The Expanded Image: On the Musicalization of the Visual Arts in the Twentieth Century
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Exposition

Until well into the nineteenth century, the experience of audiovisual arts was bound to a unity of space and time (and action, too, in a certain sense). The technical media of photography, gramophone recording, silent film, talking film, and video made it possible to reproduce sounds and images, but they also separated them only to slowly reunite them again. These media evolved from devices used purely for storage and reproduction into performative instruments for creating new forms of audiovisual experience in real time, a process reinforced through numerous efforts to synthesize or expand the arts by incorporating or transferring concepts and techniques from different art forms. Thus, musical theories and techniques were adopted to explain developments in the visual arts, and vice versa.

Against this general background, this essay aims to identify strategies which the visual arts borrowed from music while changing and expanding compulsively during the twentieth century. The focus will not be on image/sound combinations, although sound does often play a part in the works that will be discussed in the following. Instead, this text will deal with the musicalization of the image in a broader sense.

These endeavors first culminated in the 1910s and 1920s, then again in the 1960s and 1970s, and for the third time from the 1990s until today. The peaks in interest came with the media technology breakthroughs of the twentieth century, with the recognition of film as an art, with the establishment of electronic media, and with the arrival of digital technology. The possibilities offered by each new media technology and the ideas of artists about amalgamating and expanding the arts (and combining and transforming the acoustic and the visual) reinforced each other reciprocally.

Around the turn of the last century, ideas from music were used to support painting in its evolution toward the abstract, while film—the first technological time-based visual medium—integrated the temporal aspect of music. In the 1960s, expanded cinema exploded the cinematographic projection room, and the visual arts acquired a performative quality in lightshows, multimedia installments, and real-time video applications. Today, digital technology seems to have dissolved the distinction between sounds and images into bits and bytes and to have assimilated all the strategies of musicalization used in the visual arts of the past.

We can identify four main strands that enable us to trace the history of the musicalization of the visual arts:
1. a shift away from the mimetic principle in pictorial representation
2. the integration of the musical dimension of time into the visual arts and the use of compositional methods for structuring the visual
3. the expansion of the visual into space
4. the live generation of images through improvisation and the use of real-time media

All four factors first emerged—some of them independently—around the same period in the 1910s and 1920s, then proceeded in parallel or were later resumed and further cultivated. Simplifying, one could say that the different strands commenced at the start of the twentieth century, cumulated in the middle of the century, and converged at its close.

It is possible to trace a path through these developments in the visual arts in selected examples, although this should be understood as only one of several interpretations, for it would be just as easy to describe the use of visual techniques in a musical context as an inverse counterpart—but that would be another story.

Development

Non-representationality

The literature and art critic Hermann Bahr called for a musicalization of painting as early as the turn of the last century, yearning for an audience "that no longer requires an object, but rather is happy to listen to the music of the colors."[1] For many visual artists of the early twentieth century, music embodied what they believed the visual arts should ideally be achieving: "No longer content simply to reproduce the visible world, painters instead sought to endow their canvases with the emotional intensity, structural integrity, and aesthetic purity that they contributed to music."[2] The trend toward reduced forms and treating colors and lines as having their own intrinsic value had already begun in the late nineteenth century; now modern painting (following the lead of absolute music) was finally liberated from the need for external references and led into complete abstraction.[3] Around 1910, artists in many European countries—simultaneously and often unknown to one another—took to the path of "absolute painting" using a variety of techniques and styles.

One of the main protagonists was Wassily Kandinsky, who not only produced some of the first non-representational paintings, but also developed a comprehensive aesthetic theory of non-representational art in his treatise *Über das Geistige in der Kunst* (Concerning the Spiritual in Art, 1911/1912), which found wide circulation among European artists. Inspired by theosophical and anthroposophical considerations, he conceived a vision of a new "inner," "spiritual," and "abstract" art that in its conception and in the use of its instruments, in its expressiveness and its emotional effect, would emulate music as "the most non-material of the arts today."[4] He believed the prerequisite for such an art to be a profound understanding and conscious use of "the methods that belong to painting alone, color and form."[5] Kandinsky thus analyzed the materials of a potential "counterpoint in painting"[6] by evidencing the characteristics and effects of colors and forms and their possible combinations and mutual relations, which could ultimately be used to create a "composition derived from purely painterly terms."[7] Although Kandinsky believed that the harmony of colors and forms rested on the "principle of inner need,"[8] he saw the "future of the harmonics of painting" as lying in the "great and exact relationship"

1   Hermann Bahr, cited in Werner Haftmann, "Über die Funktion des Musikalischen in der Malerei des 20. Jahrhunderts," in *Hommage à Schönberg: Der blaue Reiter und das Musikalische in der Malerei der Zeit* (Berlin: Nationalgalerie, 1974), 8–41, here 20.

2   Judith Zilczer, "Music for the Eyes: Abstract Painting and Light Art," in *Visual Music: Synaesthesia in Art and Music since 1900*, eds. Kerry Brougher, Jeremy Strick, Ari Wiseman, and Judith Zilczer (New York: Thames & Hudson, 2005), 24–87, here 25.

3   Another example was the *poésie pure* of symbolist literature, which—likewise following the musical paradigm—had already broken away from the mimetic principle. There were also endeavors in painting to explore possible correlations between the musical scale and the color spectrum (similar to Baudelaire in his poem *Correspondances* and Rimbaud in his poem *Voyelles*).

4   Wassily Kandinsky, *Concerning the Spiritual in Art*, trans. Michael T. Sadler (1912; Whitefish, MT: Kessinger, 2004), 27–28. Translations have been adapted where necessary.

5   Ibid., 25 (author's italics).

6   Ibid., 36.

7   Ibid., 30.

8   Ibid., 32 and 35.

between the individual elements, which could be expressed in "mathematical form," since "the last abstract expression remaining to art is the number."[9]

As Kandinsky's deliberations make clear, (absolute) music's paradigmatic role was not limited to legitimizing a departure from objective representation, it suggested a way to work with material intrinsic to the art form and to organize it according to a set of rules. The aim of the analogy between color and form on the one hand, and musical tones on the other, was to transfer principles such as consonance, dissonance, and counterpoint to painting, and to establish corresponding, mathematically defined relationships between individual elements.

These associations of synchronous color and form relationships with harmonic theory were accompanied by efforts to also integrate the temporal dimension of music into painting—in other words, dynamic processes. This is evident in a range of Paris-based artists such as Robert Delaunay, František Kupka, and Francis Picabia, who continued the efforts begun in cubism to represent simultaneity by fanning out the pictorial object as well as seeking to systematize painting by means of geometric laws and theories of proportion and color analogous to musical art. Apollinaire coined the name "orphism" for this movement. Delaunay, for example, who preferred the term *peinture pure*, juxtaposed pure complementary colors in simultaneous contrast in his paintings; their simultaneous perception was intended to evoke the impression of movement on the plane and in space. "Around 1912–1913," Delaunay writes, "I had the idea of a kind of painting based technically only on color and color contrasts, but that develops over time and can be perceived simultaneously in one blink of the eye. For this I used [Michel Eugène] Chevreul's scientific term 'simultaneous contrasts.' I played with the colors as in music one can express oneself through a fugue of colored phrases."[10] In 1912, North American painters Morgan Russell and Stanton MacDonald-Wright, who also lived in the French capital during this period, created their orphism-related theory of synchromism, in which they developed color harmonies out of "color chords" and "color rhythms."[11] "These 'color rhythms' somehow infuse a painting with the notion of time: they create the illusion that the picture develops, like a piece of music, within a span of time, while the old painting existed strictly in space . . ."[12]

At the Bauhaus, Paul Klee also discovered a series of analogies between harmonics and color gradations, between the rules of musical counterpoint and the relationships of different pictorial elements, and between formal sequences and compositional arrangements in painting. Unlike other painters, who tended to use musical forms mainly for metaphorical reference, in works such as *Fuge in Rot* (Fugue in Red, 1921), *Polyphon gefasstes Weiß* (White Framed Polyphonically, 1930), and *Polyphonie* (Polyphony, 1932), the trained violinist Klee used principles of musical composition as an orientation for his own structural system:

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9   Ibid.

10   Robert Delaunay, *Du Cubisme à l'Art abstrait: Documents inédits publiés par Pierre Francastel et suivis d'un catalogue de l'oeuvre de R. Delaunay* (Paris: SEVPEN, 1957), 81, and in the same volume in the chapter entitled "Notes historiques sur la peinture," 112, cited in Gladys C. Fabre, "Vom Orphismus zum Musikalismus," in *Vom Klang der Bilder: Die Musik in der Kunst des 20. Jahrhunderts*, ed. Karin von Maur (Munich: Prestel, 1985), 360–367, here 362. Delaunay used this concept in his series *Windows* (1912) and *Circular Forms* (from 1912 onward) and returned to it again in 1930 for his *Rhythm* paintings.

11   Russell and MacDonald-Wright's theory was based on the concept of color they had learned from their teacher Percyval Tudor-Hart, who had developed a complex mathematical system of correspondences between musical and color tones. The artists simplified the concept and derived from it a harmony of colors based on "color chords."

12   See Zilczer, "Music for the Eyes," 43. Russell and MacDonald-Wright's quest to simulate movement and to represent color spatially led them to transcend the boundaries of painting and to experiment with a kinetic light machine from 1912 onward.

There is polyphony in music. In itself, the attempt to transport that quality into pictorial art would offer no special interest. But to gather insights into music through the special character of polyphonic works, to penetrate deep into this cosmic sphere and become a transformed viewer of art, and then to be able to follow these same things in a painting, that is something more. For the simultaneity of several independent themes is something that is possible not only in music; typical things in general do not belong just in one place, but have their roots and organic anchor everywhere and anywhere.[13]

Structuring time

The efforts described above to represent the temporal development of visual elements in terms of melody and rhythm and to overcome the definition of painting as a spatial art—which had prevailed since Gotthold Ephraim Lessing's essay *Laokoon oder Über die Grenzen der Mahlerey und Poesie* (Laocoon, or On the Limits of Painting and Poetry, 1766)—were inevitably thwarted by the fact that painting still remained static. This led numerous visual artists to experiment with a range of optical media. One artist who quickly recognized the potential of film to overcome the immobility of painting and to depict the rhythmical quality of music was the Russian-born painter Léopold Survage. He noted about his work *Rythmes colorés* (Colored Rhythms, 1912/1913), which consisted of several sequences of phase drawings intended for animation on film: "I will animate my painting. I will give it movement. I will introduce rhythm into the concrete action of my abstract painting, born of my interior life; my instrument will be the cinematographic film, this true symbol of accumulated movement."[14] At the beginning of the 1910s, both Hans Stoltenberg and the brothers Bruno Corra and Arnaldo Ginna also envisioned a non-representational, filmic temporal art, which they described as "pure color art" and "color music," thus anticipating the techniques of direct film.[15]

Walter Ruttmann, Viking Eggeling, and Hans Richter were three other painters who saw film as a suitable medium for expanding their art and incorporating

13 Paul Klee, *Paul Klee: The Thinking Eye. The Notebooks of Paul Klee*, ed. Jürg Spiller, trans. Ralph Manheim (1956; New York: Wittenborn, 1961).

