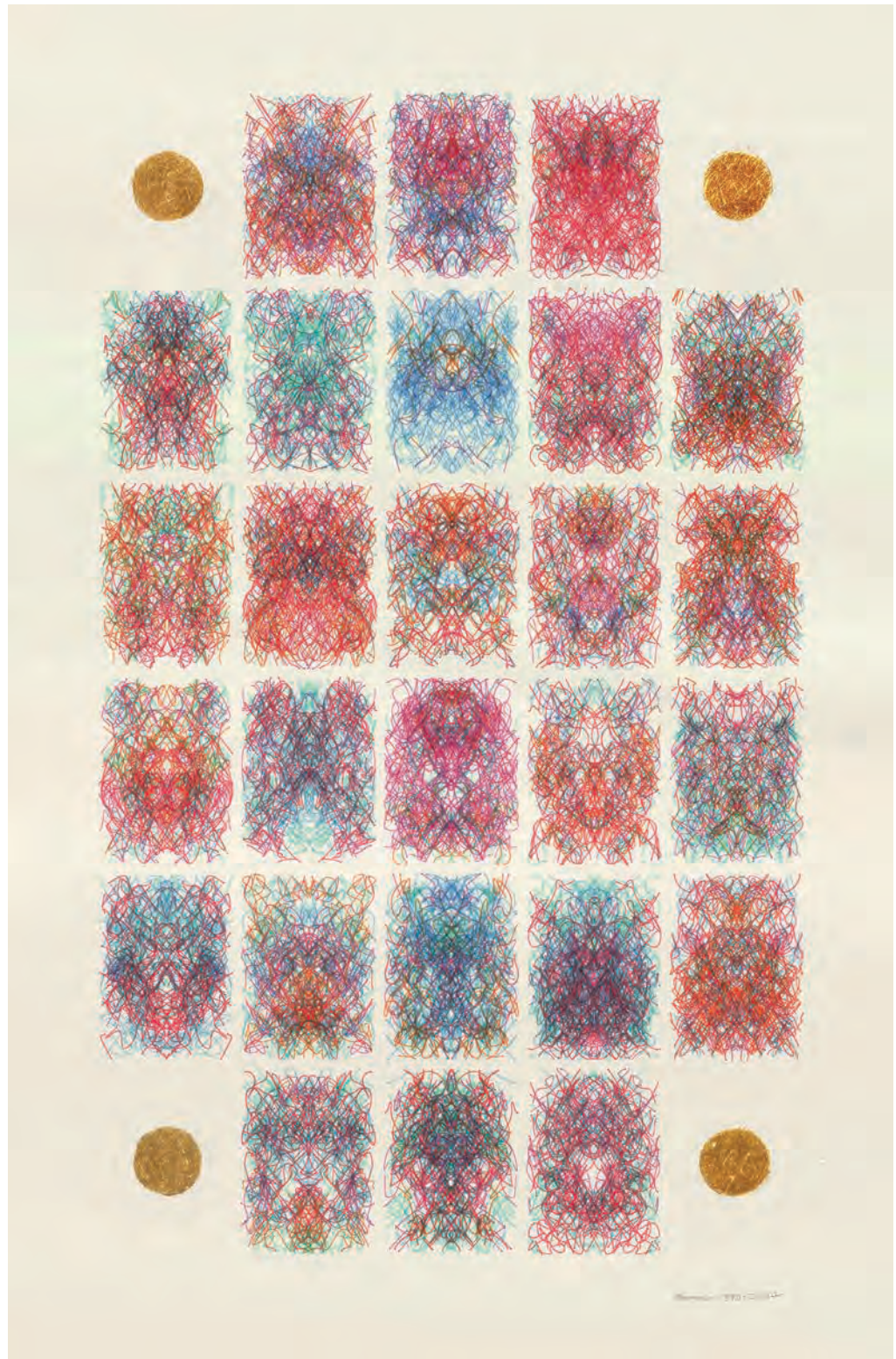


Tad Thorsand, version 1

Norman '99

**Two Thousand Improvisations, Version 1, 1999;**

**Two Thousand Improvisations: Version 6, 2000,** pen and ink plotter drawings, 8 1/2 x 11 in. (each).



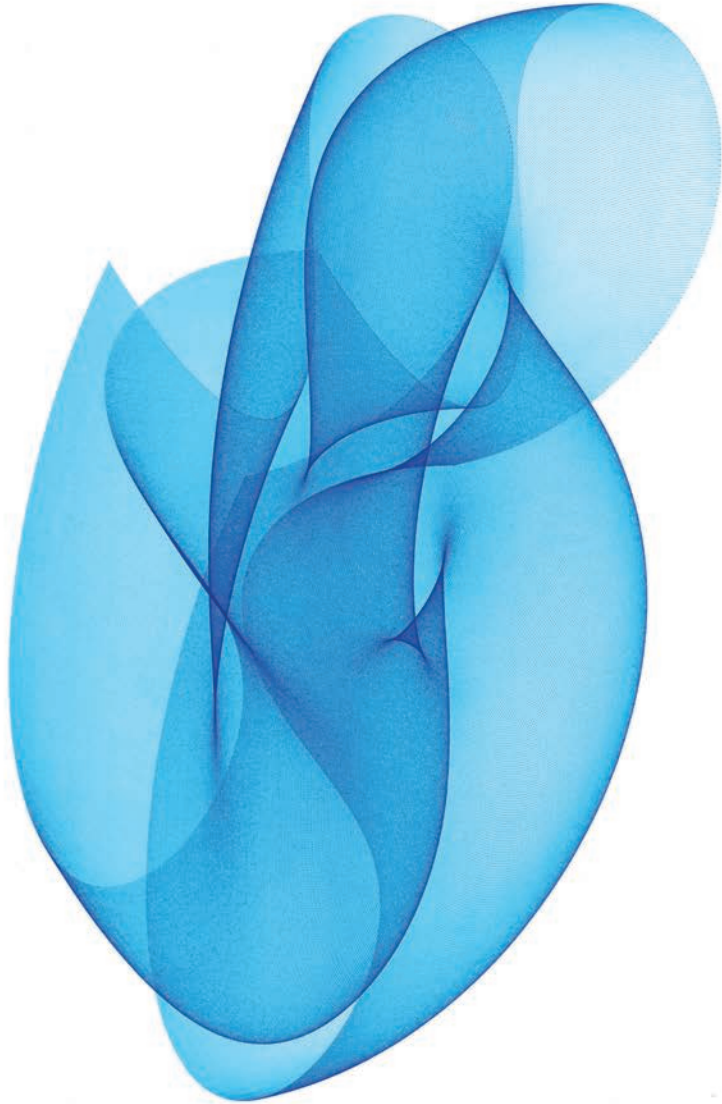
**Twenty-Six Visions of Hildegard**, 2002, pen and ink plotter drawing with hand-applied gold leaf, 30 x 22 1/4 in.

Hildegard of Bingen (1098–1179), a medieval theologian and mystic, organized her major prophetic work, *Scivias*, around twenty-six visions divided in three parts. These twenty-six pen plotted “visions of Hildegard” invite meditation through arrays of improvisation.

Each vision points to the manner in which the limits of the drawing procedure, like life, are unknowable.

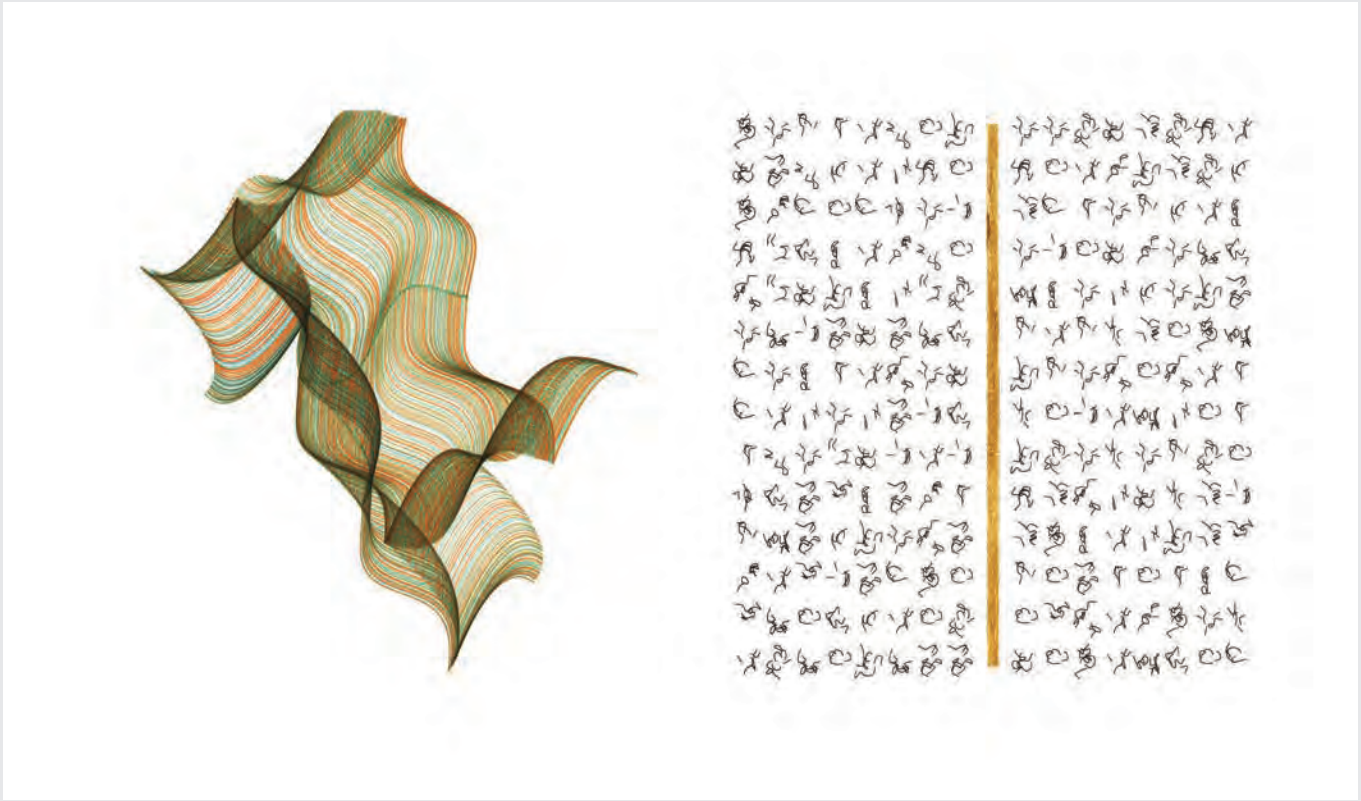
**Cyberflower Blue**, 2002, pen and ink plotter drawing, 29 x 23 in.

