

# Capturing Modernity Jazz, Film, and Moholy- Nagy's *Light Prop for an Electric Stage*



**Edit Tóth**

László Moholy-Nagy's *Light Prop for an Electric Stage* (plans, 1922–30; built in 1929–30), a light-generating kinetic device rooted in a multiplicity of cultural practices, including jazz, theater, cinema, optical toys, and architecture, was to offer an inventive example of modern design and a challenging phenomenological experience for the increasingly institutionalized senses of Weimar-era capitalist society. Defining a new vision was a lasting preoccupation of the one-time Bauhaus professor Moholy-Nagy; this vision encompassed experimentation with various new media and materials, including photography, film, metal constructions, typography, and stage designs.<sup>1</sup> Already in 1925 he was directing attention to the fact that in the post-World War I era perceptual experience and subjectivity were rapidly transforming, due to the prevalence of “film; the electric sign, the simultaneity of sensorily perceptible events” brought about by the interaction of illuminated and reflecting shop windows, mechanical transportation, and mass media images.<sup>2</sup> The awareness of the new optical dynamics, this transient optical fabric of visual culture, however, had dissolved into the background as a result of the reification of technology and consumer culture. For Moholy-Nagy photography, film, and light design had the potential for making visible modernity's challenge to habits of seeing, by, for instance, transforming visual characteristics of architectonic space and spatial experience.

Moholy-Nagy's  
*Light Prop for an  
Electric Stage*  
(also called *Light  
Display Machine*  
and *Light-Space  
Modulator*); it was  
engineered by  
István Sebők and  
built by the theater  
workshop of

*modernism / modernity*

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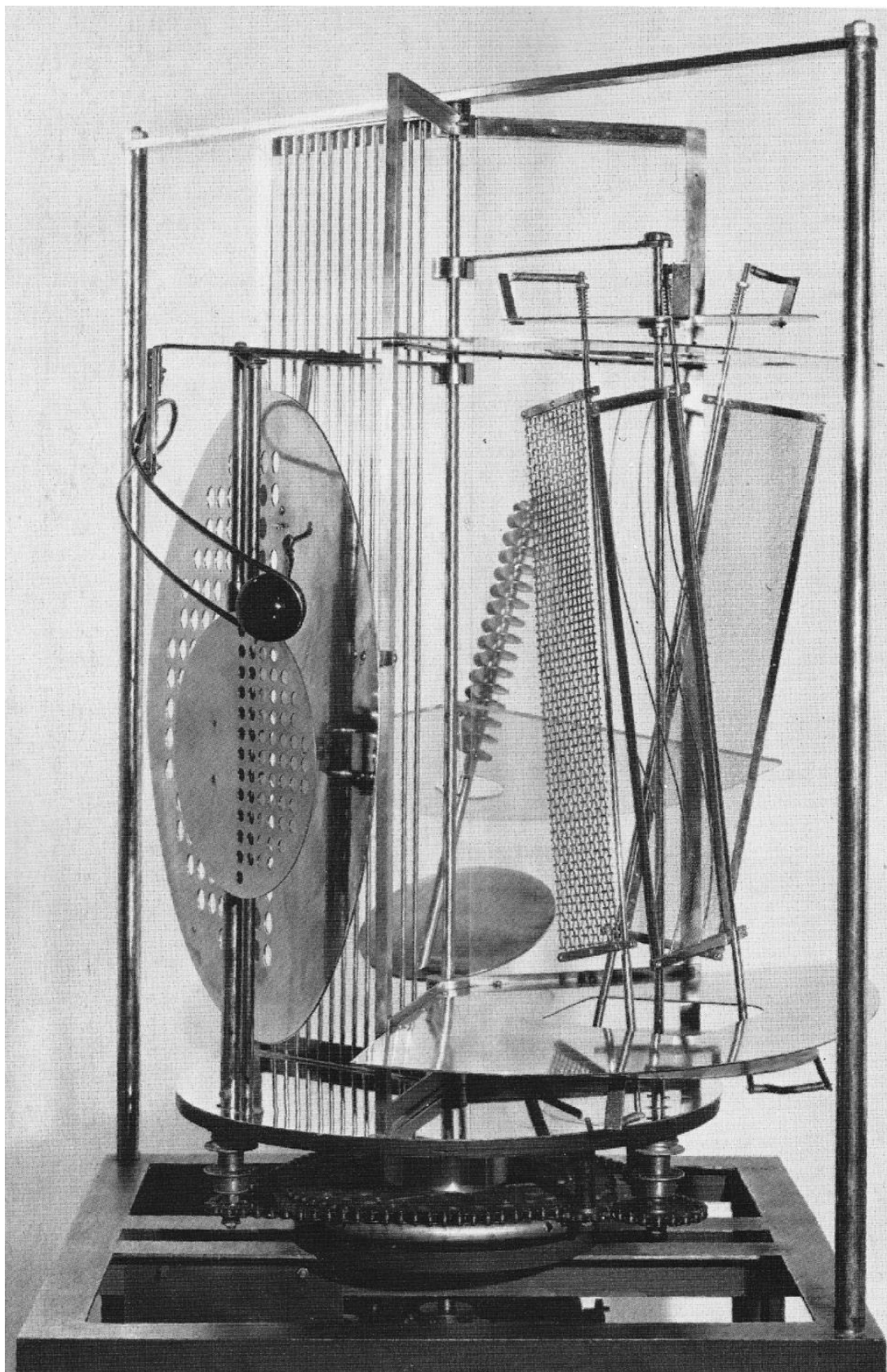


MoholyNagy's Photographic Paradigm, and Complex Gender Expressivity at the Haus am Horn."

AEG or Allgemeine Elektrizitäts-Gesellschaft, Germany's main electric company) is a kinetic construction of various polished metals and Plexiglas, to which he remained attached throughout his life. Constructivist in outlook but Dada-like in its effects, the device is key to Moholy-Nagy's project of environmental improvisation and perceptual "training" (fig. 1).<sup>3</sup> Scholars have commonly described the *Light Prop* either as a static modernist sculpture prone to technological fetishism or more favorably as a kinetic sculpture generating a light environment.<sup>4</sup> Rosalind Krauss more inventively called it an anthropomorphic "actor in technological disguise" for a theater stage, an automaton that minds its own business.<sup>5</sup> I embrace a similar creative approach here but propose a more nuanced interpretation by allowing for a variety of contextual engagements with the *Light Prop* that relate to its development and use. When understood by its performance and phenomenal processes that alter spatial experience, such as the production of mobile shadows, reflections, transparencies, and sounds, the work opens up to larger frames of reference and concerns about perception and society. I argue that the socially interactive and improvisatory aspects of the jazz performance and the interactive technological light environment of the night club, already explored in Moholy-Nagy's photographic works, could be reconfigured in the *Light Prop*, fused with experiments in film and stage design, for a variety of purposes, including the altering of architectural space and the staging of an enriched three-dimensional "cinema" to test whether environmental improvisation could survive in visual culture. By refusing to settle into neatly defined categories and contexts, the *Light Prop*'s performance encourages the awareness of perception as a performative activity responsive to social space. I outline a genealogy of the larger project, which featured complicated images and constructions over time.

I explore the *Light Prop*'s fluctuating character with the help of the concept of *Spielraum*, meaning space (or "room") for play or maneuver, a field of action (where *Spiel* stands for both play and performance). During the 1930s Walter Benjamin used the term to delineate a new type of technological space within cinematic capabilities, a space that could be accessed through play and that transformed previous relationships between image space and body space, a development brought about by the profusion of images in twentieth-century everyday experience.<sup>6</sup> Here I use the word "Spielraum" in a related but broader sense to refer to Moholy-Nagy's complex experiments with illumination, optics, and technological materials in both performative (or participatory) perceptual space and artistic conceptual space. *Spielraum* is a space in which various relationships, possibilities, and dialogues emerge among different mediums, cultural practices, and modes of experience within a technological framework, based on shared phenomena and properties that have transformative and collective potential. This *Spielraum*, as I use the concept, at work in the *Light Prop* and among the *Light Prop* and Moholy-Nagy's photographic works makes visible not only contextual

relationships but also perceptual differences, while allowing for dynamic temporality, responsive engagement, and inventiveness, not unlike in a jazz performance. In this way, despite involving technology, it resists technological enframing, defined by Heidegger as “the way in which the real reveals itself as standing-reserve,” that is, as orderable instrumental



▲  
Fig. 1. László Moholy-Nagy, *Light Prop for an Electric Stage*, 1922–1930.

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parts.<sup>7</sup> This kind of artistic and perceptual activity can be considered as a way to counter consumer spectacle and mass media image space, and their predetermination of perception, via their own technological mediums of photography, film, and light design.

8

## Modern Design, Perception, and Social Engagement

The *Light Prop*'s performative character and the variability of its mode of operation are most obviously suggested by the "evolution" of its various titles. The *Light Prop* relates to lighting design in theater and film production, the *Light Display Machine* highlights its mechanical and performing aspect, and the *Light-Space Modulator* emphasizes its space forming and architectural implications. The work's mode of beholding is alterable as well, emphasizing perception's temporally defined character. The recent environmental museum display of its replica, where the beholder was able to freely circulate within its light-shadow environment, offered one mode of experiencing the *Light Prop*. The 1930 exhibition of the Société des artistes décorateurs (Association of Designers) in Paris, where the *Light Prop* was first presented in the section of the Deutsche Werkbund design association, offered an alternative setup. Here visitors encountered the *Light Prop*'s performance in a cubical panel casing (now lost), framed for close observation. Although Moholy-Nagy's related article, published in the Werkbund periodical *Die Form*, did not mention the different implications of the *Light Prop*'s variable display, he proposed that its light-shadow play continuously transforming its ambient space could be also used on the theater stage or in various festivities. According to his description:

The model consists of a cubical box, measuring 120 x 120 cm [about 4 x 4 feet], with a round opening (aperture) at the front. Around the back of the opening [as well as on the back plate of the box] there are yellow, green, blue, red and white electric glow-bulbs mounted (ca. seventy 15 Watt bulbs for illumination and five 100 Watt spotlights [on each side]). . . . The glow bulbs flash at different places according to a prearranged scheme. They illuminate a continuously moving mechanism consisting of translucent, transparent, and perforated material in such a way that on the back plate of the box, linear configurations of light appear. . . . Each of the three sectors of the framework performs a kinetic play that is triggered whenever a sector appears in front of the stage aperture on the rotating disk of the base. ("Lichtrequisit einer elektrischen Bühne," 297–98; translation mine)

Figure 2 from *Die Form* shows a photograph of the original housing, elevated to human height by a metal framework so as to allow a view, through the large aperture, of the *Light Prop*'s "stage" performance and the light bulbs placed around it (fig. 2).

The Werkbund exhibition and its social agenda offer a helpful context from which to launch our analysis of the *Light Prop*'s performance, not only because it had a theater

and lighting section organized by Moholy-Nagy but also because it shared some of the phenomenological and social concerns embedded in the *Light Prop*. Constructed under the direction of Walter Gropius, with the assistance of Marcel Breuer, Moholy-Nagy, and Herbert Bayer (all of whom left the Bauhaus in 1928), the Werkbund exhibition,



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Fig. 2. László Moholy-Nagy, *Light Prop* in its original enclosure, 1930, from *Die Form*, vol. 5, nos. 11–12, 1930. entitled “Living in a High-Rise” (it centered on a high-tech apartment complex), presented the most sophisticated manifestation of the Bauhaus idea of uniting art (including the mediums of photography and film) with modern technological design to give shape to a new visual and material culture.<sup>9</sup> It focused, with ambivalent results, on the problem of how to channel the tension between people and modern technology, as well as between the tactile and increasingly optical experience of the city, into socially positive encounters and places of social gathering.<sup>10</sup> The exhibition in effect brought together several spaces of collective interaction, including a communal meeting room, nightclub, and the physical elements of the theater.