14 "J'anime ma peinture, je lui donne le mouvement, j'introduis le rythme dans l'action réelle de ma peinture abstraite, éclose de ma vie intérieure, mon instrument sera le film cinematographique, ce vrai symbole de mouvement amassé." Cited in Esther Leslie, *Hollywood Flatlands: Animation, Critical Theory and the Avant-Garde* (London: Verso, 2002), 280. French original in Léopold Survage, né Sturzwage, in *Survage: Rythmes Colorés 1912–1913* (Saint-Etienne: Musée d'Art et d'Industrie, 1973), n.p.

15 The German sociologist Hans Stoltenberg writes in his book published in 1920, *Reine Farbkunst in Raum und Zeit und ihr Verhältnis zur Tonkunst* (Pure Color Art in Space and Time and Its Relationship to Sound Art), that he was already experimenting with non-representational film as early as 1911. In a later, revised version of this publication, he describes his experiments as follows: " . . . and so in 1911, I had the idea of taking a blank filmstrip and coloring the individual segments for different lengths and in different shades so as to render visible on screen an artistic alteration and transformation of each chromatic color." Hans Stoltenberg, *Reine Farbkunst in Raum und Zeit und ihr Verhältnis zur Tonkunst. Eine Einführung in das Filmtonbuntspiel*, 2nd, completely revised and augmented ed. (Berlin: Unesma, 1937), 38. It is, however, unlikely, in the view of Hans Scheugl and Ernst Schmidt, that Stoltenberg's films were ever actually shown. See Hans Scheugl and Ernst Schmidt, *Eine Subgeschichte des Films: Lexikon des Avantgarde-, Experimental- und Untergrundfilms* vol. 2 (Frankfurt am Main: Suhrkamp, 1974), 864. Unsatisfied with the "chromatic piano" they had constructed around 1910, Bruno Corra (né Bruno Ginanni Corradini) and Arnaldo Ginna (né Arnaldo Ginanni Corradini) turned from their attempts to create "chromatic music" to the medium of film. By their own admission, in 1911 and 1912 they made several non-representational films by first removing the emulsion layer from the filmstrip and then, image by image, painting it with colors and geometric shapes. See Bruno Corra, "Abstract Cinema—Chromatic Music," in Umbro Apollonio, ed., *Futurist Manifestos* (New York: Viking Press, 1973), 66–69. Whether these six to nine films ever actually existed has been constantly questioned because no copies survived and the only proof is Corra's personal account. However, Bendazzi believes these sources are reliable. See Giannalberto Bendazzi, "The Italians Who Invented the Drawn-on-Film Technique," *Animation Journal* 4, no. 2 (Spring 1996), 69–77.

the temporal level of music; their urge to depict musical movement had already become evident in their paintings, however. Ruttmann noted on the back of his untitled last painting of 1918 the words "Malerei mit Zeit" (painting with time), envisaging the transfer of this concept to film as follows: "An art for the eye that differs from painting in that it takes place in time (like music) and in that the artistic emphasis does not consist (as in images) in reducing a (real or formal) process to a single moment, but precisely in the temporal development of formal aspects. Because this art has a temporal development, one of its most important components is the temporal rhythm of optical events."[16] Ruttmann did not put these ideas into practice until the making of his film *Lichtspiel opus 1* (Light-Play Opus 1), which premiered in 1921 and consisted of thousands of single-frame images he had created on a home-made animation stand and subsequently colored by hand. Critic Bernhard Diebold described the film as "music for the eye."[17] It was accompanied on its premiere by music that Max Butting had composed to precisely correspond to the events taking place on screen. Interestingly, Butting considered his music to be superfluous because he believed the film itself was already visual music.[18]

Viking Eggeling, before turning to film, first worked on a "basso continuo of painting," exploring to this end the relationships existing between a huge variety of forms.[19] Inspired by the Italian composer Ferruccio Busoni, he investigated musical counterpoint and developed the concept of an "optical counterpoint" in the sense of a visual theory of composition. He associated this concept with the philosophical considerations of Henri Bergson, who viewed the world as an endless flow in which every state is subject to permanent change in an interplay of contrasts.[20] In his best-known work, *L'Évolution créatrice* (Creative Evolution, 1907), Bergson described life as "reciprocal interpenetration" and "endlessly continued creation"[21] and compared such "creative evolution" with a "musical theme, which had transposed itself as a whole into a certain number of tones, and on which, still the whole theme, different variations had been played, some very simple, others very skilful. As for the original theme, it is everywhere and nowhere."[22]

From 1918 onward, Eggeling continued to pursue these ideas together with the like-minded painter Hans Richter, who was interested in oppositional contrasts between positive and negative planes. In order to explore relationships between forms in temporal succession, they created "scroll paintings," the first of which, *Horizontal-Vertical Orchestra* (1919), Eggeling described in entirely Bergsonian terms as "formative evolutions and revolutions in the sphere of the

16 Walter Ruttmann, *Untitled [Malerei mit Zeit]*, n.p., n.d., probably ca. 1919/1920, from the estate of Walter Ruttmann, cited in Jeanpaul Goergen, ed., *Walter Ruttmann: Eine Dokumentation* (Berlin: Freunde der deutschen Kinemathek, 1989), 73–74; and in Birgit Hein and Wulf Herzogenrath, eds., *Film als Film, 1910 bis heute: Vom Animationsfilm der zwanziger bis zum Filmenvironment der siebziger Jahre* (Ostfildern: Hatje Cantz, 1977), 63–65, here 64.

17 Bernhard Diebold, "Eine Neue Kunst: Die Augenmusik des Films," *Frankfurter Zeitung*, April 2, 1921 (cited in Goergen, *Walter Ruttmann*, 99).

18 Cf. Max Butting, *Walther Ruttmann* [sic], typescript, n.p., n.d. (property of the Svenska Filminstitutet), 6; cited in Goergen, *Walter Ruttmann*, 23.

19 Hans Richter, "Easel—Scroll—Film," *Magazine of Art* 45 (February 1952): 78–86, here 79. Because, unlike Viking Eggeling, Richter wrote in detail about the work of the two, much information about Eggeling comes from Richter's reports. Eggeling worked on his *Generalbass der Malerei* from 1915 onward, creating many studies under this name, e.g. *Generalbass der Malerei. Orchestration der Linie, Basse générale de la peinture. Orchestration de la ligne,* and *Basse générale de la peinture. Extension.*

20 See Henri Bergson, *Creative Evolution,* trans. Arthur Mitchell (1911; repr., New York: Random House, 1944).

21 Ibid., 195.

22 Ibid., 189.

purely artistic (abstract forms), roughly analogous to the events that take place in music and with which our ears are familiar."[23] In this work, Eggeling and Richter were experimenting with a "language (of forms)" based on what for them was the "elementary principle" of polarity. For the two artists, polarity was both a "general life principle" and "a compositional method for every formal expression" and thus decisive for "proportion, rhythm, number, intensity, position, sound, time."[24] From 1920 onward, Eggeling and Richter tried to translate into film this synthesis of Bergson's philosophical ideas on the flow of movement and the dualism of things with the absoluteness and the compositional principles of music, and thus to transform it into actual motion. In view of the structure of his film *Symphonie Diagonale* (Diagonal Symphony), completed in 1924, it is a matter of debate whether Eggeling took his bearings from the sonata form or merely used the title to make reference to a musically conceived composition.[25] However, he gave the film no musical accompaniment, as the sounds in a sense had already been transposed into organically curved forms and thus replaced by them. In his films *Rhythmus 21* (originally entitled *Film ist Rhythmus* [Film Is Rhythm]), *Rhythmus 23,* and *Rhythmus 25*, which were made around the same time and were likewise silent, Hans Richter used geometric shapes such as squares, rectangles, and lines on a black or white ground, and focused in their "orchestration," as the titles suggest, on the rhythm, which for him represented "the chief sensation of any expression of movement."[26]

Eggeling and Richter, who had no experience whatsoever with film technology, encountered considerable difficulties when it came to implementing their designs.[27] Werner Graeff, whom Richter met in 1922, developed a method of

23 Hans Richter, "Prinzipielles zur Bewegungskunst" (1921), cited in Ulrich Gregor, Jeanpaul Goergen, and Angelika Hoch, eds., *Hans Richter: Film ist Rhythmus* (Berlin: Freunde der Deutschen Kinemathek, 2003), 18. According to Richter, this text corresponds largely to the pamphlet *Universelle Sprache* (Universal Language) written together with Eggeling in 1920 (it probably no longer exists), which expounded the basic tenets of their understanding of film.

24 Hans Richter, in Gregor, Goergen, and Hoch, eds., *Hans Richter*, 18.

25 Cf. Sara Selwood, "Farblichtmusik und abstrakter Film," in Maur, *Vom Klang der Bilder*, 414–421, here 419; and Hans Emons, "Das mißverstandene Modell. Zur Rolle der Musik im abstrakten Film der Zwanziger Jahre," in *film—musik—video oder Die Konkurrenz von Auge und Ohr*, ed. Klaus-Ernst Behne (Regensburg: Gustav Bosse, 1987), 51–63, here 56.

26 Richter, "Easel—Scroll—Film," 84. It is difficult to precisely date Richter's *Rhythmus* films because he revised them repeatedly. As far as is known, Theo van Doesburg presented a fragment of Richter's film experiments in Paris in 1921. One of Richter's works was also shown in the same city in 1923 at the Dada performance *Soirée du coeur à barbe*. The first evidence of a public viewing in Germany is under the title *Film ist Rhythmus* at a Novembergruppe matinee performance in 1925. See Walter Schobert, "Hans Richter und die deutsche Film-avantgarde," Introduction to *Hans Richter. Malerei und Film*, Kinematograph 5, eds. Herbert Gehr and Marion von Hofacker (Frankfurt am Main: Deutsches Filmmuseum, 1989), 7–8. *Rhythmus 23* was originally planned as a play between planes and colored lines under the title *Fuge in Rot und Grün* (Fugue in Red and Green). This idea was eventually put into practice in *Rhythmus 25*, but because hand-coloring was expensive and time-consuming, only a single copy—soon lost—was made, so that only the surviving color sketches provide information about the project. See Justin Hoffmann, "Hans Richter. Filmemacher des Konstruktivismus," in Gehr and von Hofacker, *Hans Richter,* 9–15, here 12ff. The *Rhythmus* films were also occasionally shown with various musical accompaniments. After World War II, Richter produced his own sound versions.

27 In Hans Richter's words: "Finally, the day came when Major Gray gave us permission to work with Mr. Noldan in the animation department at UFA. We did so with quite negative results. The technician to whom we gave a page (a 'chord' on our roll), asking him to set it in motion, treated us with complete disdain: 'If you want me to set your drawing in motion, you first have to show me which figure starts moving, when and where it moves, when and where the others move, how fast or how slow they move, and then when and where they are supposed to disappear.' We had no answer to this. We had been shown with brutal clarity that we had been thinking as artists, not as filmmakers." Hans Richter, cited in Hein and Herzogenrath, *Film als Film*, 27.