Handwritten signature in black ink, oriented vertically on the left side of the page.



Handwritten signature in black ink, oriented vertically on the right side of the page.

*Revised '07*

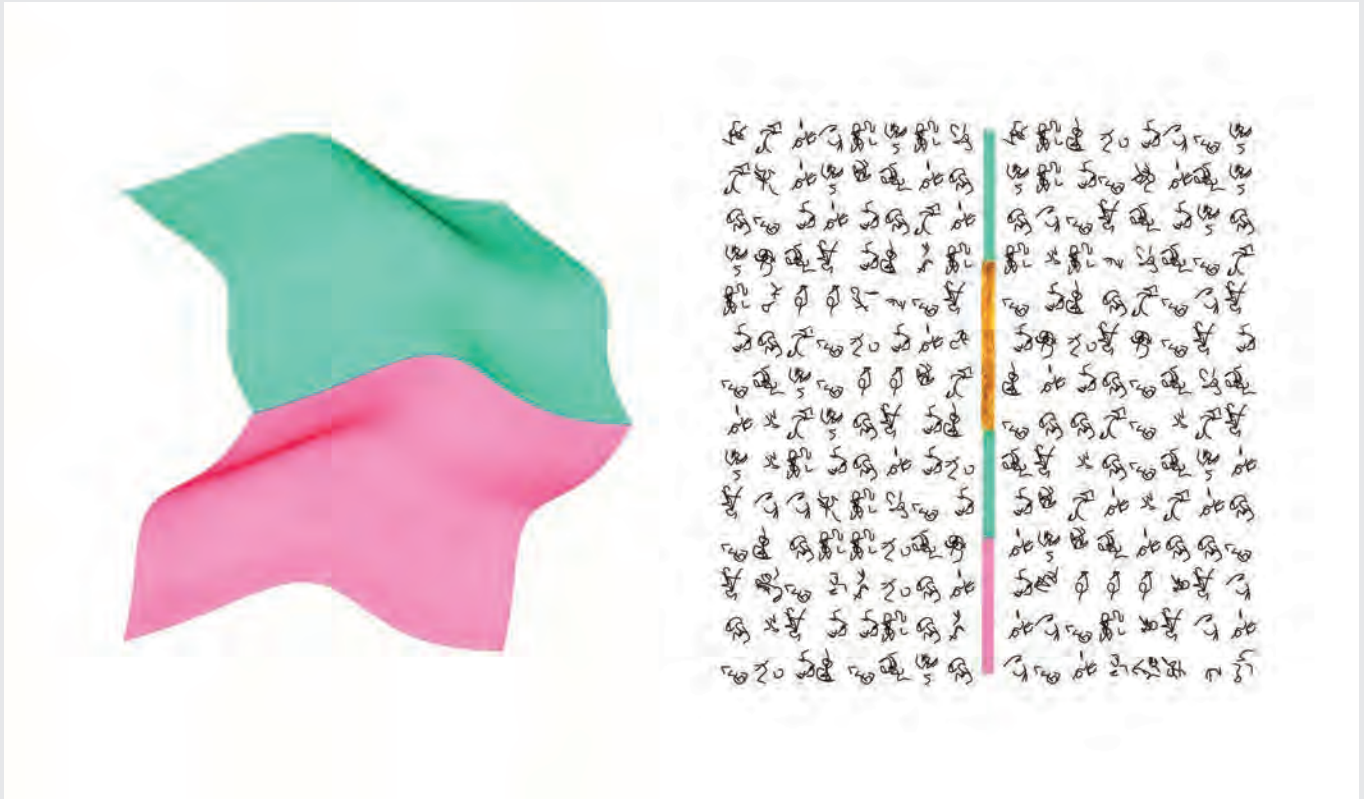


**Pearl Park Scripture, D,**

2004, pen and ink plotter drawing with hand-applied gold leaf, 21 x 30 in. Text format:

Eight glyphs per line, fourteen lines per column, two columns.

Text translation: *Non-rational glyph sequence.*



**Pearl Park Scripture: Galileo,**  
2004, pen and ink plotter  
drawing with hand-applied gold  
leaf, 21 x 30 in. Text format:  
Eight characters per line,  
fourteen lines per column,  
two columns.

Text translation: *Philosophy  
is written in this grand book –  
I mean the universe – which  
stands continually opened  
to our gaze, but it cannot be  
understood unless one first  
learns to comprehend the  
language and interpret the  
characters in which it is written.*  
– Galileo Galilei, 1623.

Text source: Galileo Galilei,  
*Il Saggiatore*, 1623.

# The Pearl Park Scriptures 2004–05

Early every morning, before breakfast, Roman takes a brisk walk around *Pearl Park* near his lakeside home in Minneapolis. During these morning walks his meditations range widely and have a deep impact on the studio work he undertakes each day. The *Pearl Park Scriptures*, influenced by these morning walks, embody his studio work for the past year (2004–05). Their format is based on decorated pages of medieval illuminated manuscripts. Some pages, enhanced with a touch of gold leaf, evoke the precious quality of sacred texts. Each work presents a colorful drawing accompanied with lines of glyphs that read from left to right. An “alphabet” of glyphs was generated for each text in this exhibition. Some works present “non-rational” glyphs arranged like a language without any meaning. Others present glyphs coded with specific texts from sources such as Darwin, Genesis, Lao Tsu, and the Apache Indians of North America. The choice of scriptures has been guided by an effort to bridge both time and culture—to find meaning from diverse cultural approaches to spirituality and learning.

Roman’s own spiritual journeys have guided his choice of scriptures. This has even included confrontation with texts that have no rational meaning as in some forms of Zen meditation and in the “non-sense” of the Dada and Neo-dada artists of the twentieth century. The works in this show that present glyphs arranged without any rational meaning shed light on those experiences.

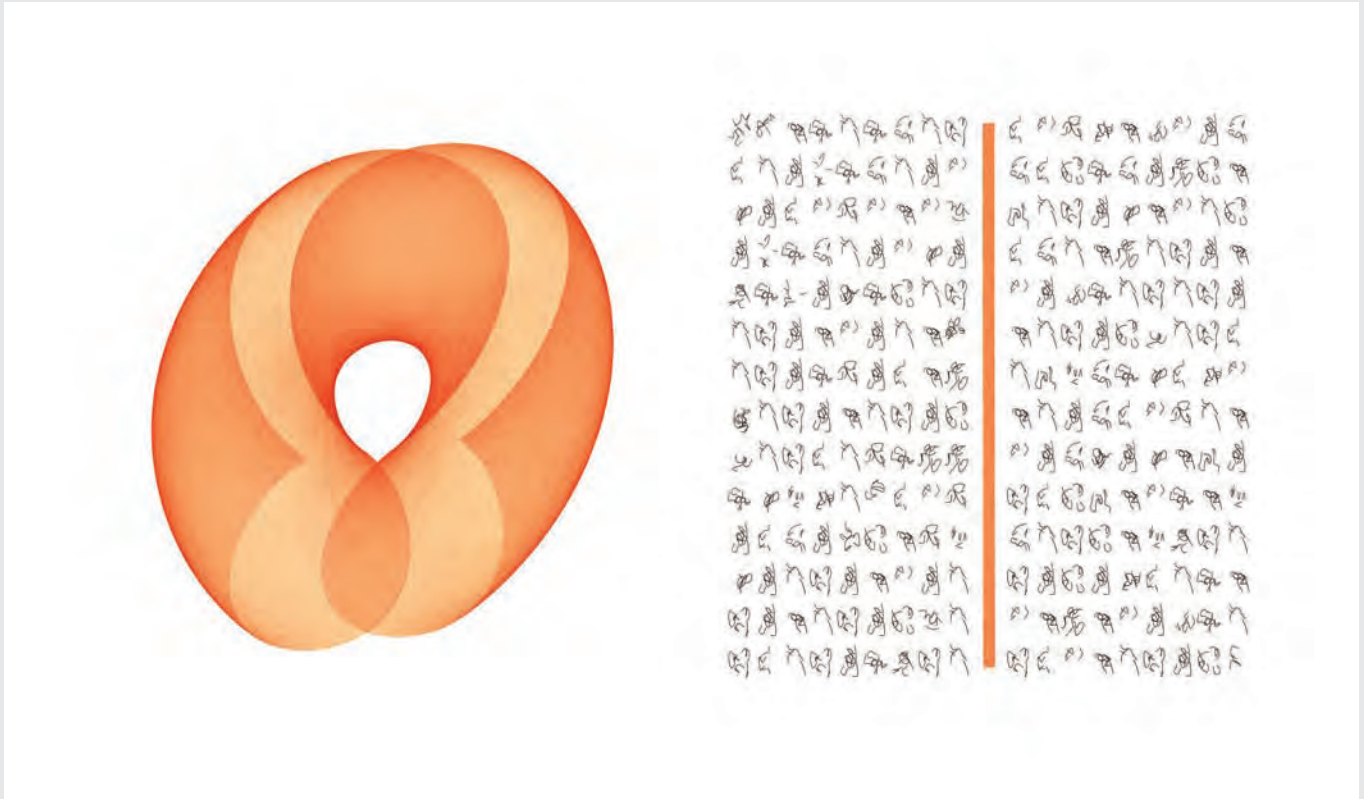
As in all of Roman’s work the drawings remain entirely non-representational and are chosen primarily for their visual form. For these works Roman has concentrated on forms that are lean with complementary colors and a memorable structure. The relationship of form and text flows from the artist’s perception of evocative qualities present in the visual form. For example, in *Scripture “N,”* the green and blue form has life-like qualities that complement the Darwin text.

All of the drawings were created with hundreds of barely visible pen strokes. The drawing pen must retain even distribution and precision for many hours without failing. Just as the sculptor’s chisel leaves its mark on the stone, so these pen strokes leave their mark on the paper. These fields of soft pen strokes exceed what can be achieved with the human hand—their precision and even distribution reveal the inner beauty of the artist’s “mind-hand.” They also reveal a patient artist who must often discard many hours of work due to pen failure.