One aspect of the exhibition relevant to the *Light Prop* was the phenomenal play of the communal space's entertainment island or small nightclub, a place of social performance and interactivity (fig. 3). The photogenic glittering of its J-shaped bar's transparent glass and chromed metal tubing, small dance floor, and phonograph were activated by overhead spotlights, orchestrated by Moholy-Nagy as if for a photo session, and by transparent and "sleek walls resembling polished metal sheets."<sup>11</sup> In full operation, the glittering lights and reflections would have intermingled with the human bodies and the rhythms of jazz, the most appropriate music for this modern setting.<sup>12</sup> The arrangement calls to mind Moholy-Nagy's discussion in *Von Material zu Architektur* (1929) of the "pliability of the surface" through surface reflections and mirrorings, for instance, on the picture glass, which "bring[s] the surroundings into the picture, while "the surface becomes part of the atmosphere" by being opened up to intersubjective space and external events, an idea operative in the communal room and the *Light Prop* as well.<sup>13</sup> What is important here is that the communal room, notwithstanding its stressed functionalism (which critics complained about), probed how modern materials such as glass surfaces with their dislocated optical phenomena can become integral to living space, both socially and visually engaging, instead of serving to just distance or separate areas and define the limits of objects, as these materials interweaved various spaces of activity and the transparent glass walls opened up the private rooms. Gropius's catalogue essay indeed stressed a community-forming intention, proposing "a joyful and informal way of meeting together in spaces which . . . promote new and simpler forms of human contact" (quoted in Overy, "Visions of the Future," 351). Another facet of the exhibition pertinent to the *Light Prop* was the inventive multiperspectival design of the exhibition space that tried to shift the focus from the search for cozy ambiance to involvement and relationality. One reviewer, for instance, compared the exhibition space to a fairground attraction, a playground complete with "fun mirrors that make one laugh, exuberant mannequins that enact a parade, and complicated scientific mechanisms [i.e. the *Light Prop*] that borrow from the prestige of Robert Houdin."<sup>14</sup> This suggests that despite its rationalizing attitude, the exhibition, including the *Light Prop*, also had playful, or counterrational, and interactive phenomenological features. The various visual plays—for example, a wall covered with a whole series of polished metal circles, resembling distorting lenses, the visual reorientation of which may have been what made a critic think of a periscope (Vaillat, "La section allemande," 342)—aimed to challenge spatial awareness as well as functionalist design and architectural



Fig. 3. Walter Gropius, Communal room, *Living in a High-Rise*, Paris, 1930

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space. The fun-house effect was reinforced by the unusual views and floating feeling created by the elevated ramps and bridges made of metal lattices—reminiscent of Moholy-Nagy's latest designs for the Piscator Theater—that interlinked the rooms. Chairs and architectural photographs unexpectedly projected from the walls at various angles and mobile arrows directed the visitors. There was also a push-button operated cinema projector and *Light Prop*.<sup>15</sup> These components made modern technology engaging and transparent and strange at the same time.

The *Light Prop* offered a similarly unfamiliar, visually and spatially engaging performance that responded to Gropius's call, in a no less ambivalent a manner, to create collective encounters through modern design. It exceeded the usual instrumentalized function of lighting devices and props employed on the theater stage and in film production—both fields in which Moholy-Nagy was working at the time, after leaving the Bauhaus—by sublimating different cultural practices of the Weimar era, not unlike the communal room. Situated at the entrance corner of room 2 (which was arranged by Moholy-Nagy) among light fixtures, cinema projector, Moholy-Nagy's stage sets, Gropius's total theater design for Piscator, as well as Schlemmer's theatrical figurines, its original paneled cubical housing, frontal circular aperture, and metal frame reiterated the forms of a technological device, the recently invented electric phonograph model with frontal circular speaker, which brought the electrifying sounds of the dance halls to the residents in the communal room. Instead of playing jazz music,



however, the *Light Prop* as a modern attraction provided a dazzling thirty-one-phase optical show

(“Lichtrequisit einer elektrischen Bühne,” 299) through its large aperture placed at eye level, according to a critic “with dancing light channeled by stunning gun batteries of scientific trickery” (created by the intense one hundred watt spotlights and the smaller colored lights hitting polished metal, plastic, and glass surfaces) (Salmon, “Exposition du Werkbund,” 340; translation mine). The construction’s shifting colored lights and the metallic shine of its disks, rods, wire lattices, and transparent Plexiglas planes competed both with the displayed light fixtures and the entertainment area’s clean lines, bright surfaces, and rich artificial illumination, while it opened up its solid surfaces toward space similarly to the furniture in view. By scattering diffused colored lights and shadows over the visitors and neighboring displays and blending them, the *Light Prop* evoked various communal events, including the theater and popular entertainment. In the adjacent cinematic projection area the projected films introducing German design further broadened the *Light Prop*’s perceptual *Spielraum* and transitive nature through the light play of cinema itself. Having situated the *Light Prop* at the intersection of various media, design experiments, and spaces of social interaction, we need to explain the implications of its different perceptions and the relationship of its performance to the interactive environment of (Gropius’s) nightclub, as well as the relevance of these activities for Weimar-era visual culture.

### **From Jazz Performance to the Performance of Perception**

Moholy-Nagy repeatedly turned to the jazz performance for inspiration at the Bauhaus during the 1920s. What was it about jazz and the nightclub experience that captivated *Bauhäusler*? Originally, for African Americans, jazz fulfilled a progressive societal function, breaking down racial and social barriers, at least in a nightclub setting. Jazz and the nightclub or dance hall scene also successfully deconstructed and transformed the alienating sound and visual phenomena of industrial modernity (deconstructing here means not only “breaking down” but also introducing improvisation that interrupted technological predetermination) into an embodied, habitable yet challenging phenomenal event within an interactive social gathering. The Bauhaus community embraced this active, embodied social formation and the electrifying, cohesive force of jazz. The Bauhaus Kapelle performed optically and acoustically heightened jazzy shows at Bauhaus parties, some of which Moholy-Nagy helped to organize—culminating in the 1929 Metal Party—where jazz, metallic design, electric lights, theater performance, and audience interacted and improvisation reigned.<sup>16</sup> Significantly, in the Weimar era the image of jazz as liberating and improvisatory cohabited with its opposite image as the “music of engineers,” to use Brecht’s phrase, as an emblematic musical manifestation of technological modernity and the machine age circulating within a wider discourse of Americanism.<sup>17</sup> The 1928 *Berlin in Light* week, promoting the German capital as a modern technological powerhouse and electric spectacle, for instance, appropriately opened with Kurt Weill’s

jazz tune of the same title.<sup>18</sup> The technological metaphor was reinforced not only by the metallic look and sound of some of the jazz instruments (saxophone, trombone, cymbals, banjo) but also by the fact that larger German bands did not emphasize improvisational syncopation (Sternfeld, “Jazz Echoes,” 75).<sup>19</sup> Critics described jazz dancers in a similar ambivalent fashion as animated yet marionette- or machine-like. “They march steadily and slowly to the beat of the big drum,” according to a commentator, “but suddenly a shrill whistling sound strikes the bones, knocking their knees together and they take a few steps with entirely dislocated and loosely hanging legs, [and] . . . then comes a race from the clarinet and like a corkscrew they revolve around each other.”<sup>20</sup> Bauhaus students delighted in playing off these discordant aspects of jazz, as well as the tension between its repetitive rhythms and vital, improvisatory forces, by combining marionette plays, mechanical dances, and jazzy music (like Kurt Schmidt’s *Mechanische Ballet* at the 1923 Bauhaus exhibition).

The *Light Prop* can be considered as an extension of Bauhaus activities, sublimating or on the phenomenological level subtly hinting at these improvisatory and technologically framed aspects of the jazz performance and its related bodily mechanics of dance. The allusions serve as a means to give a dynamic emphasis to perception as sensory experience and to generate an interactive space. Although this interpretation, inspired by the Werkbund exhibition context, may seem unfounded, it can be supported by considering the *Light Prop*’s various clues, including its forms, size, metallic materials, light show, and performance, as well as Moholy-Nagy’s other works of the period, which in certain respects present antecedents to the *Light Prop*. In the photogram (a form of cameraless photography), photomontage, and typophoto (a mixing of typography and photography), he brought together the theme of jazz and photography in ways that emphasize their shared technological framework, light phenomena, and partially improvisatory mode of interpretation and technique.

Some of Moholy-Nagy’s photograms (c. 1923–28), emphasizing the direct manipulation of light on photosensitive paper, offer a condensed visual parallel to a jazz performance and an antecedent to the *Light Prop*’s “dancing lights” with their sharp contrasts, radiance, and light-infused, rich tonal modulations (jazz was also praised by modernists for its “tonal and modulatory richness”) (figs. 4–5).<sup>21</sup> In these photograms the metallic glare of jazz instruments under changing light conditions witnessed at Bauhaus parties are distilled down to simple shapes of dazzling light, suggesting glimpses of drum and drum sticks, the strings of a banjo or guitar, as well as piano keys, with the hand of the performer (that of the artist) placed over them as if singled out from the cavalcade by spotlights or the flash of the camera.<sup>22</sup> Motion effects are generated by way of layered multiple exposures, variously lit, jagged diagonal surfaces that overlap and interpenetrate, condensed traces of light (as arrested duration), and the repetition or mirroring of certain elements. In this way, forms resembling “guitar strings” appear to vibrate and “piano keys” seem to jump around in a syncopated counterpunctual manner. In the photomontage *Rape of the Sabines* (1927), in turn, mechanically reproduced photographic fragments are used to convey the Charleston-dancing couple’s marionette-like, dislocated body parts—attached to strings pulled by athletes—and



animated yet mechanical movements. Finally, in the film sketch *Dynamics of the Metropolis* (1922–25), assembled for an unrealized early talkie, the close-up of the jazz band’s metallic instruments and the “feverish activity” (*Painting, Photography, Film*, 131) of variety dancers interact with city lights and various hectic features of urban life

Fig. 4. László Moholy-Nagy, *Photogram*, n. d. (ca. 1923-1928).

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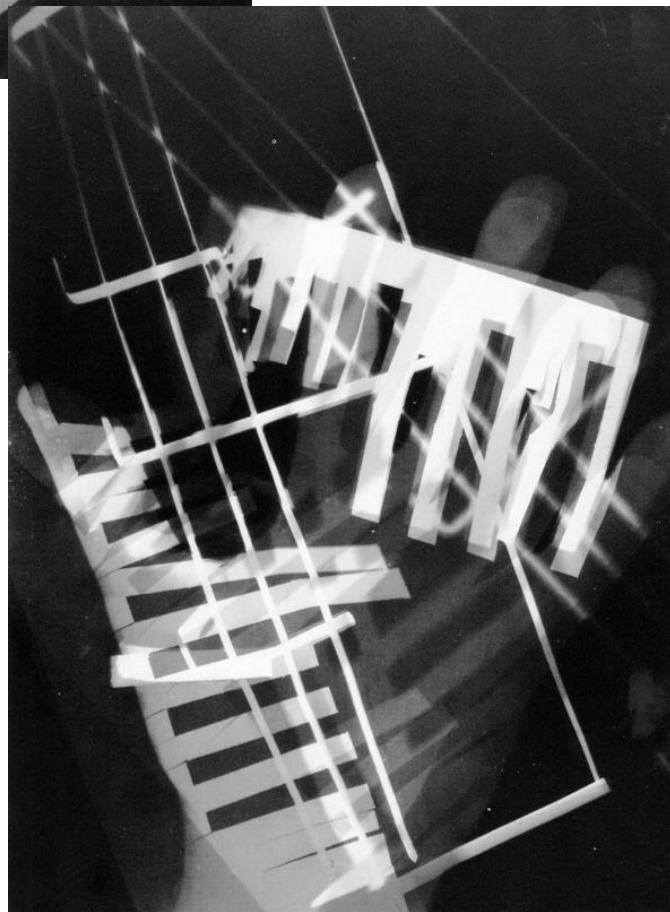


Fig. 5. László Moholy-Nagy, *Photogram*, n. d. (ca. 1923-1928).