"quasi-musical notation"[28] that took account of the requirements of cinema technology, such as image format, time, and direction of movement of the forms, and which he demonstrated in his own film scores *Filmpartitur I/22* and *Filmpartitur II/22*.[29] According to Thomas Mank, Graeff should therefore be credited "as the first to have recognized in the metric character of the media the basis for the development of visual music."[30]

This basic understanding of filmic meter also underlies Oskar Fischinger's films. Inspired by Ruttmann's *Lichtspiel opus 1*, Fischinger continued work on the concept of an absolute film art modeled on music since the early 1920s. Using techniques he created himself, he precisely synchronized his black-and-white studies and color animations to the measures and beats mostly of romantic or classical compositions, but also to hit songs of the period.

Although Fischinger worked on musical effects using cinematographic equipment, the fact that his visual compositions were not developed from the artistic material itself, but that instead he used existing music as the point of departure for the arrangement of visual components (each entry and development adapted precisely to the course of the music), means that in today's terms Fischinger's works should really be called music visualizations, which are not the focus of interest here.[31] Mary Ellen Bute, a pioneer of non-representational film in the USA, developed somewhat more concrete ways to apply the principles of musical composition to visual composition than expressed in the concepts of Ruttmann, Richter, and Eggeling. From the 1930s onward, she made a series of short films entitled *Seeing Sound* where she sought to arrange the visual material according to principles as intrinsic as those used in music. Similar to Fischinger, Bute created most of her visual worlds in combination with and on the basis of classical and romantic music, but she also used modern melodies. Unlike Fischinger, however, she made only partially clear-cut and synchronous correspondences between the musical and visual events, for she was less interested in the direct visualization of music than in the creation of an equivalent counterpart.

Bute reports that she availed herself of Joseph Schillinger's mathematical system of composition, which was universally conceived and thus could be applied to the creation of any work of art. After an analysis of the scores she had chosen, she used the numerical relationships she had established to generate a visual composition on whose basis she organized the image elements, at the same time involving them in a complex interplay with the auditory level. This method is particularly evident in the film *Tarantella* (1940), where she did not use an existing piece of music, but collaborated with the composer Edwin Gerschefski to develop a series of rhythms derived from arithmetical operations. The visual and musical layers were first developed separately and only later joined together.

28 Thomas Mank, "Werner Graeff und der Absolute Film," in James Matheson and Gabriele Uelsberg, eds., *Graeff* (Zurich: Nomad, 2001), 24.

29 These works are often cited in the literature as *Komposition I/22* and *Komposition II/22*. *Filmpartitur II/22* appeared with explanatory notes in the journal *De Stijl* in 1923. The films themselves were only made decades later—the black-and-white *Filmpartitur II/22* in 1958 and the colored *Filmpartitur I/22* in 1977. Previously Graeff, like Eggeling and Richter, had made scroll paintings, which according to him were inspired by Chinese scroll drawings.

30 Thomas Mank, "Die Kunst des Absoluten Films," in *Sound & Vision: Musikvideo und Filmkunst,* ed. Herbert Gehr (Frankfurt am Main: Deutsches Filmmuseum, 1993), 72–87, here 75.

31 Cf. Hans Emons, *Für Auge und Ohr: Musik als Film oder die Verwandlung von Kompositionen ins Licht-Spiel* (Berlin: Frank & Timme, 2005), 46–56.
One exception is the film *Radio Dynamics* (1942), which is silent and begins with an inscription bearing the words "Please! No Music—Experiment in Color-Rhythm" so as to expressly forbid the use of musical accompaniment.

This approach was continued by the brothers John and James Whitney in their *Five Film Exercises* (1943/1944), which were meant to expand the concept of a visual music. Their goal was to create "audiovisual music," not only applying an overarching structure consisting of basic motifs (developed and varied in accordance with classical counterpoint and serial principles), but also translating these into image and sound using analogous production methods.[32]

For his later films, John Whitney developed a complex theory applying Pythagorean proportions to visual composition. He proceeded on the assumption that consonant and dissonant harmonic patterns also exist outside the domain of music, namely whenever they appear as structured movement in the visual realm. According to Whitney, this circumstance was a possible basis for a "visual harmony," which he believed had the same enormous potential as musical harmony.[33] Whitney was convinced that "the application of graphic harmony, in that 'real' sense of ratio, interference, and resonance, produces the same effect that these physical facts of harmonic force have upon musical structures."[34]

Tony Conrad's film *The Flicker* (1965/1966) is also based on harmonic laws. This work consists exclusively of black and white frames whose rapid alternation creates strobe-like light stimuli that produce different effects on the retina. Because Conrad believed that stroboscopic light, alongside sound, is one of the few modalities of perception that depends on frequencies, his point of departure was to investigate whether it would be possible to create harmonic structures in the visual realm by means of stroboscopic stimuli of different frequency ratios. He explained as follows: "The experience of 'flicker'—its peculiar entrapment of the central nervous system, by ocular driving—occurs over a frequency range of about 4 to 40 flashes per second (fps). I used film (at 24 fps) as a sort of 'tonic,' and devised patterns of frames which would represent combinations of frequencies—heterodyned, or rather multiplexed together. I was interested to see whether there might be combination-frequency effects that would occur with flicker, analogous to the combination-tone effects that are responsible for consonance in musical sound."[35] These flickering images lead to hallucinatory impressions of colored shapes moving through the surrounding space in the perception of most viewers. The shapes acquire a three-dimensional, almost haptic quality and shift the attention of the audience from the screen to the projection space.

While Conrad was working in *The Flicker* with the possibilities offered by cinematography as a medium, the treatment of time acquired a brand new quality with the arrival of video. Unlike film, which consists of single images in consecutive movement, video is based on a continuous flow of electronic signals and thus already in a purely technical sense on processuality. Taking up thoughts of Peter Arn, a pioneer in communications technology, Bill Viola describes this essential difference: "In film . . . the basic illusion is movement, produced by the succession of still images flashing on the screen. In video, stillness is the basic illusion: a still image does not exist because the video signal is in constant motion scanning across the screen."[36] This also means that video, in contrast to

32 Cf. John Whitney, "Audio-Visual Music: Color Music—Abstract Film," *Arts and Architecture* 61 (December 1944), 28–29 and 42, reprinted in John Whitney, *Digital Harmony. On the Complementary of Music and Visual Art* (Peterborough: Byte Books, 1980), 138–143.

33 Ibid., 5.

34 Ibid., 41.

35 Tony Conrad, email interview by Brian Duguid, June 1996. "Tony Conrad Interview," available online at http://media.hyperreal.org/zines/est/intervs/conrad.html.

36 Bill Viola, "The Porcupine and the Car," in *Reasons for Knocking at an Empty House. Writings 1973–1994*, eds. Bill Viola and Robert Violette (Cambridge, MA: MIT Press, 1995), 59–72, here 63.

film, is not tied to a fixed materiality in the form of a celluloid strip, but rather should be understood as "flexible, unstable, and non-fixed forms of the image,"[37] whose underlying electronic signals can be manipulated and modified.

These characteristics of processuality (intrinsic to the medium of video) and of video's fundamental openness and variability can be interpreted as being quasi-musical, and in fact they were used in this sense by Nam June Paik, for example. He stated the following in reference to his work *Exposition of Music: Electronic Television* (1963): "INDETERMINISM and VARIABILITY is the very UNDERDEVEL-OPED parameter in optical art, although this has been the central problem in music for the last ten years," and he tried to transpose this "indeterminism" into the visual in his television experiments and video works, whose defining characteristic is the very fact that their result is largely unforeseeable.[38]

Spatialization
Orientation into space, as experienced in Tony Conrad's *The Flicker,* became a central paradigm of expanded cinema in the 1960s, although it had already had its forerunners in the visual music and light art of the 1920s. Since Lessing's *Laokoon* (at the latest), music as a temporal art has always been contrasted with the spatiality of the visual arts, but seen from the viewpoint of reception aesthetics, music (and sound in general) is actually not just a temporal, but also a profoundly spatial experience.[39]

The trend toward an expansion and fusion of the arts consequently involved numerous efforts to create not just a work in space and time, but a kind of spatial-visual perception comparable to the perception of music, in particular through the use of projected light, whose immaterial character was thought to have excellent potential for the purpose. "Light appears to be an ideal mediator between music as a temporal art and painting as a spatial art, because, like these, immaterial light exists in time; its movement allows the structure of flowing time to become visible; at the same time, it penetrates and fills space and thus has similarities with painting."[40]

In the initial decades of the twentieth century, numerous devices were developed for projecting light, some of which still appeared to belong to the tradition of color organs.[41] However, the color/tone analogies underlying color

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37 Yvonne Spielmann, *Video. The Reflexive Medium*, trans. Anja Welle and Stan Jones (Cambridge, MA: MIT Press, 2008), 12.

38 Nam June Paik, "Afterlude to the Exposition of Experimental Television," *fluxus cc V TRE* 4 (June 1964), reprinted in *Theories and Documents of Contemporary Art: A Sourcebook of Artists' Writings,* eds. Kristine Stiles and Peter Howard Selz (Berkeley: University of California Press, 1996), 431–433, here 432. In view of the fact that the structuring of temporal processes was of central importance in all of Paik's visual works, and because his approach to video always remained compositional in nature, Decker-Phillips also classifies him in the context of visual music. Cf. Edith Decker-Phillips, *Paik Video* (Barrytown, NY: Station Hill, 1998), 190–191.

39 Cf. Golo Föllmer, "Sound Art," in *See This Sound: Audiovisuology Compendium*, eds. Dieter Daniels and Sandra Naumann (Cologne: Walther König, 2010), 297–305.

40 Anne Hoormann, *Lichtspiele. Zur Medienreflexion der Avantgarde in der Weimarer Republik* (Munich: Wilhelm Fink, 2003), 297–305, here 298–299.

41 The film theorist Béla Balázs wrote the following, for example: "Films are also called 'Licht-spiele' (literally, 'light games, plays'). In the final analysis, they are indeed no more than a play of light. Light and shadow are the materials of this art, as color is of painting and sound of music." Béla Balázs, *Béla Balázs' Early Film Theory: Visible Man and the Spirit of Film*, ed. Erica Carter, trans. Rodney Livingstone (Oxford: Berghahn Books, 2010), 76. More detailed descriptions of color organs and color/tone analogies can be found in Jörg Jewanski, "Color Organs, From the Clavecin Oculaire to Autonomous Light Kinetics," in Daniels and Naumann, *Audiovisuology. Compendium,* 77–87, and in Jörg Jewanski, "Color-Tone Analogies. A Systematic Presentation of the Principles of Correspondence," in Daniels and Naumann, *See This Sound: Audiovisuology. Compendium*, 339–347.

organs, which had been quite rigid and often seemed arbitrary, were now replaced by more dynamic concepts that no longer set individual tones and colors in relation to one another, but instead music and light. In many respects, the results showed parallels with absolute films, which were often also viewed as "light plays."

