

The New York Times

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NEW YORK, FRIDAY, OCTOBER 14, 2016

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Art in Review



LILLIAN SCHWARTZ AND MAGENTA PLAINS

An installation view of a projected 3-D film, "U.F.O.'s" from 1971, by Lillian Schwartz, who is having her first New York solo show at Magenta Plains.

Lillian Schwartz

'Pioneer of Computer Art'

Magenta Plains
94 Allen Street, Lower East Side
Through Oct. 30

That Lillian Schwartz is having her first New York solo gallery show at the age of 89 and that one of her works is on the cover of *Artforum* magazine this month says more about the art world than it does about Ms. Schwartz. A member of the group Experiments in Art and Technology and an artist embedded for three decades at Bell Labs, Ms. Schwartz has long been known as a digital innovator. This show, with works made from 1968 to 2013, expands that to the gallery realm.

Despite her use of image-editing software, microfilm plotters and light pens, Ms. Schwartz's work is grounded in traditional techniques. The drawings on graph paper here echo other artists' longstanding application of the grid as

a structuring device, but Ms. Schwartz's drawings were used as actual schematics for computer programming. A terrific, roughly hourlong reel of 12 films and videos shows Ms. Schwartz's debt to abstract painting, and a book written with her son, Laurens, "The Computer Artist's Handbook" (1992), makes references to van Gogh, Vermeer and Picasso.

The works here have distinctly 20th-century hallmarks. Films and videos are filled with flashes and explosions that resemble warfare — and, of course, video games. Ms. Schwartz, who spent time in Japan after World War II, has described seeing marks made by incinerated bodies on the walls of Hiroshima after World War II, and these shadow forms and their terrible provenance are suggested in her work. More connections — historical, aesthetic, technological — will surely be revealed as her work finally reaches a larger audience.

MARTHA SCHWENDENER



THE NEW YORKER

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ART

LILLIAN SCHWARTZ

September 18 2016 - October 30 2016

In 1968, this trailblazing artist, who deserves to be far better known, was invited to experiment at A.T. & T.'s Bell Laboratories. She stayed for three decades, exploiting the aesthetic possibilities of cutting-edge advances in computing. The curious assortment of objects on the gallery's first floor charts her range, from early drawings on graph paper and an ode to Marcel Duchamp in the form of a gold-and-copper integrated circuit to ink-jet prints from the nineteen-eighties: Op-art-style digital graphics bearing ironic Web addresses. But it's the moving-image works in the basement that steal the show. Schwartz's short 3-D film "Pixillation," from 1970, pairs rudimentary digitally generated textures with supersaturated, hand-painted animations. The result—a throbbing, otherworldly abstraction set to a voluptuous analog synth soundtrack by Gershon Kingsley—is breathtaking.

Magenta Plains

94 Allen St.

NY, NY 10002

<http://www.magentaplains.com>

917-388-2464

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- Caitlin Keogh
- Rashid Johnson
- Alex Webb
- Joe Fyfe
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- Allison Schulnik
- Sam Lipp
- Nick Relph
- Simon Denny
- Meleko Mokgosi
- Charles LeDray
- Suellen Rocca
- Marianne Vitale
- Ed Moses
- Jesse Chun
- Xu Zhen
- Roz Chast
- Alma Thomas
- Nan Goldin

New York

Lillian Schwartz

MAGENTA PLAINS

94 Allen St

September 18–October 30

The 1970s art world was, in general, skeptical of the computer's artistic value. Fittingly, *The Artist and the Computer*, a 1976 documentary on Lillian Schwartz's work at AT&T's Bell Labs, possesses the corny vibe of an educational after-school special. The movie alternates between clips of Schwartz's computer-generated films and footage of her explaining the skill and artistry behind them. In one scene, she flips through a book on nineteenth-century art (before a roaring fire, naturally) and pauses for an aside on modernism's debt to science and technology. The camera, Schwartz reminds the audience, was useful to Impressionist facture, and color theory informed pointillism.

This earnest appeal to acknowledge the computer's place within art's unfolding history feels utterly quaint today. But the documentary, shown at the entrance to this exhibition, reinforces just how groundbreaking the artist's oeuvre was. Perhaps it also explains why many of her films, displayed here on loops in the gallery's basement, read as takeoffs of past artistic movements, demonstrating the computer's capacity not only to mimic better-established art forms but to supercharge them. In *Olympiad*, 1971, tessellated outlines of human figures run in Muybridgean arcs. *Enigma*, 1972, featuring flashing bands of colored light, is Mondrian on psychotropics. And in *Fantasies*, 1973, circles and rectangles swirl and meet in formations that recall stained glass. Though other works pull from chemistry and biology (such as *Apotheosis*, 1972, developed from pictures of cancer radiation treatment), Schwartz's ability to put a mesmerizing, often painterly spin on digital imagery is consistent throughout her work and indeed makes her a pioneer of the form.



Lillian Schwartz, *Olympiad*, 1971, video, color, sound, 2 minutes 33 seconds.

— Hannah Stampler



CHOICES

VOICE

WEEK OF OCTOBER 5–OCTOBER 12, 2016 | WWW.VILLAGEVOICE.COM/CALENDAR

“Is that idiotic?” In 2014, the University Galleries at Illinois State in Normal hosted “Walter Robinson: Paintings and Other Indulgences,” a retrospective of these works, which has now traveled to the recently re-opened Deitch Projects gallery on Wooster Street. The show includes 94 of Robinson’s perfectly silly pulp paintings. PAC POBRIC
Deitch Projects, 18 Wooster Street, 212-343-7300, deitch.com, free

**‘Lillian Schwartz:
Pioneer of Computer
Art’**

Through October 30
“UFOs proves that computer animation—once a rickety and gimmicky device—is now progressing to the state of an art,” Amos Vogel, au-

thor of the influential *Film as a Subversive Art*, wrote in the March 9, 1972, issue of the *Voice*. Vogel was right: *UFOs*, the three-minute short to which he was referring, was a groundbreaking slice of computer-generated art. A swirling, propulsive mosaic of color, line, and shape, the movie was just one of many such technologically prescient works formed by Lillian Schwartz during her thirty-plus years working at Bell Laboratories. Diagnosed in 1955 with an eye disease called chorioretinitis, Schwartz worked to obliterate the conventional boundaries dividing 2-D and 3-D animation. Given the reach of Schwartz’s accomplishments and the presence of her ideas in university classrooms, it’s shocking to

learn that “Pioneer of Computer Art” marks her first New York solo show. Don’t sleep on it—Schwartz is an artist who, in her own way, helped spearhead the idea of the computer as a creative instrument. DANNY KING
Magenta Plains, 94 Allen Street, 917-388-2464, magentaplains.com, free

GALLERIES

Paying Tribute to Lillian Schwartz, a Computer Art Pioneer

Although Schwartz has been producing computer art since the '60s, she's only now receiving her first solo exhibition in New York.



Claire Voon | 2 days ago



Installation view of *Lillian Schwartz: Pioneer of Computer Art* at Magenta Plains (all images courtesy Magenta Plains)

In 1984, the Museum of Modern Art (MoMA) commissioned the artist [Lillian Schwartz](#) to create a public service announcement to advertise the opening of its newly renovated galleries. Her 30-second video showed the museum [rapidly being built](#) before your eyes in technicolor, with architectural elements recreated frame by frame and artworks popping up in and then disappearing from digital galleries in quick succession. It was a whirlwind tour that showcased the museum in a fresh dimension and as an institution striding into an era ripe with possibility.



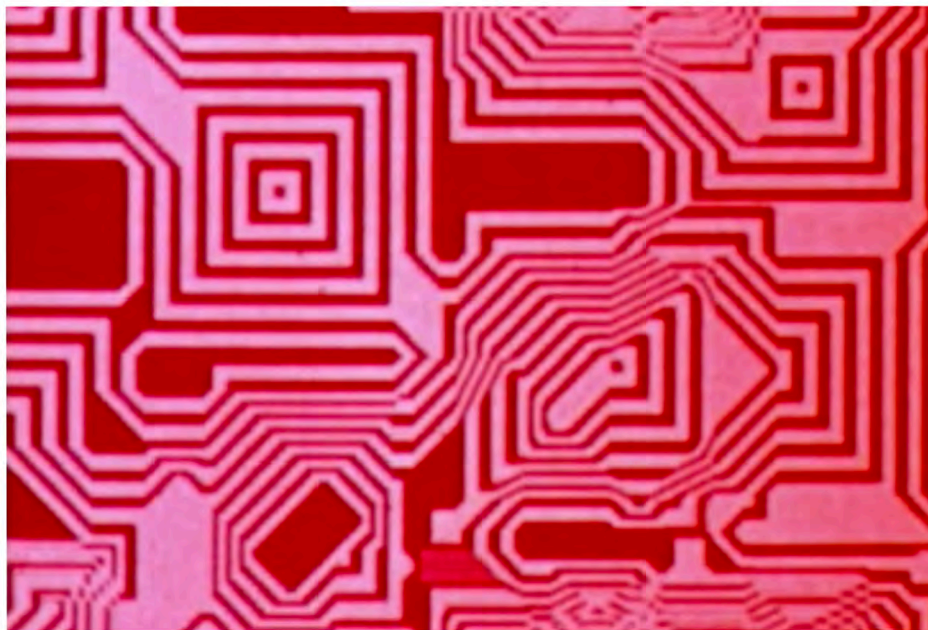
Installation view of *Lillian Schwartz: Pioneer of Computer Art* at Magenta Plains, showing a still from the PSA "The Museum of Modern Art" (1984)

The advert exemplified Schwartz's revolutionary work as one of the earliest artists to use computer software to create visual images; it was even the first computer-generated film to win an Emmy. Although Schwartz, who's now nearly 90, has been producing computer art since the '60s — and winning awards for it — she is only now receiving her first solo exhibition in New York. Celebrating her long and visionary career, *Lillian Schwartz: Pioneer of Computer Art* at Magenta Plains surveys Schwartz's major creations made

between 1968 and 2013, from motion works to prints.

MoMA is actually where Schwartz — a member of *Experiments in Art and Technology* — was first exposed to computer art, as she says in "The Artist and the Computer," a short 1976 documentary that provides an overview of her work. The video, on view in the gallery, recalls those you might watch in drivers ed or a high school health class: it's educational but cheesy, scored by campy music, reminding the contemporary viewer just how new a concept computer art was to the public at the time. In it, a bespectacled Schwartz explains how computer scientist *Ken Knowlton's* work in MoMA's 1968 exhibition *The Machine as Seen at the End of the Mechanical Age* caught her attention. Also included in that show was her own kinetic sculpture "*Proxima Centauri*" (1968), which in turn fascinated the visual perception expert Leon Harmon. He invited Schwartz to join Bell Labs, and it was there that she really began experimenting with the screen, finding novel editing techniques and creating expressive, animated artworks.

