

APPENDIX

BALLET MÉCANIQUE: AN ANALYSIS

to accompany

CUBISM AND FUTURISM
SPIRITUAL MACHINES AND THE CINEMATIC EFFECT

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BALLET MÉCANIQUE: AN ANALYSIS

Note: This analysis of *Ballet mécanique* is an appendix to R. Bruce Elder, *Cubism and Futurism: Spiritual Machines and the Cinematic Effect* (Waterloo: WLU Press, 2018); the term “main body of the text” in this text refers to that volume.

Ballet mécanique (1924), Ferdinand Léger and Dudley Murphy

(with input from Man Ray and Ezra Pound)

The film opens with a realistic image, of a woman (Dudley Murphy’s wife, Katherine) swinging on a swing in a garden. The shot is naturalistic—one of the few shots in the film that is. The shot establishes the rhythm that binds the film’s diverse components into a unity. That rhythm acts as a simple substructure that works in much the same way as do the geometric substructures in Léger’s paintings *Les disques* and *Éléments mécaniques*: the continuous “tick-tock, tick-tock,” clockwork meter integrates all the different types of forms. (I noted in the main body of the text that as more and more people migrated to cities, speed and time became pressing realities and time-pieces became common utensils.) The significance of this clockwork meter being the film’s basic structuring principle, serving a role similar to that which grid architecture serves in Cubist painting and Léger’s painterly compositions, begs to

be understood in this context. Moreover, George Antheil, a collaborator on this machine art project and the composer of its musical component, believed that the new music that must come forth—music appropriate to the machine age—would be fundamentally structured by time, not *melos*.

Léger and Murphy use many different sorts of visual forms in the film: “straight,” naturalistic images; representational images transformed by the use of prisms, triangular tubes with mirrors on their inner surfaces that multiply images in the manner of a kaleidoscope, and perhaps special lenses (which Murphy brought with him from the United States); and graphic images. The results of these transformations are more or less representational or exemplificatory or abstract, depending on the means of transformation employed: there are representational forms (for example, a woman’s lips) whose basic shapes are so emphasized by the use of a black cardboard mask and extreme close-up shooting that they become quasi-abstract; there are representational forms (for example, those of the kitchen utensils shown in the film) that are defamiliarized by the decontextualization resulting from the use of close-ups that isolate the object from its background (without the use of mattes)—this defamiliarization foregrounds the shapes of objects’ constituent forms and makes them appear more or less abstract (the apogee of this effect are the kitchen funnels that are made to appear as pure circular forms); there are realistic images (for example, of a room where camera operators are shooting with a large movie camera) that are transformed by anamorphosis (in the case of that example, by projection mapping, accomplished by shooting a reflection of that scene on the mirrored surface of a large ball); there are the multiple-image vortographs that foreground more or less strongly the pure (abstract) geometry of the image; there are images created by shooting through a matte-board in which a number of circles or triangles have been cut (furthermore, the abstract geometry of the matte-forms combines with the figures that appear in the openings in different ways: sometimes the abstract geometry is more to the fore, and sometimes the images seen through the openings make the stronger impression); there are graphic forms (e.g., the texts that the film includes, and the “0” that comes to represent a necklace) whose referential features are more exemplificatory than representational; and finally, there are graphic forms (for example, the alternating frames of the contrasting forms of a circle and a triangle) that are purely abstract, somewhat in the manner of the geometric painting of the time—but even some of the passages alternating graphic forms acquire a measure of exemplificatory qualities, as the exchange of circles and triangles of different sizes and shapes allude (through context) to a blinking eye. In sum, the film includes a spectrum of different types of visual forms, spanning the range from representation, through exemplification, to abstraction.

This diversity of types reflects, in part, the different influences that generated and shaped the film: Man Ray's Dada and Surrealism, Alvin Langdon Coburn's Photo-Vorticism, and Léger's idiosyncratic quasi-Cubism. But a more important factor is that the relation between representation and abstraction was a key issue for Cubist art. The problematic of the relation sent Analytic Cubism into a crisis around 1912 and helped fuel the development of Synthetic Cubism. Cubism developed from a realist drive, that of providing a more thorough rendering of the process of visual perception. Cubists strove to include more features of the process by which we apprehend an object than earlier painters had. Percepts, the Cubists maintained, include our memories of what an object looks like from one vantage point when we see it from another, and our expectations of what the object would look like if we were to assume a different point of view. A visual percept is the product of integrating a manifold of sensations into a whole—a synthesis must be accomplished before we form the visual image of an object.

