

COLOR FILM / FILM COLOR

ROTEM LINIAL



Michael and Sanford Wurmfeld on a train to Washington, D.C. to see the exhibition, Matisse: The Cut-Outs, 1977.

In 1969, the Wurmfeld brothers, Sanford and Michael, set off on an incredibly creative and productive collaboration that would serve as the culmination of years of intellectual and artistic exchange and bring together their shared interests in perception, color, and space. Finding a common ground in cinema, they produced, in three years, seven unique and mesmerizing short films. Shot on 16mm, the Wurmfeld brothers' films consist of pure color frames whose visual effect relies on the organization of the color experience temporally by determining the duration of each frame and exploring the possibilities of sequential organization of color stimuli on a viewer's perception. Wurmfeld's ongoing investigation of color and duration, and Michael's interest in expanding the experience of architectural space found a natural, if unexpected expression in the medium of film. Film allowed Wurmfeld to structure perceptual experience temporally and to work with a new register of color, the additive primaries red, blue, and green. It allowed Michael, the Princeton-educated architect, to dematerialize space through projection. Striking experiments in the structuring of color and time, the Wurmfeld brothers' films form a little known and seldom screened body of work and they are a profound contribution to the history of American avant-garde filmmaking.

The Wurmfelds' films have rarely had the privilege of being shown to their full advantage. In the current exhibition, all seven are projected on an entire gallery wall. Stretching from wall to wall and from floor to ceiling, the films replace tangible, mundane space with an all-encompassing color-field—an ephemeral, flickering, luminous wall of colored light. This display, which heightens the architectural potential of film, was what the Wurmfelds originally envisioned for their work. The brothers even looked into producing 70mm versions so that their films could be projected at wall-scale or larger (IMAX had not yet been invented but the Cinerama format was still around),

but the process was prohibitively expensive at the time. The immersive color-space that the brothers imagined would be achieved, years later, in Wurmfeld's Cyclorama—an endless horizontal band that occupies one's field of vision, enveloping the viewer in a radiant color-space. In the Cyclorama, color seems to detach itself from its material support, arriving at an apparent transparency and dematerialization that the gestalt psychiatrist David Katz terms film color.¹ Katz designates different modes in which color may be experienced, defining film color as the mode of appearance in which color is perceived unmoored from materiality; color detached from an object or spatial referent; color qua color, hovering between the retina and the world. Though Wurmfeld had been experimenting with film color in painting and sculpture, it is the brothers' color films that first arrived at an undeniable experience of film color and a radical transformation of space through color.

The body of knowledge in which the Wurmfelds' color films are rooted (and which they expand) is one that Wurmfeld had been exploring in painting since the mid-1960s. A rare erudition in the history of color theory and an unwavering commitment to perception vis-à-vis color brought the contingent nature of vision, and the centrality of duration, to visual experience to the forefront of Wurmfeld's interests early on. From the start, his paintings employed and investigated such phenomena as figure-ground interchange, optical mixing, color assimilation, simultaneous contrast, and apparent transparency; they reward the viewer in different ways through scanning and fixation, and reveal different possible spatial and chromatic organizations as the viewer transitions from one mode of viewing to the next. Wurmfeld sought ways that would precipitate a new active mode of looking on the part of the viewer. Seeking to further engage the viewer's body and highlight the temporal aspect of visual experience, the artist began pushing his perceptual explorations

into three dimensions. At that time, he also began making sculptures that deliberately imbricate spatial and temporal engagements [FIG - 1966 painted columns/1968 Tibor de Nagy show]. These works could never be seen as static images—impossible to sustain as suspended in the viewer's mind and removed from a temporal unfolding.² Not only did one have to contend with the work “in-the-round,” but the geometry of the sculpture was symmetrical along its central axes while the chromatic treatment of the pieces' facets varied—playing change and stasis off of each other in new and exciting ways. This underscored the primacy of the perceptual experience for Wurmfeld, highlighting the active construction of the visual experience that takes place between the eye, the brain and the world: thus not so much an object transformed by our vision as our vision itself transforming.

Wurmfeld's mobilization of three dimensions in service of an active, ever-changing perceptual experience culminated with the color maze of 1970 in which viewers quite literally changed their spatial relationship to the elements of the piece by walking through a maze of transparent color panels, making the sequence of viewing, the way the work unfolded for each viewer in time, more salient than the “objective” form of the piece. Duration became a key aspect in Wurmfeld's understanding of perception and, paralleling his move from the creation of apparent transparency in his earlier paintings to physical transparency in the color maze, the ephemeral duration of painting was replaced with real time. Viewers now literally entered the work and passed through it. The artist's move into a time-based media seemed a natural one. Indeed, the Wurmfeld brothers' first film, *Primaries 10/70*, is contemporaneous with the color maze.