This conceptual affinity is evident in László Moholy-Nagy's *Licht-Raum-Modulator* (Light-Space Modulator, 1930), which functioned as a kinetic sculpture for creating light displays, but also was used to make the film *Lichtspiel Schwarz-Weiß-Grau* (Light Play Black-White-Gray, 1930). Whereas the latter work remained fixed in the two-dimensional plane, the former created a walkable dynamic light space, as had been postulated for film by Moholy-Nagy and Theo van Doesburg in their vision of a polyhedral cinema as a "simultaneous or polycinema" and "film sculpture."[42] In van Doesburg's words: "If one had up to now considered the projection surface an enframed canvas, one should eventually discover the light-space, the film continuum."[43]

One of the first to incorporate the three-dimensional character of the projection space into his theoretical conceptions was Thomas Wilfred, who worked from the end of the 1910s onward on establishing an independent light art he called Lumia. He defined its fundamental components as form, color, and movement, which he sought to unite in a "three-dimensional drama unfolding in infinite space."[44] Wilfred constructed several models of Clavilux projectors, which were intended to induce the experience of colors floating freely through the room. The design of the apparatus was carried out in close collaboration with the architect Claude Bragdon, who—as a follower of theosophy and of contemporary concepts of the space-time continuum—held the opinion that "the highest use and supreme function of an art of light would be the quickening of human evolution and the expansion of consciousness."[45] These ideas were formulated similarly in Wilfred's writings. Strongly influenced by theosophy, Wilfred proceeded on the assumption that the perceptual apparatus is only able to capture a small fraction of the phenomena occurring in the universe; he saw his art as a means to transcend these sensory limits.

Unlike most of his predecessors, Wilfred rejected color/tone analogies with music and the imitation of musical instruments. However, parallels with acoustic and musical attributes can certainly be found in his attempt to choreograph spaces and in his fluid transformation of spatially deep, almost immaterially ethereal light formations.[46] Wilfred writes: "Light is the artist's sole mode of expression. He must mold it by optical means, almost as a sculptor models clay. He must add color, and finally motion to his creation. Motion, the time dimension, demands he must be a choreographer in space."[47] Wilfred's *Lumia* compositions are exemplary for the endeavors of his time to transcend the

42 Cf. László Moholy-Nagy, "Das simultane oder Polykino," in *Malerei Fotografie Film,* (1927; repr. Mainz: Kupferberg, 1967) 39–41, full text available under http://www.medienkunstnetz.de/quellentext/24/; Theo van Doesburg, "Film as Pure Form," trans. Standish D. Lawder, *Form* (summer 1966), 5–11 (the original article appeared in *Die Form* 4, no. 10 [May 1929], 241–248).

43 Van Doesburg, "Film as Pure Form," 9.

44 Thomas Wilfred, "Light and the Artist," *The Journal of Aesthetics and Art Criticism* 5, no. 4 (June 1947): 247–255, here 252. Full text available under http://www.rhythmiclight.com/articles/LightAndTheArtist.pdf.

45 Claude Fayette Bragdon, "Harnessing the Rainbow," in *Arch Lectures: Eighteen Discourses on a Great Variety of Subjects* (New York: Creative Age Press, 1942), 116-126, here 126.

46 Cf. Thomas Wilfred, "Composing in the Art of Lumia," *The Journal of Aesthetics and Art Criticism* 7, no. 2 (December 1948), 79–93.

47 Thomas Wilfred, cited in Stephen Bann, Reg Gadney, Frank Popper, and Philip Steadman, *Four Essays on Kinetic Art* (St. Albans: Motion Books, 1966), 10.

boundaries of the habitual means of representation and perception, to render hitherto invisible relationships discernible—through the blending of sensory impressions or the transposition of compositional means—, and to elevate sensory experience and awareness to a new level through an art expanded into the space-time dimension.

The same applies to Oskar Fischinger, who, guided by spiritual ideas similar to Wilfred's, worked on a space-light art in the mid-1920s. Having first produced film material for multiple projections to accompany presentations of Alexander Lászlo's *Farblichtmusik* (Color-Light Music, 1925–1927), he subsequently began working on his own series of performances. Fischinger created a setting using three 35-mm projectors placed alongside one another, two more projectors for additional color effects, and several slide projectors, as a precursor of future forms of expanded cinema and lightshow performances.[48] He described one of his works, entitled *R1. Ein Formspiel* (R1. A Form-Play, after 1926/1927), as "an intoxication by light from a thousand sources . . . A happening of the soul, of the eyes, of the eye's waves, waves, wave streams, Sun flowing, a level vanishing, a sudden eruption, an awakening, ceremonial, sunrising, effervescent, Star rhythms, star luster, a singing, surf breaking over chasms, a world of illusions of movements of lights, sound and song tamed."[49]

Like Thomas Wilfred, Fischinger saw his projections as representing the beginning of a new form of art in four dimensions. He called it *Raumlichtmusik* (space light music): "Of this Art everything is new and yet ancient in its laws and forms. Plastic—Dance—Painting—Music become one. The Master of the new Art forms poetical work in four dimensions . . . Cinema was its beginning . . . Raumlichtmusik will be its completion."[50]

Following his emigration to the USA, Fischinger became an important initiator behind the development of non-representational film on the West Coast, especially after his films were shown in Art in Cinema screenings (1946–1954). One of the artists he influenced is Jordan Belson, who (together with the musician Henry Jacobs) organized the *Vortex* concerts in the Morrison Planetarium in San Francisco between 1957 and 1959 and likewise sought to expand cinema into space.

Jacobs played a selection of contemporary electronic compositions ranging from Karlheinz Stockhausen to Toru Takemitsu over the planetarium's multidirectional sound system, which completely enveloped the audience in sound and created the impression of individual sounds moving and circling through space (thus the title *Vortex*). Belson translated this spatial auditory experience into visuals using around 30 different projecting devices to project shapes and colors into the dome of the planetarium.[51] He insisted that the *Vortex* concerts did not seek to overwhelm the viewer, but rather were to create audiovisual experiences that transcended traditional cinema by eliminating the limits of the screen, and by removing the divide between audience and projection.

48 Cf. Cindy Keefer, "Space Light Art—Early Abstract Cinema and Multimedia, 1900–1959," in *White Noise,* eds. Ernest Edmonds and Mike Stubbs (Melbourne: ACMI, 2005), 21–33. (A revised version of Keefer's article is available on the website of the Center for Visual Music Library at http://www.centerforvisualmusic.org/CKSLAexc.htm.)

49 Oskar Fischinger, "A Note About R1," cited in William Moritz, *Optical Poetry: The Life and Work of Oskar Fischinger* (Eastleigh: John Libbey, 2004), 176 (capitalization in original).

50 Oskar Fischinger, "Raumlichtmusik," n.d., unpublished typescript from the Collection of the Fischinger Archive, Long Beach, CA, cited in Keefer, "Space Light Art," 24 (capitalization in original).

51 Cf. Keefer, "Space Light Art," and Scott MacDonald, *A Critical Cinema 3. Interviews with Independent Filmmakers* (Berkeley, University of California Press, 1998), 72ff.

The entire domed space of the planetarium became a "living theater of sound and light."[52] In Belson's words:

> We could tint the space any color we wanted to. Just being able to control the darkness was very important. We could get it down to jet black, and then take it down another twenty-five degrees lower than that, so you really got that sinking-in feeling. Also we experimented with projecting images that had no motion-picture frame lines; we masked and filtered the light, and used images that didn't touch the frame lines. It had an uncanny effect: not only was the image free of the frame, but free of space somehow. It just hung there three-dimensionally because there was no frame of reference.[53]

These concepts were continued in the expanded cinema of the 1960s, which not only expanded conventional forms of cinematographic production and presentation, but also its modes of reception. Such ideas were related to the critique of the visual regime of traditional cinema as expressed, for example, in the apparatus theory championed by Jean-Luis Baudry, but also to a fundamental questioning of the primacy of vision in the fine arts. This debate went hand in hand with a criticism of the perceived passivity of the viewer, the suppression of the physical space, and the concealment of the material and technical foundations of film. It was closely linked to discussions about the role of the subject and questions of perception and awareness.

At the same time, expanded cinema and associated multimedia projects were significantly inspired by ideas on systems theory, cybernetics, communications and media technology, and not least the utopian society, by Norbert Wiener, Richard Buckminster Fuller, and Marshall McLuhan. New York filmmaker Stan VanDerBeek, for example, wanted to create new forms of global communication, as he wrote in his manifesto *Culture: Intercom and Expanded Cinema* (1966). To this end, from 1963 onward he constructed a *Movie-Drome*—a semispherical space with multiple projections of randomly selected and combined images—in order to realize his vision of cinema as "image libraries," as performative art, and as an "experience machine."[54] He described the functioning of his *Movie-Drome* in the following terms:

> In a spherical dome, simultaneous images of all sorts would be projected on the entire dome-screen . . . the audience lies down at the outer edge of the dome with their feet towards the center, thus almost the complete field of view is the dome-screen. Thousands of images would be projected on this screen . . . this image-flow could be compared to the "collage" form of the newspaper, or the three ring circus (both of which suffuse the audience with an abundance of facts and data) . . . the audience takes what it can or wants from the presentation . . . and makes its own conclusions . . . each member of the audience will build his own references from the image-flow. The visual material is presented and each individual makes his own conclusions . . . or realizations.[55]

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52 "Vortex 4, may [sic] 1958, Program Notes, typed by Barb. Golden, 4/95 974w," available online at http://www.mcs.csueastbay.edu/~tebo/history/50s&_60s/Vortex/Vortex_4.html.

53 Cited in Gene Youngblood, *Expanded Cinema* (New York: E. P. Dutton, 1970), 389.

54 A detailed description of the *Movie-Drome* can be found in Gloria Sutton, "Stan VanDerBeek's Movie-Drome: Networking the Subject," in *Future Cinema: The Cinematic Imaginary after Film,* eds. Jeffery Shaw and Peter Weibel (Cambridge, MA/Karlsruhe MIT Press and ZKM/Center for Art and Media, 2003), 136–143.

55 Stan VanDerBeek, "Culture Intercom. A Proposal and Manifesto," *Film Culture* 40 (1966), 15–18, here 16 and 18. Available online at http://www.guildgreyshkul.com/VanDerBeek/_PDF/CultureIntercom1,2,3_PDF_LORES.pdf.

While the recipients at the *Vortex* concerts and in the *Movie-Drome* were thus liberated from their cinema seats, in the succeeding developments they were also made to move. As early as 1922, Alfred Kemény and László Moholy-Nagy had called for a dynamization of space and a mobilization of the recipient in the manifesto *Dynamisch-konstruktives Kraftsystem* (Dynamic-Constructive Power System), where the viewer would be transformed from a "formerly purely receptive to an active subject"[56]—a concept that Moholy-Nagy tried to put into practice in his *Licht-Raum-Modulator,* begun the same year.

In Nam June Paik's exhibition *Exposition of Music—Electronic Television* (1963), which had been inspired by his concept of a *Symphony for 20 Rooms* (1961), and in *HPSCHD*, which was developed by John Cage and Lejaren Hiller together with Ronald Nameth between 1967 and 1969, a component elementary to the experience of the artwork was its mobile or even "distracted" reception. At the premiere in 1969, Cage and Hiller's computer-generated and random-process-based composition for seven harpsichords and up to 51 tapes was accompanied by numerous projections created by Ronald Nameth. In the middle of the enor-mous assembly hall of the University of Illinois, Nameth had installed eleven semitransparent screens in parallel to one other, as well as a 360° projection screen around the walls on which he projected dozens of films and thousands of slides. On a sketch describing the arrangement of the screens and the pro-jections, Nameth wrote:

> The imagery from both sides passes through and "mixes together" in the middle. This can be seen by walking under the middle screens. The films can be seen on both sides of the outer screen as well from below. People are free to walk under and around the screens to see the images and films pro-jected from any viewpoint.[57]

Thus, Nameth was playing here in different ways with spatial aspects: On the one hand, the visitor had to change his or her point of view in order to be able to grasp the totality and complexity of the projections, which in a way led to completely individual visual compositions. On the other, the use of transparent screens led to overlapping between the projections. Thirdly, the fact that the projections were also visible from the exterior (the windows of the assembly hall were covered with transparent material) ultimately led to a dissolution not only of the projection surface, but of the entire projection space, out of which both images and sounds penetrated into the open air.