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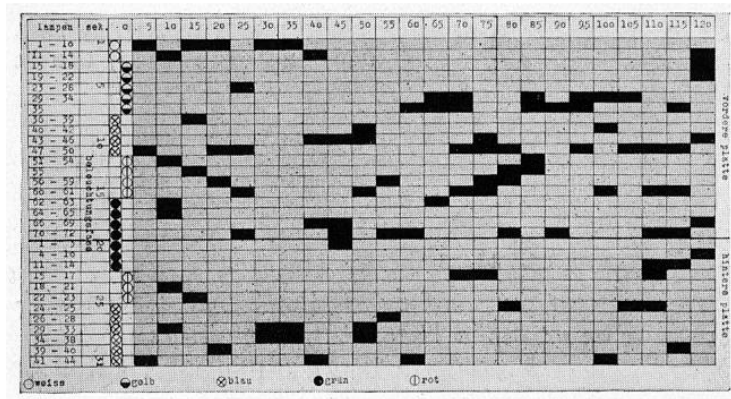
to convey the urban tempo, both in its looser, more Dadaistic graphic form as well as its organized typophoto form.

<sup>23</sup> Although if realized, the dynamics of the film would have resulted from the rhythmic

cuts and the sequential montage of various light, musical, and mobile elements, in the static film sketch similar effect is obtained by typographic, graphic, and photographic means.<sup>24</sup> As visual equivalents of the proposed music changing tempo from “fortissimo” to “pianissimo,” jazzy, improvisational rhythms are suggested by typography: the word “tempo” is rhythmically scattered all over the sheet, and the unrelated photographs are framed and structured by shifting black registers, which are punctuated by oppositions and interruptions of arrows, wedges, and other marks to create a complex visual space.

Some aspects of these evocations of jazz and jazz performance find their abstract echo in the *Light Prop*'s primary properties and activities, giving form to and to actualizing its mobility. Although the geometric demeanor of the various shiny metallic “performers” of the three sectors are pronounced, the size of the ensemble and the compact composition of the components parallel some of the features of a jazz orchestra kit, for example, the drum-like circular, chromed plates (the smaller one moving up and down in the manner of a cymbal to provide a “steady beat”) and the elongated mobile frame of the rolling ball that evokes the swinging of the brass trombone's shiny long frame. The rocking of the triadic planes and the spiraling “corkscrew,” in turn, remind one of the jerking movements and revolving of the Charleston dance, rendered in mechanical slow motion. The rods and spring mechanisms of the three rectangular planes, through which they are connected to an upper horizontal plate, fulfill essentially the same activating function as the handles and strings of a marionette dance. The rhythmically changing colored lights support the dance while contributing to the improvisatory light reflections (fig. 6). The lights and the reflectivity of the chrome nevertheless complicate the design, that is, the primary properties (materials and forms) of the *Light Prop* in various ways.

Why is performance a preeminent concern for Moholy-Nagy? He would have been positively predisposed to jazz performance and the mobility of the dance hall, for he himself conceived artistic practice and perception itself, the two forming a loose symbiotic relationship, as performative activities, in the sense of continuous physical exploration, experimentation, and interactivity. Compared to the layered surface of the partially improvisatory but single-frame photograms, the film sketch *Dynamics of the Metropolis*, for instance, introduces a more complex and sequential visual space requiring a more complicated multidirectional beholding, as the viewer needs to simultaneously maneuver among the film sketch's disparate shots and visual components. The enclosed, three-dimensional *Light Prop*'s mobile performance, in turn, encourages sustained looking through the aperture (at least for two minutes, its revolution time), the result of which is that the forms and movements of the “band” and those of the “dancers” appear to visually interact and form constantly changing constellations, not unlike at a Bauhaus party, thanks to the revolving stage, the perforated and transparent materials, and metallic reflections. Like the *Light Prop*'s dancing lights, the spontaneous action of electric light on glass, metal, and mirrors in a night club alters the perception



▲  
Fig. 6. László Moholy-Nagy and István Sebők, Lighting program for the enclosed *Light Prop*, from *Die Form*, vol. 5, nos. 11-12, 1930.

of forms, movements, and spatial relationships of the moving bodies in unpredictable ways. The interaction of the closely positioned ten spotlights with the metallic and glass surfaces when seen up close within the *Light Prop*'s casing, however, created a more potent and aggressive emphasis on perception as pure sensory phenomena than a jazz orchestra and nightclub would have.

We encounter these aggressive and often uncomfortable mobile light effects, as well as the mechanized movement, in city traffic, in the reflection of the headlights of an automobile on a shop window or the constant blinking of an electric sign, itself a variety of a light display machine or mechanism that Moholy-Nagy related to the *Light Prop* ("Lichtrequisit einer elektrischen Bühne, 297). The *Light Prop* and photograms as condensers of various light phenomena thus bring us to Moholy-Nagy's technique of breaking down and transcribing the properties of various manifestations of modern life to engender a multifaceted *Spielraum* that, in Benjamin's terms, enables one to experience the world as a social field of analogies and correspondences while at the same time being aware of their differences. The process allowed for medium-specific investigations while activating manifold relations with other media, modern urban spaces, and social interactions, encouraging various interpretations depending on context, presentation, and modes of revealing, making the *Light Prop* akin to what Umberto Eco calls the open work.<sup>25</sup> Although he clothed it in the language of a Machian type of empiricist philosophy, Moholy-Nagy had already laid the foundations of his program in "Aufruf zur elementaren Kunst" ("Manifesto of Elemental Art"), which he published with Raoul Hausmann, Hans Arp, and Ivan Puni in 1921 in *De Stijl*.<sup>26</sup> The manifesto proclaimed that its scope extended beyond the realm of art, stating that "the artist is but an exponent of the forces that give shape to the elements of the [modern] world" (156; translation mine).<sup>27</sup> The multiplicity of dislocated urban phenomena and the fragmented perception entering into various relations in this way is made into an artistic principle (not unlike in the polytonal structure of jazz or the mechanism of a kaleidoscope). Moholy-Nagy may have wanted to ground perception in the materialism of empiricist science; his projects nonetheless also articulate a set of phenomenological issues. In fact, the blurring of the limits and categories, or contexts, of various media

would have made apparent how the changing situation alters subjectivity and the perception of the same phenomena.

The multifaceted *Spielraum*, in which the acoustic “unruliness” and rhythm of jazz, dance, film, photography, and the city’s energetic urban tempo, disorienting light effects, and soundscape bear on each other and interact, emerges most clearly in the film sketch *Dynamics of the Metropolis*, since here the elements that make it up are visibly related to representations of human bodies and objects. The work, for instance, oscillates between various media. Are we supposed to interpret it as a “film,” a cinematic story board with directorial notes, a typo-photo, or, given that at the end the artist instructs us that “the whole thing is to be read through again quickly,” an interactive book (*Painting, Photography, Film*, 137)? Also, whereas jazzy rhythms are expressed in typographic forms, photographs suggest film shots. Moholy-Nagy’s directions for the film indicate that the unexpected appearance of the close-up of jazz instruments, the flash of electric signs, the blinding projections of car headlights, and other features of urban life would optically assault the audience; in the sketch, however, the dispersed photographs rather draw attention to interrelationships and correspondences, as well as to the different perceptions involved in film and photography. Perception itself resembles a *Spielraum*, a performance of maneuvering, since diverse trajectories, ways of mapping, and understanding can be imagined.

The *Light Prop*’s *Spielraum* is created by its changeable presentation, modes of viewing, and applicability, which alter our orientation and mode of awareness. When we encounter it without its enclosure, as a free-standing environmental work in a room space, for instance, in a museum space, as in the 2006 exhibition of its replica at the Busch-Reisinger Museum, or if we imagine it at an indoor festivity where its light and shadow projections could be contained and registered, as Moholy-Nagy suggested, an alteration occurs in perception. One experiences the light reflections in a nightclub as part of the fun, instead of as something uncomfortable as in the city, where they engender an intersubjective space complementing the music with their play on surfaces and dancing bodies. Likewise, the freestanding *Light Prop*, operating simply as a light prop and space modulator, produces a comparable perceptual effect when its metallic and glass reflections and mirrorings are dispersed and not intensified by closely positioned light bulbs in a casing. The interaction of the *Light Prop*’s oscillating colored lights with circulating bodies and other objects or images, as well as the experience of the changing room space and architectural boundaries, becomes the focus instead of its object aspect (which does not disappear, however).

Mondrian gave a similar description of the nightclub in *i 10*, a journal for which Moholy-Nagy was an editor, as a space where “everything is subsumed by rhythm” and movement, where the “bottles and glasses . . . move in color and sound and light,” achieving liberation from form.<sup>28</sup> Walter Ruttmann’s dance hall scene in *Berlin, Symphony of the Big City* (1927) strives to transmit this animated and fluctuating atmosphere in the medium of film with the help of a montage technique that interweaves jazz music with the glittering of crystal balls, bottles, glasses, mirrors, musical instruments, reflecting silk dresses, and the manifold movements of the Charleston-

dancing couples.<sup>29</sup> Just as the Bauhaus jazz band incorporated noises and activities of its environment into its music, the smooth surfaces of the mobile *Light Prop* embrace and reflect its surroundings. The comparison, of course, serves only to point to the perception of oscillating intersubjective space, not to make the *Light Prop* into a nightclub. Perhaps Moholy-Nagy's linking his work to festivities inspired scholars to relate it to early science fiction stories by the prewar novelist Paul Scheerbart, whose works inspired both expressionists and Dadaists, about colored lights that would create harmony between human beings and technology, as well as provide people with joy and motivation.<sup>30</sup> In this "virtual" world the human body would be united with and energized by technology, while subject-object distinctions would be subsumed by the all-embracing effects of light-shadow and motion phenomena. (Certainly, Hitler put a different spin on this idea with the light spectacle as sublime experience, exploiting the easy manipulability of human perception and psyche).

In his last film *do not disturb* (1945), realized with the contribution of his students in Chicago, one of the centers of jazz music, Moholy-Nagy juxtaposed two different perceptions of similar colored light phenomena, akin to those of the *Light Prop*. When the close-up of a kaleidoscopic and disturbing colored light display is (re)inserted into the live, embodied context of jazz music and dancing students, the technological light environment becomes a place of social gathering, an event that reminds one of today's relational aesthetics. His film montage of disparate images, jazz music and colored light effects demonstrates Moholy-Nagy's sustained interest in creating an energizing visual and acoustic event for a community of students, although these effects are extended to evoke an overall disturbing dreamlike state.<sup>31</sup> Like the *Light Prop*, the film calls attention to the various spatial interactions of light, shadows, and human bodies, a subject also elaborated in Moholy-Nagy's stage designs of the late 1920s, which I take up in the last part of the article. But why the insistence on the different framings of the same phenomena and their effects on perception?

### **Productive Creation / Creative "Technology"**

Before considering this issue, we need to discuss the *Light Prop* as a site of another performance, besides its own performance inspired by jazz and the perceptual performance of beholding it. The *Light Prop* as a site of artistic performance involves the fashioning of a visual "technology" that can fulfill a social role, without becoming instrumentalized or succumbing to technological predetermination, by fostering inventiveness. As one focuses on the arbitrary "dancing lights" and colors in relation to the mechanization (the condition of the *Light Prop*'s self-sustained mobility) and its correlate, the repetitive noises (the flipping of the ball, the rocking of connected planes and switching circles, meshing gears, and the subdued mechanical humming of the motor) that constitute the acoustic dimension, one is drawn to debates concerning mechanical music and color music (instruments that generate optical phenomena combined with or supported by sound effects, such as color pianos, Thomas Wilfred's *Clavilux*, or Ludwig Hirschfeld-Mack's light play).<sup>32</sup> During the 1920s these practices

often attracted artists, including Moholy-Nagy, who were interested in technological synesthesia or the discovery of new sounds and who wanted to redefine what constituted music and its manner of reception in technological modernity. Moholy-Nagy engaged this issue by setting up a dialectical audiovisual play between improvisation and (mechanical) repetition, which provides insight into the underlying mode of operation of the *Light Prop*.