One advantage of showing computer art is that it doesn't require much display space. The exhibition provides the opportunity to view over a dozen of Schwartz's videos (including the MoMA PSA), almost all of which loop not on a computer monitor, but as projections on a giant screen in the gallery's basement. The smart, magnified display immerses you in her animated worlds, which, despite their careful coding, are wild. Bursting with color and ever-shifting shapes of all kinds, they introduced delightful rhythm and unpredictability to a system that was, in those days, mostly home to the linear and systematic.



Lillian Schwartz, still from "Pixillation" (1970)

Take "[Pixillation](#)" (1970), for instance, Schwartz's earliest work with Bell Labs, for which she combined black-and-white, computer-generated images with free, hand-colored animation. It's explosive: shapes like blood drops swirl, blossom, and transform into hard-edged, labyrinthine patterns that flicker like lights at a rave.

The screen seems to be undergoing a seizure that escalates by the second, an effect heightened by [Gershon Kingsley's](#) thunderous, industrial, Moog-synthesized sounds that punctuate every movement. Your eyes will struggle to keep up with the frames; it's an experience both nerve-wracking and thrilling.

"[Apotheosis](#)" (1972), which draws on images made from radiation treatment of cancer, delivers a similar effect: it begins as a slow march of brain shapes filled with colors that pulse like lava-lamp blobs, then rapidly accelerates, with textured patterns tailing each other so quickly the frames become painful to watch. More entrancing is "[Olympiad](#)" (1971), which expands on [Muybridge's](#) motion experiments of running men. It's magnetic in its simplicity, setting athletes in an endless chase as they run back and forth across the screen and overlap with each other in glorious rainbow hues.



Lillian Schwartz, still from “Olympiad” (1971)

Schwartz’s editing techniques may seem old hat to some 21st-century viewers, but her videos still consistently compel; many of them get their charge from familiar, organic-looking material manipulated to form highly sensory experiences. What’s particularly remarkable, however, is that Schwartz arrived at some of her innovative techniques because of personal physical limitations. In 1955, she was diagnosed with [chorioretinitis](#), which affects how she perceives color. It led her to devise methods of oversaturating her creations, ultimately enabling many of her films from the ’70s to be seen in both 2D and 3D; they predated the development of [pixel-shifting technology](#), which is required for such conversion. And earlier, after the end of World War II, Schwartz contracted polio while living in Japan and practiced Japanese calligraphy to recover from muscle weakness. The painterly elements evident in many of her works produce an expressiveness so unexpected of computer imagery at the time.

We can better appreciate such artistic strokes through Schwartz’s still images, on view on the gallery’s ground floor. Playful inkjet prints of computer graphics from the 1980s feature her illustrations of cave paintings and dodos, mingled with anachronistic HTML links and buttons. They’re all rendered with smooth daubs of digital color, with pixels mixed and overlaid as a painter would handle pigments. In another series, from 1970, Schwartz experiments with etching, using lasers to embed Duchamp-inspired designs into gold circuit boards. Although frozen, these futuristic, figurative forms recall the running men in “Olympiad” — they’re pregnant with energy, poised to stride out of their frames.

In “The Artist and the Computer,” Schwartz says she must bring to her computer works the same imagination, intuition, and emotion as she would to any art form. Her handling of color and creation of complex optical effects in early videos proved that the computer is not at odds with art, but an instrument capable of showcasing creativity. It’s a concept we’re more than familiar with now, but Schwartz’s worlds were truly pioneering for their time. Playing out on screens for over 50 years now, they speak to how strongly she imbues mechanical systems with spirit.



Installation view of *Lillian Schwartz: Pioneer of Computer Art* at Magenta Plains

ARTFORUM

OCTOBER 2016

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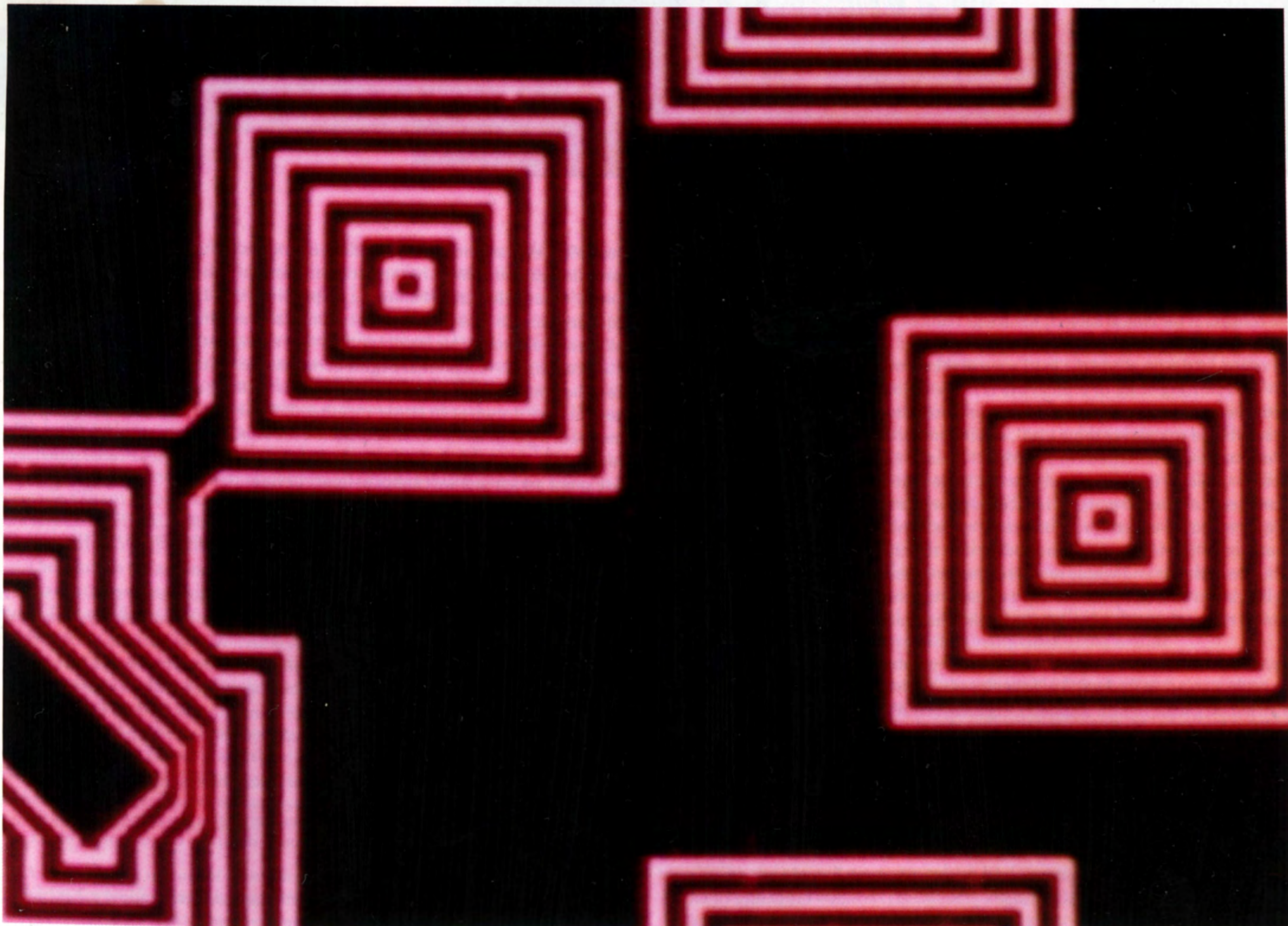
LILLIAN SCHWARTZ

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REBEKAH RUTKOFF ON THE ART OF LILLIAN SCHWARTZ

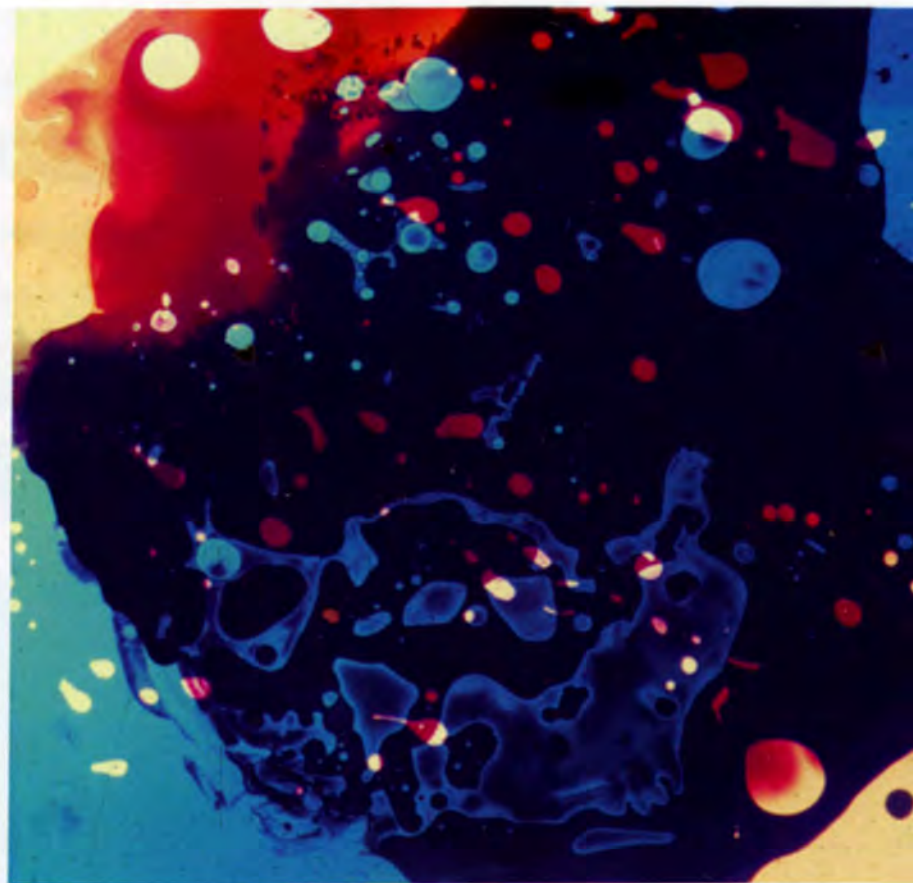




Opposite page: Lillian Schwartz, *Pixillation*, 1970, 16 mm, color, sound, 4 minutes.