Primaries 10/70 began the brothers' experimentation with temporal optical mixing. The film begins with static frames of blue, green, and red following in sequence. Though the films unfold linearly, one frame following another, the visual effects and the experience of viewing complicate this basic tenet of the medium. As the movie progresses, the duration is shortened to begin arriving at apparent color mixing. However, from the outset, additional factors complicate the visual experience. The relatively long frames of single colors with which the film opens and the inten-



FIG. 1 From M.E. Chevreul, *The Principles of Harmony and Contrast of Colours, and Their Applications to the Arts*, translated from the original French by Charles Martel, third ed., published by Henry G. Bohn, London, 1859.

sity of projected light produce a vivid afterimage for the viewer. [FIG - Color halo/simultaneous contrast illustration from Chevreul's *De la loi du contraste simultané des couleurs, et de ses applications*] One can refer to the nineteenth century illustration from M.E. Chevreul's *De la loi du contraste simultané des couleurs, et de ses applications* (1839) [Fig. 1] that demonstrates the disappearance of the forms' complementary hued halos with durational viewing; this experience is due to simultaneous contrast and afterimage phenomena. The films induce this perceptual sensation, destabilizing conventional understandings of the objective, straightforward nature of vision. As the bright colored light flickers on the screen, these afterimages, “burned” onto the retinas of the viewers, continue to “hover” between the viewers' eyes and the screen. The afterimage is seen “over” or “in front” of the next frame, creating yet another form of color mixture—the projected color being affected by the afterimage of the previous frame. The Wurmfeld brothers engaged with these phenomena, consciously creating varying intensities of color mixture through the controlled succession of color frames. They systematically explored the blending of two colors and contrasted them

with the third. As all three colors are projected in quick succession, the intense visual experience of single frames coalesces into apparent whiteness, as the colors blend in the eye of the viewer. The experience of the additive mixture occurring temporally is then allowed to resolve as an afterimage lingering over a ground of static color.

The brothers developed meticulous shooting scripts using grid paper on which they mapped out the films' structures. These scripts are fascinating visual artifacts in their own right, and are being displayed publicly for the first time in the present exhibition.³ The system they developed for *Primaries 10/70* used narrow-band Wratten filters to expose single layers of the film stock's color emulsion leaving only pure red, pure green, and pure blue to be developed. The process itself was, with the technology available at the time, extremely laborious and expensive. Film graphics companies specializing in credits and other graphic effects for the film industry were commissioned to produce the Wurmfeld brothers' movies following the scripts, exposing the film stock frame-by-frame on optical printers.⁴

The following two films, *Primaries 11/71* and *Primaries 10/72*, complicated the system set out in the first film. Using similar organizational structures, the brothers split the screen vertically, in two and three respectively, allowing them to explore the effect of temporal as well as spatial organization of color. The afterimages produced in these films further layered the viewing experience as the floating skein of color could now be seen as both affecting and affected by the color against which it was seen, as a split-screen afterimage was now experienced over a single fixed frame of color. Color mixing occurred within the frame while the introduction of an edge condition—the highly contrasted edge at the meeting between a red and green field within a single frame for example—simultaneously allowed for an experience of contrast across the entire image plane. These were followed by *Film in Six Colors 1/73* and *Film in Six Colors 2/73* which expanded the chromatic vocabulary of the film to six hues—red, orange, yellow, green, blue, and violet. *Film in Six Colors 1/73* consists of full frames of color while in *Film in Six Colors 2/73* each frame consists of seven equal-width vertical bands of color, such that the outer bands repeat. The frames follow in sequence

as the colors “shift” position progressively across the screen from one frame to the next, producing, in addition to the optical phenomenon described thus far, also a rudimentary experience of motion. As the film shortens the projection time eventually to a single frame of each image, comprised of vertical bands, an apparent “motion” appears only to “reverse” as the film lengthens back toward multiple frames of each image creating a feeling of decelerating “motion.”

The films, primarily the full frame ones, present no discrete objects for the eye to focus on, therefore producing in the viewer a shifting focal range as the eye-brain tries to make sense of the space in which it has found itself. As the films arrive at a frame rate of approximately ten frames per second, luminous ephemeral forms emerge. These shapes have no evident source in the static images projected and are a direct result of our perceptual faculties. These geometric forms have been documented as early as the 1819, most famously by Jan Evangelista Purkyně [Purkinje] for whom the phenomenon Purkinje Colors is named. Also known as photically induced hallucinations, or flicker hallucinations, this phenomenon remains little understood and is still being studied by neurologists. The experience makes vividly clear the subjective nature of vision as every viewer's perception necessarily diverges; no two viewers can experience the film identically. The full range of visual phenomenon produced by the films; the afterimages that linger somewhere “between” the eye and the screen; the flicker which taxes the eyes; the Purkinje Colors and the retinal fatigue produced by static frames of color—all contrive to produce an experience of film color which serves to dematerialize the perception of the concrete architectural space.

The Wurmfelds' interest in the perception of duration is perhaps most pronounced in the film *From White to Black 12/73*. The film begins with a static image of white light lasting twelve frames—indeed each color throughout the film last exactly twelve frames. The film progresses in steps of equal duration, dividing the contrast between white and black eventually into thirty-three discrete equidistant degrees of value. The structure of the film, in fact, is defined by intercutting an additional light/dark value to each one of the steps between frames of white and black: white and black interspersed