The approach is spelled out in practical terms in his article “Musico-Mechanico, Mechanico-Optico” published in the “Music and Machine” issue of the music periodical *Anbruch*, edited by the modernist composer Hans Stuckenschmidt.<sup>33</sup> The text’s rationalizing rhetoric is constantly subverted by a focus on experimentation with technology, which encourages the embrace of tactics such as repurposing, chance, and improvisatory processes, tactics that are manifest in the *Light Prop* as well. Moholy-Nagy calls for reconfiguring musical apparatuses or reproduction devices through free experimentation, as, for instance, by manually inscribing music onto records to produce entirely new sounds (Moholy-Nagy claimed he undertook research as to how to do this at the Vox record company). In this way, the optical improvisatory process and the resulting mechanical acoustic (re)production become interrelated, although surely such music would have not found much of an audience. Moholy-Nagy had already suggested this idea in his 1922 article “Production—Reproduction.” “Are we able, and if so to what end, to alter the apparatus’s use so that it can serve production as well?,” he asks, turning on its head the meaning of the word “production” as defined by scientific rationality with his own rationalizing language and at the same time rejecting a fetishistic self-serving play with technology (“Produktion—Reproduktion,” 98–101; *Painting, Photography, Film*, 30–31). The ultimate aim of this repurposing technique would be to produce a flexible system capable of infinite modulations and unpredictability, an inherently creative and noninstrumental “technology” that subverts technological enframing. In his system, acoustic and visual processes, improvisation and precision, the mechanical and the arbitrary or the spontaneous, and the technological and biological are reconciled or establish dynamic tensions.

In the *Light Prop*, the hypnotic repetition of mechanical sound and metallic forms is similarly offset by the visually produced arbitrary colored light-shadow show and multiplicity of reflections, creating a counterpoint. Although Moholy-Nagy may not have had jazz in mind when he was writing his article, the interaction of improvisation and repetition animated jazz as well, providing inspiration for modernist and mechanical music composers associated with the Bauhaus, such as Stuckenschmidt, George Antheil, Paul Hindemith, and Stefan Wolpe.<sup>34</sup>

What is at stake in the preoccupation with improvisation and technological mediation if not a conviction that despite the emergence of ever more challenging technologies, experience was impoverished by these technologies being put to the service of instrumentalized and alienating functions? “Today, it is vitally important to recognize that, thanks to capitalism, we have reached a stage of economic and social development detrimental to healthy and satisfactory life,” states Moholy-Nagy. “This phase is best



expressed by capitalism's anti-biological use of technology."<sup>35</sup> A biologically based visual technology (which Moholy-Nagy associated with the term "Biotechnik" coined by the popular scientist Raoul Francé), then, should appeal to the senses and perception in an uninstrumentalized and vital manner, one would assume.<sup>36</sup> Does the *Light Prop* repurpose or reconfigure any apparatus other than a conventional light prop in a biologically oriented fashion? If so, to what end? To answer this question we have to consider the status of perception in Weimar Germany, which the *Light Prop* provides several ways of framing.

### **Framing Cinema: Vision in Motion**

One of the ways leads to cinema. If we shift the context of the *Light Prop* from jazz-like light performance and geometric forms to the mobile shadow play of cinema, as Moholy-Nagy did when he placed it in his film and at the center of an unrealized plan for a "new media" exhibition space (*Raum der Gegenwart* [1931], recently reconstructed at the Van Abbemuseum in Eindhoven), amid avant-garde film projections and photographs, we may discover the critical potential of his creative "technology" and its framings of visual phenomena in the most unexpected places.<sup>37</sup> The various contexts, in fact, do not extinguish each other but rather constitute continuously interacting dimensions, just as jazz, city experience, photography, and film are brought to bear on each other in *Dynamics of the Metropolis*. By 1928 Moholy-Nagy was increasingly turning to the temporal, spatial, and perceptual possibilities offered by the film medium. He even argued that the *Light Prop*, with its rich light effects and mobility, could help in discovering a "new, specific dimension for film," which he attempted to demonstrate in the experimental film featuring the work, *Lichtspiel: Schwarz—Weiss—Grau* (*Light Play: Black—White—Gray* [1930]).<sup>38</sup>

The *Light Prop*'s shadow play, light projection, and original cubical housing, which led visitors to the 1930 Werkbund exhibition to liken it to a magic lantern, also link it to the history of the cinema. With its different performance possibilities—in its original housing, with the back of the box open, or without it—the *Light Prop* tried to encompass various perceptual practices, including those mediated by then marginalized precinematic imaging devices and optical toys that articulate light and/or motion phenomena in a mobile container or as projections. In his article explaining the mechanism of the *Light Prop*, Moholy-Nagy suggests that in a dark space it could also be operated with the back plate of its casing removed, allowing the oscillating shadow play to be projected on a screen or wall behind the box, a setup that could be further complicated with the insertion of stencil figures ("Lichtrequisit einer elektrischen Bühne," 311). Therefore we can call its mobile shadow formations "paracinematic," which for Hollis Frampton included any phenomena that shared at least one element with cinema, for instance, modularity (movement) with respect to space and time, that contributed to creating a kinematographic-type experience.<sup>39</sup> In this setup, the *Light Prop* would function as an exposed "projector" that generated its own shadow images for an abstract "cinema," creating its own constantly changing space. Seen in this way,

through its aperture opening, the rhythmically modulated abstract light dance and performance produced by the moving parts and revolving stage could be understood as reconfiguring the principles of optical toys such as the zoetrope, kaleidoscope, or praxinoscope theater of earlier fun fairs in an oversized and technologically updated form. Indeed, in his autobiography Moholy-Nagy himself called the *Light Prop* a “space kaleidoscope.”<sup>40</sup> The contraption’s colored light-shadow projections, in turn, establish parallels with the operation of the magic lantern.<sup>41</sup>

Why would a design made by a modernist like Moholy-Nagy point back to the infancy of cinema at the very moment when cinematic technology had just made a great forward leap with the introduction of the sound film, unless it wanted to engage some perceived problem occasioned by this new technology? As his sketch for an early talkie, *Dynamics of the Metropolis*, and contemporary articles demonstrate, Moholy-Nagy faced head-on the new perceptual challenges that the introduction of sound in film created. Yet we may argue that what the *Light Prop* in its last stages of conception and its film critically responded to, directly or indirectly, was the final institutionalization of commercial cinema, as it embraced one specific kind of sound film and one way of viewing it.<sup>42</sup> Now, as Moholy-Nagy the modernist saw it, the light play of cinema constituted the triumph of representation with its more perfect and uncomplicated story-bound illusion, detached from the cinematic apparatus, to the extent that the spectator became more riveted and passive. “To the trained eye and mind the present-day film can give no pleasure,” he remarked, as it “is beginning to waste the magnificent technical heritage of the past century” (“An Open Letter,” 272, 275). The huge production costs of the new sound film, Moholy-Nagy complained, resulted in the growing monopoly of a few influential film companies and strangled possibilities of artistic experimentation (“An Open Letter”). Certainly, for Moholy-Nagy cinema did not have a fixed definition. Except for light and the effect of stroboscopic motion, Moholy-Nagy saw its materials and technology as historically contingent and constantly evolving. He especially sought to further develop cinema by increasing the perceptual challenge it posed, as is evident, for instance, in his ideas for three-dimensional cinema and polycinema, which he had outlined in *Painting, Photography, Film* (1927). Here Moholy-Nagy proposed the simultaneous projection of several intertwining and occasionally superimposed events on an unusually shaped screen as well as the idea of films projected into space.<sup>43</sup> The *Light Prop*, like Moholy-Nagy’s emerging film practice, reflected his efforts to prevent cinema and cinematic experience from petrifying into a set of technical and perceptual routines and uncritical acceptance of illusions.

In contrast to narrative cinema, what these “vernacular” optical toys and early “cinematic attractions” had in common were their diversified, visceral sensory stimuli and, in Jonathan Crary’s words, their “insufficiently phantasmagoric” effects, as they scattered “desire into new shifting and labile arrangements, by fragmenting any point of iconicity and disrupting stasis.”<sup>44</sup> Instead of being simply an invisible, transparent film projector for conveying a world of fantasy, with its “insufficiently phantasmagoric” implications and in-built tension between material presence and

phenomenal dispersal, abstract surfaces and lived space, anti-illusionism and immersive experience, the *Light Prop* liberated the shadow play of cinema from its narrative duration, visual cage, and emotional aspects. Instead of sitting isolated among other people in front of a screen, the viewers could even become part of the event by walking into the light projections and casting their own shadows and in this way relate to each other, not unlike the interactive experience of Kazimir Malevich's *White on White* canvas, as Moholy-Nagy interpreted it (*Von Material zu Architektur*, 90). The *Light Prop*'s play, then, in its modest effort, counteracted the predetermination of perception by the ideology of the mainstream film industry by reviving and combining the by then displaced embodied perceptual experience of nineteenth-century precinematic attractions, as well as the communal environment and physical presence of live performances, both jazz and theater. Tom Gunning has made a similar comparison between the repetitive rhythmic dances featured in optical toys and in early cinema and the "serpentine" light dance of Loïe Fuller that exploited the effects of colored electric light on the moving body, calling these mutually informative aspects of early twentieth-century culture.<sup>45</sup>

By evoking the principles of earlier optical toys, which were originally used for scientific study of perception, however, Moholy-Nagy may have had something else planned besides calling for cinematic experimentation and a reexploration of earlier forms of subjectivity. One may wonder what role another contingency, the *Light Prop*'s disturbing, insistent slow motion, plays in this creative "technology," since it induces a disparate temporality by failing to accord either with jazz tempo, with regular cinematic time, or, in fact, with the tempo of modernity. When the contraption is framed for inspection in a casing, the slow motion hypnotizes the viewer's perception with the constant transformation of its mobile forms and space by the colored lights and reflections. Whereas in the still photographs and film sketch the suggested rhythmic, jazz-like experience still wears the imprint of the body that produced it as a sign of embodied presence and locus of meaning, the slow motion and abstract forms separate the *Light Prop* from the representational realm of everyday experience and tempo, introducing a distance that makes its phenomenal properties, sounds, and embodied perception itself the focus of attention.

We could argue that Moholy-Nagy, an art educator rather than a hypnotist, magician, or a jazz musician, rationalized his artistic endeavor as being educational, as aiming to attune the human organism and technology to each other to create social interconnectedness by inducing heightened self-awareness, the awareness of perception itself. In his view the human eye's dexterity, for instance, could be improved to meet the visual and mobile challenges of modernity through new light-based, technological, and mobile artistic media. As he argued, these artistic "devices" would "establish far-reaching new relationships between the known and the as yet unknown optical, acoustical, and other functional phenomena so that these are absorbed in increasing abundance by the [human] functional apparatus" (*Painting, Photography, Film*, 30; bold in original).<sup>46</sup> Moholy-Nagy embraced (or intuitively investigated) many aspects of the burgeoning Gestalt psychology, such as establishing relationships within

different aspects of the visual field and paying attention to the perception of motion illusion and surface color under changing illumination.<sup>47</sup> His mission of perceptual training, his interest in multiplicity (which is, however, not the sum of its parts), and the interrelation of human physiological functions and mechanical structures of technological modernity nevertheless overlapped with the approach of elementarist empiricism (*Von Material zu Architektur*, 188–91). According to the then still prevalent empiricist view, perception was a learned behavior that occurred by a gradual coordination of eye movements, retinal stimulations, various tactile sensations, and largely unconscious associative processes acquired by extensive experience with the world, as most prominently theorized by Helmholtz. Thus the more thoroughly the observer engaged with various phenomena, it was believed, the richer and more complex his or her perceptions became. Helmholtz modeled his ideas of sensory inferences and testing on the structural workings of experimental science, while Moholy-Nagy correlated the structure of perception, mechanics, and his method of artistic elementarism.<sup>48</sup> His works nevertheless demonstrated that perception is more complicated than material facts, earning the interest of phenomenologists in 1929 at the University of Freiburg, the center of phenomenological studies.<sup>49</sup>

Besides at least eight varieties of photographic seeing, Moholy-Nagy also distinguished a kind of cinematic perception of space-time that he would later call “vision in motion” (theorized in *Vision in Motion* of 1947 but already operative in *Von Material zu Architektur* of 1929), privileging dynamism, flexibility, and mutability instead of fantasy and imagery.<sup>50</sup> Whereas the single frame of the photograms make one aware of bracketed intricate light, motion and spatial relationships, which the prevalence of commodity form renders less available, to anchor the perception of modern urban phenomena, the film sketch *Dynamics of the Metropolis*, the mobile *Light Prop*, and Moholy-Nagy’s experimental films loosen the anchor and further complicate the viewing relationships. According to modernist wisdom, “cinematic” perception is different from that of the everyday in its multiplicity of perspectives that accommodate a world in constant flux and that, like photography, can make things visible that are usually invisible to the human eye, such as minute details, complex optical illusions, and space-time relationships.<sup>51</sup> Whereas this cinematically generated visual world is separate from the spectator and transmitted in a fixed form, Moholy-Nagy wanted to make it into an approximate, lived perceptual possibility. He even went so far to locate one of the main achievements of constructivism in its conscious use of “optical energy, visual illusion and after-image, which are the means of a new kinetic space-time rendering” (*The New Vision*, 38), reconfiguring the human perceptual apparatus.<sup>52</sup> Film, along with the *Light Prop*, then would produce a viewing subject whose subjective vision is biologically instead of emotionally focused, that is, collective instead of conflicting or possessive. To progress toward this goal, the artist wanted the perceived light phenomena to enter us without any preconditions, theology, consumerist desire, or political doctrines. Instead, the various phenomenal relationships of cinema, jazz, and other mass cultural channels, interpreted by means of an artistic breakdown and transformation, would be registered psycho-physiologically, sustained in the nervous

system, and responded to interactively, so that people could become producers of their own experience in their social interactions.