The *Pearl Park Scriptures* summarize Roman’s involvement with code for well over twenty years. They represent the convergence of experimentation with new visual form, coded meanings, and the human ability to communicate. They may also lead us to ponder the codes we use daily—not only our language, but also our gestures and even our dress codes. Leaping beyond these concrete aspects of living, they faintly echo the coded processes of genes that shape life itself. By doing so they become icons illuminating the mysterious nature of self, earth and cosmos.

Alice Wagstaff, PhD

*This essay was originally published in the exhibition catalog, Roman Verostko: Pearl Park Scriptures, [DAM] Berlin, 2005.*



**Pearl Park Scripture, O,  
Tao Te Ching,** 2005, pen and  
ink plotter drawing, 21 x 30 in.  
Text format: Nine characters per  
line, fourteen lines per column,  
two columns.

Text translation: *So it is that  
existence and non-existence give  
birth the one to (the idea of) the  
other; that difficulty and ease  
produce the one the other –  
that height and lowness arise  
from the contrast of the one  
with the other; that musical  
notes and tones become  
harmonious through the  
relation of one with another.*

Text source: Lao-Tzu,  
*Tao Te Ching*, English translation  
by James Legge (Sacred Books  
of the East, vol. 39, 1891).



**Flowers of Learning: Homer,**

2006, pen and ink plotter drawing, 40 x 30 in.

Text translation: *Ulysses and his son fell upon the front line of the foe. Minerva raised her voice aloud, and made every one pause. 'Men of Ithaca', she cried, 'cease this dreadful war, and settle the matter at once without further bloodshed.'* – Homer

Text source: Homer, *The Odyssey*, trans. Samuel Butler, book XXIV (520).





**Flowers of Learning:**  
**Black Elk**, 2006, pen and ink  
plotter drawing, 40 x 30 in.

Text translation: *Then I was standing on the highest mountain of them all and around that made one circle, wide as daylight and as starlight, and in the center grew one mighty flowering tree to shelter all the children of one mother and one father – Black Elk*

Text source: John G. Neihardt, *Black Elk Speaks: The Life Story of a Holy Man of the Oglala Sioux* (1932). Quoted from chapter 3, "The Great Vision."



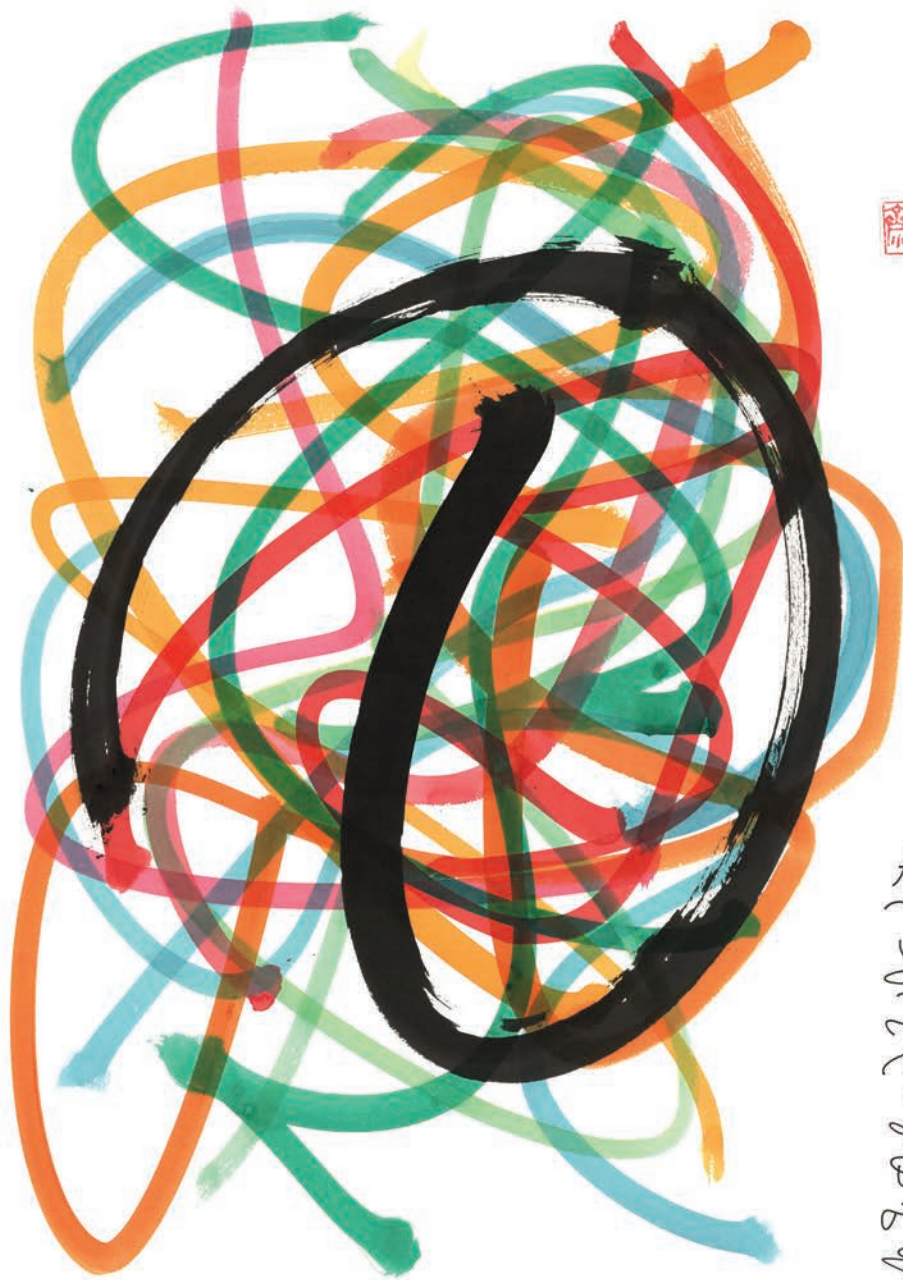
**Rocktown Scroll: Shakespeare,**  
2006, pen and ink plotter  
drawing, 29 x 23 in.

Text translation:  
*I know a bank where the wild  
 thyme blows,  
 Where oxlips and the nodding  
 violet grows,  
 Quite over-canopied with  
 luscious woodbine,  
 With sweet musk-roses and  
 with eglantine: // //*  
*Shakespeare in A Midsummer  
 Night's Dream (2.1.255-258)*

Text source: William Shakespeare,  
*A Midsummer Night's Dream.*

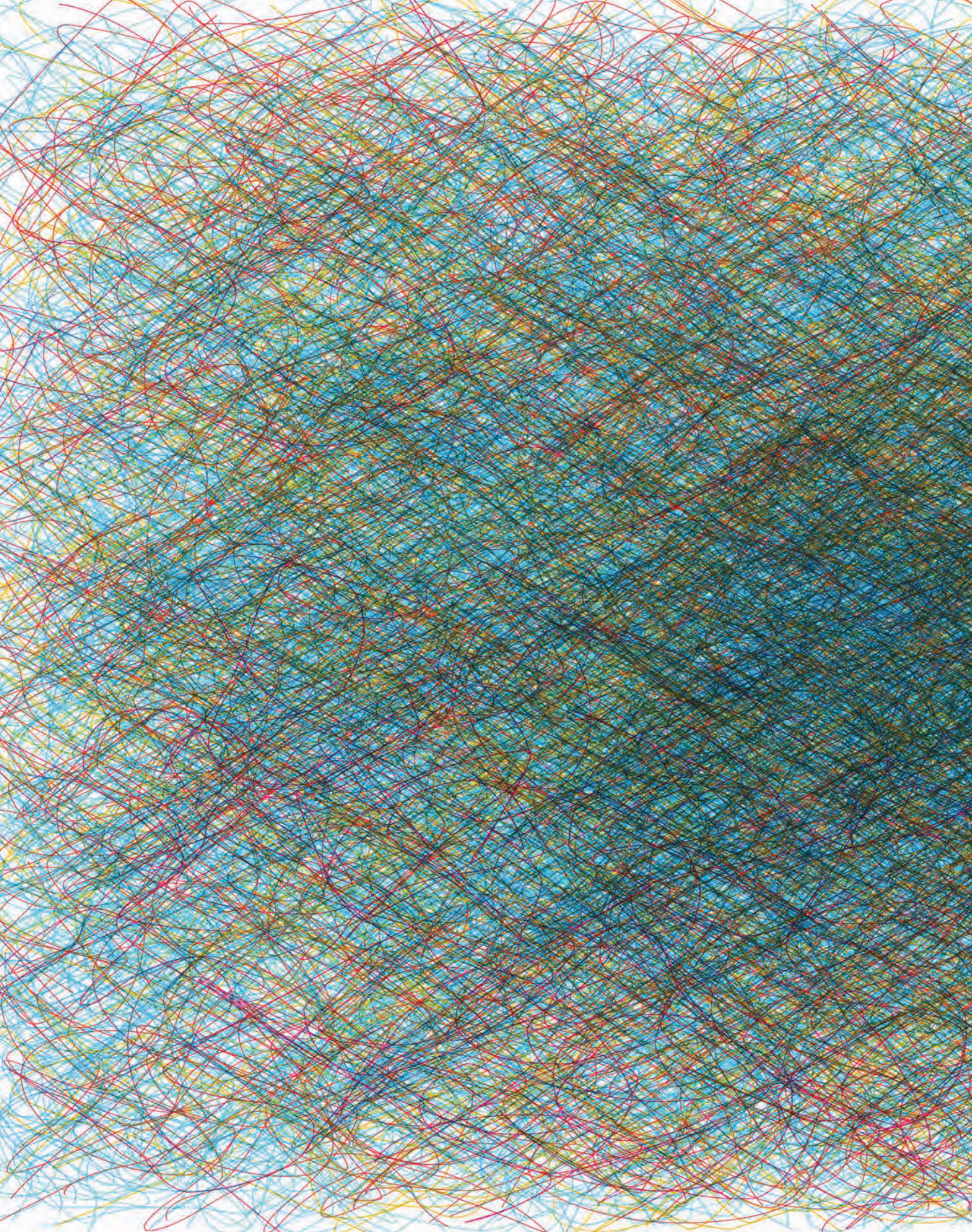
**Algorithmic Poetry,**  
**Tumbleweed,** 2010, brush, ink,  
 and acrylic plotter drawing,  
 29 1/2 x 22 in. This work displays  
 seventeen brushstrokes, a visual  
 haiku, where the shape of each  
 stroke is repeated in the smaller  
 vertical columns.