Left: Lillian Schwartz, *Proxima Centauri*, 1968, plastic, ripple tank, slides, slide projector, motors, electrical equipment, lightbulbs, mirrors, metal, pressure-sensitive pad, Micarta-laminated wood; base 55 × 30 × 30", globe 30" diameter. Photo: Peter Moore.

Right: Two slides for Lillian Schwartz's *Proxima Centauri*, 1968.



THE CRYSTAL PEN

On a Sunday in 1970, Salvador Dalí summoned pioneering computer artist Lillian Schwartz to the St. Regis hotel in New York. She was instructed to wear beautiful clothes, and so she chose a fitted dress with multi-colored stripes and long Mylar earrings. Escorted through beaded curtains into a cocktail lounge with candle-topped tables and a coterie of attractive men and women, one dressed in a metallic jumpsuit open to the waist, one wearing body paint, Schwartz arrived at a platform on top of which a tuxedoed Dalí sat with a top hat, cape, and cane. A boy with platinum hair stood guard on one side and two women in white crepe on the other. Speaking in French and Spanish through an interpreter, Dalí announced that he had received special information from the waxed mustache he relied on for premonition, and he charged her with four missions. As he spoke, his mustache drooped and he regularly fondled and tweaked it back into place.

He wanted Schwartz, an artist embedded at Bell Laboratories and known for her creative exploitation of the microfilm plotter, to create a computer-generated painting of his dead brother; to convince Bell Labs to manufacture a telephone modeled after one he had painted, the earpiece of which was a lobster; and to sprout a bean painted with a microscopic Chairman Mao. Most crucially, she was to produce a video of his sparkling pen: a writing utensil encrusted with diamond-like crystals that had formed after the artist urinated on it every morning for a year. He presented the pen in a white box; Schwartz could hold it if she kept it protected in a swath of cotton. The interpreter explained: “[Dalí] wants you to videotape this pen. He knows the results will be spectacular, magnificent bursts of light. . . . It is your job to [catch the

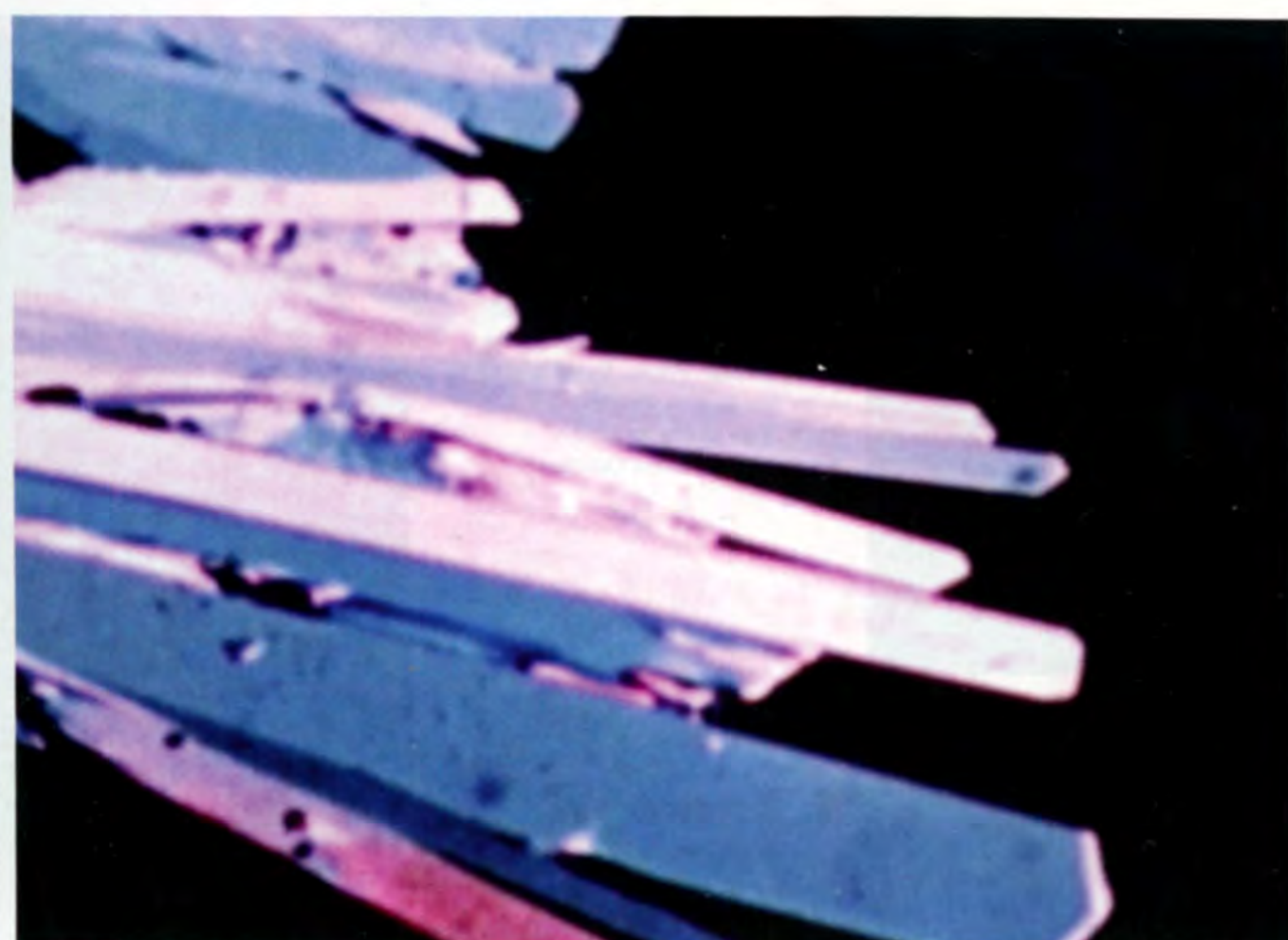
brilliance of this phenomenon] and make a permanent record.” Schwartz carried out the fourth mission—she returned with a crew and shot the pen, magnified and rotating under lights—but she never saw the footage. As for the portrait of the Surrealist’s brother, Schwartz declined after Dalí refused to give her credit. He wanted, she said, a slave—like his beautiful servants at the St. Regis—to carry out his mustache’s whims. He even snatched a napkin on which Schwartz had begun to sketch his image, drawing on top of her lines before putting it in his pocket.¹

A NAME IN LIGHTS

Dalí’s unwillingness to credit Schwartz fits a pattern. In the more than five decades of her career, her own proper name has risen and fallen, often in association with the high-tech mark-making instruments she used and the light-emanating objects she made. In some ways her name is deeply inscribed in history: Nobel laureate and head of research at Bell Labs Arno Penzias declared, “What we know as computer art began on a December morning in 1968 when Lillian Schwartz grasped a light pen and began to draw,”² and her work is in the collections of top museums around the world, including the Museum of Modern Art in New York and the Stedelijk Museum Amsterdam. And unlike Mrs. Marcel Duchamp, Mrs. Claes Oldenburg, Mrs. Barnett Newman, Mrs. Allan Kaprow, and Mrs. Robert Breer, Mrs. Lillian Schwartz was one of the very few women identified by her own given name on the dinner list for the opening of Pontus Hultén’s epochal exhibition “The Machine as Seen at the End of the Mechanical Age” at MOMA on November 25, 1968.³ Schwartz’s recently fabricated kinetic light sculpture *Proxima Centauri* launched her career that

evening. Designed with engineer Per Biorn, it was one of nine collaborative works from a competition sponsored by the group Experiments in Art and Technology (E.A.T.)—led by Robert Rauschenberg and Billy Klüver—that Hultén selected for the 220-piece show. *Proxima*’s translucent white dome generated abstract images, shifted colors, and descended into its black plastic base as visitors approached and stepped on a pressure-sensitive pad. Its interior was stuffed with a projector and slides (of Schwartz’s own nonfigurative paintings), a ripple tank, a Singer sewing-machine motor, and colored lights.⁴ The dome “at times seems to become a gelatinous mass that shakes, breathes, and then returns to still images,” the catalogue describes.⁵ *Proxima* fascinated visual-perception expert Leon D. Harmon (whose *Studies in Perception No. 1*, 1966, cocreated with computer scientist Kenneth C. Knowlton, was another E.A.T.-competition work included in the show), and he invited her to tour Bell Labs, the research wing of AT&T in Murray Hill, New Jersey. Schwartz secretly visited the facilities three times before her official appointment a week later.⁶ She ended up staying for more than three decades.⁷

Between 1968 and 2002, Schwartz created computer-mediated films, videos, optical effects, art-historical analyses, and animations at Bell’s Acoustical and Behavioral Research Center, producing seminal works of early computer art. But internally her name receded: Unknown to company administrators, she was an unpaid “resident visitor” at Bell Labs, which functioned as an academic utopia where newly minted Ph.D.s in science and engineering freely pursued their own long-term research without competition for resources.⁸ In 1986, Schwartz’s own research generated



more media attention than Bell Labs' groundbreaking invention of the transistor: Harnessing Gerard J. Holzmann's new PICO image-editing software and UNIX-based machines, she showed that Leonardo used himself as a model for the *Mona Lisa*, and the *CBS Evening News* with Dan Rather even broadcast an interview with her. Bell executives were livid and demanded to know why she wasn't in the company directory. Almost two decades after her arrival, she received a contract and a salary as a "consultant in computer graphics."