Following this reasoning, the *Light Prop* can be interpreted as a paracinematic device of heightened temporality intended to activate a quasi-cinematic perception on the part of the spectator while also highlighting its three-dimensional differences. The paracinematic understanding of the *Light Prop* is facilitated by its photogenic quality, reinforced by the gleaming metal and modulated and mobile light play. French film commentators located the concept of *photogénie* in “electricity’s reign” in the music hall and defined it as the simultaneous movement and variability of a figure in space and time that ensured the development of its rhythmic variables.<sup>53</sup> Seen through a cinematic glass, the glittering “dance” and shadow play of the *Light Prop* display their visibility through the evocation of cinematic framing techniques and the movement of the exposed “projector,” calling attention to the play of two and three dimensions, the phenomenal and the material. Whereas its metal frames separate (and connect) the three sections in the manner of the successive shots and intervals of a film, the visual relationships between the elements of each frame—and, since the metal frames are transparent or gridded, between the elements of different frames and their shadow formations—are continuously changing, in the manner of a montage, as the stage moves around. Their transparencies, superimpositions of reflections, and multilayered spaces, paralleling the multiple-exposure technique of films and Moholy-Nagy’s photographic works, create various space-time constellations and perceptual plays between proximity and distance that Moholy-Nagy hoped would enrich spatial vision and define the machine’s rhythmic variables. The aperture window of the box, echoing the masking used in early films (which in turn referred back to the viewing hole of optical attractions), acted as a kind of “close-up” focus of the partly dematerialized performance. (Interestingly, in the English summary of the article explaining the *Light Prop*, the translator used the term “moving picture,” instead of “kinetic play” to suggest the cinematic character of the mobile performances [“Lighting Requisite for an Electric Stage,” trans. E. T. Scheffauer, in “Lichtrequisit einer elektrischen Bühne,” 299].) The interaction of lights and reflections engenders flickering, as in early film, making the observing eye blink, whereas the flashing colors produce afterimages, and the changing configurations of geometric forms bring about various associations. These allusions to cinematic techniques and byproducts, which Moholy-Nagy made ample use of in the film *Lichtspiel*, would have become more apparent in the *Raum der Gegenwart* setting (as one can judge from its reconstruction at the Van Abbemuseum).

Ultimately, the *Light Prop*’s performance fosters an interaction of biological and performative seeing, for which the term “training,” connoting mastery, is not suitable. For how could vision master mirroring reflections and flickering and blinking spotlights? In the *Light Prop* embodied experience returns in the form of biological, visceral opticality, even if not as a genuine “cinematic” perception, magnifying the uncontainability of urban phenomena. As Moholy-Nagy’s own process of constant transcription demonstrates, from photographs to film sketch, films, and the *Light Prop*, perception also changes according to different (media) contexts and cannot be stabilized

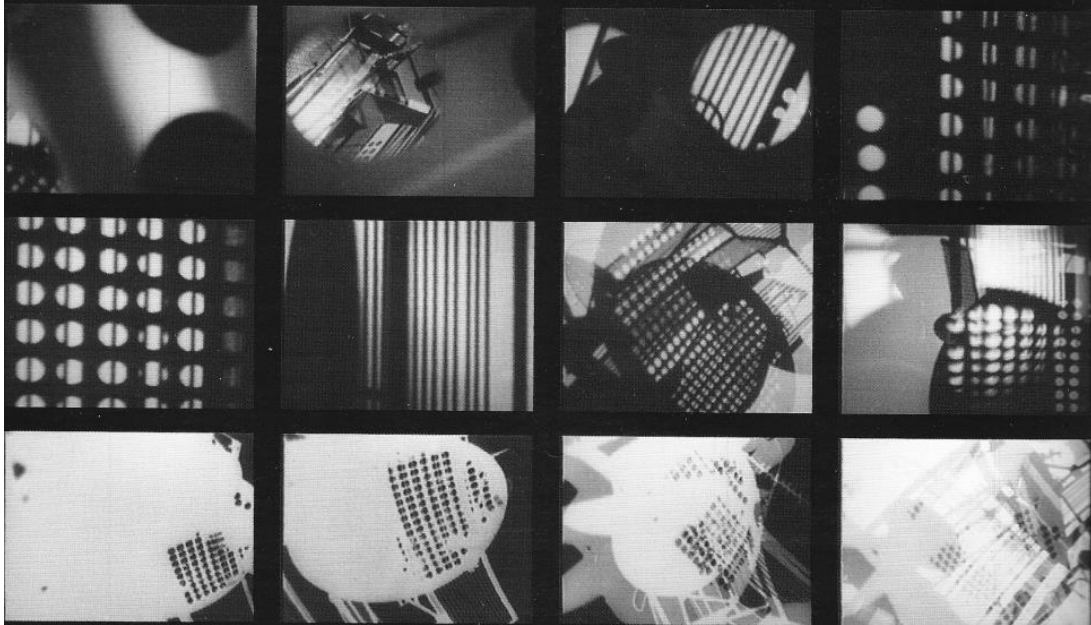
into a set of exercises based on some “metavocabulary” of visual elements. Similarly, the hybrid nature and multivalent applications of the *Light Prop* encourage us to keep shifting its conceptual and physical context, and the participatory refocusing reveals new aspects of its properties and relationships, reconfiguring our perceptual structure and orientation. This reconfiguration, in turn, allows us to discover new levels of experience. Therefore, instead of understanding our perceptual engagement with the *Light Prop* in terms of the controllable mastery of training, we should see it in a phenomenological sense, as a creative event, a performance aware of itself as biologically rooted and environmentally predisposed. The *Light Prop*'s performance in multiple contexts and the awareness of its changing of perception would then undermine technological enframing.

### **Light Play: Black—White—Gray**

By evoking cinema and jazz through interwoven shadow play, dancing lights, self-generated sounds, and cinematic techniques, the *Light Prop* drew attention to the building blocks of narrative cinema at the time when the first sound films, such as the *Jazz Singer* (first shown in Germany in 1928), *Blue Angel* (1929) and *Saxophone Suzie* (1929), were making their debuts, showcasing their new capabilities by featuring (commercialized) jazz music and heralding a new age of commercialized film making. The *Light Prop* rematerialized the cinematic show and its technical aspects, liberating the play of contingencies fixed on the celluloid film. At the same time, maybe to make a stronger point, Moholy-Nagy brought his experiments full circle by channeling the effects of his three-dimensional paracinematic construction into the film medium itself, thereby fully realizing both its perceptual and technical potential. According to Sybil Moholy-Nagy, the artist also wanted to integrate the film with music, which plan failed to materialize, no doubt due to technical difficulties, given his preferences for sound-image montage (*Moholy-Nagy*, 66). His film of the *Light Prop*, *Lichtspiel: Schwarz—Weiss—Grau* (*Lichtspiel* meaning both “light play” and “film”) nevertheless made it clear to its spectators that film, and by implication, for instance, Al Jolson impersonating an African American jazz singer or Marlene Dietrich dancing on the silver screen exuding sentimentalism and eroticism, in reality was nothing else than rhythmically dancing and flickering light and shadow projections appearing as blackwhite-gray formations at the phenomenological level (fig. 7). I do not mean to argue that Moholy-Nagy's *Light Prop* and *Lichtspiel* directly commented on these specific movies. It is nevertheless tempting to notice that several of the first box office hits in sound film employed jazz or revue music to finally complete the mimetic illusion of reality, erasing former signs of mediation on which, by contrast, the *Light Prop* and its film insist. (In the later film *do not disturb jazz*, dance, and light play occasionally create a montage.)

The *Light Prop*'s shadow formations, dancing lights, and its film, then, attempted to creatively reconfigure the relationship between the viewer and the cinematic apparatus

by foregrounding the cinematic process, as well as its perception, that in narrative cinema remained suppressed through decomposition or “depicturization” and the liberation of chance events. In the fluctuating light play of the film *Lichtspiel* we obtain yet again a different perception of the *Light Prop*. Now its object aspect is nearly



▲  
Fig. 7. László Moholy-Nagy, Film stills from *Lichtspiel: Schwarz-Weiss-Grau*, 1930.

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annihilated, calling to mind something like pixelization in digital photography or what Dziga Vertov termed “gaseous perception,” which occurs when the image is diffused in all directions, defined by free movement, the flickering of luminous, vibrational elements behind the image, carrying perception into the materialization of light as energy particles.<sup>54</sup> This effect was achieved by the amplification of the *Light Prop*’s light vibrations and multiple spaces by an almost obsessive application of film techniques in “slow time,” so that they refuse to settle into a unified object and predetermined meaning. The close-ups, positive-negative pictures, fades, prisms, split screens, dissolving, and distortions draw the eye into a web of constantly transforming, shifting, and floating light phenomena shown from different angles and in multiple superimpositions, which intermesh with the object that produced them and with the surrounding space.<sup>55</sup> The disorienting effect opposed mainstream cinema’s attempt to make people believe, even if temporarily, that they were seeing replacements of unified and present real objects. The actual light-projecting machine, its shadow reproductions, and their representations appearing in *Lichtspiel* in this way form an inseparable, cross-referencing unity, revealing the process through which cinematic properties generate the film. Even the basic element of film, the photogram, makes its appearance in the form of negative image, which also refers to Moholy-Nagy’s photographic photograms as another form of “light play.” Therefore, the cross-referencing reflexivity and sensory emphasis of the *Light Prop* and *Lichtspiel* find common points with the structural materialist cinema of the 1960s and to some extent also with Benjamin’s

phantasmagoric critical theory and its disruptive appropriation of visual technologies, although in Moholy-Nagy's modernist project ideology critique remains hidden.

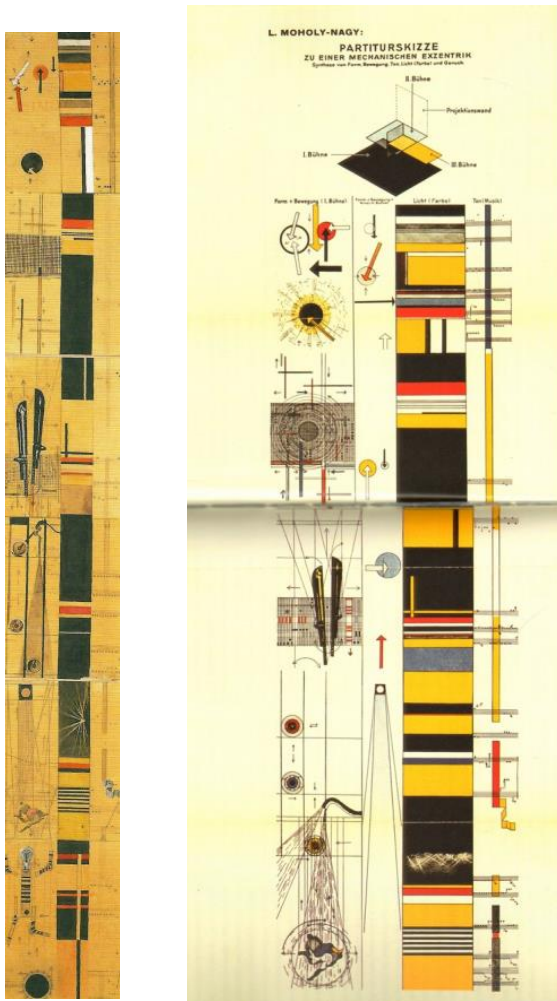
As our investigation of the *Light Prop* has revealed so far, the breakdown and remediation of light and acoustic phenomena and technologies, understood to be defining aspects of modern life, various arts and mediums could be correlated with each other (while retaining their specificities) and with certain aspects of larger culture beyond the boundaries of art within a multifaceted *Spielraum*. Thus Moholy-Nagy's project was not merely a self-serving formalism or a naïve celebration of surface culture but was also based on the (not less naïve) belief that by mapping and restructuring urban visual space and calling attention to phenomenal relationships instead of to mere objects or to the conventional, reified appearance of objects, perception and consequently social relationships could be changed. For him the analysis and understanding of the floating phenomena of the city, situated between objective reality and subjective experience, as well as an inventive approach to design, offered a solution to the "unbiological" use of technology and alienated urban existence, even though the *Light Prop* failed to overcome it.