The Cubists' concern with the dynamics of visual perception required that their subjects be rendered by a two-stage treatment. First, the subject was resolved into several facets—and to ensure that it would be possible to reintegrate these facets, they were resolved on a common basis, reducing them to simple geometric forms (the sphere, the cone, and the cylinder). The second stage involved integrating these forms into a complex, resolved unity.

Across the history of Analytical Cubism, this resolution and reintegration becomes increasingly complex, so that with such works as Picasso's *Ma jolie* the architecture the painter devised for recombining the facets became so elaborate that the resultant construction pulled away from reality. This detachment—or, at least, pulling away—from reality is evident in Cubist paintings of 1911 and 1912. Space in those paintings is problematical and problematized. It is so replete with ambiguities and contradictions that it is extraordinarily difficult, if not downright impossible, to make precise determinations about the facets' spatial relations one to another; this makes it impossible to work out the relation between the painted forms and their model. Pictorial space and natural space are cleaved apart, as the tonal values of the painting confound our expectations—where our experience of form leads us to expect an area to shade off into relative darkness, we sometimes find instead a processive light area.

Synthetic Cubism developed as a response to these problems. It answered them by identifying the picture plane with the painting's material support (whose attributes were often foregrounded) and the (usually shallow, but nonetheless) illusory picture space. A key means for identifying the picture plane with painting's material support was the incorporation of texts, or other components that do not provoke any illusion of space—no matter what the

context into which they are inserted, they remain flat forms that adhere to the surface of the support. A letter-form never fuses with a painting's pictorial space; the only space that contains it is that of the painting's intractably physical support. Cubists realized that if words could be incorporated into a Synthetic Cubist painting, almost any visual form could be: postage stamps, buttons, tobacco pouches, nails, pieces of linoleum, and printed papers (for example, newspapers or wallpaper). And the diversity introduced by collage was only one among the many sorts of diversity that Synthetic Cubist works incorporated: different luminosities, different densities, different volumes or planes, different types of reference were put side by side, and conflicting tactile and chromatic attributes were brought into the artwork. A single work brought different types of images—evoking different “realities”—in an integrated form that contained and resolved the differences among them.

Ballet mécanique likewise integrates many different types of “reality”; in this respect, *Ballet mécanique* (like most of Léger's paintings after 1916) is more closely allied to Synthetic Cubism than to Analytical Cubism. Despite these affiliations, it returns to the roots of Analytical Cubism, the concern with the dynamics of perception. (Ironically, interest in the process of perception was not central to Léger's work—and that is true even of his work before 1912, the beginning of Synthetic Cubism.)

One device the film uses to integrate the variety of types of forms it contains is to flatten most (not all) of the shapes (the hat flattened into two concentric circles at the beginning of the film highlights this method)—and not only do the filmmakers flatten the film's visual forms, they also fragment them and simplify them to their purest geometric forms by using extreme close-ups, shooting reflections in mirrors and through a triangular tube with mirrored inner surfaces that generate kaleidoscope-like effects.¹

But the main principle that unifies the work's diverse forms is rhythm, and using rhythm as the key organizing principle makes this concern with time and perception, with fragmentation and recombination, clear. The first shot of the film sets up a rhythm that, although it undergoes variation (it is often dupled and halved, and sometimes staggers a little before it returns to a steady pace), persists throughout the film and binds together the film's expansive repertoire of visual forms. The meter marked out by this back-and-forth movement serves (to borrow an idea from Ezra Pound) as a vortex, in which whirl all the different sorts of images that make up the film—the naturalistic images; the modified photographic images, shot through prisms or mattes, or as a reflection in a sphere; the images of isolated objects, photographed in a way that highlights their basic geometry; and the abstract images. Or, to think of the issue differently, it serves as a matrix from which the film's content—naturalistic images, modified photographic images, and abstract

images—emerge. This mechanical rhythm is a pumping rhythm; its seemingly incessant, driving character provides for the sexual humour of the many shots that compare machine motion and human motion.