The dilemma of status had trailed Schwartz since her arrival. In the early 1970s, the center's director, Max Mathews, grew concerned. Stockholders were touring the facilities, and someone might inquire about her training. "If anyone asks, just say you're a 'morphodynamicist,'" he instructed her, coining a word. "Here I was, an artist, and a nurse, a housewife—but I wasn't a scientist," Schwartz recalled.⁹

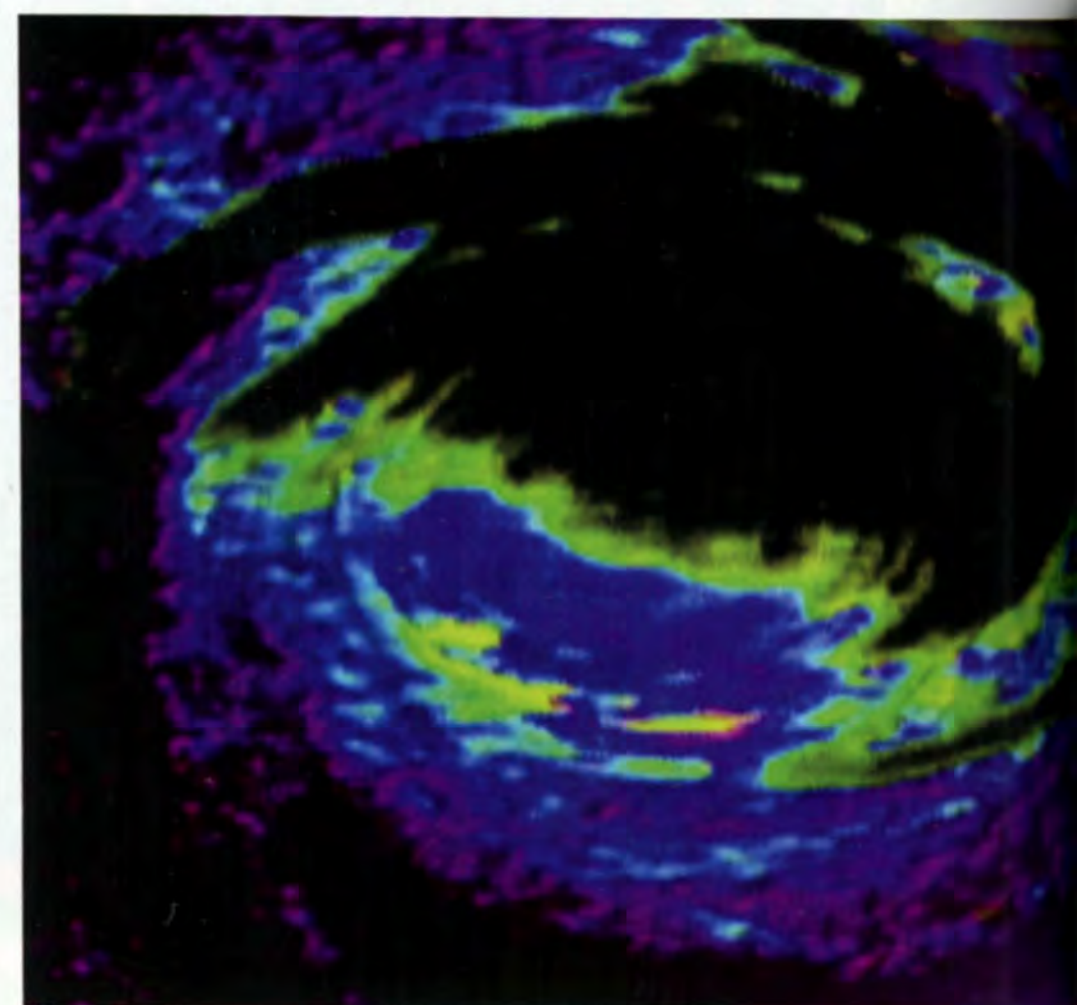
To Schwartz, open-doored Bell Labs was "a masterpiece of odd geniuses" (overwhelmingly male), "the true heaven of thought and research." Integrated circuits, gas tanks, and safety showers dazzled Schwartz on her first day, and in a computer lab with blinking lights, cables, and punch cards, she experimented with a light pen.¹⁰ She called its modus operandi "technological pointillism": a Seurat-like manipulation of dots both distinct and merged.¹¹ She emerged from months of training at Bell Labs and study at the New School in New York in coding, Boolean algebra, and logic with clarity: Her imagination would never be sated by writing programs.¹² Her initial shyness morphed into what Penzias affectionately called a "monumental ingratitude to technology"¹³; her experimental

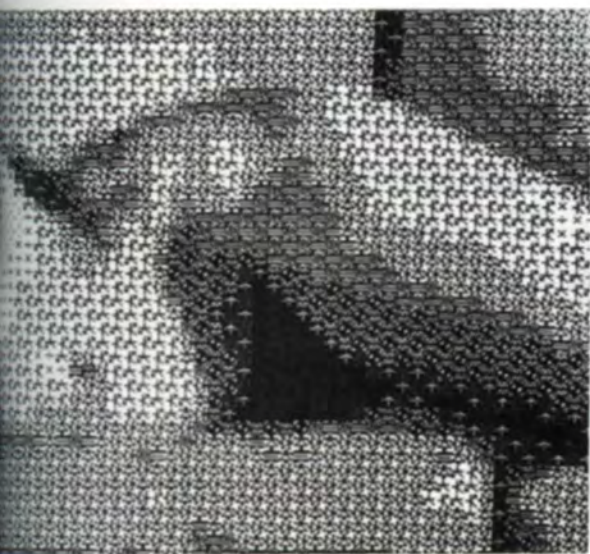
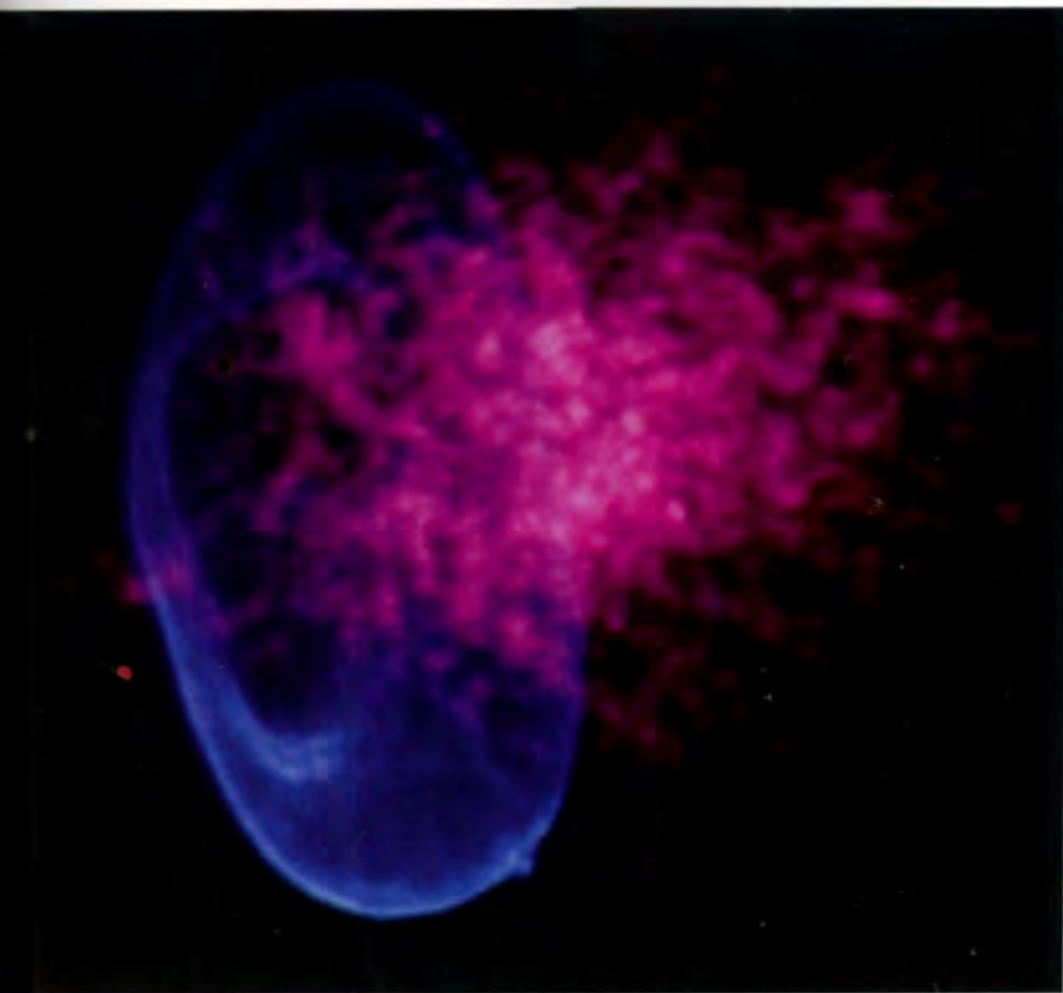
approach was fed by a keen capacity to twist new technologies against the grain of intended use and a multilingual mind at ease shuttling between scientific precision, abstract thought, and visionary foresight. Schwartz roamed the long hallways of Bell Labs in search of stimulations; in a chemist's trash can she once found sequences of images animating atoms and molecules at a moment when FORTRAN couldn't produce the circular shapes she needed for a film.¹⁴

Schwartz collaborated with visual perception specialists, physicists, and information theorists, transforming scientific experiments into art: In *Mutations* (1972), she generated film imagery from laser beams diffracted and bent through heated plastic forms, and she worked with NASA scientist Frank Hohl on *Galaxies* (1974), an animated world of spinning and overlapping disc forms derived from satellite footage. Schwartz drenched the muted electronic palette of the late '60s with saturated color, and demanded both enhanced control over the manipulation of pixels and opportunities to subject them to chance operations. She produced the first computer-generated public service announcement—commissioned by MOMA on the occasion of its renovation and expansion in 1984—and won an Emmy for it, and she deciphered the perspectival logic behind da Vinci's *Last Supper*. She also unwittingly discovered the essentials of Chroma-Depth 3-D technology (which exploits the depth-generating potency of color rather than relying on stereoscopic imagery as conventional 3-D does) twenty years before its official invention.¹⁵ But science was not simply Schwartz's muse; in a letter to Bell Labs mathematician Robert C. Prim in 1972, Mathews documented the crucial advice Schwartz ("one of the

Above: Three stills from Lillian Schwartz's *Mutations*, 1972, 16 mm, color, sound, 7 minutes 30 seconds.

Right: Kenneth C. Knowlton and Leon D. Harmon, *Studies in Perception No. 1*, 1966, ink on paper, 60 × 120".