### **Space Forming in Three Dimensions: Cinematic Theater and Mechanical Ex-Centric**

Finally, we need to consider the development of the *Light Prop* in relation to Moholy-Nagy's 1929 stage designs integrating his earlier experiments in photography, his three-dimensional constructions, and his new film practice into complex spatial designs that incorporated the human body. After all, the *Light Prop* was constructed in the theater workshop of AEG, Germany's main electric company, sometime in 1929–30, as a potential stage prop, and subsequently it was displayed among theater designs at the 1930 Werkbund exhibition. Although the *Light Prop* can fulfill a range of functions on the theater stage, from simply being a light prop, or "projector," and space modulator to acting as a participant in the performance, it never appeared in an actual theatrical production during Moholy-Nagy's lifetime.<sup>56</sup> What concerns us here, then, is by what means he attempted to construct stage designs that admitted a "cinematic" perception of space and a Benjaminian-expanded *Spielraum*, a new type of performative space that integrated and reconfigured the relationship between image space and body space while trying to avoid technological enframing. We also need to consider how his theatrical experiments relate to the project of the *Light Prop* and what implications they may have had for the common experience of architecture.

Moholy-Nagy's plan for the *Mechanical Ex-Centric* play, a vertically enfolding "cinematic storyboard" exhibited at the 1924 International Theater Exhibition in Vienna and reproduced with an accompanying article in *The Theater of the Bauhaus* (1925), may be seen as a reference point for both the *Light Prop* and his realized stage designs (fig. 8).<sup>57</sup> His version of Bauhaus (mechanical) theater attempted to reach back to the visual attractions and nonnarrative performance of popular entertainments, such as the





variety show that combined dance, acrobatics, and circus stunts, that is, to more spontaneous, partially improvised performances, in which human subjectivity and narrativity are deemphasized. Here the human actor would have become an “ex-centric” element, no more important than mechanical devices. According to Moholy-Nagy in “Theater, Circus, Variety,” instead of the high art refinement, illusionism, and hero

Fig. 8. László Moholy-Nagy, *Mechanical Ex-*

*Centric* play, 1924

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worship of the Wagnerian-type Gesamtkunstwerk, this Bauhaus total theater wanted to create fluidity by reducing the division between the stage and auditorium.

It proposed using various interpenetrating stage constructions to allow for interactivity and emphasized physical presence through the “close-up” view available in film. Technological devices, such as light projectors used as means of forming space, film projection onto reflecting glass surface to create perceptual challenges, and noisy mechanical music instruments to thwart passive contemplation would create a context in which physicality was heightened and “collective” participation was encouraged (47–56).

Moholy-Nagy’s version of expanded cinema, which developed from his ideas about three-dimensional cinema and polycinema that were already germinating in *Mechanical Ex-Centric* and then were realized in the *Light Prop* and in a more complex form on the theater stage with various light props, film and light projections, and other technical equipment, however, had broader social ambitions than creating a Dadaistic perceptual challenge. As suggested already in relation to the 1930 Werkbund exhibition, it investigated whether reflective surfaces and light and shadow projections, or what he called “light architecture,” could transform the rigid conception and delimitation of architectural space and liberate people from the architecture of utility, as happened for instance in a nightclub or in film (*Von Material zu Architektur*, 216). The cinematically infused language of *Von Material zu Architektur* supported the claim that the study and articulation of spatial relationships and lighting comprised not only the main problems

of film but that of contemporary architecture, modern living, and our orientation in the city as well, since light (as visible energy flow) in general realizes space. According to Moholy-Nagy, in a biologically oriented architectural environment, as in the environment of the *Light Prop*, the inside and outside interpenetrate, “boundaries become fluid, space is conceived as flowing—a countless succession of relationships” (*Von Material zu Architektur*, 222; translation mine). This sounds like he’s suggesting that architecture takes on film qualities by losing its monolithic solidity, immobility, isolation, and conformity to the parameters of fixed linear perspective and functionalism. But Moholy-Nagy, in fact, recommended the theater stage as a “laboratory” for this kind of “kinetic space forming,” where man “becomes himself an active partner with the energies unfolding themselves” (*Von Material zu Architektur*, 163; translation mine). Whereas Russian constructivist stage designers often built the theatrical space out of raw materials, implying parallels with construction sites and factory production, Moholy-Nagy took film as a paradigmatic modernist art of space-time. Film provided a model and tool for assembling fluctuating and interpenetrating spaces articulated by mobile constructions, light, and shadows in such a way as to transform, in Moholy-Nagy’s terms, perception and bodily interaction into collective energies.

Moholy-Nagy’s experiments with light and film projections and light props as a stage designer in 1929 at the Krolloper and the Piscator Theater in Berlin, while the *Light Prop*’s final form was taking shape, served as an important means of inquiry and testing, incorporating three- and two-dimensional spaces, light and mobile bodies, stage and the audience. The act of integration meant combining directed intentionality toward things (the active engagement of perception) with environmental attunement or the opening oneself up to one’s surroundings. Overcoming the division between stage and auditorium, necessary to opening oneself up to one’s surroundings, was not, however, easy to achieve in a traditionally built theater and in the framework of a narrative play. As with the *Light Prop*, Moholy-Nagy utilized mainly visual means.

His theatrical space forming can be related to the “cinematic” preoccupations of the *Light Prop* in at least two ways, one structural, the other perceptual. The constructivist “light montage,” as Theodor Adorno’s review described the stage design of Offenbach’s *Tales of Hoffmann*, premiering in February 1929 at the experimental Krolloper in Berlin, opposed the “old illusionistic and magic stage lighting . . . [with its] own space construction,” actualizing a quasi-“cinematic” space in a more organized and (due to its dimensions) imposing form than the *Light Prop* (fig. 9).<sup>58</sup> As can be made out from the surviving photographs, the exposed grids and frames of the slender metal construction scaffolding and the reflecting and mirroring materials of stage sets created an intricate, interwoven space in interaction with the projected “light complexes” and pronounced shadows. The shadow projections, despite the transparency of construction, nevertheless still conveyed the impression of standing for real structures (which the mobile *Light Prop* was able to avoid doing). The foldable and mobile planes and Breuer tubular steel



▲  
Fig. 9. László Moholy-Nagy, *Tales of Hoffman*, Krolloper, 1929, from *Von Material zu Architektur*, 1929

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furniture, prefiguring the Werkbund exhibition, added a spontaneous dimension to the performance and constructivist design, for they acted as undisguised light props further modulating the space of the actors as they interacted with them and interlaced optical and tactile effects. It is not clear whether the light-shadow architecture spread over the auditorium, but at least one circus-like activity introduced an all-around audiovisual surprise (similar to the launching of the *Light Prop*'s play with the push button), when “young girls floated in dreamlike rigid poses on high swings over the heads of the audience.”<sup>59</sup> As the culmination of *Von Material zu Architektur*, in the section “space forming on stage and in film,” Moholy-Nagy notes that this kind of inventive spatial experiment would propel the theater ahead of the other arts, as soon as “it leaves the blind alley of the purely literary” that had until then commanded the focus of attention (*Von Material zu Architektur*, 219; translation mine).

Moholy-Nagy wanted a self-aware perception to be central to stage designs and live performance, articulated by cinematic techniques as in the *Light Prop*, although this perception had to be activated from a greater remove than that from which one could observe the performance of the enclosed *Light Prop*. If the *Light Prop* “challenged” mainstream cinema with its interactive shadow projections, intersubjective light environment, and the film *Lichtspiel*, the stage designs, by employing film projections, generated a further interaction of image space, shadow space, and body space in a manner not available to cinema. In the *Tales of Hoffmann* (which also elaborated the idea of the musical automaton) the magnification and doubling of the actors’ gestures with the use of mirrors, shadows, and close-up film projection and the simultaneous amplification of their voices brought about interplay between theatrical distancing and intensification of embodied presence.<sup>60</sup> The stage sets of Walter Mehring’s controversial political play *The Merchant of Berlin*, which opened in September 1929 at Piscator’s Political Theater, in turn, produced a more immersive environment (advocated by Piscator) in which perception was put to a greater test. The design, in fact, tested how far one could push technology in pursuit of a complex “cinematic” perception and free-flowing space that would remain “biological” and nonexploitative.<sup>61</sup> In this dystopic tale of postwar hyperinflation and breakdown of the machinery of capitalism, the interaction of various stage machinery carrying the actors in diverse directions suggested a mechanistic social environment and urban commotion, while the revolving stage, which was turned at least thirteen times during the first act alone, quickened the viewers’ temporal sense and perceptual mobility. The actors’ mobility on the hanging bridges, exposed elevators, conveyor belts, and ramps also responded to the divergent perspectives of the montage of film sequences showing street scenes of Berlin on four projection screens and a transparent gauze material. The multilevel stage compartments, which resembled live “film shots” when illuminated one by one, further complicated image- and body space. In this multimedia *Spielraum* the stage increasingly lost its solid materiality while at the same time cinematic projection gained three-dimensional material presence that forced the spectators to maintain awareness of the distinction between illusion and reality, phenomenal and material environment.

Moholy-Nagy nevertheless had to realize that the theater technology of the time failed to live up to his expectations for creating a mobile stage of space-time and harmonious interaction between humankind and technology. Although the various projections, mobile stage constructions, textures, and light effects turned the theater space of *The Merchant of Berlin* into a continuously transforming, bustling city, it also became cold, technological, and to some degree even as dysfunctional as the capitalist economy. Critics complained that the operation of stage machinery was slow, cumbersome, and loud (Piscator, *The Political Theater*, 316; Bettina Wilts, *Zeit, Raum und Licht*, 96–97). Hence the utopian idea of a minutely constructed, multilayered technological light environment (a metaphor of the Weimar era itself) and its “cinematic” perception could not be realized even on the hermetic theater stage in a way that Moholy-Nagy would have wished.

On the one hand, these multifaceted theatrical experiments with light and space forming facilitated the construction of a more compact and elaborate light prop that could generate an immersive yet anti-illusionistic light environment without the use of extensive machinery. On the other hand, they may have also given impetus for reconfiguring this device, at least on one level, into a self-contained theater as well, a mechanical ex-centric that rid itself of literary and political burdens, the unreliable human element, and psychological make-believe. Yet to achieve his anti-illusionistic “event space” Moholy-Nagy needed components of the jazz performance, which would allow for unpredictability and improvisation, as well as extended perceptual duration and an intersubjective spatial experience in the performance of his mechanical theater. All these ideas concerning space forming and light architecture were also channeled back into the social framework of everyday life, their point of origin, in the communal room’s nightclub at the Paris exhibition.

Have we taken our interpretation too far? I believe we have only opened up a *Spielraum* that emerges from Moholy-Nagy’s experiments and the *Light Prop*’s potential as an open work. The *Light Prop* subtly engages, by way of its performance, with various cultural practices and visual technologies, including the jazz performance, cinema, outdated optical toys, and theater in a way that defies technological determination and conventional perception, integrating and at the same time separating image space and body space that tended to become momentarily confused in Weimar visual culture. Moholy-Nagy’s drive for a self-aware perception that could deconstruct and go beyond the façade of desires of the city’s light environment, however, proved insufficient by the early 1930s. As his constant resituating and reformulation of the *Light Prop* and with it the problem of perception suggest, he addressed, although underestimated, capitalism’s ever-adapting and controlling means of image production. By the time Moholy-Nagy arrived in the United States in the mid-1930s, the stage was set for the *Light Prop*’s formalist interpretation as a metal sculpture. This step was initiated by no other than the artist when he called his contraption a “mobile” after Calder’s constructions, which came to obscure its original versatility and mutability (*The New Vision*, 80).