The metric framework is the film's principal integrative device and holds all the visual forms together in harmonious relations. This simple, repetitive rhythm has a mechanical character. Its clockwork character develops out of another mechanical pulse inherent in all film: the consecutive presentation of individual frames, each of which, when it appears, produces a slight pulse. The frequent alternation of black-and-white frames and of graphic circles and triangles reinforces this matrical meter, which is built into the film's basic material.

While other films made around the same (or just slightly later) display traits characteristic of Cubist art—for example, Eisenstein's *Броненосец «Потёмкин»* (*Bronenosets Po'tyomkin, Battleship Potemkin*) and *Октябрь* (*Oktyabr', October*) and *Десять дней, которые потрясли мир* (*Oktyabr': Desyat' dney kotorye potryasli mir, October: Ten Days that Shook the World*) are examples of Cubo-Constructivism in the cinema—*Ballet mécanique*, made by a member of the Cubist circle, is closer to the ideals of Cubism than any other film made before Joyce Wieland's (1931–1998) *Water Sark* (1965) and Ernie Gehr's (b. 1941) *Wait* (1968).

SECTION I: RHYTHMIC PATTERN (3–59)

General Remarks

The section begins with a woman swinging back and forth on a swing. However muted the allusion is, this image does make the first of many sexual allusions the film will offer (the film originally incorporated many images of nudes and lovemaking)—using an image that, when it first occurs, seems utterly innocent but in time is revealed to harbour a muted sexual allusion hardly uncommon in literature. This rhythm of the swing's motion is repeated in the pendulum-like movement of a metal ball in the next shot. As though to confirm the importance of this rhythm, the woman on the swing reappears after the sequence with the metal ball. This time, however, the shot is upside down: this inversion defamiliarizes and, in some measure, abstracts the shot. This second appearance of the woman on the swing strengthens the shot's rhythmic quality by showing her upside down: we notice more the shape the swing's movement describes than her (appealing) face and figure. The woman's form has been estranged by being inverted—a seductively realistic image becomes more of a motion-shape.

But this swinging to-and-fro is also a form of dance—and introduces a dance motif (comprising the “Charlot cubiste” images, and the shots of

cutouts of legs doing a sort of Charleston, as well as the dance of everyday objects). A series of still images immediately following the pendulum/ball (a dance of wine bottles, a white hat, the angular face of a woman, a white triangle, numbers on a black grid, a cubist illustration) draws the connection between the metrical pulse and the dance of everyday objects. Instead of filming the objects in motion (instead of presenting the woman actually turning her head, for example), Léger and Murphy use cutting to underscore this rhythmic pattern. The cinema itself becomes a *ballet mécanique*, the mechanical dance of rapidly animated still images, presided over by a rhythm that undergirds the presentation of the various choreographic gestures.

One component of this quick, camera-induced animation is a pair of lips (belonging to the woman whose angular face we glimpsed in the still-image animation): the lips repeatedly rise in a smile, then fall back into a neutral position. The two shots alternate in the same 1–2, 1–2 meter as the one established by the shot of the woman on a swing—though now the meter plays at a slow rate (natural to a person performing the act). The previous section contrasts continuous actual motion—the swing and the ball—with virtual, cinematically produced motions that approach the pulse of the cinematic flicker; this section also offers a contrast between actual and virtual motion, with the lips' change of expression offering a continuous, actual movement and the rapid cutting generating artificial, virtual motion.

A rapid succession of alternating triangles and circles (besides evoking the alchemical merging of Sol and Luna, the male and female principles) generally marks the end of one idea, or theme, and the introduction of a new one; and that is what happens at the end of this section of the film. The use of simple graphic images puts the emphasis of the sequence on cinematic movement rather than on static pictorial form. During this transitional section, the triangle and the circle reduce to about half their size, seemingly receding into space (a dynamic that can be taken to have sexual overtones). Thus, this shrinking and expanding creates an illusion of three-dimensional movement, even though the forms of the images, because they are so graphic, seem flat.

SOME THEMES IN THIS SECTION.

(i) *A variety of types of images*

A shot of a woman on a swing moving back and forth introduces the film and a quick succession of various representational, abstract, and geometric images follows (1–9). This short section introduces the various kinds of images that one can expect in the film—human figures, abstract shapes, text and numbers, geometric patterns, material objects—and provides a matrix (the to-and-fro rhythmic pattern) from which the film's diverse imagery will emerge. Among

the types of images the sequence comprises are representational, semi-representational (exemplificatory), abstract, and geometric images.