Another example of this kind of exploration of spatial conventions and stan-dards of perception is Andy Warhol's Exploding Plastic Inevitable, a series of multimedia performances he created in 1966 and 1967. In these works, Warhol combined a variety of auditory, visual, and performative elements: one or two sets by The Velvet Underground & Nico, performances by dancers such as Ingrid Superstar, and the simultaneous playback of an assortment of pop songs accompanied by different light and image effects created using a whole arsenal of optical equipment (film and slide projectors, stroboscopes, follower spot-lights, and disco balls).[58] Branden W. Joseph described the resulting

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56 Jan Sahli, *Filmische Sinneserweiterung: László Moholy-Nagys Filmwerk und Theorie* (Marburg: Schüren, 2005), 15.

57 Ronald Nameth, "HPSCHD—Planning of Projection Screens in the Hall, 1969," in *X-Screen. Filmische Installationen und Aktionen der Sechziger- und Siebzigerjahre*, ed. Matthias Michalka, (Cologne: Walther König, 2004), 40.

58 Branden W. Joseph, "'My Mind Split Open': Andy Warhol's Exploding Plastic Inevitable," *Grey Room* 8 (Summer 2002), 80–107, here 80.

"cumulative effect as a disruptive multiplicity and layering."[59]

Because of these simultaneous superimpositions, Marshall McLuhan uses Exploding Plastic Inevitable as an illustrative example of the "acoustic space"[60] of electronic media in his manual *The Medium Is the Massage* (1967, illustrated by Quentin Fiore).[61] Proceeding on the assumption that the listeners are enveloped by sound in a kind of seamless web, he conceives of such an auditory space as follows: ". . . any pattern in which the components co-exist without direct, lineal hook-up or connection, creating a field of simultaneous relations, is auditory, even though some of its aspects can be seen . . . Yet they form a mosaic of corporate image whose parts are interpenetrating."[62] Here, the peculiarities of the listening experience and the simultaneous and spatially layered perception of different sound sources become the paradigm of the visual or audiovisual.

The spatialization of the visual is even more evident, however, in the process that Gene Youngblood in his book *Expanded Cinema* calls "holographic cinema"—the use of laser technology to create a "true three-dimensionality"— which was in its infancy when the book appeared.[63]

One of the first to use this technology in the arts was Iannis Xenakis in his *Polytopes*, a series of audiovisual spatial installations created between 1967 and 1978 in which, as the title suggests, different spaces of light, color, sound, and architecture were superimposed on one another. In Xenakis' collaboration with Le Corbusier and Edgard Varèse on the Philips Pavilion (1958), representational images had been projected onto the interior walls of the building, whereas in the *Polytopes* he dissolved the image into a web-like grid of 1,200 colored flash lights enveloping the room, writing scores to compose their arrangement. Because Xenakis took the slow reaction of the eye into consideration when planning the flash frequencies, the dynamic patterns he designed were perceived as continuous movements of light. In a later version of the work—*Polytope de Cluny* (1972–1974)—the flash lights were complemented by moving and intersecting laser beams, whose spatial configuration was multiplied and modified through their reflection in 400 mirrors.

In the article *Towards a Space-Time Art,* Sven Sterken describes Xenakis's compositional method as follows: "Transposing his abstract and geometrical vocabulary (based on the axiomatic entities of point and line) to the sphere of light and sound in the *Polytopes*, Xenakis realizes a global and parallel formalization in the spaces of architecture, light, and sound. Doing so, he pursues in a certain way Kandinsky's theories as exposed in *Point and Line to Plane*, where the latter developed the vocabulary of abstract painting as based on the elementary notions of point, line and movement."[64]

Sterken believes that Xenakis's *Polytopes* not only transposed concepts of non-representational painting into three-dimensional space and constituted artistic

59 Ibid., 80.

60 Marshall McLuhan, *The Medium is the Massage* (1967; London: Penguin, 2008), 63.

61 Marshall McLuhan, "The Agenbite of Outwit," 1963, reprinted in Michael A. Moos, ed., *Media Research. Technology, Art, Communication* (Amsterdam: GB Arts International, 1997), 101–125, here 123–124. McLuhan describes the "auditory space" in somewhat more detail in this early article.

62 Ibid., 123–124.

63 Youngblood, *Expanded Cinema*, 403.

64 Sven Sterken, "Towards a Space-Time Art: Iannis Xenakis's Polytopes," *Perspectives of New Music* 39, No. 2 (June 2001), 262–273, here 267, available online at http://www.highbeam.com/doc/1G1-86744597.html.

compositions of space-time structures, rather in a very concrete way they also transported the idea of a "musicalization of space."[65]

Improvisation and real-time production
The lightshows of the 1960s, which were mostly performed as an integral part of psychedelic music concerts, employed similar concepts regarding the combination of very disparate visual material and performative filmic art to those formulated by VanDerBeek for the *Movie-Drome* and practiced by Warhol in Exploding Plastic Inevitable. Here, too, images and light effects generated by slide, overhead, and film projectors, and strobe lights and color wheels were superimposed, layered, alternated, and blended together in a sometimes overwhelming rush of images. The aesthetic characteristic of the lightshows that most stood out, however, were the "liquid projections" in which, similar to the workings of lava lamps still popular today, different-colored oils, inks, and other non-soluble liquids were mixed and projected onto the screen by an overhead projector. Unlike most expanded cinema performances, the lightshows were usually performed by a group of artists, each of whom operated a different light instrument, filling out a specific role in the interplay of the ensemble.

Writing about one of the best-known lightshow groups in the USA, Single Wing Turquoise Bird, David E. James noted that "projectors thus became instruments that could be played, apparatuses through which the projectionists could interact with each other, collectively composing visual events in response to the present of projection."[66]

While Single Wing Turquoise Bird also used pre-prepared materials such as slides and film excerpts in addition to the live liquid projections and light effects, the actual arrangement of the different elements was always carried out on site spontaneously, creating a visual equivalent to the improvisations (likewise non-reconstructable and unrepeatable) that characterized the performances of bands such as Jefferson Airplane and Grateful Dead, where the lightshows first appeared.

Because of these collective and improvisational techniques, the performances of Single Wing Turquoise Bird and of lightshows in general were compared to the way modern jazz is played; they were celebrated as the expression of a collective consciousness. Gene Youngblood sees the multimedia performance as a "paradigm for an entirely different kind of audio-visual experience, a tribal language that expresses not ideas but a collective group consciousness."[67]

Similarly, Peter Mays, the Single Wing Turquoise Bird member who was responsible for film and video, describes his artistic experiences in the group as feeling fundamentally different to the very personal and individually controlled work of the solo artist. He portrays it as a form of communication, a collective vision and meaning that can be compared to Hermann Hesse's *Glasperlenspiel* (The Glass Bead Game, 1943): ". . . taking everything in all cultures and communicating comprehensively on all levels of society simultaneously. In a sense that's what the new consciousness is about, comprehensive living."[68]

We must also not forget that the lightshows had close associations with the counterculture of the 1960s, where the consumption of psychoactive substances

65 Ibid., 268.

66 David E. James, *Allegories of Cinema. American Film in the Sixties* (Princeton: Princeton University Press, 1989), 135.

67 Youngblood, *Expanded Cinema*, 387.

68 Peter Mays, cited in Youngblood, *Expanded Cinema,* 396.

and the common experience of an altered state of consciousness played a central role. A synergetic effect occurred between the altered consciousness produced by hallucinogenic drugs and the sound and image worlds of the lightshows, given that they were modeled on the ecstasy of intoxication, while being intended to produce similar experiences. Hallucinogens not only could evoke or intensify synesthetic experiences, but were also encouraged as a means to externalize internal processes and to expand consciousness, or, as Timothy Leary put it: "Turn on, tune in, drop out."[69] He clarified this slogan as follows in his autobiography *Flashbacks*:

> "Turn on" meant go within to activate your neural and genetic equipment. Become sensitive to the many and various levels of consciousness and the specific triggers that engage them. Drugs were one way to accomplish this end. "Tune in" meant interact harmoniously with the world around you—externalize, materialize, express your new internal perspectives. "Drop out" suggested an elective, selective, graceful process of detachment from involuntary or unconscious commitments. "Drop out" meant self-reliance, a discovery of one's singularity, a commitment to mobility, choice, and change.[70]

These experiments in expanding sensory perception and the individual and collective consciousness through psychedelic music and lightshows, also in association with the kind of utopian aspirations for society formulated by Leary, found their excessive highlights in events like the *acid tests* (1965/1966) organized by Ken Kesey and the Merry Pranksters, or the three-day Trips Festival (1966) instigated by Stewart Brand in San Francisco.

Moreover, the lightshows' negation of the closed artwork and (individual) authorship, their relatedness to the immediate setting, and their dissolution of boundaries between the art forms also had (alongside significant differences) parallels to developments in the action and performance art of the 1960s. The decisive feature of the lightshows with respect to the musicalization of images lies, however, in their very performativity—the live creation of visual material which brings to media-based image production something that was previously the exclusive reserve of music in practice. It is for this reason that Gene Youngblood can state: "In real-time multiple projection, cinema becomes a performing art: the phenomenon of image-projection becomes the 'subject' of the performance and in a very real sense the medium is the message."[71]

The popularity of lightshows waned in the 1970s as the psychedelic era faded, but the advent of video and video synthesizers around the same time provided new instruments for audiovisual live performances, like those of Steina Vasulka and Stephen Beck. In their *Violin Power* performances (from the 1970s onward), Vasulka exploited the fact that in video sound and image are both based on electronic signals and basically interchangeable.[72] If the audio signals of the violin playing recorded by microphone are used for real-time processing and manipulation of video images of the violinist's performance, then the instrument becomes an interface for real-time production of images (and sound).

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69 Hallucinogenic drugs such as mescaline, LSD, and psilocybin can trigger temporary and unstable synesthetic perceptions in which, for example, pseudohallucinogenic visual phenomena are elicited while listening to music. These are cases of drug-induced, not genuine synesthesia; in the latter case, the union of sensory impressions is lasting and constant. Interactions between psychoactive drugs and psychedelic culture are explored in several contributions to the exhibition catalog *Summer of Love. Psychedelische Kunst der 60er Jahre,* ed. Christoph Grunenberg, (Ostfildern: Hatje Cantz, 2005).