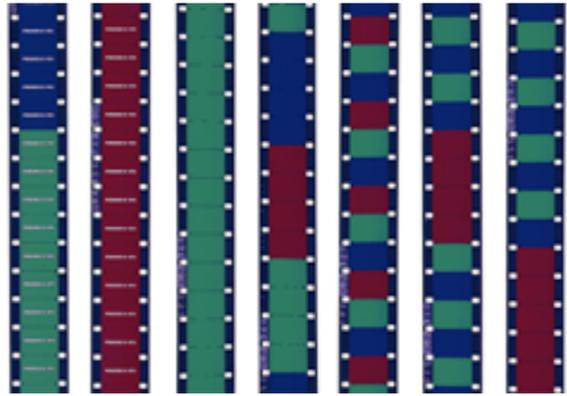


PLATE 14 Primaries 10/70, 1969-73 (Digitized 2010-12). 16 mm

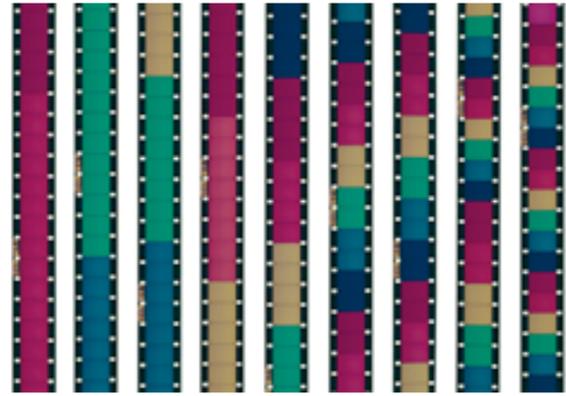


PLATE 17 Film in Six Colors 1/73, 1969-73 (Digitized 2010-12). 16 mm

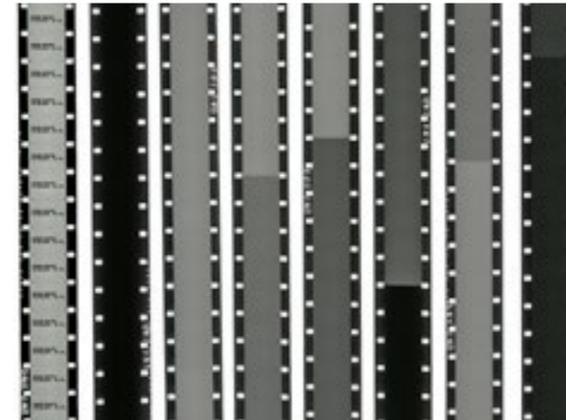


PLATE 20 From White to Black 12/73, 1969-73 (Digitized 2010-12). 16 mm

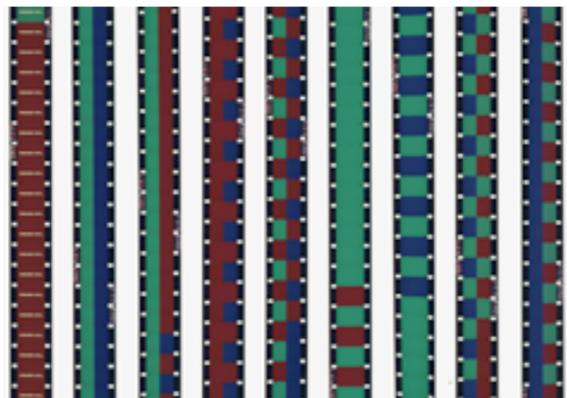


PLATE 15 Primaries 11/71, 1969-73 (Digitized 2010-12). 16 mm

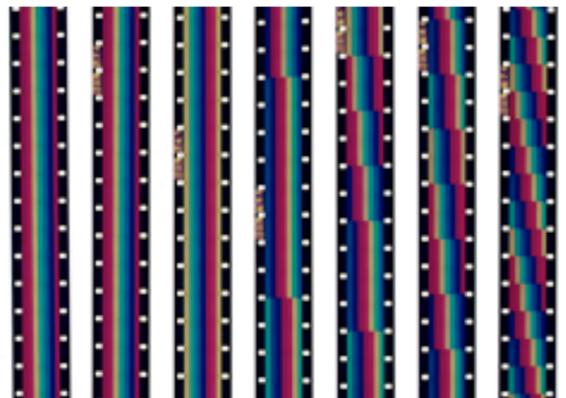


PLATE 18 Film in Six Colors 2/73, 1969-73 (Digitized 2010-12). 16 mm

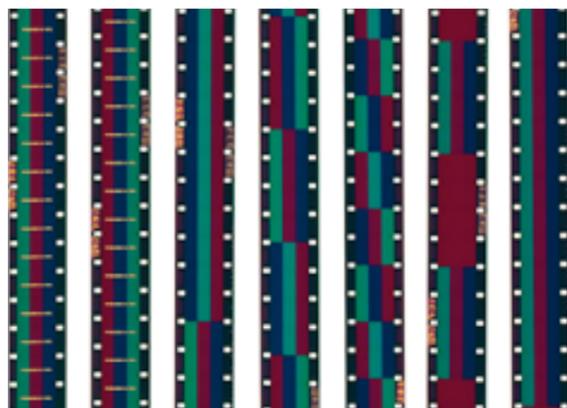


PLATE 16 Primaries 10/72, 1969-73 (Digitized 2010-12). 16 mm



PLATE 19 Film in Six Colors 10/73, 1969-73 (Digitized 2010-12). 16 mm

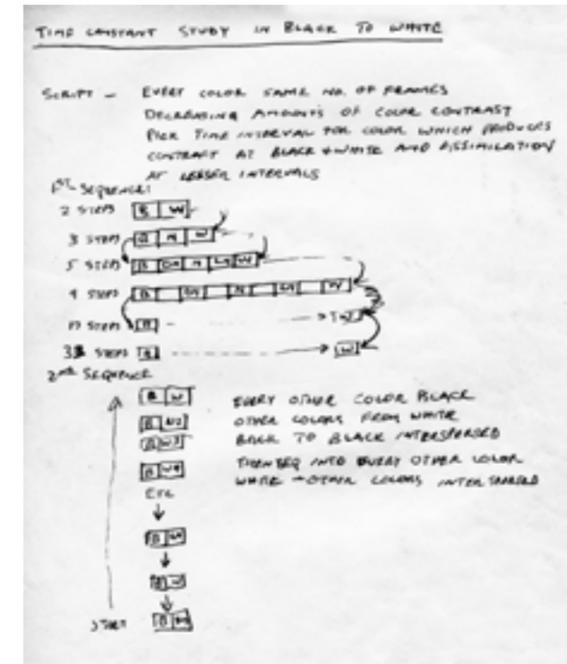


PLATE 21 Film script from From White to Black 12/73, 1969-73. Mixed medium on paper, 9 x 14 in. (22.9 x 35.6 cm)

with middle gray, followed by three steps of gray, and progressing to five, nine, seventeen, and finally thirty-three steps of gray. The film arrives at thirty-three values of gray and then reverses the order of their display; having begun with pure white, the film moves in inverted symmetry this time toward black.

Though the physical duration of the different gray values does not change from one “shot” to the next, the changing degrees of contrast are perceived as having different durations—a surprising discovery which makes palpable that duration itself is experienced as contingent on color perception and that not only the reverse is true. It is a rare thing to become so viscerally aware of the subjective and active nature of visual and temporal perception—an achievement that the Wurmfeld brothers struck many times over in their color films.

The films are all silent, static, and most are intensely stroboscopic. They present no “natural” imagery or motion in a conventional sense, and the films’ shooting scripts set up systems for the organization of color. While Wurmfeld’s paintings explore the different possible organizations of the hue, saturation, and value within limited structural, two-dimensional frameworks, the films do so by organizing their elements temporally. The films activate the nature of perception, pushing persistence of vision—the eye-brain system’s tendency to cohere intermittent static frames into apparent motion, a condition fundamental to the working of cinema technology—into an exploration of color perception. Color frames replace each other sequentially on the screen. Though we may begin by seeing discrete frames of red, green, or blue, the brothers’ alteration of the duration of the frames causes new colors to be perceived: colors that are “not there,” colors that exist only in our perception. Within the intense strobe of the films, colors mix in our eyes, making viscerally clear that vision itself is far from a simple linear process; rather vision is experienced as an active collaboration between our minds, our eyes, and the external world.

Due to the stroboscopic and highly structured nature of the brothers’ films, their work may at first glance appear to have strong visual and formal affinities with the cinematic experiments of “Structural Film,” such as Tony Conrad’s *The Flicker* (1965) or Paul Sharits’ stroboscopic color films (from the 1970s). This superficial