These introductory passages forecast the subsequent development of the film. For the most part, the early sequences offer primarily representational images: a woman on a swing, a hat, a face, a wine bottle. Some later sequences are combinations of simple representational shapes (the hat and the wine bottle), and some are combinations of more complex object matters (the woman swinging and the angular face of another woman). The film as a whole incorporates an extraordinary range of images, and this section is typical in that regard: a simple geometric shape (a triangle) appears briefly, and several sequences later an abstract cubist illustration. Anamorphic, semi-representational images are formed either by filming the reflections on a circular metallic ball (which usually swings back and forth, connecting it to the rhythmic matrix from which the film's image emerge), by shooting through a kaleidoscopic lens (vortoscope) that multiplies an image, or by using simpler strategies such as photographing an image upside down (the same woman on a swing). These images all depict (more or less) circular, angular, or tubular shapes—the repetition (with variation) of a small number of motifs creates unity-in-variety. Along with the clockwork meter, repetition (both literal repetition and repetition with variation) is one of the film's principal integrating devices.

(ii) *Circular, angular, and tubular shapes*

The shapes appearing in the first sequence are mostly circular, angular, or tubular. A round hat, an angular face of a woman, a white (angular) triangle, and a (tubular) wine bottle are initial examples of some of these shapes.

(iii) *Underlying rhythmic pattern*

The film began with a woman on a garden swing moving back and forth—that movement is later mimicked in the back-and-forth movement of a metal ball on a string (17). This back-and-forth pattern becomes the basic rhythmic kernel that structures the entire film and holds it together—sometimes its speed accelerates or decelerates (often this change in tempo will follow a duple principle, becoming twice as fast, twice as slow, for four times as fast, etc.). These changes highlight the profound effects that acceleration and deceleration have on the film's structuring pattern. Although the swing and the ball/pendulum present this rhythm most clearly, the movement of most of the shapes that appear in the film develop from this matrilineal rhythmic kernel. The single-frame flicker between a circle and a triangle (26–59) connects this rhythmic kernel to the flicker pulse that is built into all film. Note that the circle and triangle's movements (51–59), their expansion and contraction, are carefully

timed to follow this broader pendulum pattern. Thus, this passage relates the rhythm articulated by the swing to the film's underlying metrical pulse. The panning, spinning reels (16) contribute to this swing rhythm: both through the rate at which the reels spin and through the time it takes for them to move across the frame. (In addition, both the optical superimposition of circles and squares and the spinning reels can be taken to have sexual connotations.)

For the most part, complex (highly variegated) images are combined in complex rhythmic structures and simpler images are combined in simpler metric structures. For example, the triangle and the circle simply alternate with each other, generally with great rapidity (with the form being switched every two or three frames) (26–59): the metrical pulse articulated by this sort of regular alternation is exceedingly simple (but marked by a strong pulsing effect). When the images are more complex, the rhythm is more layered: the much smoother movement of the kaleidoscopic (vortographic) forms (24), which consist of repeated white circular shapes with small black spots surrounded by diagonal/angular shapes, articulate a polyrhythm. The circular shapes move at twice the rate established by the swinging motion at the beginning of the film; the diagonal shapes are slower, moving at half the rate set by the image of the woman on a swing.

(iii) *Later images refer to earlier images (another sort of back-and-forth movements)*

Spinning wheels (shot 16) allude to the hat portrayed earlier on (the thick black lines running down the wheels resemble the black band around the hat) (4, 10, 12, 14). The film continues to interweave sequences of complex shapes with simpler ones, geometric with abstract shapes, semi-representational (exemplificatory) images with more realistic images.

ANALYTICAL COMMENTARY

To this point, I have presented a schematized overview of the film's architecture. I turn now to a more detailed commentary on the film and its context.

An animated Cubist figure appears and does a little dance. This animated sequence is followed a title card with the phrase "*Charlot présente 'Ballet mécanique.'*" Charlot is the name the French gave Charlie Chaplin's tramp persona—and the animated figure resembles that much-beloved character. This sequence is an homage to the cinema, expressed in Cubist terms. The Charlot figure reappears at the end of the film.