70 Timothy Leary, *Flashbacks. An Autobiography* (1983; New York: Tarcher, 1997), 253.

71 Youngblood, *Expanded Cinema,* 387.

72 Spielmann, *Video*, passim.

Beck used his Direct Video Synthesizer in a series of real-time video performances he presented under the title *Illuminated Music* in the USA in 1972 and 1973, inspired by Oskar Fischinger, Thomas Wilfred, the Whitney brothers, and Jordan Belson. According to Beck, the visual structure always remained the same in these performances, while the visual themes and variations changed in each interpretation, which is why he considered his work to be a kind of "visual jazz": ". . . that was kind of my concept, wanting to try to create a form of visual jazz, that would flow in time like music but be visual, and also have a compositional structure that was formal and intact, but still allowed for variations in the way that it was played and performed."[73]

While video was becoming established, there were also individual efforts in film to use filmic material not only for performances, but instead to transform the cinematographic production process itself into a performative act. One example of these is Tony Conrad's *Film Feedback* (1974), where in a sophisticated setting he and his students simultaneously exposed, developed, projected, and re-recorded one and the same filmstrip. It amounted to a tongue-in-cheek transfer of a technique taken from the medium of video to that of film—a "mise-en-abyme of space and time," as Branden W. Joseph described it.[74] Jürgen Reble took a somewhat different approach. From the 1980s onward (first as a member of artist group Schmelzdahin and then together with Thomas Köner), he manipulated the celluloid chemically and physically during the projection process.

However, early experiments with the real-time manipulation of electronic signals as practiced in video were already started in the 1920s, in Leon Theremin's attempts to construct a television and his experiments with oscillators and oscilloscopes. At his first concert in the USA in 1928, he presented the Etherophone—an appliance with which he guided electric waves through a container holding transparent liquid to create color effects.[75] In 1932, he presented the Whirling Watcher, where he had connected a gas-filled glass tube to an oscillating circuit so as to generate a stroboscopic effect.[76] He continued these experiments in the 1930s with Mary Ellen Bute, who describes them as follows:

> We immersed tiny mirrors in a small tube of oil, connected by a fine wire, which was led through an oscillator to a type of joy-stick control. Manipulating this joystick was like having a responsive drawing pencil, or paint brush that flowed light and was entirely under the control of the person at the joy-stick . . . It (this little point of living light) seemed so responsive and intelligent. It seemed to follow what you had in mind rather than the manipulation of the oscillator. The result on the screen was pristine and pure like a lovely drawing in kinetic light that developed in time-continuity.[77]

73 Stephen Beck, cited in César Ustarroz, "Stephen Beck. Pioneering Media Artist," *RealTime* 93 (2009): 35, available online at http://www.realtimearts.net/article/93/9591.

74 Branden W. Joseph, *Beyond the Dream Syndicate. Tony Conrad and the Arts after Cage* (New York: Zone Books, 2008), 317.

75 Shortly after its invention, the Etherophone was renamed the Termenvox. When it went into serial production at RCA in the USA in 1929, it was brought onto the market as The RCA Theremin, while the prototype of a modified model was given the name Victor Theremin.

76 Cf. Albert Glinsky, *Theremin. Ether Music and Espionage* (Urbana: University of Illinois Press, 2005), 44. Glinsky describes a "U-shaped glass tube filled with neon gas" (146). It is possible that this was a gas-filled electron tube or a cathode ray tube. The stroboscopic effect was created through the rotation of two large discs (one painted with geometric shapes, the other with numerals), whose rate of revolution depended on the respective pitch. Because the frequency of the flashes of light lay beyond the capacity of human perception, however, what appeared on the discs as the pitch changed were different shapes and numerals.

77 Mary Ellen Bute, speech to Pittsburgh Filmmakers, manuscript, Pittsburgh, June 30, 1982, [page] E.

According to Bute, however, the apparatus she and Theremin had built was too expensive and too unpredictable and thus difficult to use outside of experimental contexts.[78] Their experiments belonged to the field of color-light art, where artists battled similar difficulties, sometimes working for decades on the development and improvement of their color-light instruments, like Thomas Wilfred. Their projecting devices (such as Anatol Vietinghoff-Scheel's Chromatophon (1930), Alexander László's Sonchromatoscope (1925), Mary HallockGreenewalt's Sarabet (1920–1934), and Thomas Wilfred's Clavilux, already mentioned above), should be considered as the real forerunners of performative visuals, since they were used to create colored pattern plays in performances with or without music. Among the most sophisticated compositions are those of Wilfred, who created his organic forms using a highly complex system of movable prisms, independently rotating colored discs, and distorting mirrors, with several light sources and color regulators. It is for this reason that he became an important inspiration for light-show artists.[79]

Nonetheless, the many color-light devices never caught on because they had to be operated by several people—like the projection apparatus built for the *Reflektorische Lichtspiele* (Reflective Light-Plays, 1924)—or had a very limited repertoire of expression modes, their operation was excessively inflexible and cumbersome, some of them barely transportable, and mostly tied to the person of the inventor. The same fate was shared by analog video synthesizers, whose size and cost prevented them from becoming widely established as performance instruments. The concept of real-time creation of images as a performative act was continued, however, with digital instruments.

Reprise: Convergence in the Digital

Digital media for image production and their use in the context of VJing, live visuals, live cinema, and audiovisual live performances can be seen both as return to and continuation, or as a further enhancement and consolidation of the strategies for the musicalization of the visual discussed up to now—the move toward the non-representational, the introduction of a temporal level, the use of compositional principles, the expansion into space, collaborative improvisation, and real-time production. It is both the convergence of aesthetic means and their union in the universal machine of the computer that enables simulation of the techniques and effects of visual composition and image-processing.

In the early years of VJing, image sequences were mixed together live with the help of electronic appliances and storage media—similar to the way that records were mixed. As digitalization progressed, the functions of video tools were transferred to the computer and used for live collaging and manipulation of pre-prepared images. As high-performance computers and appropriate software applications for real-time production of images emerged, from around the end of the 1990s, live generation came increasingly to the fore—to quote Jan Rohlf: "Generate, don't collage."[80] The term live cinema has increasingly been adopted for this genre as a result of the significance given to the process of real-time generation, and also as a kind of guarantee of quality in the translocation of audiovisual live performances from club culture to traditionally high-culture contexts.

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78 Mary Ellen Bute, "Abstract Films," unpublished typescript, n.p., n.d. (approx. 1954).

79 Cf. Kenneth Peacock, "Instruments to Perform Color-Music: Two Centuries of Technological Experimentation," *Leonardo* 21, no. 4 (1988), 397–406, here 405.

80 Jan Rohlf, "Generieren, nicht Collagieren. Ton-Bild-Korrespondenzen im Kontext zeitgenössischer elektronischer Musik," in *Musik*, ed. Natalie Böhler, special issue of *Cinema – unabhängige Schweizer Filmzeitschrift* 49 (2004), 121–132, The text is also available online at http://www.janrohlf.net/uploads/media/Generieren_Rohlf.pdf.

In performances based on generative processes, visual structures are usually created on the basis of an audio analysis, that is, by means of algorithmically processed parameters of the musical performance being accompanied. Depending on what kind of translation or amalgamation is created, the spectrum of these performances ranges from pure music visualizations to visual compositions. The principles of a musical treatment of visual elements conceived of by Eggeling and his contemporaries today belong to the everyday vocabulary found not only in non-representational film, music video, and music visualization software, but also that of live visuals. Regardless of the strength of the algorithmic link with audio information, in the live context image worlds are formed that achieve autonomy from the sound and acquire their own compositional quality, to the point that they can be considered visual music.

An artist who works intensively with generative methods in live performances is the Austrian performer Lia, who has developed a characteristically minimalist visual language in which organic forms change "processively." She is considered a representative of the Austrian Abstracts, a contemporary movement in non-representationalanimation film concerned with reviving the concepts of absolute film.

Although it is still common to project live visuals onto a single screen, there have also been efforts from the outset to experiment with multiple projections, to create spatially structured visual settings, and to incorporate the architectonic conditions of the space being used. These aspirations have intensified in recent years as digital projection technology has improved and 360° projectors have been developed. An example of an artist who works with the possibilities offered by spatial projection is Kurt Laurenz Theinert. He designed a *visual piano* controlled via a MIDI keyboard which generates different types of graphical patterns for projection into space via a 360° projector.

Other artists build on the tradition of collective visual improvisation, layering and processing material from different sources in their performances. The 242. pilots are a good example here; their approach is described by Hans Christian Gilje as follows: "Using our individual video instruments the three of us respond to and interact with each other's images in a subtle and intuitive way. The images are layered, contrasted, merged and transformed in real-time combining with the improvised soundtrack into an audiovisual experience."[81]

Coda

An amalgam or hybrid of the concepts of non-representationality, time, space, improvisation, and liveness described above can be found in the laser-sound performances of artists such as Robin Fox and Edwin van der Heide, who realize waveform synthesis both visually and acoustically. Edwin van der Heide sees his set-up for the *Laser/Sound Performance*, aka *LSP* (from 2003 onward), as an instrument he uses to create "a composed light space that is combined with a composed sound space."[82] The result is not only a visual spatial experience reminiscent of an auditory perception of space, rather during the performance the visitors, who are enveloped both in sound and light, can also move within the projections, penetrate them, or observe them from different viewpoints. In formal terms, *LSP* consists of signal sequences "that have both a structural

81 HC Gilje, "Within the Space of an Instant," available online at http://www.bek.no/~hc/texts.htm.

82 Edwin van der Heide, interview by Arie Altena, "A Spatial Language of Light and Sound. Interview with Edwin van der Heide by Arie Altena," in *The Poetics of Space. Sonic Acts XIII*, eds. Arie Altena and Sonic Acts (Amsterdam: Sonic Acts Press, 2010), 137–148, here 138.

musical quality" and a "time-based structural visual quality."[83] Van der Heide generates these structures live and improvises with them; during his performances, he directly couples sound and laser, assigning equally important roles to the auditory and visual aspects. The artist describes his approach as follows: "I develop my own spatial language of light and sound that forms the basis of the performance. Then it's all about developments, contrasts, and creating tension."[84]

The tension van der Heide describes must be understood not only in the musical or visual sense, but just as much in physical and technical-functional terms. Thus, in *LSP*, he draws on principles of electronic sound and image synthesis which are based on sine waves and the overlaps and phase shifts between them—in other words, on the flow of electrical currents. These genuinely electronic processes with their mutually transformable signals are characterized by their indifference to the information they transmit and can be represented in mathematical terms. Today, transposed into the digital realm, they are subject to the logic of "semantically neutral code," whose relationships are fundamentally expressible in digits and "regulated according to their tension values."[85] It is in this sense that Vilém Flusser in his text *Ins Universum der technischen Bilder* (Into the Universe of Technical Images) recognizes the basis for music's organizational principles in rules as the model governing media-based foundations of electronic and "computed" images, and thus as an indicator of a general trend toward musicalization.[86] Whereas Yvonne Spielmann considered video to be the first really audiovisual medium because of the equivalence between the audio and video signals, the possibility to represent any kind of information in digital code has led to their total convergence. [87] Although code-based tension values can be represented in any form, for example auditory and/or visual, Werner Jauk believes they can be seen as fundamentally musical: "What appears to be a crossover between disciplines should ultimately be considered musicalization. The digit—in the absence of any specific sensory perception—is liberated as a common digit from the dominant forms of meaning creation (with their narrative, final, and causal logic)."[88] Thanks to the reference-free code system as well as the "emancipation" from "semantic dimensions," this disengagement from the mimetic principle transports "technical images" into a "'pure' universe" which is comparable to music.[89] According to Werner Jauk, digital code has not only allowed visual art to liberate itself definitively from its representational attributes, it has also brought it closer to chance processes in musical composition. Florian Rötzer thus concludes that "the moving image, the image that can be modified in every pixel, is truly the image become music."[90]

Contemporary audiovisual live performances such as Edwin van der Heide's *LSP* not only unite historical concepts in a musical composition of the visual,

83 Cf. http://www.evdh.net/lsp/.

84 Van der Heide, "A Spatial Language of Light and Sound," 140.

85 Werner Jauk, "Multisensorische Künste. Musikalisierung der Künste des 'common digit' und der 're-defined body,'" in *Techno-Visionen, Neue Sounds, neue Bildräume*, eds. Sandro Droschl, Christian Höller, and Harald A. Wiltsche (Vienna: Kunstverein Medienturm, 2005), 94–111, here 99.