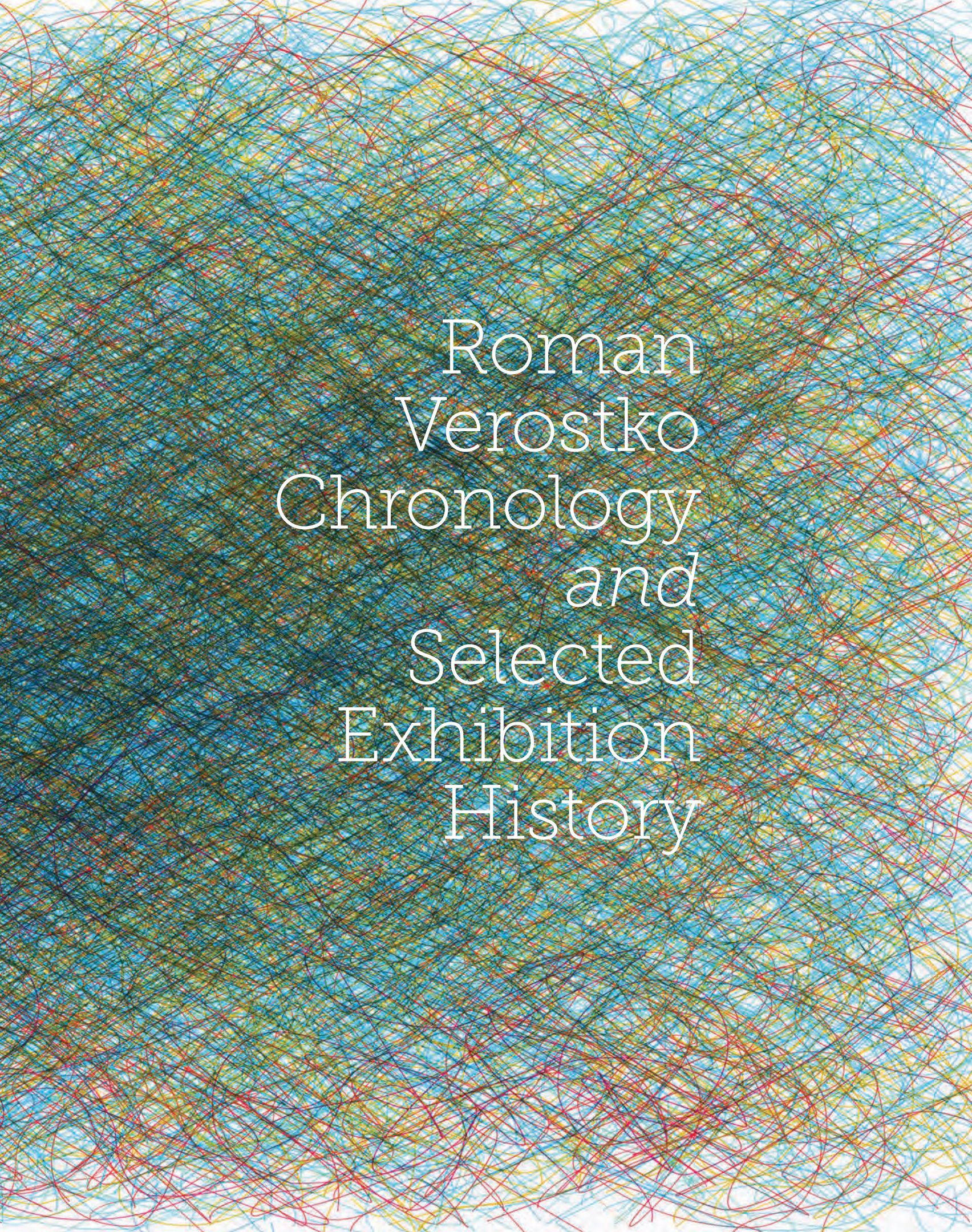
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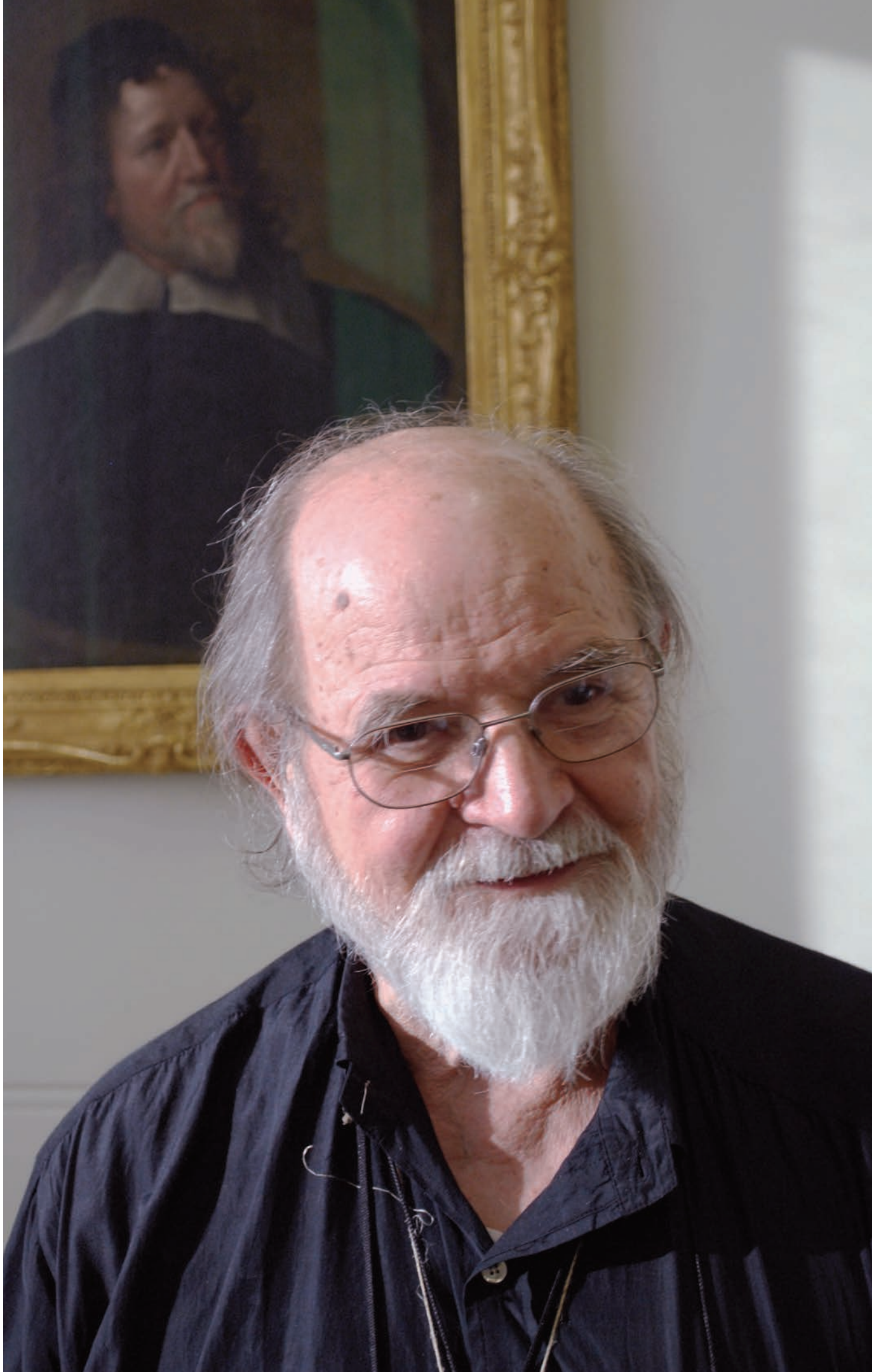
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Roman  
Verostko  
Chronology  
*and*  
Selected  
Exhibition  
History



# Roman Verostko

## Chronology and Selected Exhibition History

### 1929

On September 12, Joseph Verostko is born in Tarrs, Pennsylvania.

### 1949

Receives diploma from the Art Institute of Pittsburgh.

### 1952

Becomes a Benedictine monk, Saint Vincent Archabbey, Latrobe, Pennsylvania.  
Takes on new monastic name, Romanus (Roman).

### 1953

Completes fresco mural *Angel Choirs* at Saint Vincent Archabbey, Latrobe, Pennsylvania.

### 1955

Receives bachelor of arts in philosophy, Saint Vincent College, Latrobe, Pennsylvania.

### 1957

Completes mural project *The Nine Choirs of Angels* for the Saint Vincent Archabbey and Seminary courtyard, Latrobe, Pennsylvania.

### 1959

Completes theology studies and becomes an ordained priest, Saint Vincent College, Latrobe, Pennsylvania.

### 1960

Installs ceramic tile mural in Saint Vincent College Library, Latrobe, Pennsylvania.

### 1960–61

Receives master of fine arts, Pratt Institute, Brooklyn, New York.



**1951** Joseph Verostko, *The Decision Bit*, oil on canvas, 19 x 28 in. This seminal painting encompasses the difficult decision that Verostko made to become a monk.



**1953** Verostko next to installation of his painted mural *Angel Choirs* at Saint Vincent Archabbey.



**1957** Installation view of Verostko's metal mural *Nine Choirs of Angels* at Saint Vincent Archabbey.

## 1961–62

Takes graduate art history courses at New York University and Columbia University.

## 1962–63

Spends year in Paris in residence at the Centre International Catholique. Studies printmaking with Stanley William Hayter at Atelier 17.

## 1963

*Paintings and Drawings*, Maison Biermans-Lapôte, Cité Universitaire, Paris (solo exhibition).

## 1963–68

Teaches at Saint Vincent College and Seminary, Latrobe, Pennsylvania.

## 1964–67

Appointed staff editor for art and architecture, *New Catholic Encyclopedia*, first edition, 1967, 15 volumes, McGraw Hall, Washington, D.C.

## 1965

*Paintings by Roman Verostko*, Benedicta Arts Center, College of Saint Benedict, Minnesota (solo exhibition).

*Paintings and Drawings*, Westmoreland County Museum of Art, Pennsylvania (solo exhibition).

## 1966–67

Presents *Psalms in Sound and Image* at Marymount Manhattan College, New York City, and presents performance at numerous sites, including the Yale Disciple's House, New Haven, Connecticut; Duquesne University, Pittsburgh; Seton Hill College, Greensburg, Pennsylvania; St. Scholastica College, Atchison, Kentucky; St. Mary's College, Convent Station, New Jersey; Fisk University, Nashville, Tennessee; and Loyola University, Chicago.