Like many of his Soviet contemporaries, Léger was interested in the circus and the music hall, and Charlot's appearance and reappearance gives the beginning and end of the film a vaudevillian cast. Charlot seemed to many

of the era an exemplar of modernity.² The early Soviet arts theatre group ФЕКС (FEKS), based in Petrograd, declared in their ЭКЦЕНТРИЗМ (Eks-sentrism, Eccentrism, 1922) manifesto: “We prefer Charlie Chaplin’s arse to Eleonora Duse’s hands!”³ Chaplin’s films, after all, were American, and ФЕКС proclaimed, “Yesterday—the culture of Europe. Today—the technology of America. Industry, production under the Stars and Stripes. Either Americanization or the undertaker . . . *The rhythm of the machine*, concentrated by *America*, realized on the *street*.”⁴ ФЕКС’s first theatrical presentation, an adaption of Gogol’s *Женитьба* (Zhenit’ba, Marriage, 1842) mounted in September 1922, included clips from Chaplin films, which featured an actor who was playing Gogol being “electrified by putting a plug and electric wire into his posterior.”

Another progressive artist (this one with a direct connection to Léger) who took a great interest in Chaplin was the Czech Surrealist (more exactly, a participant in the Czech Devětsil movement) Yvan Goll. Léger got to know Goll in 1922 (the same year that ФЕКС mounted their Chaplinized version of *Женитьба*). Goll admired Apollinaire and indeed all modern, urban forms of Surrealism. In a eulogy he wrote for Apollinaire, just after the poet’s death (1918), Goll made this comment: “Guillaume, you gave the fact, proven through centuries of poetry—that the deepest melody pours out of the smallest daily experience—theoretical meaning and also the baptismal name: ‘surréalisme [Apollinaire coined the term for his 1903 play *Les mammelles de Tirésias*],’ which has nothing in common with realistic naturalism.”⁵ In this version of Surrealism (Surrealism before *Surréalisme*, to be sure), the marvellous inhabits the everyday and the surfaces of everyday reality are charged with poetry. This is, of course, a very cinematic interpretation of Surrealism, and Goll actually stressed the affinities between Surrealism and the cinema.

Goll also developed a fascination with Charlie Chaplin and wrote “Die Chapliniade. Eine Kinodichtung,” published in 1920 (Dresden: Kaemmerer), an extended literary work that Goll referred to as a film poem (*Kinodichtung*), that is, a poem in the form of a film script, in many voices (e.g., Chaplin, a bill poster, a lieutenant, a lady, a deer, a restaurateur); a year later, it appeared in a French translation in *Vie des lettres*, where it was titled “Chapliniade ou Charlot poète. Poème, drame, film.”⁶ “Die Chapliniade” is a witty, quasi-picaresque poem that begins with references to the modern visual culture that the Charlot figure has produced—for example, the scores and scores of posters on walls and kiosks that in the 1910s advertised Chaplin’s films. Charlot travels through Europe on a promotional tour (another modern phenomenon), and outlining Charlot’s travels gives Goll a chance to offer reflection on the

French and German avant-gardes. In the end, Chaplin undergoes a sort of momentary apotheosis: “The Billposter grabs Charlie by the collar and pushes him against the kiosk. For a second Christ is seen as a Christ with a crown of thorns. Nevertheless the Billposter inexorably pastes him with his brush to the poster.”⁷ Goll’s “Die Chapliniade” is likely the basis for Vítězslav Nezval’s short 1922 film script *Charlie před soudem* (Charlie in Court).⁸ In the autumn of 1920, Fernand Léger’s illustrations for *Die Chapliniade* appeared in the anthology *Revoluční sborník Devětsil* (Devětsil Revolutionary).⁹

Yvan Goll led Léger to see the connections among the cinematic medium, Chaplin’s films, and Surrealism’s fascination with the everyday (as Witkovsky shows, Goll understood Surrealism as cinematic lyrical poetry). Around the time he began work on *Ballet mécanique*, Léger had just finished three kinetic wood panels (as he called them). The composition, titled *Charlot cubiste* (1924), was made up of wooden pieces, which function somewhat as facets in Cubist paintings do. Léger apparently came to realize that by repositioning the blocks that make up different parts of the body and taking three or four frames of each arrangement, he could create a dancing Charlot. (It is likely that Léger actually began work on an animated film with Charlot and got as far as making animation tests; parts or all of these tests were incorporated into *Ballet mécanique*.) Léger even drew up a script outline for an animated film, to be called *Charlot cubiste* (this script outline was likely the basis for the wooden panels). The outline suggests both Léger’s deep interest in the historical precedents for the new art of his time and his enthusiasm for the new Cubist universe. The plot line has Charlot awakening into a world that has become entirely Cubist. He becomes the “Emperor of Cubism” and takes a stroll through the Louvre—that conceit affords Léger the opportunity to display his deep historical awareness of Cubism’s genealogy. The shot breakdown consists of fifty-two shots, many of them in the Louvre:

- 21 The museum. The Louvre. The entrance.
- 22 Cane in the cloakroom.
- 23 Walks through the Museum.
- 24 Interested in the everyday paintings.
- 25 Admires Egyptian, Aztec, and Negro art, and the High Renaissance.
- 26 Encounters. Mona Lisa. Silence. Pause. Observation.
- 27 Charlie’s hooked on her: Mona Lisa is crazy about him.
- 28 He looks at her and gives her face a few Cubist touches. They don’t last.

29 Charles moves on disdainfully.

30 With her frame under her arm, Mona Lisa follows, declaring that she is burning in love with him.¹⁰

Ballet mécanique itself testifies that Léger's interest in *la poésie du quotidien* has much in common with the biomechanists' enthusiasm for Chaplin. As I point out in the main body of the text, the biomechanicists analyzed actions into what they understood as their basic components, adjusted these fragments according to harmonic metrics, and then resynthesized these harmonized fragments into economical wholes. The philosopher and cultural theorist Walter Benjamin published a remarkable paper on Chaplin that asserts that the quality of Chaplin's movements reflect back onto the mechanical nature of cinema itself:

Chaplin's way of moving is not really that of an actor... His unique significance lies in the fact that, in his work, the human body is integrated into the film image by way of his gestures—that is, his bodily and mental posture... Each movement he makes is composed of a succession of staccato bits of movement. Whether it is his walk, the way he handles his cane, or the way he raises his hat—always the same jerky sequence of tiny movements applies the law of the cinematic image sequence to human motorial functions.¹¹

In Chaplin's gestures, we see human movements being mechanized. Benjamin contends that most actors try to dominate the cinematic apparatus, asserting their humanity in the face of the machine (this is certainly true of Buster Keaton). He writes that the masses, oppressed by the machine in their workaday world, "fill the cinemas to witness the film actor take his revenge on their behalf."¹² In Chaplin's gait, carriage, and gestures, a biomechanical humanity, a fusion of human and machine, actor and medium, comes to the fore.

Further, the Orphic and *retour/rappel à l'ordre* movements influenced Léger's, so he strived to bring harmony to experience, which he believed was being disarrayed by the sensory chaos of the new world of ever-changing (kaleidoscopic) fleeting impressions. He believed that considerations of efficiency produced harmonious objects and that regularity in experience would also result in harmonious form.

Shot Breakdown

N.B.: Frame counts and shot numbers I give to the MoMA print generally follow the outline in Standish Lawder's *The Cubist Cinema*.¹³ However, I have used a different criterion for dividing the film into shots than Lawder does—for example, he counts a series that alternates a graphic triangular form with a

graphic circular form as a single shot, while I enumerate this sequence as a series of shots. (This means that my shot numbers become much larger than his.)

Shot No. Frame count Description

1	108 frames	in the Museum of Modern Art (MoMA) print
	48 frames	in the Dutch Cine-Club (Dutch) print

An animated cubist figure raises his hat and nods his head.

***The primary source for frame counts is the Dutch Cine-Club 16mm print. Differences of greater than three frames (or five frames for longer shots) between the MoMA print and the Dutch Cine-Club print will be noted. I am following Lawder's frame counts for the MoMA print (to make it simple to compare our analyses). However, on occasions when my criterion for dividing the film into shots and Lawder's conflicts, I have included a note highlighting the difference.