86 Cf. Vilém Flusser, *Ins Universum der technischen Bilder,* 2nd ed. (Göttingen: European Photography, 1989), 137ff.

87 Cf. Yvonne Spielmann, "Video, an Audiovisual Medium," in Daniels and Naumann, *See This Sound: Audiovisuology Compendium*, 315–320.

88 Jauk, "Multisensorische Künste," 103.

89 Flusser, *Ins Universum der technischen Bilder*, 138.

90 Florian Rötzer, "Technoimaginäres—Ende des Imaginären," *Kunstforum International* 98 (1989): 54–59, here 55.

but also incorporate musical parameters that are inherent only to the digital. This essay has dealt with the musicalization of the visual arts, but one could equally speak of an individual musicality belonging to each medium. Thus, if musical strategies and the possibilities of different media not only condition each other reciprocally but also achieve a synthesis, then this can be understood as a musical-media emergence. To conclude with the words of Paul Valéry: "Among all the arts, music is the closest to the changing orders of the new time."[91]

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[91] "La Musique, entre tous les arts, est le plus près d'être transposé dans le mode moderne." Paul Valéry, "La conquête de l'ubiquité," in *Œuvres*, vol. 2 (1928; Paris: Gallimard, 1960), 1283–1287, here 1285.
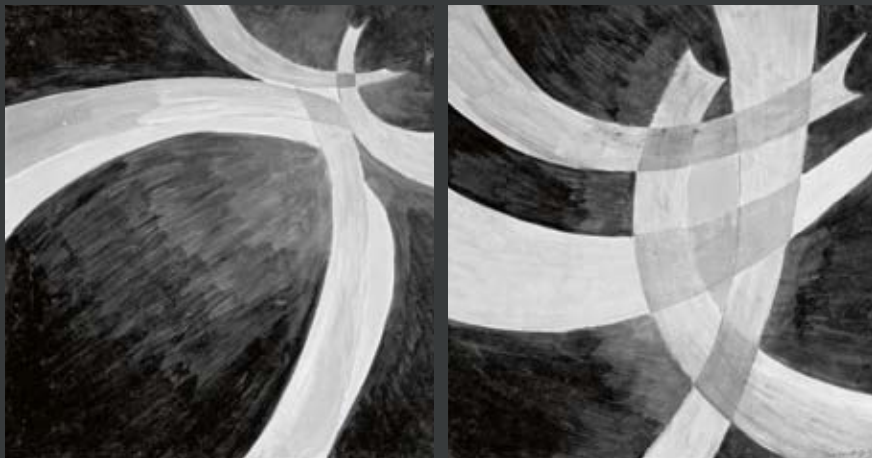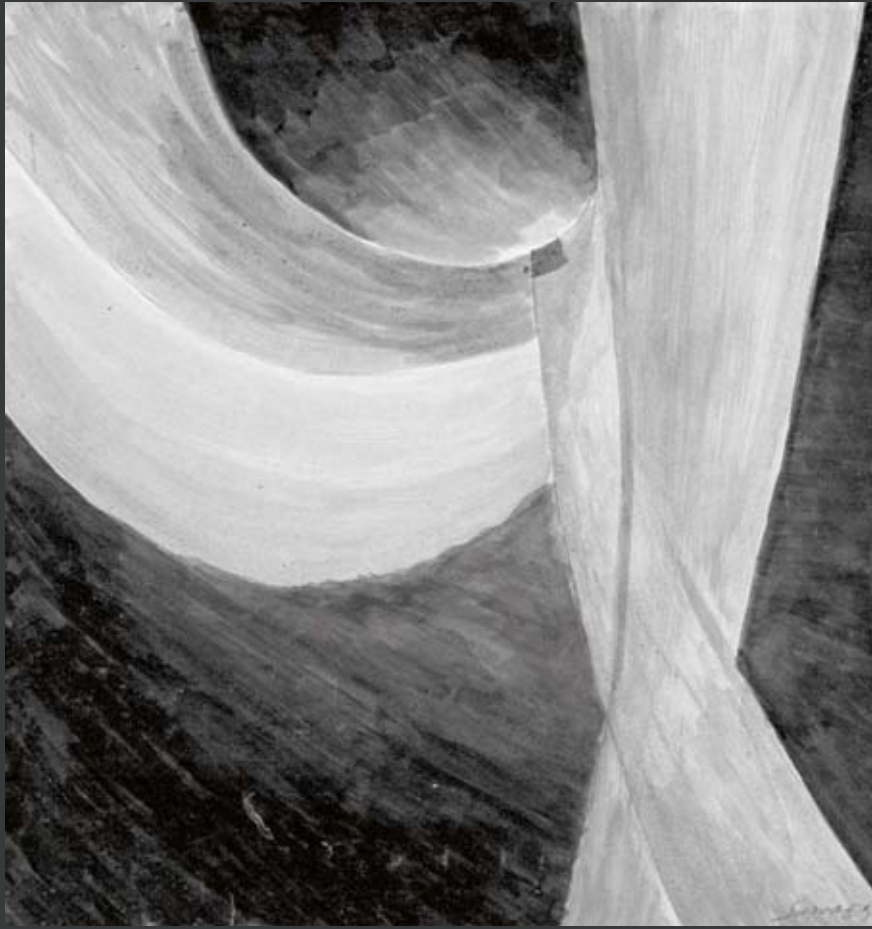
– *Coloured Rhythm: Study for the Film* (1913) by Leopold Survage.
New York, Museum of Modern Art (MoMA).
Watercolor and ink on paper on black paper-faced board, 13 x 12 1/16″ (33 x 30.7 cm).
Purchase. Acc. n.: 661.1939.56
Purchase. Acc. n.: 661.1939.57
Purchase. Acc. n.: 661.1939.58
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Léopold Survage
Rythmes colorés (1912/1913)

Following a period of training in his father's piano factory and studies at the Moscow School of Painting, Sculpture, and Architecture, Léopold Survage (né Sturzwage) moved to Paris in 1908, where he began to exhibit his work in the Salon des Indépendants from 1912 onward. During this period he also started work on his *Rythmes Colorés*, a series of abstract paintings that were intended as the point of departure for an animationx on film: "I will animate my painting. I will give it movement. I will introduce rhythm into the concrete action of my abstract painting, born of my interior life; my instrument will be the cinematographic film, this true symbol of accumulated movement."[1]

Having exhibited sequences from these "Symphonies in Colors" in the Salon d'Automne in 1913 and in the Salon des Indépendants in 1914,[2] Survage proposed the film to the French production company Gaumont, who had recently developed a trichromatic process that could have been used—financial constraints and the outbreak of World War I prevented the realization, however.[3] In 1914, Guillaume Apollinaire published a detailed account of Survage's ideas in *Les Soirées de Paris.* Proceeding on the belief that a fundamental relationship exists between auditory and visual rhythms, Survage here emphasized that ". . . colored rhythm is not an illustration or an interpretation of a piece of music. It is an independent artform."[4] For Survage, the similarity with music was determined in particular by the way in which the individual elements were organized in temporal succession. Where music uses sounds as its material, he saw colored forms as the counterpart in his visual dynamic art. Composition was carried out on the basis of three central factors: "(1) genuine visual (abstract) form; (2) rhythm i.e., movement and change of form; (3) color."[5] Because colored rhythms created in this way are based on the same psychological premises as music, according to Survage they can also evoke comparable emotional effects.

1 Cited in Esther Leslie, *Hollywood Flatlands: Animation, Critical Theory and the Avant-Garde* (London: Verso, 2002), 280. French original in Léopold Survage, né Sturzwage, in *Survage: Rythmes Colorés 1912–1913* (Saint-Etienne: Musée d'Art et d'Industrie, 1973), n.p.

2 Léopold Survage, "Autobiography," in *The Glistening Bridge, Léopold Survage and the Spatial Problem in Painting,* ed. Samuel Putnam (New York: Covici-Friede, 1929), 167–175, here 174.

3 See Survage, "Autobiography," 174. In the trichromatic process, three plates of different colors were used in both filming and projection.

4 Léopold Survage, "Le Rythme coloré," *Les Soirées de Paris* 26/27 (July/August 1914), 426–429, cited in Jean Mitry, trans. Christopher King, *The Aesthetics and Psychology of the Cinema* (Bloomington: Indiana University Press, 2000), 112.

5 Survage, "Le Rythme coloré," 113.
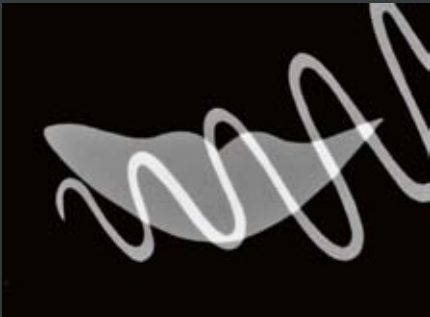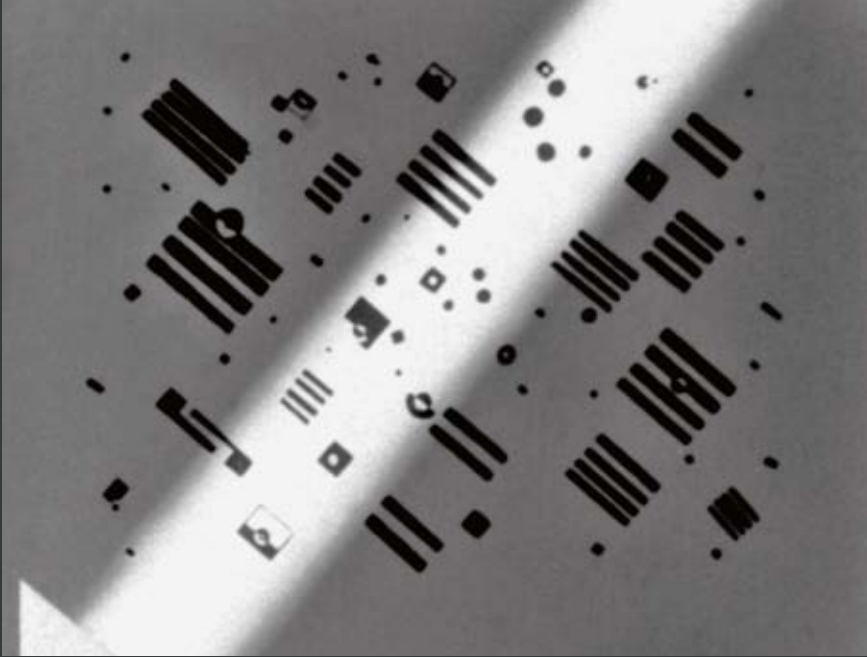
– Stills from *Tarantella* (1940) by Mary Ellen Bute.
  Courtesy Cecile Starr and Arsenal—Institut für Film und Videokunst e. V.