Below: Three stills from Lillian Schwartz's *Galaxies*, 1974, 16 mm, color, sound, 4 minutes 30 seconds.

brightest geniuses I have known”) provided to top scientists: She worked with statistician John Chambers on color-contour plots of functions and counseled physicist Manfred R. Schroeder on the incorporation of film into his experiments on visual aftereffects.¹⁶

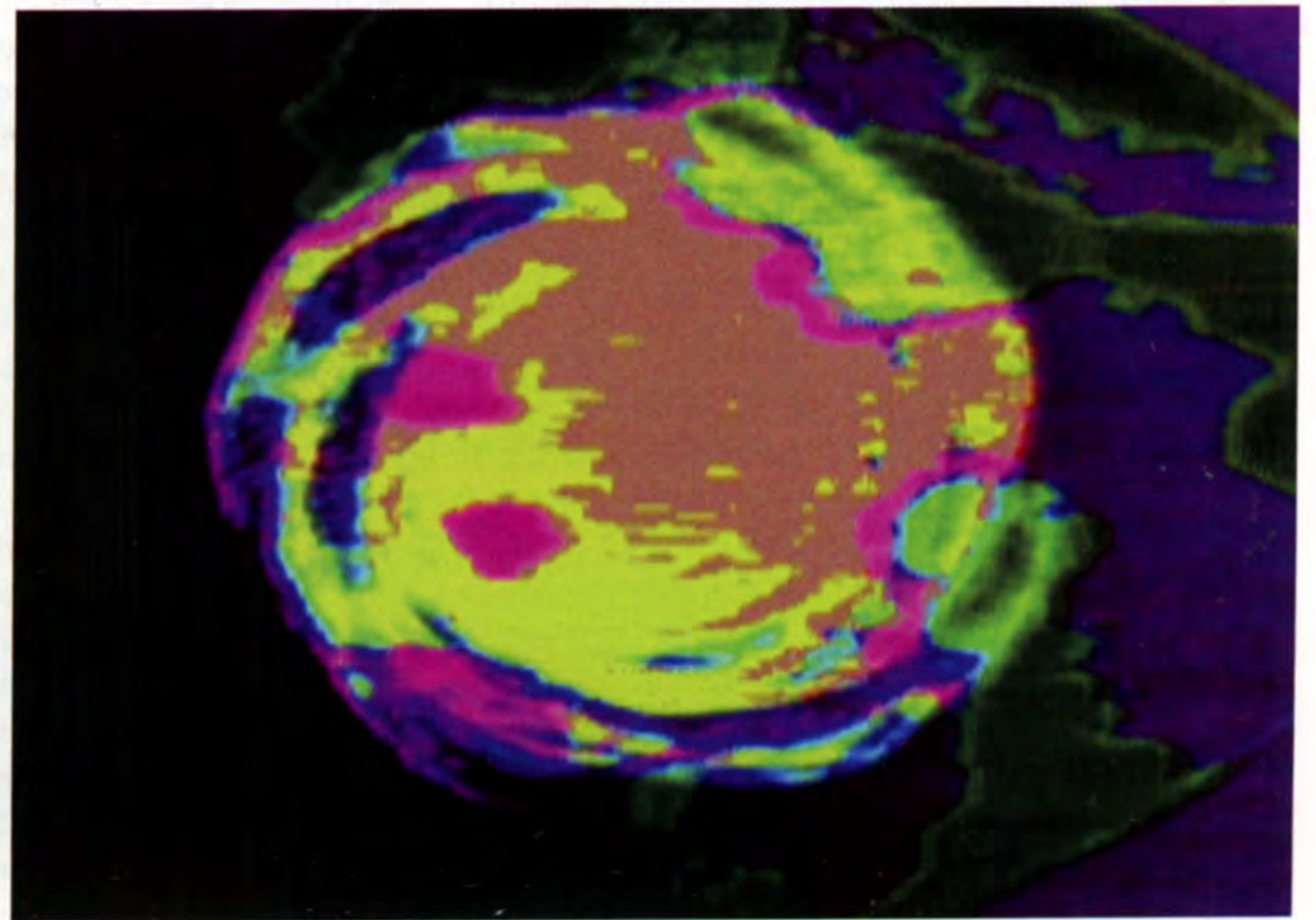
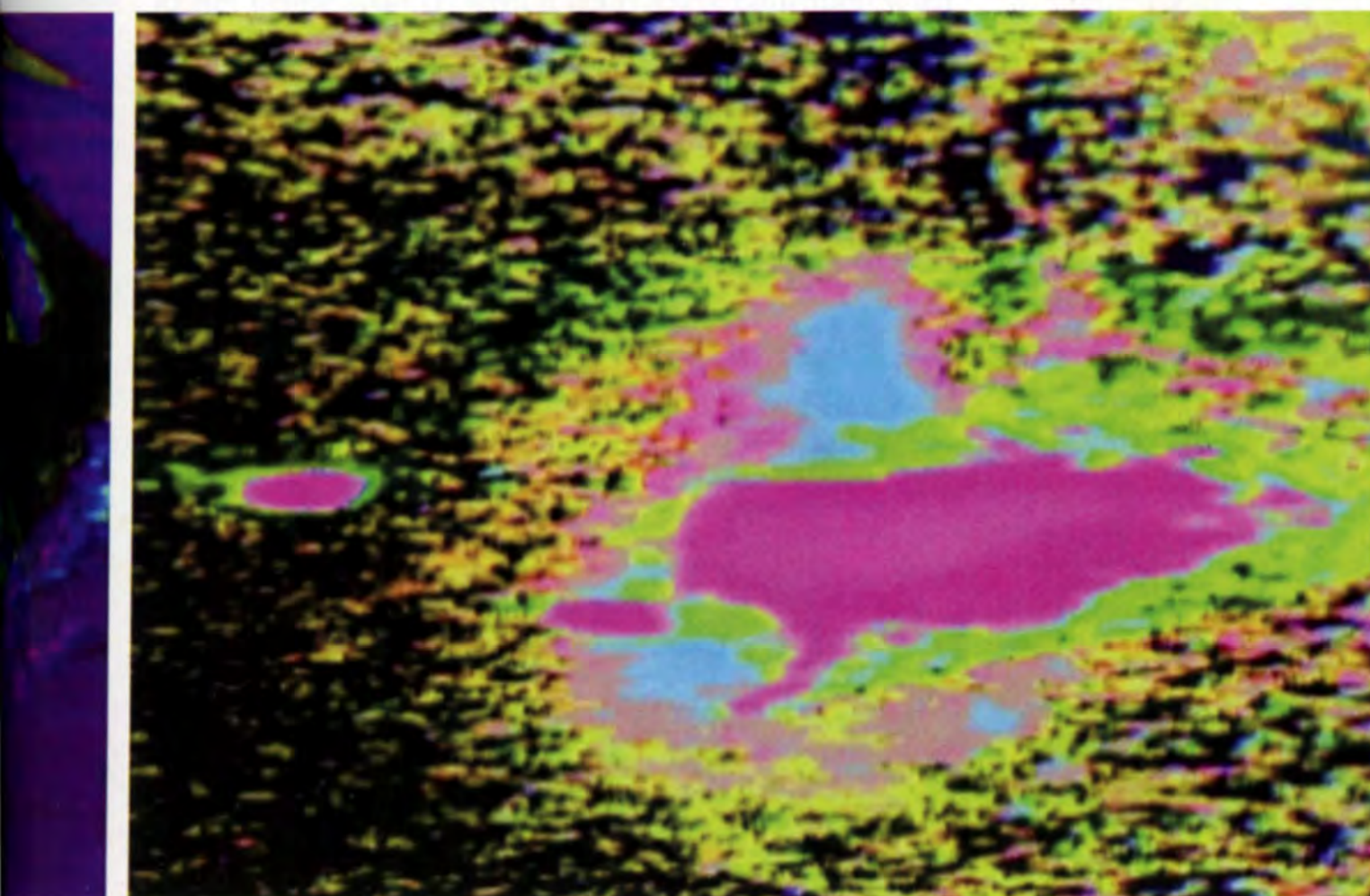
PAINTBRUSH

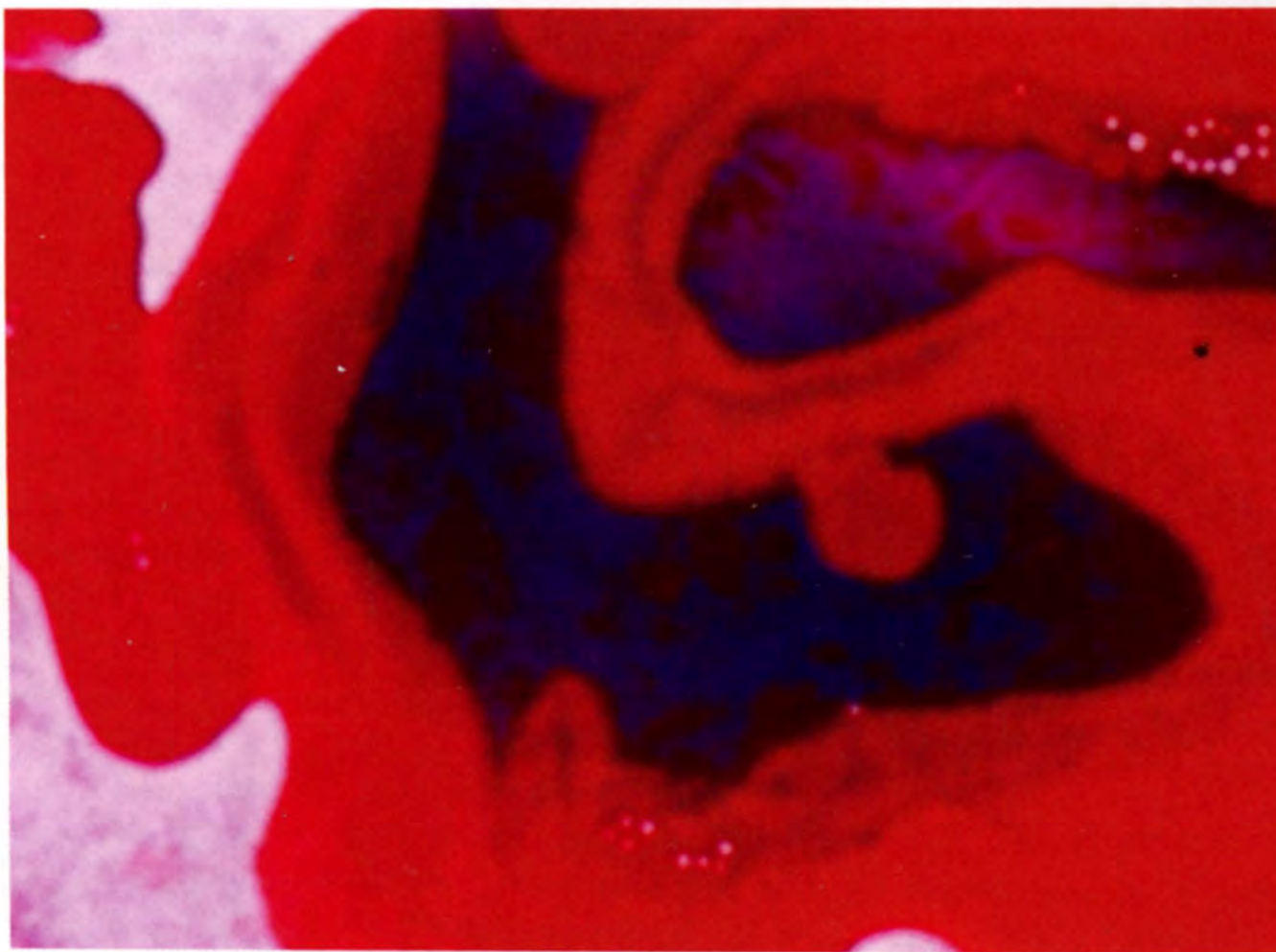
Her tireless engagement with new technologies notwithstanding, for several weeks at Bell Labs in 1969, not long after her arrival, Schwartz also used a paintbrush. She had received an AT&T commission to produce her first computer-animated film, *Pixillation* (1970), just as Knowlton was writing *EXPLOR* (Explicit Patterns, Local Operations, and Randomness), a new programming language that would “permit the manipulation of rectangles and squares in two-dimensional black, grays, and white.”¹⁷ The process of generating animated imagery was excruciating: Two to three days lapsed between the time one plotted and programmed a series of images and the moment when one could first view them via the Stromberg-Carlson 4020 microfilm recorder, a peripheral device outfitted with a cathode-ray tube and shutterless camera that allowed mainframe computers to “present and preserve images and image sequences in ways that then-contemporary interactive computer screens simply could not.”¹⁸ In *Peripheral Vision*, her important history of the S-C 4020, Zabet Patterson describes the time-delayed groping for images inherent in the process: “Schwartz drew patterns on graph paper and then used *EXPLOR* to code pixel-like blocks that became generative shapes once input into the computer. The process . . . was relatively blind. She had to wait until the full processing was done and the