similarity, however, belies a significant difference between the Wurmfelds' work and the work of their contemporaries. While the Wurmfelds' films display certain visual and structural features that P. Adam Sitney defines as distinctive hallmarks of "Structural Film"⁵—as stroboscopic effects, the use of fixed frames and systematic organization of the total form of the film—they do not fit neatly within this category. Sitney and other film scholars understood "Structural Film" as an expression based on an impetus toward an examination of the material determinants of the medium itself, considered in terms of a larger project of medium reflexivity.⁶ Turning to the underlying determinants of cinema, filmmakers that Sitney would categorize as "Structural," expressively made use of and explored the material qualities of celluloid, the mechanics of projection and camera, the nature of the screen, magnetic sound, the basic condition of intermittent light fundamental to film, and so on.

The Wurmfeld brothers had seen Sharits' and Conrad's work as well as the work of other young American filmmakers and were well versed in the history of avant-garde abstract cinema, having seen the work of such abstract film luminaries as Len Lye, Oskar Fischinger, and Hans Richter. While the brothers recognized the visual affinities between the "Structuralist" artists' work and their own, Sanford Wurmfeld states that their rationale, as well as their motivation, remained decidedly apart:

We were making these as an offshoot of my interest in perception and Michael was doing them as a continuation of his interest in exploring duration and space. We saw them as an offshoot of our other work in painting and architecture.⁷

The Wurmfelds understood that while their films inhabited similar territories, their motivations varied from those of "Structural Filmmakers." Narrowing down the formal aspects of film offered the brothers clear limits within which they could mount their exploration of color perception and duration. Their films did not intend to merely reveal or articulate the material determinants of the medium, but to extend new perceptual phenomena made possible by this medium. The films thus turn "pure cinema" toward the cross-media concern that has been the driving force of

Wurmfeld's life-long practice—his investigations into color.

In their singular approach to the medium, the Wurmfeld's films may have more in common with works that went beyond the narrow confines of the materials and tools of the medium such as Anthony McCall's Long Film For Ambient Light (1975) or Conrad's Yellow Movies from the early 1970s. While using no recognizable film materials, these works can still be understood as medium-reflexive by "simply shifting the locus of the 'essentially cinematic' from the film strip, camera, projector, and screen to light and time. Thus, any artwork that traded in these elements—light and time—could be considered 'cinema,' even if it was not film."⁸ Similar to the way in which works that were not embodied in the material of film could be thought of as "cinematic" perhaps the Wurmfelds' films could be considered through another parallax, namely that of painting. Borrowing Jonathan Walley's iteration of the term "para-cinematic" the Wurmfelds' films may be regarded as "para-painterly." What had become "essentially painterly" for Wurmfeld were color and duration, aspects which he explored in every medium in which he worked. Harnessing each medium to produce new and unique visual experiences, the films expanded the artist's indefatigable exploration of color and perception.