Works with Pittsburgh architect Tasso Katselas to create and install *Brother*, a permanent concrete wall, and other concrete castings at Saint Vincent Archabbey, Latrobe, Pennsylvania.

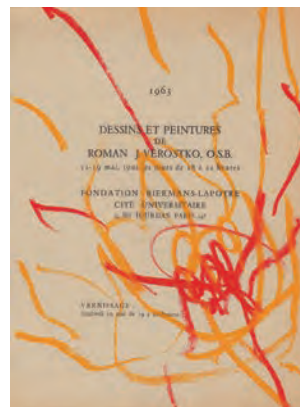
## 1968

Departs monastic life and marries Alice Kennedy Wagstaff. Moves to Minneapolis.

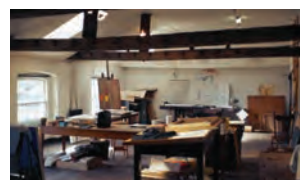
Begins teaching in the Liberal Arts Department at the Minneapolis School of Art (renamed Minneapolis College of Art and Design in 1970), where he teaches until 1994.

## 1969

Participates in the Ekistics Institute, Athens, Greece.



1963 Poster with unique gestural drawing advertising Verostko's exhibition at Cité Universitaire, Paris.



1963 Verostko's studio at Saint Vincent Archabbey.



1965 Installation view of Verostko's exhibition at Benedicta Arts Center, College of St. Benedict, Minnesota.



1967 Portrait of Verostko in his Saint Vincent studio at work on his large sculptural concrete walls. Photo: Terry Deglau.



### **1969–71**

Works as a humanities consultant at a startup electronics endeavor, Tetra Corporation, Minneapolis.

### **1970**

Receives a Bush Leadership Fellowship that leads him to work with Gyorgy Kepes at the Center for Advanced Visual Studies, Massachusetts Institute of Technology, Boston.

### **1971**

Presents keynote address "Changing Nature of Art and Artist" at the Rochester Art Center, Rochester, Minnesota.

Receives an award from the Outstanding Educators of America.

### **1972**

*Imaging the Unseen: Paintings and Drawings*, Westlake Gallery, Minneapolis (solo exhibition).

### **1973**

*Imaging the Unseen: Paintings and Drawings*, Trajectory Gallery, London, Ontario (solo exhibition).

### **1974**

Receives a second award from the Outstanding Educators of America.

Presents paper "The Future of Art and Artists: Towards the Humanistic Responsibility" at the University of Georgia, Athens, and the Georgia Museum of Art's annual meeting of friends to honor founder.

Presents keynote paper "The Sacred and the Profane in Art" for one of several inaugural events celebrating the new buildings designed by Kenzo Tanguy for the Minneapolis Institute of Art, MCAD, and the Children's Theatre Company.

### **1975**

Presents paper "The Artist in Our World Today" for the session "A Future for the Arts," Second Assembly, World Future Society, Washington, D.C.

### **1975–78**

Serves as academic dean at the Minneapolis College of Art and Design.

### **1978**

Presents "Artists and Designers: Educating for the Future" at the International Symposium, World Future Society, Education Section, University of Houston.

### **1979**

Begins the *Decision Machine Suite*. This series of electronic sculptures pays homage to scientist, humanist, and father of cybernetics Norbert Wiener (1894–1964).



**1973** Poster advertising Verostko's solo show at Trajectory Gallery in London, Ontario, Canada.

## 1982–90

*ARCADIA: Minnesota in Four Seasons*, an audiovisual program presented at MCAD (1982); University of Minnesota Landscape Arboretum (1983); Zhejiang Academy of Fine Arts, People's Republic of China (1985), among others.

## 1982

Creates seminal work *The Magic Hand of Chance*, which consists of four algorithmic sequences displayed on a monitor. It was shown at several nonconventional local venues from 1983 to 1985. This included a continuous showing in the storefront window of a new computer service and parts store in downtown Minneapolis owned by John Scobee as well as various educational events related to emerging technologies.

## 1985

Travels to China as a visiting professor, Zhejiang Academy of Fine Arts (renamed China Academy of Art), Hangzhou, People's Republic of China. Following the five-week course, four of the participating teachers helped arrange for Verostko to present a one-week series of slide lectures at art academies in Nanjing, Tianjin, Chongqing, and Wuhan. The Wuhan lecture was aborted due to travel exertion. However, he was able to add one lecture session at the academy in Beijing.



1985 Verostko and wife, Alice, in China.

## 1988

*Pathways: Robotic Paintings, Drawings, and Real-time Images*, Benedicta Arts Center Gallery, College of Saint Benedict, Saint Joseph, Minnesota (solo exhibition). Exhibition includes computer-generated works, forty-nine mounted pieces, and a computer with images generated in real time.

*CRASH: ComputeR AssiSted Hardcopy*, first presented at the University of Wisconsin-Madison, travels to the Wright Museum of Art, Beloit, Wisconsin. An invitational show that focuses on works of archival quality and intends to "crash" certain assumptions about computer art and technology (group/invitational exhibition). Exhibition travels through 1990.

Presents paper "Epigenetic Painting: Software as Genotype, A New Dimension in Art" at the First International Symposium on Electronic Art (FISEA), Utrecht, Netherlands.

## 1988–91

Serves as the chair of the Liberal Arts Department at the Minneapolis College of Art and Design.

## 1989

*Pathways: 25 Years from Brush to Plotter*, Honeywell Corporate Gallery, Minneapolis, Minnesota (solo exhibition).

*The Technological Imagination: Machines in the Garden of Art*, Intermedia Arts Minnesota and Minneapolis College of Art and Design. This invitational show complements a national symposium on electronic art at the host institutions (group/invitational exhibition).



1987 Verostko's first successful brushstroke drawing on the 24" Houston Instruments DMP52 pen plotter he purchased after returning from China in 1985.



1989 Mark Feireisen curated Verostko's exhibition at Honeywell Corporate Gallery.

## 1990

*SIGGRAPH '90 Art Gallery*, Dallas, Texas. Exhibition travels to the Computer Museum, Boston, in 1991; Barcelona, Spain; and Frankfurt, Germany (1991–93) (group/invitational exhibition).

Produces a limited edition of artist book titled *Derivation of the Laws*, which honors nineteenth-century mathematician George Boole. Printed at St. Sebastian Press in Minneapolis.

## 1991

Organizes two-day symposium "Art & Algorithm – Mind & Machine" honoring the philosopher and mathematician George Boole (1815–1864) at the Minneapolis College of Art and Design and St. Sebastian Press Gallery. As symposium chair, he organizes the work of twenty-three artists and scientists from six countries in an audiovisual show, *Images of the Unseen from the Worlds of Art and Science*, and also participates in a panel presentation.

*Art & Algorithm – Mind & Machine*, St. Sebastian Press Gallery, Minneapolis. Exhibition honors George Boole and includes Verostko's limited-edition artist book *Derivation of the Laws* (solo exhibition).

*El Art: International Exhibition of Electronic Art*, Retretti Art Center, Finland (group/invitational exhibition).

*Interface, Art & Computer*, Park Avenue Atrium, New York City (group/invitational exhibition).

*Dada-Data: Developing Medias since 1970*, Maryland Art Place and Fine Arts Gallery, University of Maryland, Baltimore (group/invitational exhibition).

*Fourth National Computer Art Invitational* originates at Eastern Washington University and travels to several western states between 1991 and 1993 (group/invitational exhibition).

## 1992

*Imagina: Images Beyond Imagination*, Digital Art Gallery, Institut National de L'Audiovisuel, Monte Carlo, Monaco (juried exhibition).

*SIGGRAPH '92 Art Gallery*, Chicago (juried exhibition).

*Third International Symposium on Electronic Art ISEA*, Sydney, Australia (juried exhibition). Travels to museums at Adelaide and Brisbane, Australia.

*Seoul International Computer Art Festival*, Seoul, Korea (group/invitational exhibition).

## 1992–93

Serves as the program director, Fourth International Symposium on Electronic Art (FISEA '93), Minneapolis.

## 1992–96

Serves as a board member for the Inter-Society for the Electronic Arts (ISEA).

## 1993

Receives an honorary mention, Prix Ars Electronica, Linz, Austria.

*New York Digital Salon*, Art Directors Club, New York City (juried exhibition).

*Genetische Kunst - Kunstliches Leben: Genetic Art - Artificial Life*, Linz, Austria (group/invitational exhibition).

*Recent Epigenetic Works*, Richard Halonen Fine Arts, Minneapolis (solo exhibition).

*Digital Salon des Independents*, Cyberspace Gallery and Los Angeles New Art Foundation, West Hollywood (group/invitational exhibition).

*Computer Art*, Yeiser Art Center, Paducah, Kentucky (group/invitational exhibition).

*Electronic Media Show*, Northern State University, Aberdeen, South Dakota (group/invitational exhibition).

## 1994

Receives the Golden Plotter, First Prize, 1994, Gladbeck, Germany.

Retires from teaching and becomes professor emeritus at the Minneapolis College of Art and Design.

*Elastic Visions*, Zoller Gallery, Pennsylvania State University, University Park (group/invitational exhibition). Exhibition travels 1994–95.

*Digital Visions*, Williams Gallery, Princeton, New Jersey (group/invitational exhibition).

*Computer Art: Visual Adventures Beyond the Edge*, Evansville Museum of Arts and Science, Evansville, Indiana (group/invitational exhibition).

*International Exhibition of Digital Art*, Academy of Fine Arts and Design, Bratislava, Slovakia (group/invitational exhibition).

*ISEA '94, Fifth International Symposium on Electronic Art*, Helsinki (group/invitational exhibition).

*Computer Art 94*, Gladbeck, Karlsruhe, Germany (group/invitational exhibition). Exhibition travels 1994–95.

## 1995

Co-founder of the Algorists (with Jean-Pierre Hébert and Ken Musgrave) to give an identity to those who wrote coded instructions for drawing machines and electronic sound utilities.

Receives an ARTEC '95, Recommendatory Prize, Nagoya, Japan.

*ARTEC '95, International Biennial*, Nagoya City Science Museum, Nagoya, Japan (group/invitational exhibition).

*SIGGRAPH '95 Art Show*, Los Angeles (group/invitational exhibition).

*New York Digital Salon*, School of Visual Arts, New York City (group/invitational exhibition).



**1995** Verostko's *Struggle* series featured at ARTEC '95, Nagoya, Japan.

*Computer Generated Art*, University of St. Thomas, St. Paul (solo exhibition).