image sequences were output to 35-mm film before she could see precisely what she would get.”¹⁹ After two months she had only a few seconds of computer-generated imagery.²⁰

Schwartz realized she would never meet the AT&T deadline at this rate. So she left the computer and began to paint. Having recently taught herself to shoot with a Bolex and edit 16-mm film on a Steenbeck, she studied the experimental animated films of Norman McLaren.²¹ And then, through trial and error, she mastered frame-by-frame painted animation in a drafting room at Bell Labs. Over the course of three months, she produced seventeen hundred frames of 16-mm film by pouring and spreading pigment on glass plates, lit from below and shot from above with a mounted camera.²² She used spray cans, brushes, palette knives, compressed air, and her fingers to manipulate oil and plastic paints, and filmed colors colliding in the concave bowls of small glass lenses.²³ The raw *Pixillation* footage reveals the quick ascent of the artist’s learning curve: She painted representationally, animated objects, and experimented with handwriting and too-thin paints before landing on the concentrated field of abstraction that would ultimately drive the film.

Schwartz also shot photomicrographs of crystals forming in glass cells, working with a chemist to produce shapes in morphological dialogue with her graphic and hand-rendered forms. “I wanted them to be together,” Schwartz said of her desire to meld the three distinct image types: black-and-white computer imagery, painted frames, and mineral growth.²⁴ She produced her own color filters to further relate the disparate varieties of image, and with an optical bench,

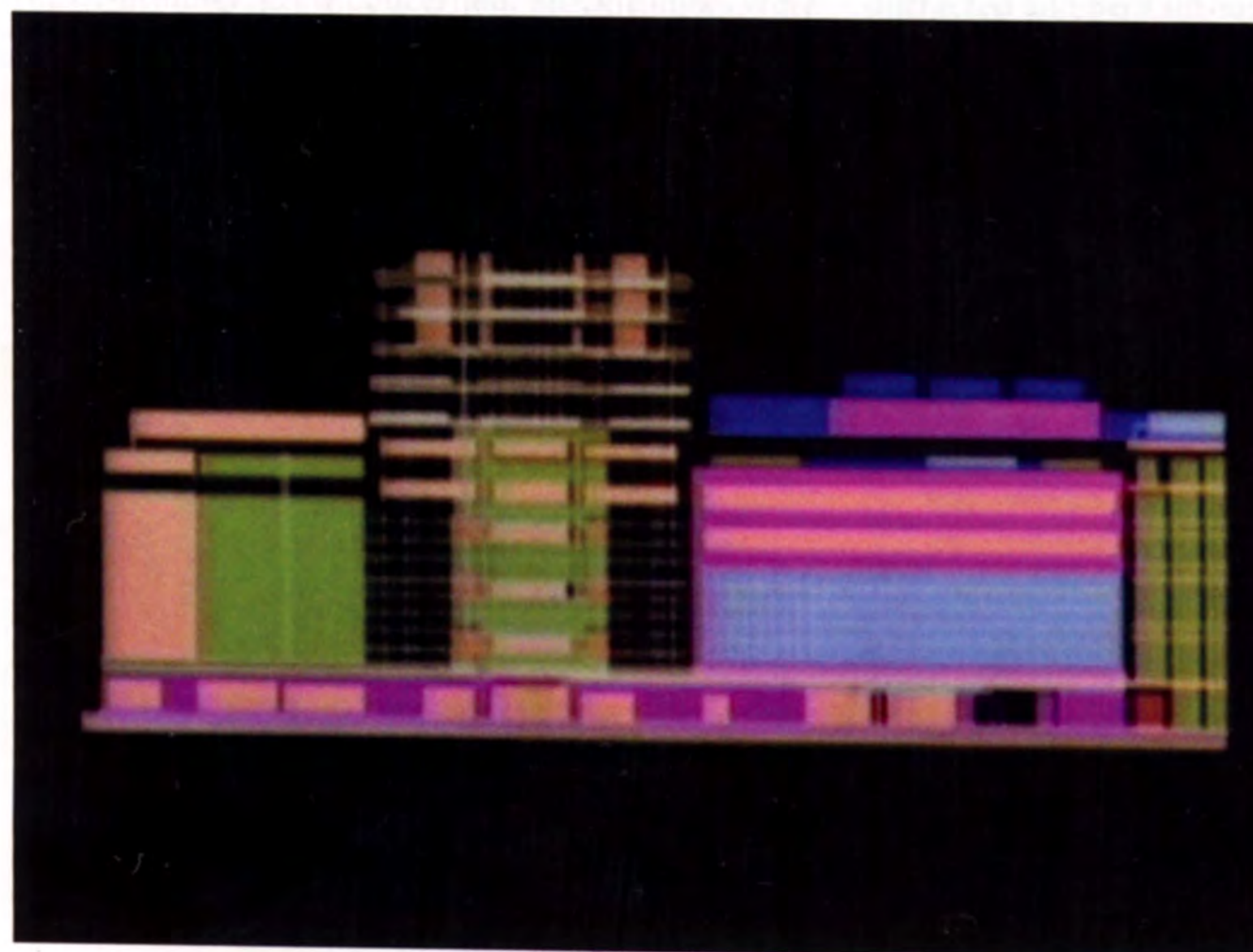




she froze, enlarged, superimposed, and blocked aspects of her footage.²⁵ The result is four minutes of thrilling integration of the hard-edged and the viscous, a hypnotic spectacle of shifting shape. Early in *Pixillation*, cherry-red tableaux of falling droplets and spreading puddles are suddenly incised with squares (anticipating the arrival of blinking EXPLOR shapes), and the assertive growth of lavender and slate-blue crystal shards gives way to the diamond patterning of animation that eventually reaches a state of liquid-seeming kaleidoscopic intensity. *Pixillation's* painted scenes

resemble aspects of a marbleized universe: a glowing Milky Way, a beating heart, a series of meeting rivers. Technical constraint had catalyzed an eruption of experimentation and problem-solving. The "colorlessness" of the EXPLOR images had stimulated an "obsession with color," Schwartz said, leading her to invent a technique of inserting frames with black or pale backgrounds into stretches of vibrantly colored frames in order to maintain the viewer's capacity to tolerate saturated color.²⁶ Mirroring the film's heterogeneous origins, *Pixillation* has multiple sound tracks: a

Schwartz's *Pixillation* is four minutes of thrilling integration of the hard-edged and the viscous, a hypnotic spectacle of shifting shape.





This page and opposite, top: Four stills from Lillian Schwartz's *Pixillation*, 1970, 16 mm, color, sound, 4 minutes.

Opposite page, bottom: Two stills from Lillian Schwartz's computer-generated public service announcement for the Museum of Modern Art in New York, 1984, video, color, sound, 30 seconds.

GROOVE (Generated Real-time Output Operations on Voltage-controlled Equipment) composition by Dick Moore, a score for harpsichord and celesta by Frank Lewin, and two Moog synthesizer accompaniments by Gershon Kingsley.²⁷

In making *Pixillation*, Schwartz “got carried away.” She had left a mess in the drafting room at Bell Labs; paint was sprayed and splattered all over the floor and table. She received an admonishment (“I was banned”) and never used paint at Bell Labs again.²⁸

HOW TO CATCH A PRESENT

Schwartz completed the painted portion of *Pixillation* at her home studio (which was newly equipped with a Moviola and was the site of all of her film editing for decades to come).²⁹ By 1971, when AT&T commissioned her second film, *UFOs* (1971), Schwartz “was emotionally prepared to give up the hand-painted images and created this film entirely with computer images.”³⁰ As technology progressed, it became easier to generate more—and more varied kinds of—computer-derived imagery.³¹ Computer art asks us to speed ahead to keep up with its breakneck evolutions, but let’s momentarily pause at the paintbrush—and the anger-provoking splatter—to consider Schwartz’s imagery and practice within the social and artistic contexts that prevailed at the moment she was to cross this frontier between the handmade and the computer-generated.