Mary Ellen Bute
Tarantella (USA 1940)

Mary Ellen Bute was a pioneer of non-representational film in the USA, who between the mid-1930s and the mid-1950s created *Seeing Sound*, a series of short films arranged to music.

The film *Tarantella,* made in 1940, is described in the opening credits as "a swift moving dance, presented musically and in linear forms in color." Unlike in her other films, Bute did not build on pre-existing music here, but rather used mathematical operations to create—together with Edwin Gerschefski—a series of rhythms that the composer translated into dance, while Bute transposed them into colors and forms. By the end, Gerschefski's somewhat harsh piano music is met with a rapid succession of largely geometric shapes: dots, rectangles, circles, and squares, groups of arrow-like triangles, formations of different figures, circular shapes and beams, as well as jagged and waved lines, forms reminiscent of oscillograms, and mouth-shaped figures that change both position and—like the backgrounds—color.

The exclusive use of the colors black, white, red, and blue and the alternation between them creates sharp contrasts. Bute created these bright colors using the innovative but extremely elaborate trichromatic process, which required the creation of a separate filmstrip for each of the colors. She made over 7,000 hand drawings for four and a half minutes of film in the process.

The separate preparation of a visual and an audio version from the same material, which simultaneously allowed points of contact and autonomy, made *Tarantella* into a real audiovisual composition that also represents a highlight within Mary Ellen Bute's oeuvre.

Stan VanDerBeek
Movie-Drome (1965–1967)

After completing his art and architecture studies in New York and some time spent at Black Mountain College in North Carolina, Stan VanDerBeek began making films in the mid-1950s. The first were mainly based on animation and collage techniques, but from the early 1960s onward he increasingly used computer graphics and began to show films as multiple projections and multimedia combinations. He wanted to overcome both the limits of the film image and the spatial confines of the movie theater and used ideas from painting, sculpture, and theater to transcend the boundaries of visual representation.[1]

Exploring the ideas of Marshall McLuhan and Richard Buckminster Fuller, he developed the concept for a *Movie-Drome,* which he constructed in 1965. On the land behind his house in Stony Point (part of the artists' colony The Land, where John Cage also lived), he built a semispherical aluminum structure more than 30 feet high. Entrance was via a trapdoor in the middle of the capsule, which stood on a wooden frame around six feet above the ground. There was no seating inside the dome—visitors lay on the floor, preferably with their feet facing inward and their eyes upward. Using numerous movable projectors, Van-DerBeek projected disparate and incoherent images in quick succession alongside and on top of each other onto the entire surface of the dome's interior, while a quadraphonic sound system played a likewise collage-like mix of political speeches, news reports, advertisements, and music. Gloria Sutton described the experience of these "movie murals," "newsreels of dreams," and "image libraries" as follows:[2]

> The first realization was that your view was not confined to the rectangular frame of a painting or the elongated window of a cinematic screen, nor to the clear boundary produced by the raised stage of a theater. Instead, the spherical dome formed an edgeless surface for projection while an infinite stream of light and sound bounced off the participants and enveloped the space in a complete multimedia environment . . . The images floated in a three-dimensional visual field, coalescing spatially nor temporally, and so dispersed rather than unified a specific type of viewing subject. The inter-dispersal of unique and found images, the utilization of all surfaces, material and bodily, the unique combination of pre-determined audiovisual and aleatory effects, and the uninhibited mobility of the participants fused into a dynamic immersive experience dubbed the *Movie-Drome.*[3]

In this project, VanDerBeek explored a combination of purposes and visions related to reception aesthetics, media, and communications theory. To him the dense and only partially comprehensible flow of images held the potential not only for a reorganization of the individual's consciousness, but also a redefini-

1 Cf. Adrienne Mancia and Willard van Dyke, "Four Artists as Filmmakers," *Art in America* 55 (January 1967), 64–73, here 70.

2 Stan VanDerBeek, "Culture Intercom. A Proposal and Manifesto," *Film Culture* 40 (1966): 15–18, here 16. Available online at http://www.guildgreyshkul.com/VanDerBeek/_PDF/CultureIntercom1,2,3_PDF_LORES.pdf.

3 Gloria Sutton, "Stan VanDerBeek's Movie-Drome: Networking the Subject," in *Future Cinema. The Cinematic Imaginary after Film,* eds. Jeffrey Shaw and Peter Weibel, (Cambridge, MA/Karlsruhe: MIT Press and ZKM/Center for Art and Media, 2003), 136–143, here 136–137.
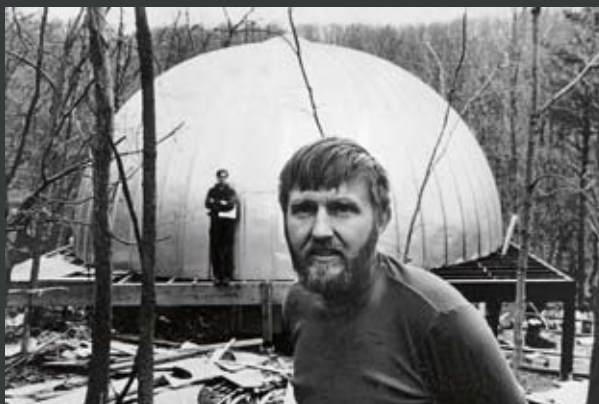
– Stan VanDerBeek in front of his *Movie Drome* (1965–1967) Photo: Lenny Lipton, courtesy Johanna and Sara VanDerBeek.

– Interior view of *Movie-Drome* (1965–1967) by Stan VanDerBeek. Photo: Peter Moore © Estate of Peter Moore.

tion and restructuring of "moving images."**4** Accordingly, he saw the *Movie-Drome* as a "sight and sound research center, a prototype theater of the future, exploring motion pictures, image transmission and image storage, video graphics, electronic sound and music, drama and experimental cinema-theater."**5** He also predicted the transformation of film into a performative art; in fact, his approach to visual material (especially his techniques of collage, overlayering, and multiple projection) is very reminiscent of contemporary VJing. He further envisioned the development of a universal, nonverbal pictorial language that could act as a means for intercultural, global communication.**6** VanDerBeek considered the *Movie-Drome* a model for a range of similar image spaces that could be located worldwide and linked by satellite, in which creation, distribution, and reception would be connected in a kind of network. This idea evokes associations with contemporary practice regarding Internet culture and net art; VanDerBeek linked his *Movie-Drome* to concepts that only began to develop fully with the advent of digital technology and the World Wide Web.

4 See VanDerBeek, "Culture Intercom," 17–18.

5 Stan VanDerBeek, "Re: Vision," *The American Scholar* 35, no. 2 (Spring 1966), 335–340, here 339, available online at http://www.guildgreyshkul.com/VanDerBeek/_PDF/Re.Vision_PDF_LORES.pdf.

6 See VanDerBeek, "Re: Vision," 339.
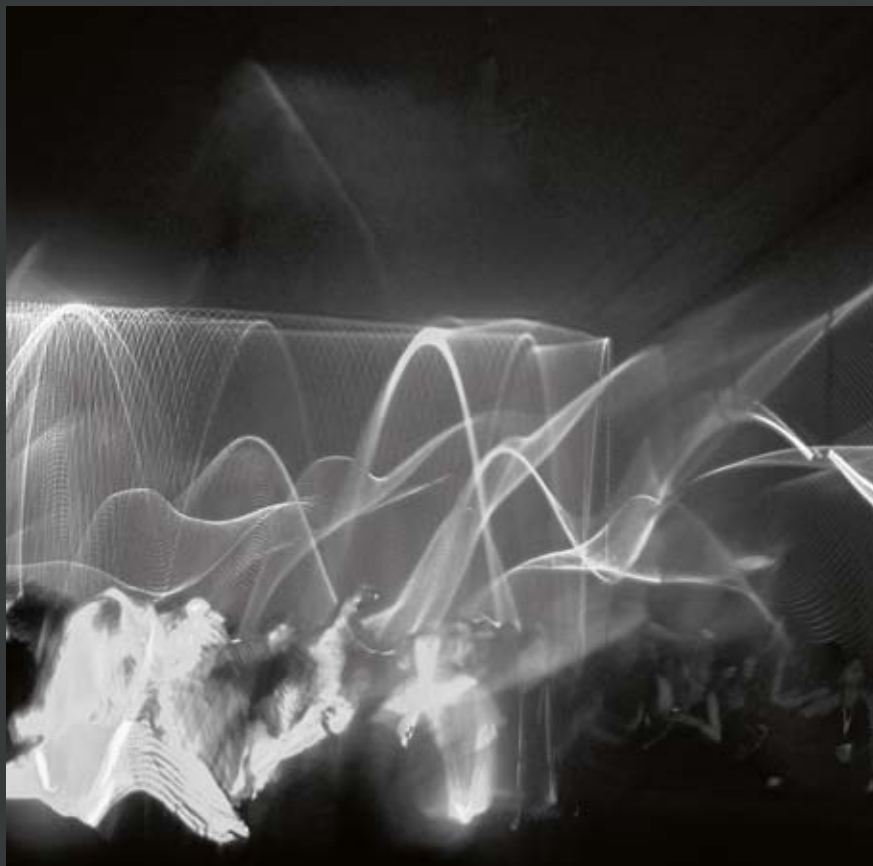
– View of *LSP* (2003–present) by Edwin van der Heide at Sonar 2008.
  Photo: Olga Mink, courtesy the artist.

– View of *LSP* (2003–present) by Edwin van der Heide at Tabakalera 2009.
  Photo: Asier Gogortza, courtesy Tabakalera, San Sebastián.

Edwin van der Heide
LSP (since 2003)

The work of sonologist Edwin van der Heide deals with the nature of sound, focusing in particular on its acoustic and perception-related characteristics. The artist applies compositional methods to the spatial organization of the sounds and to the interaction between viewers. In his *Laser Sound Performance (LSP)*, he expands this approach by a visual component, linking sound synthesis to laser projections.

The approach is motivated both artistically and scientifically and draws on the curve graphs first described by Nathaniel Bowditch in 1815 and explored in the 1850s by Jules Antoine Lissajous; these show the frequency and phase ratios of two sine waves and are known either as Bowditch curves or Lissajous figures. In the direct coupling of sound and light in *LSP*, the manipulation of the sound waves leads to an associated change in the light forms and creates an experience that is aesthetic at both the visual and auditory levels. By projecting laser beams onto artificial fog or drizzle, van der Heide gives them an almost tactile quality: they can be experienced spatially and become part of an interwoven light-sound-space. This fits the artist's aim of extending the spatial perception of sound into the visual realm and of creating a compositional unity between "light, space, color, and sound."[1] Because viewers do not experience *LSP* from a distant observer perspective, but rather find themselves right in the middle of the performance, they are called on to actively explore the work, to interact, and to communicate with it.

1   Edwin van der Heide in "A Spatial Language of Light and Sound. Interview with Edwin van der Heide by Arie Altena," *The Poetics of Space. Sonic Acts XIII*, eds. Arie Altena and Sonic Acts (Amsterdam: Sonic Acts Press, 2010), 137–148, here 138.