*Fax: Individual Body - Infected Bodies: Social Body - Contaminated Bodies*, BilboGraph'95, Bilbao, Spain (group/invitational exhibition). Curated by Marissa Gonzalez.

## 1996

*Creativity & Cognition, LUTCHI*, Loughborough, UK (group/invitational exhibition).

*New York Digital Salon*, School of Visual Arts, New York City (group/invitational exhibition).

## 1997

Installs *Epigenesis: The Growth of Form*, a forty-foot, eleven-panel mural at the Frey Science and Engineering Center, University of St. Thomas, St. Paul.

*Digital Perspectives*, Ukrainian Institute of Modern Art, Chicago (group/invitational exhibition).

*A Bunch of Digital Art*, The College of New Jersey, Trenton (group/invitational exhibition).

*New York Digital Salon*, School of Visual Arts, New York City (group/invitational exhibition). Travels to Madrid, Spain, in 1998.

*SIGGRAPH '97 Art Gallery*, Los Angeles (group/invitational exhibition). Travels to Fraunhofer-Institut, Germany, 1997; Living Arts Centre, Mississauga, Ontario, 1998; Sausalito Art Festival California, 1998; The Art Institute of Houston, 1999; Saint Malo, France, 1999; George Mason University, Fairfax, Virginia, 2000.

## 1998

Completes the *Manchester Illuminated Universal Turing Machine*, a serial edition of pen-plotted drawings that honors twentieth-century mathematician Alan Turing.

Serves as an international advisor for the Inter-Society for the Electronic Arts (ISEA).

Travels to China as a visiting professor of algorithmic art, China Academy of Art, Hangzhou, People's Republic of China.

*Aesthetics + Artificial Life*, Center for Digital Arts, University of California, Los Angeles (group/invitational exhibition).

*Computerkunst'98*, Gladbeck, Oko-Werkstatt in der Finne, Saaleck, and Technische Sammlungen der Stadt Dresden, Germany (group/invitational exhibition).

*The Digital Artist: Art, Abstraction and Algorithms*, The Williams Gallery, Princeton, New Jersey (group/invitational exhibition).

Presents keynote paper "Algorithmic Art: Epigenetic Form Generators" at the *Gallery of the Future, Under Construction* exhibition opening at Loughborough University, UK.

*Gallery of the Future, Under Construction*, Loughborough, UK (group/invitational exhibition).



1997 Installation view of Verostko's eleven-panel mural *Epigenesis: The Growth of Form*, Science and Engineering Center at the University of St. Thomas.



1998 Chinese poster advertising Verostko's artistic practice and academic contributions.



1998 Verostko and wife, Alice, in China.

## 1999

*Ars (Dis)Symmetryrica '99*, Ernst Museum, Budapest, Hungary (group/invitational exhibition).

*Southern Graphics Council Media Exhibition*, Arizona State University Computing Commons Gallery, Tempe (group/invitational exhibition).

## 2000

Works on series *Two Thousand Scarabs: Marking Two Thousand Years*. Each work contains two thousand algorithmically generated scarab-like forms that are unique without any repetitions.

*Computerkunst/Computer Art 2000*, Innovationszentrum, Wiesenbusch, Gladbeck, Germany (group/invitational exhibition).

*Through the Looking Glass*, Beachwood Center, Beachwood, Ohio (group/invitational exhibition). Curated by Patrick Lichty.

*Digitally Propelled Ideas*, W. Keith and Janet Kellogg Art Gallery, California State Polytechnic University, Pomona (group/invitational exhibition).

## 2001

*Retrospective of Digital Art*, London Guildhall University, London (group/invitational exhibition).

*The Art Institute of Pittsburgh, Alumni Show*, Art Institute Gallery, Pittsburgh (group/invitational exhibition).

*The New York Digital Salon, Selected Works*, The Corning Gallery, New York City (group/invitational exhibition).

*Algorithmic Fine Art: Pen & Brush Plotted Work by Roman Verostko*, Computing Commons Gallery, Arizona State University, Tempe (solo exhibition).

## 2002

*Computerkunst/Computer Art 2002 (9th International)*, Gladbeck Innovationszentrum Wiesenbusch, at Wiesenbusch, Germany (group/invitational exhibition).

*Math and Art*, Selby Gallery, Ringling School of Art and Design, Sarasota, Florida (group/invitational exhibition).

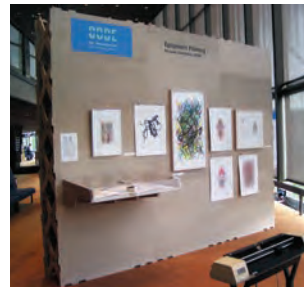
## 2003

Presents paper "Epigenetic Art Revisited: Software as Genotype," at "CODE—The Language of Our Time" at Ars Electronica, Brucknerhaus, Linz, Austria.

*CODE—The Language of Our Time*, Ars Electronica, Brucknerhaus, Linz, Austria (group/invitational exhibition).

*Contemporary Art & the Mathematica Instinct*, Tweed Museum of Art, University of Minnesota, Duluth (group/invitational exhibition).

*State of the Art: Maps, Stories, Games and Algorithms from Minnesota*, Carleton Art Gallery, Carleton College, Northfield, Minnesota (group/invitational exhibition).



**2003** Installation view of Verostko's *Epigenetic Painting CODE—The Language of Time*, at the Ars Electronica exhibition, 2003.



**2003** Verostko presenting his paper for Ars Electronica, 2003.



**2003** Alice Wagstaff overseeing Verostko's drawing plotter at Ars Electronica, 2003.

*SIGGRAPH 2003 Art Gallery*, San Diego (group/invitational exhibition).

*ARTWARE2*, PUCP Cultural Center, Lima, Perú (group/invitational exhibition). Curated by Umberto Roncori.

## 2004

*Algorithmic Revolution: The History of Interactive Art*, ZKM: Center for Art and Media, Karlsruhe, Germany (group/invitational exhibition).

*Computerkunst/Computer Art 2004 (10th International)*, Museum der Stadt Gladbeck, Germany (group/invitational exhibition).

*Contemporary Art & the Mathematica Instinct*, University Art Museums, Marsh Art Gallery, University of Richmond, Virginia (group/invitational exhibition).

*SIGGRAPH 2004 Art Gallery*, Los Angeles (group/invitational exhibition).

## 2005

Serves on the advisory board for the International Symmetry Association.

*SIGGRAPH 2005 Art Gallery*, Los Angeles (group/invitational exhibition).

*Roman Verostko: Pearl Park Scriptures*, DAM Gallery, Berlin, Germany (solo exhibition).

## 2006

Installs *Flowers of Learning, Hortus Conclusus Nazareus*, a mural of seven cyberflower drawings, presented as a *hortus conclusus*, an enclosed garden, with coded quotations from various fields of learning and culture at the Spalding University, Academic Learning Center, Louisville, Kentucky.

Receives a nomination for the dam digital art award (ddaa).

*20th Century Computer Art: Beginnings & Developments*, Tama Art University Museum, Tokyo, Japan (group/invitational exhibition).

*Computerkunst/Computer Art 2006 (11th International)*, Innovationszentrum Wiesenbusch, Gladbeck, Germany (group/invitational exhibition).

*SIGGRAPH 2006 Art Gallery*, Boston (group/invitational exhibition).

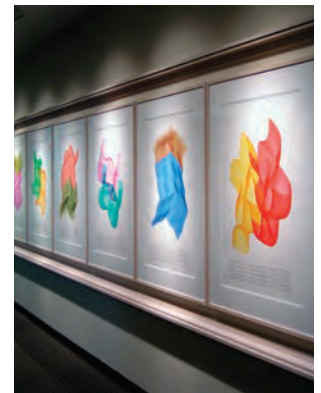
*MCAD Faculty at the Minnetonka Center for the Arts*, Minnetonka, Minnesota (group/invitational exhibition).

*The Algorithmists: Four Visual Artists in the Land of Newton*, Verostko, Horwitz, Hébert, Dehlinger, Kavli Institute for Theoretical Physics, University of California, Santa Barbara (group/invitational exhibition).

*Form und Raum*, Computerkunst Actuel, Museen der Stadt Lüdenscheid Städtische Galerie, Lüdenscheid, Germany (group/invitational exhibition).

## 2007

*SIGGRAPH Art Gallery*, San Diego Convention Center, California (group/invitational exhibition).



**2006** Installation view of Verostko's, *Flowers of Learning, Hortus Conclusus Nazareus*, a mural of seven cyberflower drawings, Academic Learning Center, Louisville, Kentucky.

*Roman Verostko's Algorithmic Drawings*, Nina Bliese Gallery, Minneapolis (solo exhibition).

*Feedback*, LABoral Centro de Arte y Creación Industrial, Gijón, Spain (group/invitational exhibition). Curated by Christiane Paul.

*The Algorists: Jean-Pierre Hébert (France), Roman Verostko (USA), Mark Wilson (USA), Manfred Mohr (GER-USA), Hans Dehlinger (GER)*, DAM Gallery, Berlin, Germany (group/invitational exhibition).

## 2008

Installs *WIM: The Upsidedown Mural* at the entrance to the Fred Rogers Center, Saint Vincent College, Latrobe, Pennsylvania. Mural consists of eleven panels spanning two stories. Along with the mural, a children's book is published, *WIM: The Upsidedown Book*.

*Evolutions: MCAD in the 1960s and 1970s*, Concourse Gallery, Minneapolis College of Art and Design (group/invitational exhibition).

*Imaging by Numbers: A Historical View of the Computer Print*, Block Museum of Art, Northwestern University, Evanston, Illinois (group/invitational exhibition).

## 2009

Receives the SIGGRAPH Distinguished Artist Award for Lifetime Achievement.

*Digital Pioneers*, Julie and Robert Breckman Prints and Drawings Gallery, V&A Museum, London (group/invitational exhibition).

## 2010

*Algorithmic Poems: The Joy of Digital*, DAM Gallery, Berlin, Germany (solo exhibition).

Presents paper "Sixty Years: From Brush in Hand to Brush in Machine" at the V&A Museum, London.

## 2011

Presents keynote paper at the ISEA 2011, Sabancı Center, Istanbul, Turkey.

*Geometries of the Sublime*, Museum of Contemporary Art, Zagreb, Croatia (group/invitational exhibition).

Projected performance: *Three-Story Drawing Machine*, an eight-hour video of real-time "line by line" procedure for a completed drawing. Site: North Wall, Minneapolis College Art and Design, Minneapolis; in conjunction with Northern Spark.