Nearly forty years after their creation, Wurmfeld returned to these films, transferring them to digital format in 2010 and 2012. This transfer is far from a simple transcription of the films from one medium to another: rather Wurmfeld re-created the films digitally with Ira Eduardanova. Adhering to the original shooting scripts, the films were meticulously reconstructed one frame at a time on a computer. In these versions, Wurmfeld followed the original logic of the Wratten filter optical printing by replacing the "pure blue" of film stock with the "100% B" of the digital color space, retaining not the purity of medium, but the purity of vision. Michael, who passed away in 2000 would never experience his work realized in this way, because technology had not yet caught up to their work. Their 16mm reels were proposals awaiting the realization that digital video would offer. Not incidentally, the brothers began their foray into time-based media with an unrealized (and at the time unrealizable) project—they hoped

to control the separate pixels of a cathode ray tube from a television set, pixel by pixel: red, green, and blue. Technologically trivial by today's standards, no computer existed at the time that would have the computational power to do what the Wurmfeld brothers envisioned. Their films foresaw the digital/video landscape through the methodical and experiential engagement with color to which Wurmfeld has dedicated his life. They are visual experiences and offer the viewer new ways to experience color and duration, and they are intense, beautiful, and exciting. Their dematerialization of space, their realization of an appearance of film color and an immersive color space would all find their way later into Wurmfeld's Cyclo-ramas which achieve these effects in painting—"the most passive medium which would promote the most active viewing."⁹ The films' accomplishments, however, remain unparalleled not only in the brothers' oeuvre, but also in the history of art and cinema. Presenting us with a mesmerizing aesthetic experience, as well as a vivid awareness of our own visual engagement unfolding in time, the films engulf us in luminous color while expanding our perception of perception itself—a rare experience that film as a medium was uniquely suited to explore.

1. "Film color" is the standard English translation of Katz's term Flächenfarbe. See David Katz, *The World of Colour*, trans. R.B. MacLeod and C.W. Fox (London: Kegan Paul, Trench, Trubner & Co. Ltd., 1935): 15. It is important to note that while in English, film and cinema are nearly synonymous, the English term film color used here is unrelated to the medium of film. "Film" in this case refers to the perceptual and (im)material qualities of this mode of appearance of color. Katz further used the term Die freie Farbe to refer to the Flächenfarbe mode of appearance. Freie Farbe which can be translated as "free color" refers to color's detachment from a material strata and concrete location, while Fläche, meaning "plane" addresses the seeming non-volumetric boundlessness of color in this mode of appearance, perceived neither as a discreet, delineated object nor as belonging to a specific volume or surface. My thanks to Gabriele Evertz, Joan B. Reutershan, and Nicoline Strøm-Jensen for their research into the history and usage of the German terms and for elucidating the subtleties of Katz's terminology.

2. Attempts at highlighting the phenomenological experience of art could be found the mid- to late 1960s in the writing of both practicing artists and critics. Artists frequently referred to the philosophy of phenomenology to interpret certain aspects of Minimalism, most famously Robert Morris in his Notes on Sculpture 1-4, Annette Michelson's writing on Morris, and Michael Fried's well-known indictment of "theatricality." Wurmfeld's approach to phenomenology however, diverges from that of his contemporaries, addressing itself as much to vision as to the object under scrutiny. His investment in these ideas had less to do with the status of the object, a status that Minimalist artists

attempted to redefine—but rather with the act of looking itself. The object or painting served for Wurmfeld as a mirror through which to reflect on one's active involvement in the act of seeing, a mirror onto perception itself. Though beyond the scope of this essay, the relationship between Sanford's diverse practice and that of his contemporaries—in both painting as well as sculpture—warrants an in-depth study.

3. I would like to thank Constance DeJong for introducing me to these scripts and insisting on their display in the current exhibition, and for Wurmfeld's generosity in walking me through them, illuminating their logic.

4. Though graphically simple, the precision required to create these frames is impressive. The film mattes had to line up perfectly in two and later in up to six subsequent exposures. The smallest gap would produce a black line between areas of color where the film was unexposed; the smallest overlap would overexpose the film resulting in a lighter strip of mixed color.

5. Sitney, P. Adam, "Structural Film," *Film Culture* (Summer 1969); reprinted in *Film Culture Reader*, ed. Sitney, P. Adam, 2nd ed. (New York: Cooper Square Press, 2000): 326-348.

6. While Sitney's theorization of "Structural Film" applied to certain works and filmmakers (Sitney considered under this rubric) and while the term offered a framework through which to consider certain tendencies arising in avant-garde filmmaking at the time, the term was extremely contentious and was criticized by artists and critics alike, most notably by George Maciunas shortly after the publication of Sitney's aforementioned essay and Bruce Jenkins' "The Case Against 'Structural Film,'" *UFA Journal* 33 (Spring 1981): 9-14.

7. Sanford Wurmfeld, interview by the author, October 11, 2012, New York.

8. Walley, Jonathan, "The Material of Film and the Idea of Cinema: Contrasting Practices in Sixties and Seventies Avant-Garde Film," *October*, 103 (Winter 2003): 16.