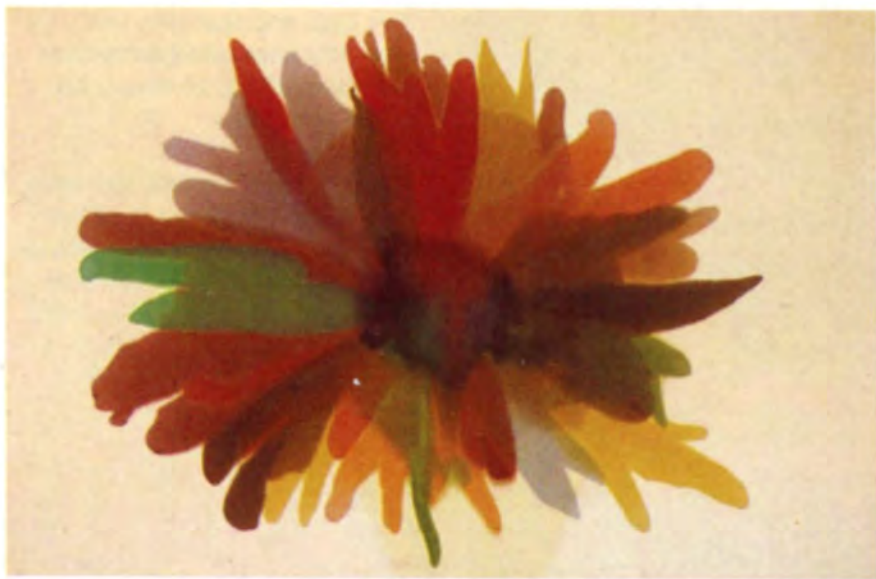
In her remarkable short book *The Pragmatism in the History of Art* (2013), Molly Nesbit celebrates the discursive and imaginative moments when art criticism was open to the full range of human experience—before Greenbergian orthodoxy ushered “larger

historical forces and other realities [religion and politics, ‘the outer world’], things not-paintings and not-sculptures, things not exhibited, . . . away from the big stage.”³² Embodying the pragmatic interest in “a thought’s odyssey, its quest for effect,” Nesbit pulls out latent historical threads, offering an alternative to formalism’s straight-ahead story of art.³³ “How to catch a present?” she asks. “Write it down? No writing, not even history, is stable. The current catches everything. One art history will chase another art history away.”³⁴ Her book concludes in 1971, a year after *Pixillation* was completed, with Linda Nochlin’s landmark essay “Why Have There Been No Great Women Artists?,” which (in Nesbit’s words) addresses, among other things, a woman’s “right to participate in history.”³⁵ If there have been no great women artists, Nochlin argues, “the fault, dear brothers, lies not in our stars, our hormones, our menstrual cycles, or our empty internal spaces, but in our institutions and our education—education understood to include everything that happens to us from the moment we enter into this world of meaningful symbols, signs, and signals.”³⁶ Nesbit, via Nochlin, is drawing a line in hopes of catching the pigment of “actuality,” her term, via Foucault and George Kubler, for the alternately vast and fragile field of the experiential present, an alternative to the assurances of abstract truth-seeking.

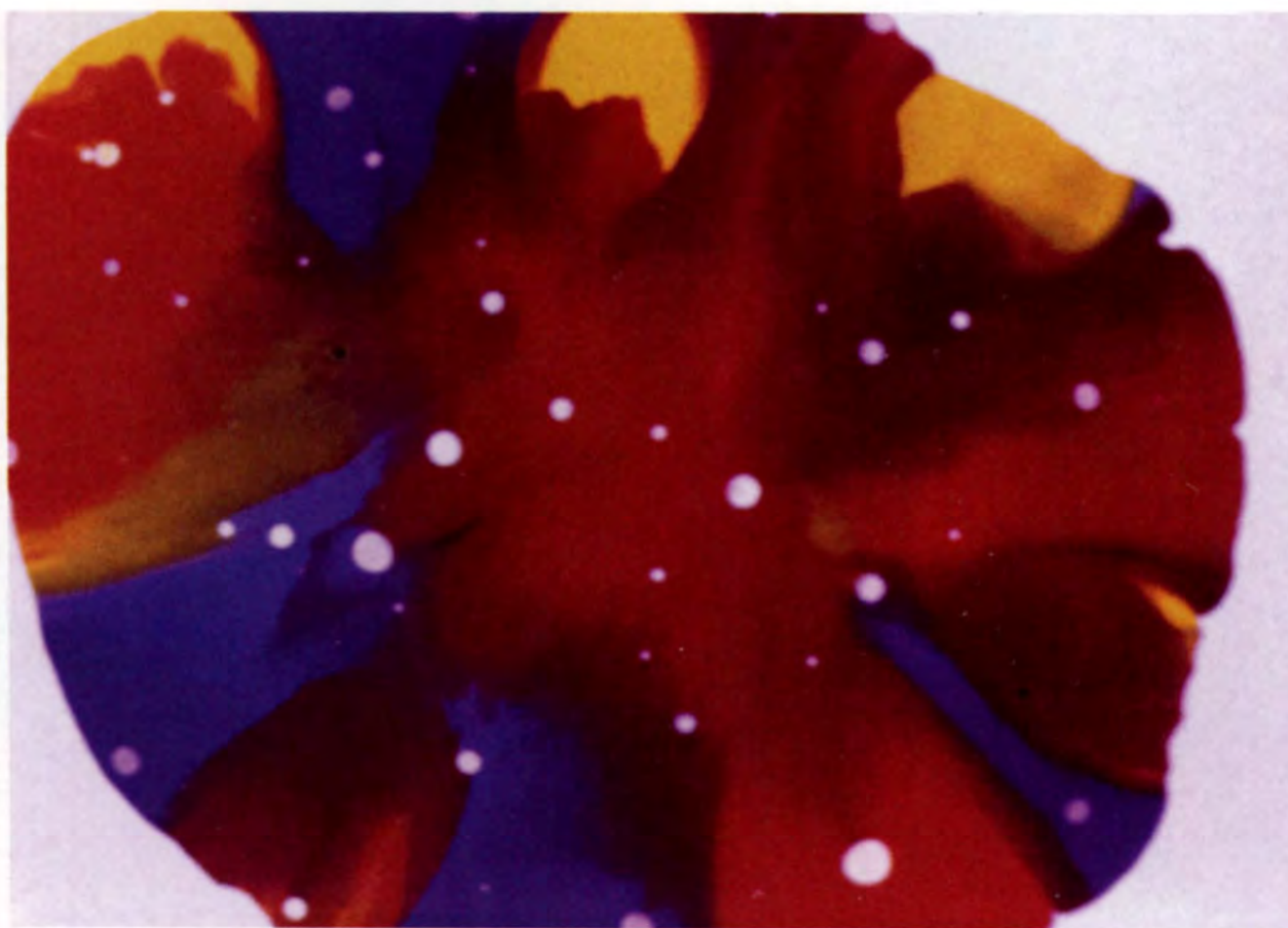
“I felt guilty about being born a girl. . . . I knew very early on that girls were second-rate citizens,” Schwartz said.³⁷ But her voracious curiosity and Day-Glo imagination careened through obstructions. Born in Cincinnati in 1927 to a poor Jewish family, Lillian Feldman was the twelfth of thirteen children, six of whom, in addition to her father, had died by the

time she was thirteen.³⁸ The household, however, was illuminated by the spirit of creation: The Feldmans owned a hand-cranked 16-mm projector, and Lillian’s mother encouraged drawing on the walls and instructed each child to select an artistic pursuit. (Lillian chose the violin.)³⁹ By thirteen she was working in a dress shop in Newport, Kentucky, making and selling jewelry with rhinestones that had fallen on the floor and playing slot machines with pennies during lunch.⁴⁰ Lillian Feldman grasped sizable freedom at sixteen, lying about her age to get into nursing school (against her mother’s wishes: “Jewish girls don’t go into nursing!”).⁴¹ But the gendered bonds of family and education persisted, even as she made adult choices. A 1946 letter from the University of Cincinnati stated, “Since you will be a senior student in December, and permission has already been received from your mother, the Executive Committee of the College of Nursing and Health . . . approves of your plan to be married in December.”⁴²

TWO YEARS BEFORE NOCHLIN was asking and answering “Why?,” Schwartz was dripping and pouring pigment at Bell Labs. Lynda Benglis had begun to pour paint the year before that, and Helen Frankenthaler had been doing so for nearly two decades. But Schwartz’s splattering was unhinged from formalist motivation and conceptual critique, and was instead guided by her intuitive pleasure regarding the interaction of forms and colors and motivated by her need to solve to a practical dilemma: How could she extend the minuscule piece of machine-generated footage she had produced in order to complete her first film? Moving not only backward in time, against the rush of technological



Schwartz abandoned the materiality of paint in her computer art, but it remained a guiding force, a figurative anchor.



Top, from left: Morris Louis, *Spawn*, 1959–60, acrylic resin on canvas, 72 × 96". Still from Lillian Schwartz's 16-mm prepatory "paints" reel for *Pixillation*, 1970.

Bottom, from left: Slide for Lillian Schwartz's *Proxima Centauri*, 1968. Helen Frankenthaler, *Reunion*, 1969, acrylic on canvas, 67 × 35".

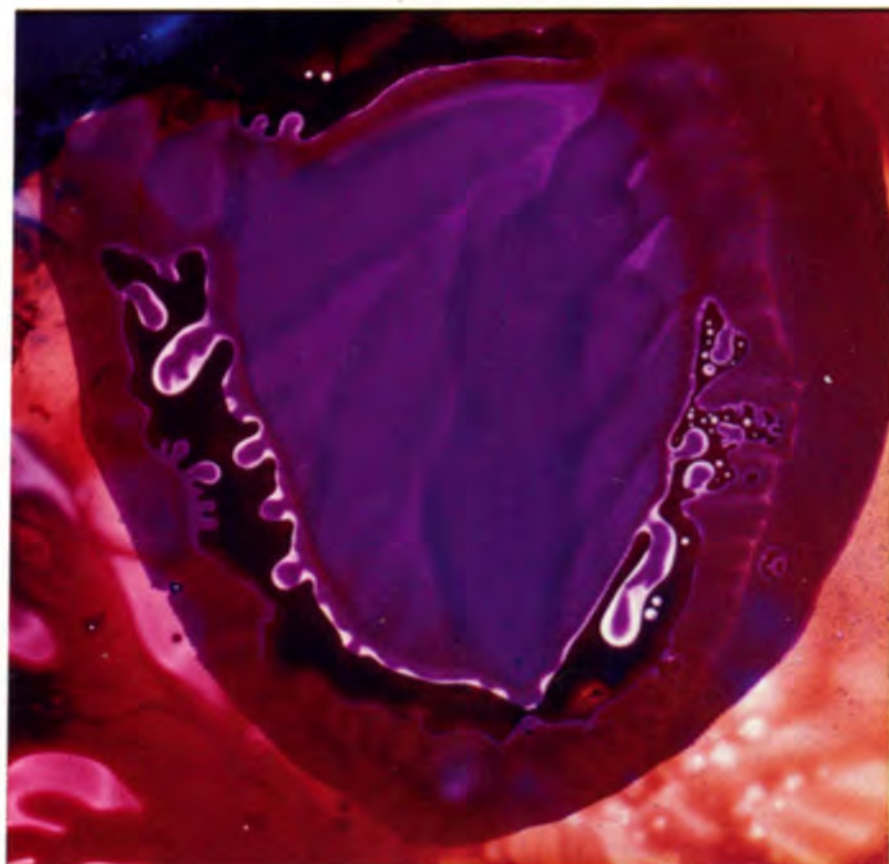


innovation, but toward the interior of Schwartz's artworks themselves—to the paintings she created for *Proxima* and other light sculptures, to a set of images that might exist in the expanded field of Schwartz's dense "actuality"—a trail of abstract painting vividly anticipates *Pixillation*. Schwartz had painted representationally at first: After mastering Chinese brushwork in Japan during the occupation—her husband, a doctor, was stationed there—she studied with Léger's student Ugo Giannini and the American muralist Michael Lenson in New Jersey in the '50s.⁴³ But off the canvas, a drive toward representing chromatic