*Drawing with Code*, De Cordova, Sculpture Park and Museum, Lincoln, Massachusetts (group/invitational exhibition).

## 2013

Presents lecture "Processing Art: From Hand to Machine, 1947 to 2013," at Tokyo Zokei University.

*The American Algorists: Linear Sublime*, Suzanne H. Arnold Art Gallery, Lebanon Valley College, Pennsylvania (group/invitational exhibition). Travels to the New York Digital Salon, SVA Flatiron Gallery, School of Visual Arts, New York City. Curated by Grant D. Taylor.



**2008** Book jacket for the children's book *WIM: The Upsidedown Book*.



**2009** Verostko receiving the SIGGRAPH Distinguished Artist Award for Lifetime Achievement from Cynthia Beth Rubin.



**2010** Verostko interviewed by fellow algorist Frieder Nake in conjunction with Verostko's DAM Gallery exhibition *Algorithmic Poems: The Joy of Digital*.



**2011** Verostko's artwork featured on the facade of the Museum of Contemporary Art, Zagreb, Croatia, as part of the exhibition *Geometries of the Sublime*.



*Stemperando 2012*, Fifth Biennial Invitational sponsored by Istituto Nazionale d'Arte Contemporanea (I.N.A.C.) Turin, National Central Library, 2012; Cosenza National Library, 2013; Rome, National Central Library, 2013 (group/invitational exhibition).

Performance: Nottingham Playhouse Cutting Room presents *The Way Forward* honoring Alan Turing's anniversary. Event includes Verostko's *Universal Turing Machine as a Self Portrait*.

## 2014

Presents paper "Algorithmic Leverage: From Art Idea in Mind to Art Idea in Machine" at the EYEO Festival, Walker Art Center, Minneapolis.

Projected performance: *The Magic Hand of Chance*, a large-scale projection of real-time form generation, programmed with a first-generation IBM PC in 1982. Site: North Wall, Minneapolis College Art and Design, Minneapolis; in conjunction with Northern Spark.

## 2015

*Roman Verostko: Algorithmic Transformations*, Saint Vincent Gallery, Latrobe, Pennsylvania (solo exhibition).

*all.go.rhythm idea >>machine>>art* Colette Bangert, Roman Verostko, Paul Hertz, and Jean-Pierre Hébert; Ukrainian Institute of Modern Art, Chicago (group/invitational exhibition). Curated by Paul Hertz.

*Aesthetica: 50 Years of Computer Generated Art*, DAM Gallery, Berlin, Germany (group/invitational exhibition).

## 2017

*Algorithmic Signs*, Fondazione Bevilacqua La Masa, Galeria di Piazza San Marco, Venezia, Italia. Curated by Francesca Franco (group/invitational exhibition).

*The Algorists*, Orange Door Chicago, Thoma Art Foundation, Chicago (group/invitational exhibition).

*Seeing Math*, Flaten Art Museum, St. Olaf College, Northfield, Minnesota (group/invitational exhibition).

## 2018

Receives induction into the ACM SIGGRAPH Academy.

*Coder le monde*, Centre Pompidou, Paris (group/invitational exhibition).

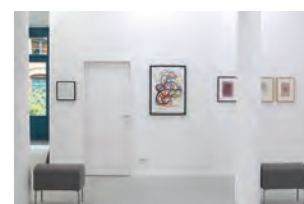
*Chance and Control: Art in the Age of Computers*, V&A Museum, London (group/invitational exhibition).

## 2019

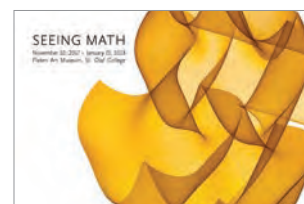
*Roman Verostko and the Cloud of Unknowing*, Main and Concourse Galleries, Minneapolis College of Art and Design (retrospective exhibition).



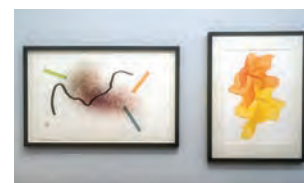
2013 Poster advertising Verostko's talk at Tokyo Zokei University.



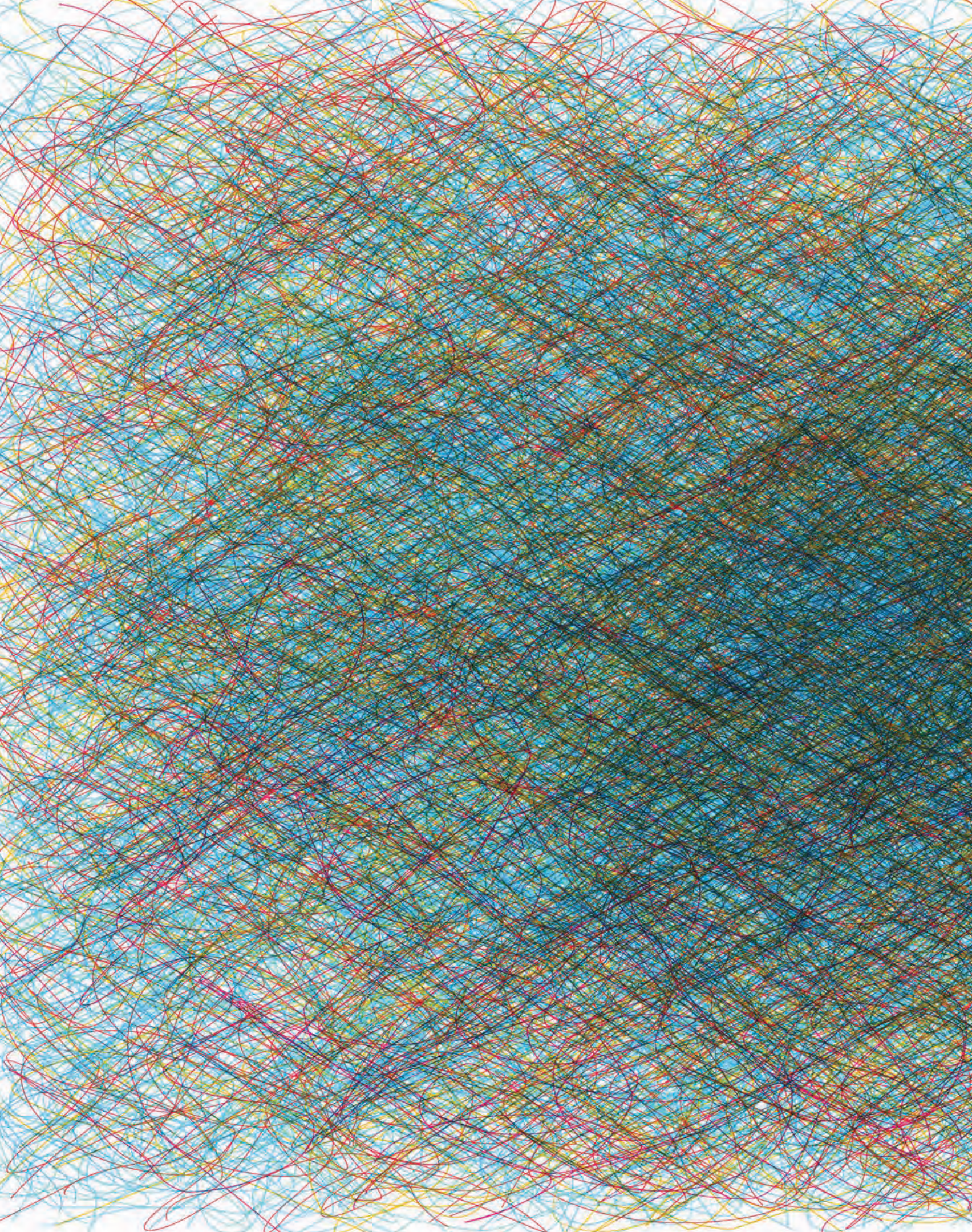
2015 Installation image of Verostko's artwork at the DAM Gallery in Berlin.