9. Sanford Wurmfeld, interview.

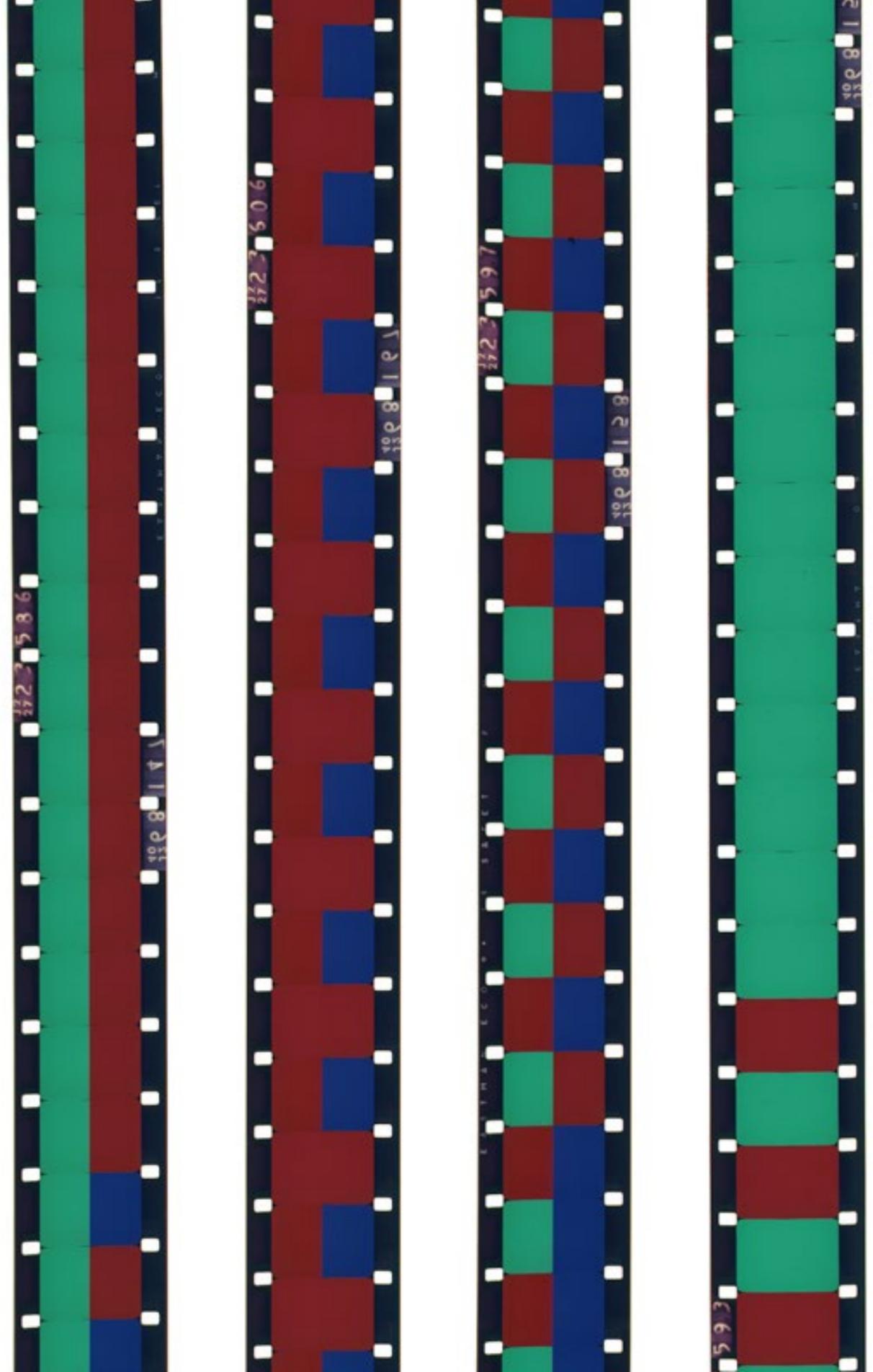
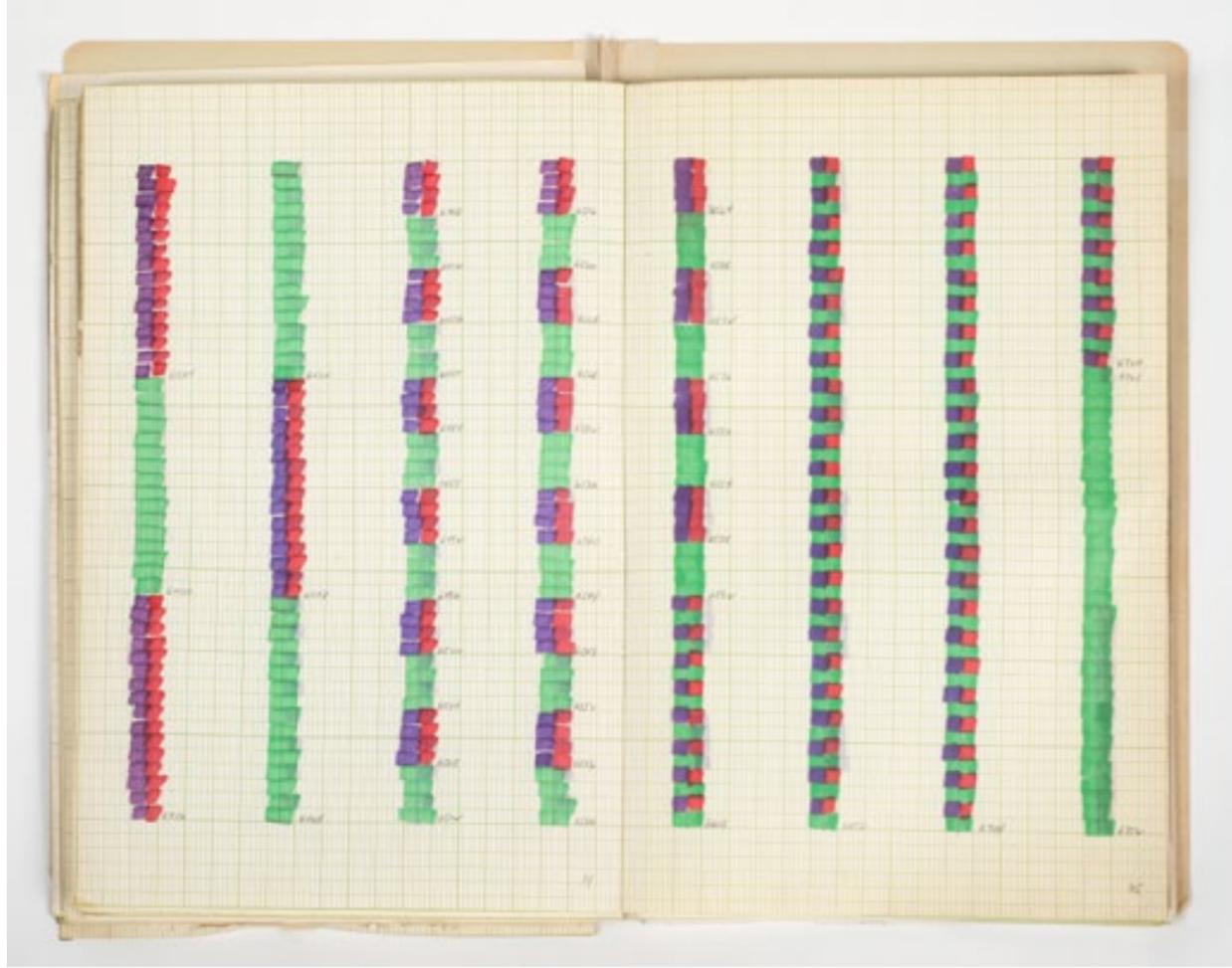