liquidity itself took hold: In the early '60s, Schwartz began to infuse her sculpture, previously made of bronze, cement, or plaster, with colored lights and liquids, mounting laminated paintings on medical X-ray boxes with fluorescent backlighting and injecting dye into plastic "Acrylicast" forms streaked with bubbles and distortions. In her *World's Fair*, 1964, motors thrust and retract six colors of liquid through overlapping glass tubes and spiral containers, producing sudden, wild chromatic variations and foretelling *Proxima Centauri*'s radiant flow.⁴⁴ But Schwartz was not satisfied. "I need to make movies. . . . I need motion," she confessed to Lenson in 1969.⁴⁵ He encouraged her to return to sculpture, but ironically she wanted to use film to get closer to painting: "I think I can get flickering surfaces like the Cubists, and capture the sensation of objects in motion like [Giacomo] Balla, like the Futurists."⁴⁶ Schwartz needed a medium that could keep pace with the sheer speed of her mind.

In juxtaposing Schwartz's images with famous ones that emerged unscathed from the flow of time—made permanent, as Dalí hoped his crystal pen might be—I do not seek a resemblance that might confer value but rather hope to invite fresh forms of contact. Schwartz's fluencies are so various and so unmotivated by the developmental story of art that we depend on to determine value that her images and processes literally don't stop in the familiar places. Recalling Penzias's remark about her productive "technological ingratitude," Schwartz is insistent that she hates to repeat herself. "I've always been interested in what different media could provide me in terms of creating something that had never been seen before or provoke



Left: Slide for Lillian Schwartz's *Proxima Centauri*, 1968.

Right: Lillian Schwartz, *Acrylicast #32 (detail)*, 1961, acrylic, metal, 21 1/4 x 20 1/8 x 6 7/8".

Above: Lillian Schwartz, *Proxima Centauri (detail)*, 1968, plastic, ripple tank, slides, slide projector, motors, electrical equipment, lightbulbs, mirrors, metal, pressure-sensitive pad, Micarta-laminated wood; base 55 x 30 x 30", globe 30" diameter. Photo: Peter Moore.

me to create in ways I had not created before," she said.⁴⁷ This interest was so forceful that it superseded her need to identify as an artist. "My fellow artists began to look on me as a prostitute," she said. "My friends were computer people, not artists. I haven't been able to find an artistic circle where I can discuss my work," she added, at eighty-six, ushering the dilemma into the present tense.⁴⁸

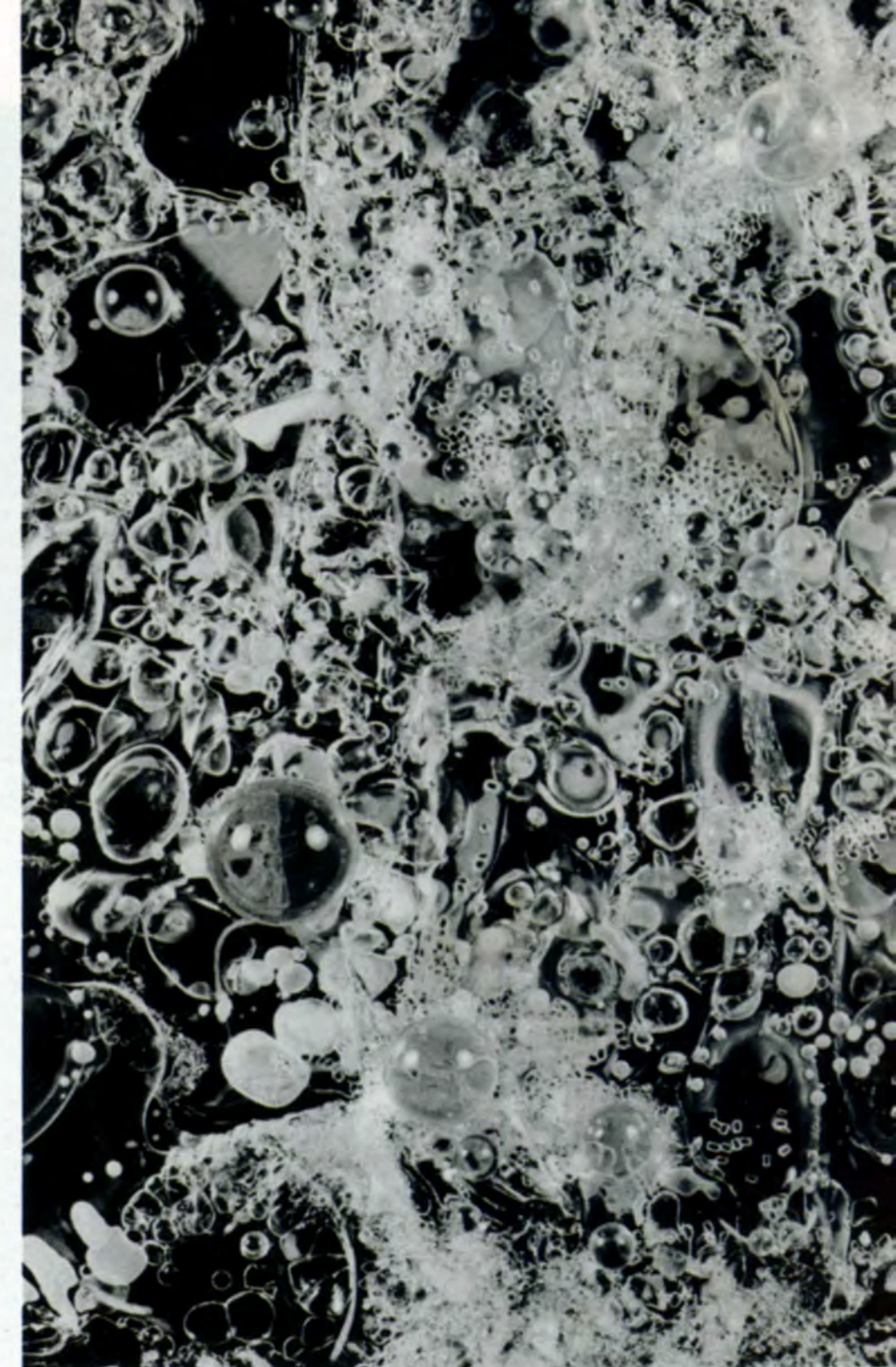
Puncturing the old story of modernism can cause a splatter that announces the irregular contours of an "actuality" we overlooked. In *The heroine Paint: After Frankenthaler* (2015), a compendium of essays, edited by Katy Siegel, on the titular Abstract Expressionist's work and its legacy, the "calcified" modern narrative opens onto a broader space of consideration that emphasizes the second generation of the New York School—and beyond—and women who poured, stained, and bled paint.⁴⁹ Siegel attends to Frankenthaler's "variously impure space where varied aesthetics could coexist" and Lane Relyea to forgotten forms and contexts: watercolor and tapestry and industrial and domestic destinations for works of art.⁵⁰ They reinstate the capacity of "painting" to function as "a very broad social, intellectual, physical container for whatever it is that [artists] wanted to do," paying particular attention to the gendering of painting's broad social and material contexts.⁵¹ Schwartz's art belongs in the aerated book of modernism—one that embraces unfamiliar discursive orientations and acknowledges alternate mixtures of seriousness and play and economies of labor and recognition.⁵² In *The Computer Artist's Handbook*, Schwartz's 1992 guide to "re-shap[ing] the computer"

for creative purposes, her interlocutors include Duchamp, van Gogh, Vermeer, Picasso, Kant, and Wittgenstein.⁵³ Her engagement with the history of Western art is profound, but she grants it practical, accessible value, oriented not to the metaphysical but to craft, technique, and the mechanics of perception. Schwartz happily chopped up MOMA's holdings for her PSA, animating thumbnail Matisse and Rousseaus into a fast-paced parade.

Schwartz abandoned the materiality of paint in her computer art, but it remained a guiding force, a figurative anchor: an analogy (the computer is "like an apprentice [who mixed paint for Leonardo]"), a foil (the computer artist "no longer has to wait for the paint to dry"), and an ideal (accidents resulting from the use of a random number generator made the process "just like painting!").⁵⁴ In an undated marker drawing, Schwartz wrote the following words over an elephantine face composed of bright stripes: THE WOMAN IS CAUGHT WITHIN HERSELF. SHE'S BROKEN UP INTO RED, YELLOW, ORANGE, GREEN AND MEN . . . SHE MUST—DIE—LIVE—SUFFER—PAINT—IMAGINE—AND GET FAT . . . THESE ARE VAN GOGH'S COLORS. THEY ARE HERS TOO. HERS TOO. NOT JUST VAN GOGH'S . . . IT'S TIME TO PAINT AGAIN.⁵⁵

LOSS OF FACULTIES

In 1949, in Japan, Schwartz was hospitalized with polio. A Zen Buddhist teacher addressed her paralysis by teaching her calligraphy as meditation. First Schwartz spent weeks contemplating the variety of brushes—their shapes and functions—and the blocks of dry ink that she would later crush and liquefy.



"I learned to paint in my mind before putting one stroke on paper," she recalled. "I learned to hold a brush in my hand, to concentrate and practice until my hand no longer shook."⁵⁶ Schwartz names this time as the origin of her filmmaking at Bell Labs.⁵⁷ The capacity to imagine lines unfolding before they found material form enabled her to envision whole films—enabled her not just to tolerate but to thrive in the time-delayed terrain of Bell Labs, where there was "a disembodiment of hand, drawing tool, and canvas" and "no immediate interaction among input, an image appearing on a monitor, manipulation of the image, and output."⁵⁸ In the modernist story of drip and splatter painting, drama resides in the unmediated contact between fluid and canvas; brush cast away, the whole body performs the mark-making gesture. Schwartz guides us to a much vaster space of chroma in motion—where its roles as imagined and material mark, held alternately by mind and hand, are forever trading places. □

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For notes, see page 292.