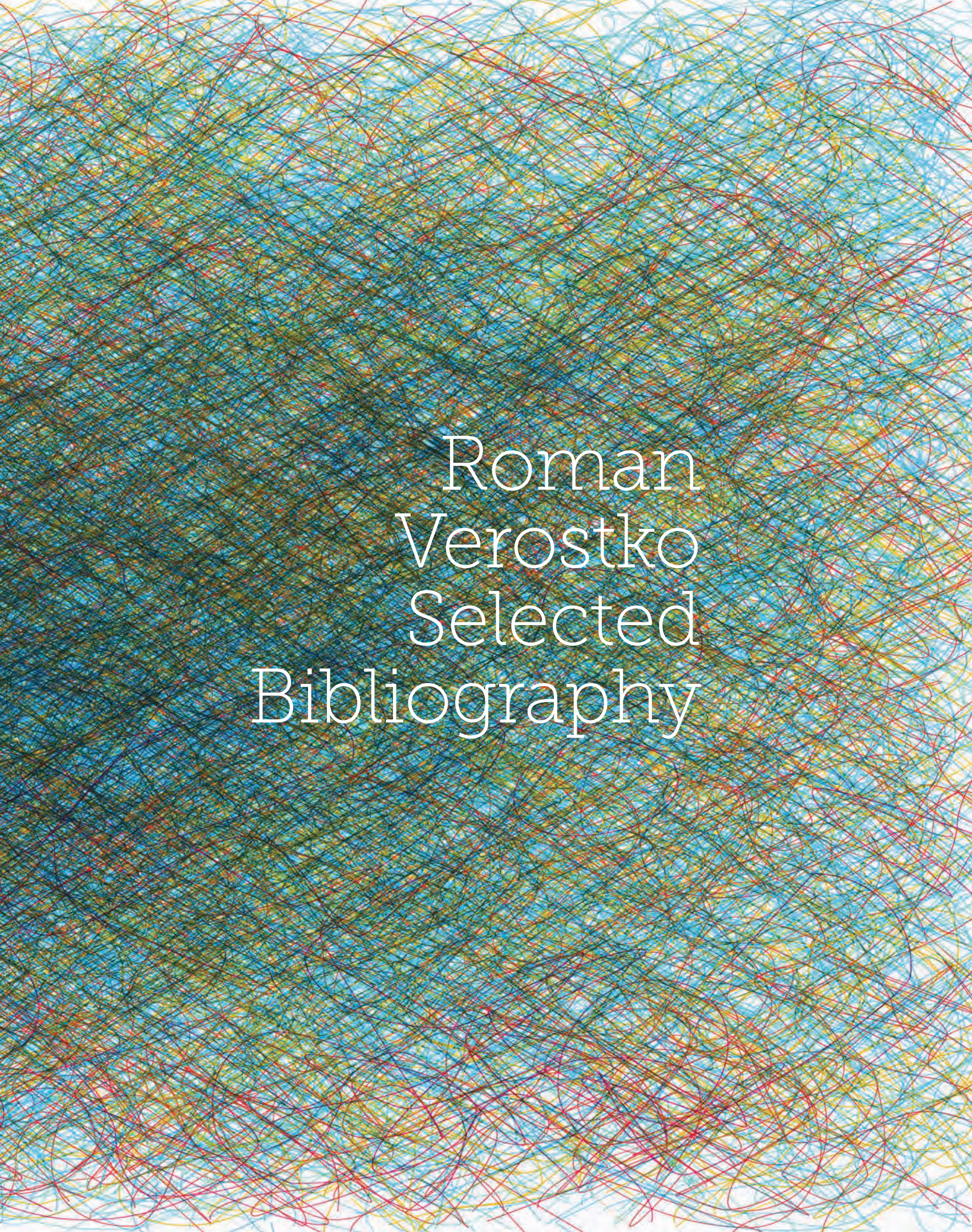


2017 Exhibition announcement for *Seeing Math* at the Flaten Art Museum features Verostko's *Cyberflower V, 1*, 2000.

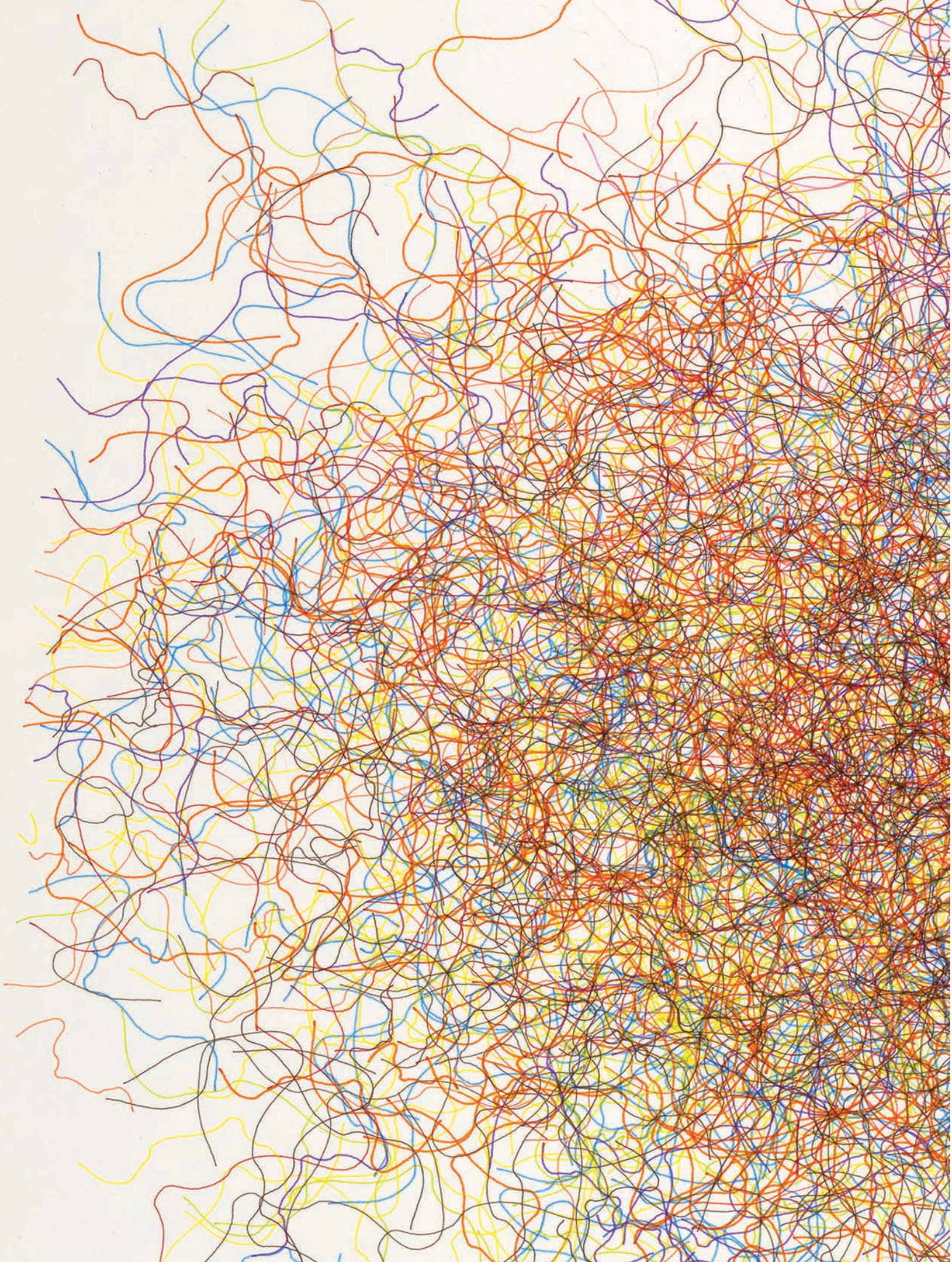


2018 Two pen and ink plotter drawings belonging to the V&A, *Pathway series*, *Bird 2* (1990) and *Cyberflower, Sunshine Version 1* (2008), were featured in the exhibition *Chance and Control*. Photo: Douglas Dodds.





Roman  
Verostko  
Selected  
Bibliography



# Roman Verostko

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*WIM: The Upsidedown Book*. Minneapolis: Jewelweed Impressions, 2008.

*Flowers of Learning: Hortus Conclusus Nazareus*. Spaulding University, Louisville, KY, 2006.

"Epigenetic Art Revisited: Software as Genotype." In *CODE—The Language of Our Time, Ars Electronica 2003*, edited by Gerfried Stocker, Christine Schöpf, and Ingrid Fischer Schreiber. Berlin, Germany: Hatje Cantz Verlag, 2003, 156–67.

"Algorithmic Fine Art: Composing a Visual Arts Score." In *Explorations in Art and Technology*, edited by Linda Candy and Ernest Edmonds, 131–36. London: Springer, 2002.

"Algorithmic Art and the Artist." In *Computerkunst 2000: Die Preisträger des Goldenen Plotters/The Prizewinners of the Golden Plotter*, edited by Abe Yoshiyuki, 21. Gladbeck, Germany: Museum der Stadt Gladbeck, 2000.

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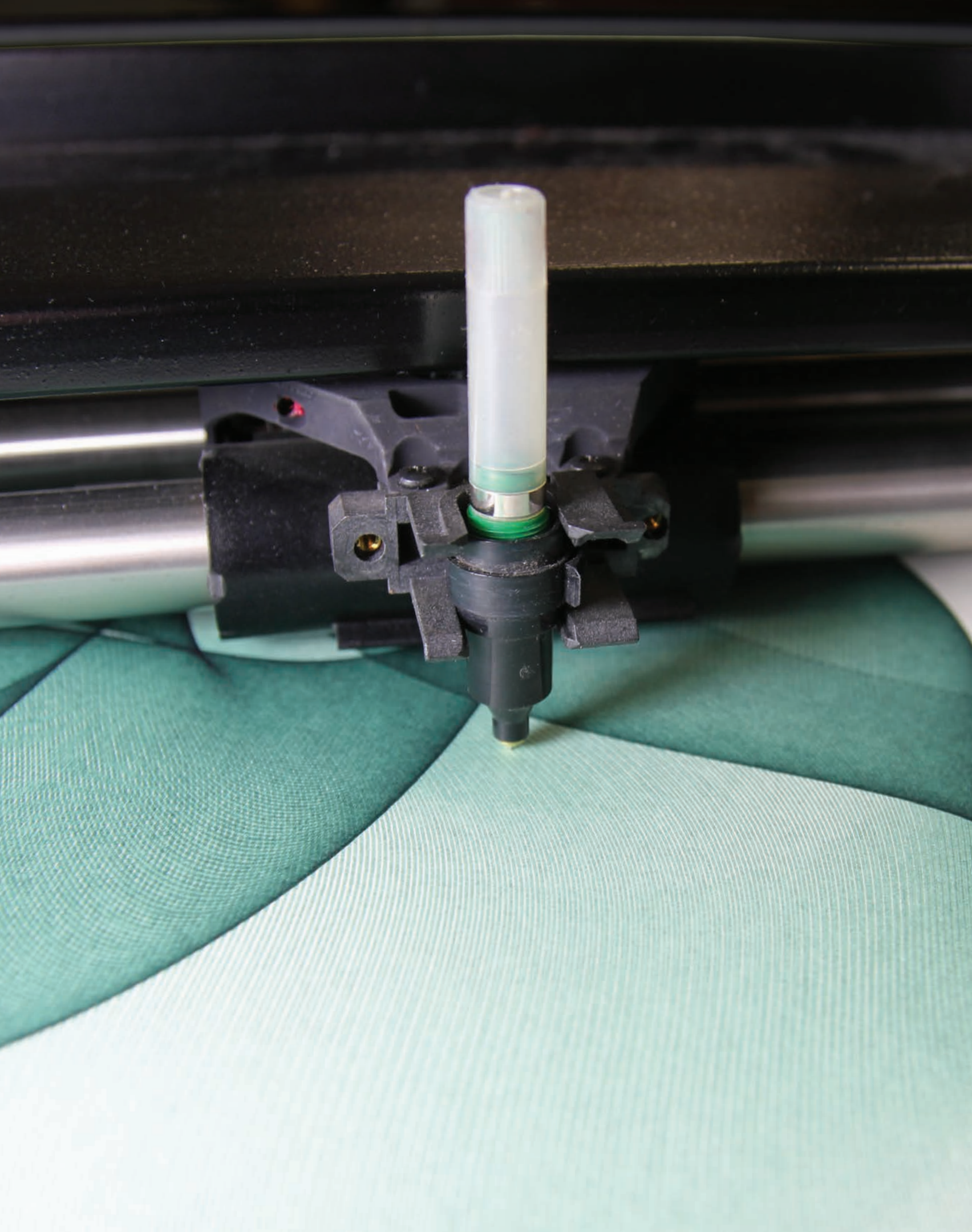
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