PLATE 22 Film script from Primaries 11/71, 1969-73. Mixed medium on paper, 9 x 14 in. (22.9 x 35.6 cm)
Opposite: Primaries 11/71 (detail), 1969-73.

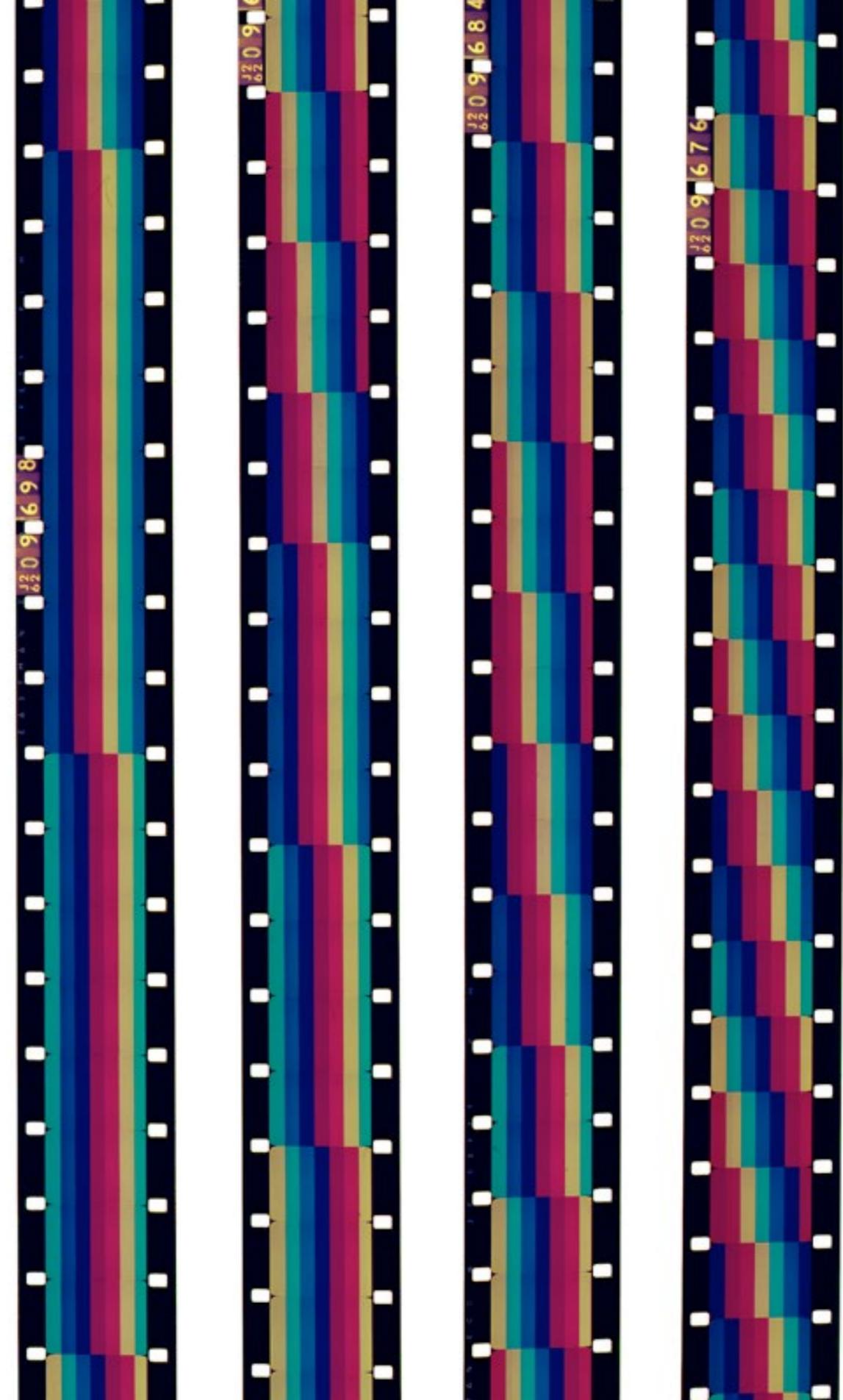
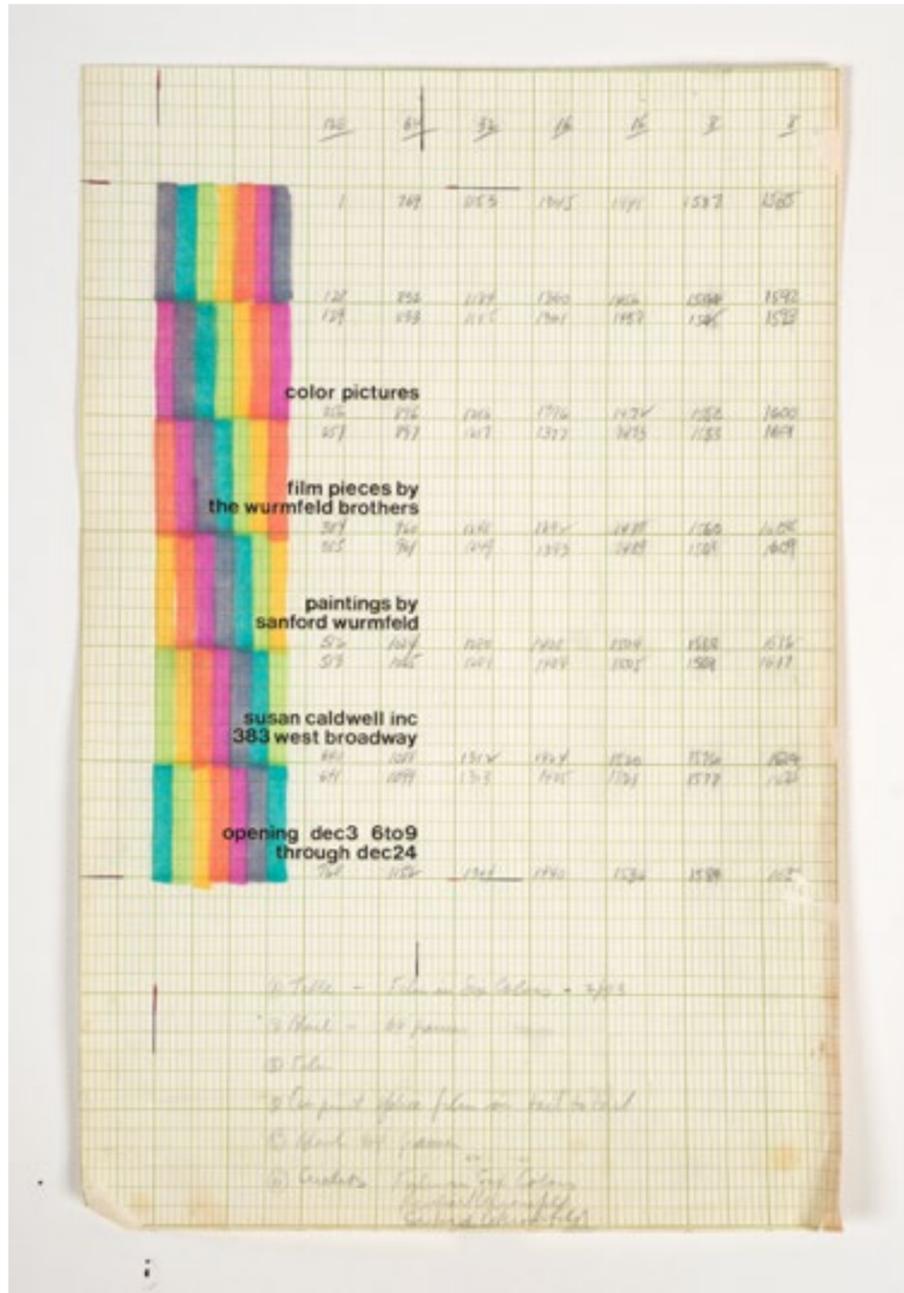


PLATE 23 Film script from Film in Six Colors 2/73, 1969-73. Mixed medium on paper, 9 x 14 in. (22.9 x 35.6 cm)
Opposite: Film in Six Colors 2/73 (detail), 1969-73.



Installation view of Color Pictures exhibition at the Susan Caldwell Gallery, New York, December 1976.