## Notes

I thank Jason Benton for his insightful comments, and Jessica Henderson and MJ Devaney for their editorial suggestions.

1. In the time since this article was written, a new exhibition called “Sensing the Future: MoholyNagy, Media, and the Arts” has been held at the Bauhaus-Archiv, Berlin, organized by Oliver Botar, indicating the ongoing interest in the topic of my research.

2. László Moholy-Nagy, *Painting, Photography, Film*, trans. Janet Seligman (Cambridge, MA: MIT Press, 1969), 39, 43. On Moholy-Nagy’s book and issues of perception in Weimar Germany, see Pepper Stetler, “‘The New Visual Literature’: László Moholy-Nagy’s *Painting, Photography, Film*,” *Grey Room* 32 (Summer 2008): 88–113.

3. The 1930 article explaining the construction calls it *Light Prop for an Electric Stage*, although here Moholy-Nagy also refers to it as a “light display machine,” whereas in the United States it became known as *Light-Space Modulator*. See László Moholy-Nagy, “Lichtrequisit einer elektrischen Bühne,” *Die Form* 5, nos. 11–12 (1930): 297–99.

4. For the first position, see, for instance, Hal Foster, "The Bauhaus Idea in America," in *Albers and Moholy-Nagy: From the Bauhaus to the New World*, ed. Achim Borchardt-Hume (New Haven, CT: Yale University Press, 2006), 95; for the second, see Joyce Tsai, "The Sorcerer's Apprentice: László Moholy-Nagy and His *Light Prop for an Electrical Stage*," in *The Aesthetics of the Total Artwork: On Borders and Fragments*, ed. Anke Finger and Danielle Follett (Baltimore, MD: Johns Hopkins University Press, 2011), 277–304. Besides the most recent Harvard replica (originally built for the 2006 Tate exhibition), there are two other replicas, one at the Bauhaus Archive in Berlin and another at the Van Abbemuseum in Eindhoven from 1970. The original construction was probably damaged in the course of Moholy-Nagy's several relocations during the 1930s, and thus, it was activated only for a few minutes at a time. This static presentation undoubtedly contributed to its treatment as a static sculpture.

5. Rosalind E. Krauss, *Passages in Modern Sculpture* (Cambridge, MA: MIT Press, 1993), 207, 212–13.

6. Walter Benjamin refers to *Spielraum* in film, for instance, in "The Work of Art in the Age of its Technological Reproducibility," trans. Edmund Jephcott and Harry Zorn, in *The Work of Art in the Age of Its Technological Reproducibility and Other Writings on Media*, ed. Michael W. Jennings, Brigid Doherty, and Thomas Y. Levin (Cambridge, MA: Belknap Press of Harvard University Press, 2008), 37, 38. Miriam Bratu Hansen explores Benjamin's use of the term in this essay in relation to his concepts "image-space" and "body-space," giving these concepts and the annihilation of distinction between them a more positive overall interpretation than Benjamin's ambiguous stance suggests in the context of cinema (compared to his application of them to surrealism). The merging of the viewer and the cinematic image, however, is exactly the goal of the entertainment industry. See Miriam Bratu Hansen, "Room-for-Play: Benjamin's Gamble with Cinema," *October* 109 (Summer 2004): 21–30. On Benjamin's debt to Moholy-Nagy, see Michael W. Jennings, "The Production, Reproduction, and Reception of the Work of Art," in *The Work of Art*, 11–14.

7. Martin Heidegger, "The Question Concerning Technology," in *The Question Concerning Technology and Other Essays*, trans. William Lovitt (New York: Harper Torchbooks, 1977), 23.

8. For Moholy-Nagy's critique of recent developments in commercial cinema and the sound film, which I subsequently address in more detail, see László Moholy-Nagy, "Zum Sprechenden Film," *i 10*, no. 15 (1928): 69–71, and László Moholy-Nagy, "An Open Letter," *Sight and Sound* 3, no. 10 (1932), rpt. in László Moholy-Nagy, *Vision in Motion* (Chicago: Paul Theobald, 1947), 272–75.

9. For the interaction of photography and Bauhaus furniture design, see my article "Breuer's Furniture, Moholy-Nagy's Photographic Paradigm, and Complex Gender Expressivity at the Haus am Horn," *Grey Room* 50 (Winter 2013): 90–111.

10. Gropius's interest in communal living during the late 1920s is discussed in Paul Overy, "Visions of the Future and the Immediate Past: The Werkbund Exhibition, Paris 1930," *Journal of Design History* 17, no. 4 (2004): 337–57, and Robin Krause, "Die Ausstellung des Deutschen Werkbundes von Walter Gropius im '20e Salon des Artistes Décorateurs Français,'" in *Das Bauhaus und Frankreich, 1919–1940 / Le Bauhaus et la France, 1919–1940*, ed. Isabelle Ewig, Thomas W. Gaethgens, and Matthias Noell (Berlin: Akademie, 2002), 275–96.

11. Léandre Vaillat, "La section allemande," pt. 2 of "Au Salon des artistes décorateurs," *Le Temps*, May 27, 1930, 3, rpt. in Matthias Noell, "Zwischen Krankenhaus und Mönchszelle: 'Le Nouveau Visage de L'Allemagne'—Die Werkbund-Ausstellung 1930 im Spiegel der Französischen Tagespresse," in *Das Bauhaus und Frankreich*, 342; translation mine.

12. On the glittering lights, see André Salmon, "Exposition de Werkbund au XXe Salon des artistes décorateurs," *Art et décoration* 58 (July 1930): 15. See the reprint of French reviews in Noell, "Zwischen Krankenhaus und Mönchszelle," 317–46.

13. László Moholy-Nagy, *Von Material zu Architektur*, Bauhausbücher, vol. 14 (Munich: Albert Langen, 1929), 90.

14. G. de Pawlolowski, "Le Salon des artistes décorateurs," *La France*, May 30, 1930, 1, rpt. in Noell, "Zwischen Krankenhaus und Mönchszelle," 326; translation mine. Robert Houdin was a popular nineteenth-century magician.

15. According to an exhibition reviewer, *Light Prop* could be operated by pushing a button. See Salmon, "Exposition du Werkbund," in Noell, "Zwischen Krankenhaus und Mönchszelle," 340.

16. See Xanti Schawinsky, "Bauhaus Metamorphosis," in *Bauhaus and Bauhaus People*, ed. Eckhard Neumann (New York: Van Nostrand Reinhold, 1993), 158; Sibyl Moholy-Nagy, *Moholy-Nagy: Experiment in Totality* (Cambridge, MA: MIT Press, 1969), 41; Hans Stuckenschmidt, "Music am Bauhaus," in *Vom Klang der Bilder: Die Musik in der Kunst des 20. Jahrhunderts*, ed. Karin von Maur et al. (Munich: Prestel, 1985), 408–13, and Lothar Schmidt, "Musik und Maschine," in *Konstruktivistische internationale schöpferische Arbeitsgemeinschaft, 1922–1927: Utopie für eine europäische Kultur*, ed. Bernd Finkedley et al. (Stuttgart: Gerd Hatje, 1992), 120–23. Jazz and shiny metal interacted in abundance especially at the 1929 "Metal Party," which was decorated with metallic balls, bells, cymbals and other interactive attractions: "There was music in the air everywhere, and everything was aglitter, . . . shinily metallic and fairy-like" ("Something Metallic"—Bauhaus Celebration," *Anhalter Anzeiger*, February 12, 1929, rpt. in Hans M. Wingler, *The Bauhaus: Weimar, Dessau, Berlin, Chicago*, trans. Wolfgang Jabs and Basil Gilbert (Cambridge, MA: MIT Press, 1986), 157.

17. Bertolt Brecht, quoted in Beeke Sell Tower, "Jungle Music and Song of Machines: Jazz and American Dance in Weimar Culture," in *Envisioning America: Prints, Drawings, and Photographs by George Grosz and his Contemporaries 1915–1933*, ed. Beeke Sell Tower, exh. cat. (Cambridge, MA: Busch-Reisinger Museum, Harvard University, 1990), 87. The critic Paul Landau described jazz as "the beat of the technical era, the rhythm of the machine culture that surges from the din of our factories and the noise of urban streets monotonously and forcefully into our ballrooms" ("Girllkultur: Von der Amerikanisierung Europas," *Westermanns Monatshefte* 71, no. 845 [1927]: 565–68; translation mine). On jazz reception in Weimar Germany, see Michael J. Budds ed., *Jazz and the Germans: Essays on the Influence of "Hot" American Idioms on 20th-Century German Music* (Hillsdale, NY: Pendragon Press, 2002), Susan C. Cook, "Jazz as Deliverance: The Reception and Institution of American Jazz during the Weimar Republic," *American Music* 7, no. 1 (1989): 30–47, J. Bradford Robinson, "The Jazz Essays of Theodor Adorno: Some Thoughts on Jazz Reception in Weimar Germany," *Popular Music* 13, no. 1 (1994): 1–25, and Joshua Sternfeld, "Jazz Echoes: The Cultural and Sociopolitical Reception of Jazz in Weimar Germany and Nazi Berlin, 1925–1939," (PhD diss., University of California, Los Angeles, 2007).

18. See Janos Frecot and Klaus-Jürgen Sembach, *Berlin im Licht: Photographien der nächtlichen Stadt* (Berlin: Nikolai, 2002), and Janet Ward, *Weimar Surfaces: Urban Visual Culture in 1920s Germany* (Berkeley: University of California Press, 2001), 107–10.

19. The Bauhaus band, however, even incorporated sirens, bells, and giant tuning forks into its performance (Schawinsky, "Bauhaus Metamorphosis," 157).

20. Hans Siemsen, "Jazz," in *Jazz und Shimmy: Brevier der neuesten Tänze*, ed. Franz Wolfgang Koebner (Berlin: Eysler, 1921), 17; translation mine.

21. Kurt Weill, *Ausgewählte Schriften*, ed. David Drew (Frankfurt am Main: Suhrkamp, 1975), 133; translation mine.

22. Promotion photographs of the Bauhaus jazz band, often shown in a dark space, dressed in dark-light contrasting outfits, and holding gleaming metallic instruments, in turn, emulated the light plays and contrasts of Moholy-Nagy's photograms, uniting jazz and visual technology.

23. See László Moholy-Nagy, "A nagyváros dinamikája" ["Dynamics of the Metropolis"], *MA* 9 (September 1924): 8–9, and Moholy-Nagy, *Painting, Photography, Film*, 124–37. On the film sketch, see Edward Dimendberg, "Transfiguring the Urban Grey: László Moholy-Nagy's Film Scenario 'Dynamic of the Metropolis,'" in *Camera Obscura, Camera Lucida: Essays in Honor of Annette Michelson*, ed. Richard Allen and Malcolm Turvey (Amsterdam: Amsterdam University Press, 2003), 109–26.

24. Fernand Léger and Dudley Murphy employed jazz rhythms in a comparable manner in *Ballet Mécanique* (1924) through montage and rapid editing. See James Donald, "Jazz Modernism and Film Art: Dudley Murphy and Ballet Mécanique," *Modernism/Modernity* 16, no. 1 (2009): 25–49.

25. I do not share, however, Umberto Eco's view that the open work still functions in the traditional aesthetic universe and that it still conforms to the romantic paradigm in which art is reality's improved version. See Eco, *The Open Work* (Cambridge, MA: Harvard University Press, 1989), and

András Kovács, “Notes to a Footnote: The Open Work According to Eco and Deleuze,” in *Afterimages of Gilles Deleuze’s Film Philosophy*, ed. D. N. Rodowick (Minneapolis: University of Minnesota Press, 2002), 31–45.

26. Raoul Hausmann, Hans Arp, Ivan Puni, and László Moholy-Nagy, “Aufruf zur elementaren Kunst,” *De Stijl* 4, no. 10 (1921): 156. An English translation can be found in Krisztina Passuth, *Moholy-Nagy* (London: Thames and Hudson, 1985), 286. See also László Moholy-Nagy, “Noch einmal die Elemente,” *Filmliga* 9–10 (October 1929): 114–15.

27. Baudelaire famously compared the kaleidoscope to the experience of modernity. See Charles Baudelaire, “Le peintre de la vie moderne,” in *Oeuvres complètes*, ed. Claude Pichois (Paris: Gallimard, 1961), 1161.

28. Piet Mondrian, “Jazz en de Neo-Plastiek,” *i 10* (December 1927), in English in Piet Mondrian, *The New Art—The New Life: Collected Writings of Piet Mondrian*, ed. Harry Holtzman and Martin S. James (Boston: G. K. Hall, 1986), 222.

29. Ernst Lubitsch’s *Artist’s Ball* (1926) even further complicated the jazz rhythms, the multiplicity of glittering lights and dresses with various cinematic techniques.

30. On Moholy-Nagy’s debt to Scheerbart see Veit Loers, “Moholy-Nagys ‘Raum der Gegenwart’ und die Utopie vom dynamisch konstruktiven Lichtraum,” In *László Moholy-Nagy*, ed. Veit Loers (Stuttgart: Gerd Hatje, 1991), 45–46.

31. The film script of *do not disturb* is published in Moholy-Nagy, *Vision in Motion*, 290–91.

32. Instead of music proper, Moholy-Nagy himself discussed the different techniques and processes of producing color music and optic sound (in film, Raoul Hausmann’s *Optophonetics*, and graphically inscribed gramophone records) in several publications and lectures. See *Painting, Photography, Film*, 20–24, “Produktion–Reproduktion,” *De Stijl* 5, no. 7 (1922): 98–101, and “Neue Gestaltung in der Musik: Möglichkeiten des Grammophons,” *Der Sturm* 14 (July 1923) (see Passuth, *Moholy-Nagy*, 291, for an English translation of “Neue Gestaltung in der Musik”).

33. László Moholy-Nagy, “Musico-Mechanico, Mechanico-Optico,” *Musikblätter des Anbruch* 8 (October–November 1926): 363–67. This article appeared in a special issue that considered the sound possibilities of various mechanical instruments, the concept of antiphony, the mechanization of the stage and orchestras, and music in the coming sound film. Even jazz was discussed in terms of mechanization and sound reproduction. See Hanns Gutman, “Mechanisierung und Jazz,” *Musikblätter des Anbruch*, 8 (October–November 1926): 407–8.

34. Antheil, for instance, claimed that his score for the jazz-infused *Ballet mécanique*, written for sixteen player pianos and sirens, represented the “new fourth dimension” of music. See George Antheil, “Manifest der musico-mechanico,” *De Stijl* 6, no. 8 (1924): 99–102, “Abstraktion und Zeit in der Musik,” *De Stijl* 6 no. 10–11 (1925): 152–56, and “My Ballet Mécanique,” *De Stijl* 6 no. 12 (1925): 141–44. The technical diagram of the *Light Prop*’s lighting sequences gives the impression of a musical pattern of rhythmic variations, similar to the ones supplied for making color music for mechanical instruments.

35. László Moholy-Nagy, “Festészet és fényképészet” [“Painting and Photography”], *Korunk* 2 (1932): 104–5; see Passuth, *Moholy-Nagy*, 319, for an English translation.

36. On Biotechnik, see Moholy-Nagy, *Von Material zu Architektur*, 60 and R. H. Francé, *Bios: Die Gesetze der Welt* (Munich: Franz Hanfstaengl, 1921). On Moholy-Nagy as a “biocentrist,” see Oliver A. I. Botar, “László Moholy-Nagy’s ‘New Vision’ and the Aestheticization of Scientific Imagery in Weimar Germany,” *Science in Context* 17, no. 4 (2004): 525–56.

37. *Raum der Gegenwart*, unrealized plan for the Hanover Landesmuseum, 1931. See note 30 and Ulrike Gärtner and Kai-Uwe Hemken eds., *Kunst Licht Spiele: Licht Ästhetik der klassischen Avantgarde* (Bielefeld: Kerber, 2009).

38. László Moholy-Nagy, “Fényjáték-film,” *Korunk* 12 (1931): 866–67; László Moholy-Nagy, “Light Display Film,” in Passuth, *Moholy-Nagy*, 316.

39. Quoted in P. Adam Sitney, *Visionary Film: The American Avant-Garde, 1943–1978* (New York: Oxford University Press, 1979), 396.

40. László Moholy-Nagy, *The New Vision and Abstract of an Artist* (New York: George Wittenborn, 1947), 80.



41. G. de Pawlowski, "Le 20e Salon des artistes décorateurs du Grand Palais," *Le Journal*, May 24, 1930, 6, and May 25, 1930, 6, rpt. in Noell, "Zwischen Krankenhaus und Mönchszelle," 338. Although Moholy-Nagy's device does not relate directly to any particular mechanism, composite applications existed. According to its inventor, David Brewster, the kaleidoscope could be fitted to a magic lantern. See David Brewster, *The Kaleidoscope: Its History, Theory, and Construction with its Application to the Fine and Useful Arts* (London: Murray, 1858), 117–21. One version of Reynaud's praxinoscope theater was operated by a motor, another was fitted in a cardboard or wooden box with an opening in the lid for viewing, and its German variant, the "Kinematofor," was driven by a small steam engine. See Laurent Mannoni, *The Great Art of Light and Shadow: Archeology of the Cinema*, trans. Richard Crangle (Exeter, UK: University of Exeter Press, 2000), 366–73. At the Bauhaus Kurt Schwerdtfeger created an "art laterna magica," a shadow theater played with paper figures on a screen. Ludwig Hirschfeld-Mack's *Reflected Light Play*, in turn, used abstract shapes for his colored light play, illuminated with acetylene lamps. In the periodical *Der Kinematograph* contemporary articles discussed optical toys and the "live shadows" of Lotte Reiniger's cartoons. See "Tradition der Kaleidoskops," *Der Kinematograph* 23, no. 9 (1929): 18, and "Lotte Reinigers lebende Schatten," *Der Kinematograph* 23, no. 16 (1929).

42. Moholy-Nagy objected to the subordination of sound to visual imagery to create a reality effect. See, for instance, "Zum Sprechenden Film" and "Die Optik im Tonfilm," *Film und Volk*, no. 6 (July 1929): 9–10.

43. See László Moholy-Nagy, "Painting, Photography, Film," 41–43; László Moholy-Nagy, "Az új film problémái" ["Problems of the New Film"], *Korunk* 10 (1930): 712–19. An English translation of "Az új film problémái" can be found in Passuth, *Moholy-Nagy*, 311–15.

44. Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1990), 113–14. On the early cinema as a cinema of attractions, see Tom Gunning's seminal essay "The Cinema of Attraction[s]: Early Film, Its Spectator and the Avant-Garde" (1986), in *The Cinema of Attractions Reloaded*, ed. Wanda Strauven (Amsterdam: Amsterdam University Press, 2006), 381–88.

45. Tom Gunning, "Loïe Fuller and the Art of Motion: Body, Light, Electricity, and the Origins of Cinema," in *Camera Obscura, Camera Lucida*, 75–89.

46. See also Moholy-Nagy, "Noch einmal die Elemente," 114–15.

47. See Mitchell G. Ash, *Gestalt Psychology in German Culture, 1890–1967* (Cambridge: Cambridge University Press, 1995), 58–59, 231–36, for an account of David Katz's experiments on color perception and Karl Duncker and Wolfgang Metzger's studies on motion sensations, respectively.

48. See Gary C. Hatfield, "Helmholtz: The Epistemology and Psychology of Spatial Perception," in *The Natural and the Normative: Theories of Spatial Perception from Kant to Helmholtz* (Cambridge, MA: MIT Press, 1990), 165–234.

49. See Heinrich Wiegand Petzet, *Encounters and Dialogues with Martin Heidegger, 1929–1976*, trans. Parvis Emad and Kenneth Maly (Chicago: University of Chicago Press, 1993), 12. Moholy-Nagy is mentioned here as an "architect," maybe due to his occupation at the time as a stage designer and the title of his book *From Material to Architecture*, which was published in German in 1929.

50. The eight varieties of photographic vision included abstract, rapid, slow, intensified, simultaneous, penetrating, and distorted (László Moholy-Nagy, "A New Instrument of Vision," *Telehor* 1–2 [1936]: 35). Moholy-Nagy considered the photogram to be the basic step in photographic seeing (László Moholy-Nagy, "Fotografie ist Lichtgestaltung," *Bauhaus* 2, no. 1 [1928]).

51. Gilles Deleuze, *The Movement Image*, vol. 1 of *Cinema*, trans. Hugh Tomlinson and Barbara Habberjam (Minneapolis: University of Minnesota Press, 1986), 84. On Vertov and the camera eye, see Malcolm Turvey, "Vertov: Between the Organism and the Machine," *October* 121 (Summer 2007): 5–18.

52. László Moholy-Nagy, "Új filmkísérletek," *Korunk* 8 (1933): 231–37; see Passuth, *Moholy-Nagy*, 319–23, for an English translation.

53. See, for instance, Jean Epstein, "L'essentiel du cinéma," in *Écrits sur le cinéma, 1921–1953*, 3 vols. (Paris: Seghers, 1974), 1:120. See also Laurent Guido, "Rhythmic Bodies/Movies: Dance as Attraction in Early Film Culture," in *The Cinema of Attractions Reloaded*, 148, 150.

54. On Vertov and “gaseous perception” see Deleuze, *The Movement Image*, 84.
55. Critics considered the film an interesting but self-serving light play in which the techniques took over. On the film and its reception, see Jan Sahli, “Filmische Sinneserweiterung: László Moholy-Nagys Filmwerk und Theorie” (PhD diss., University of Zurich, 2006), 133–46.
56. The manipulation of light and shadows on the theater stage was not new; already at the beginning of the twentieth century Gordon Craig and Adolph Appia experimented with it as a means of creating mystical atmosphere, followed by Max Reinhardt, Scriabin, and the futurists. See Wolfgang Schivelbusch, *Licht, Schein und Wahn: Auftritte der elektrischen Beleuchtung im 20. Jahrhundert* (Berlin: Ernst and Sohn, 1992).
57. The plan and article were published in László Moholy-Nagy, “Theater, Circus, Variety,” in Oskar Schlemmer, László Moholy-Nagy, and Farkas Molnár, *The Theater of the Bauhaus* (1925) (rpt., trans. and ed. Arthur S. Wensinger [Baltimore, MD: Johns Hopkins University Press, 1996], 52–70). See also the catalogue by Friedrich Kiesler, *Internationale Ausstellung neuer Theatertechnik* (Vienna: Kunsthandlung Würthle and Sohn, 1924), 27. For a discussion of Moholy-Nagy’s theatrical works see Bettina Wilts, *Zeit, Raum und Licht: Vom Bauhaustheater zur Gegenwart* (Weimar: VDG, 2004), 89–121.
58. Theodor W. Adorno, “Berliner Opernmemorial” (1929), in *Musikalische Schriften*, vol. 6, in vol. 19 of *Gesammelte Schriften*, vol. 19 (Frankfurt am Main: Suhrkamp, 1984), 268; translation mine.
59. Hans Curjel, “Moholy-Nagy und das Theater,” *Du—Atlantis kulturelle Monatschrift* (Zürich) 24 (November 1964): 11–12; excerpt in English in László Moholy-Nagy, *Moholy-Nagy*, ed. Richard Kostelanetz (New York: Praeger, 1970), 95.
60. An article by Theo van Doesburg shows some shots of the film used in the *Tales of Hoffmann*. See Theo van Doesburg, “Film als reine Gestaltung,” *Die Form* 4, no. 10 (1929): 247. Moholy-Nagy’s sensory-driven conception of the theater bore similarities to that of Oskar Schlemmer, but it favored complex design instead of a focus on the human body. On Schlemmer’s phenomenologically oriented theatrical practice, see Melissa Trimmingham, *The Theater of the Bauhaus: The Modern and Postmodern Stage of Oskar Schlemmer* (London: Routledge, 2011).
61. Given the politically controversial nature of the play and the high cost of operation, it closed after little more than a month. See Erwin Piscator, *The Political Theater* trans. Hugh Rorrison (London: Eyre Methuen, 1963), 314–17.