[The inclusion of the Cubist figure is delightful, but it is not merely delightful. The animation sequence is a fragment of a film that Léger had wanted to make, to be titled *Charlot cubiste*. That film was never made, but by including a section of it in *Ballet mécanique*, the filmmakers indicate there is a relation between the film Léger intended to make and this film. Léger's *Charlot cubiste* would have been a tribute to the vitality and delight of the cinema, so this inclusion also indicates *Ballet mécanique's* relation to mass culture/industrial culture (Chaplin's films were the product of industry's "imagination machine"). Because the "Charlot cubiste" sequence relies on the method of decomposition and recombination, the inclusion of the Charlot sequence also tells us this film draws its inspiration from the methods of the Cubist painters.

I have noted there is a striking irony at the heart of Cubism: its origins were in the desire Cézanne inspired in certain painters (especially Pablo Picasso, Georges Braque, Juan Gris, and Sonia and Robert Delaunay) to create a higher form of realism, an art that is true to the dynamics of perception, that understands perception is not the instantaneous registering of the world on a *tabula rasa*, but a process that unfolds through time and in which memory, intellect, and intuition all play roles. For to generate a perception, the mind synthesizes different aspects of the object (no object is ever seen from a fixed, monocular vantage point, or without certain portions or facets of it taking on greater valence than others, or without memories or associations or anticipated images being introduced into the experience of it). Despite its seeming precision, the system of geometric perspective is really a generalization about experience: it represents a model of perception that does not represent the

way that we actually see. When you look at an object, your eye is never still: it darts from side to side. Nor is your head absolutely fixed in relation to the object; with every passing moment its position shifts, however slightly, and you assume a slightly different vantage point: a visual experience is a product of mental activity, not a mirror of reality. For one thing, it unites different glimpses of the object: the brain can be trained to isolate a given view—that is what drawing students take such pains to learn—but we do not normally experience the world that way. Our ordinary experience of the world is like a mosaic integrating a great number of aspects on any object, none of them fixed. The Cubists set out to capture that truth about perception.

However—and this is the great historical irony of Cubist art—in their quest to capture the dynamics of perception, the Cubists sundered the model their works represent into numerous simplified monochrome facets, each of which implied it was viewed from a different vantage point than that implied by any of its neighbours, and when they subsequently synthesized these facets into a new whole, the impression given was often of a nearly abstract form. More exactly, this severing of the bonds between the image and reality was the result of three processes: (1) the process just noted, of resolving the model into many discrete geometrically simplified facets, (2) presenting facets from slightly (and sometimes even substantially) different vantage points, and (3) treating the canvas as a flat surface, a picture plane defining the surface from which the various facets recede (usually into a very shallow space).

Our experience of a Cubist painting made during the period when Analytical Cubism reached its most complex, highly developed form (say, from 1911 or 1912) often involves a sequence of phases. At first, the represented object is difficult to discern among the myriad angular forms: it seems almost abstract. In time, some groups of facets here and there resolve themselves into representational (or, at least, exemplificatory) forms—perhaps here a hand on the arm of a chair, and there a pipe. But not all parts of the object resolve themselves in representational figures equally quickly; and the result is that some areas of the painting continue to seem abstract, and some seem somewhat more representational. Over time, more and more areas are understood as representations, but the tension between the different exemplificatory modalities generally lingers. No formal configuration can be decisively categorized either as representational or as abstract: over time, it shifts its position in relation to those two poles.

With *Ballet mécanique*, Léger shows that the same lability of exemplification that characterizes Cubist art applies to other visual arts, including the cinema. The cinema might seem the most realistic of all the arts, the art whose images were destined to be the most faithful and accurate depiction possible of their models. But, in *Ballet mécanique*, Léger—I cannot but think this

dimension of the film developed out of Léger's painterly interests—demonstrates that the capacity to present realistic representations is only one of the cinema's capabilities, for the medium can readily accommodate the full range of visual forms, from utterly realistic to utterly abstract. He does this partly through organizing the film as a strict metrical construction that unites visual forms of many different types (accurate representations, transformed representations, graphic forms that possess referential significance, and purely abstract forms)—he shows, in essence, that images of all these different types can take their place within this metrical matrix. The metrical principle constitutes, in a sense, a fixed element, a still centre, around which various different types revolve: thus, the spatial features of Coburn's Vorticist compositions have their analogy in the film's temporal construction. Another way Léger does this is by showing how forms that, in one context, seem purely abstract, may, in another context, have exemplificatory significance (just as components in Analytical Cubist painting can sometimes seem abstract and at other times representational or, at least, exemplificatory).]

- 2 72 frames (MoMA) The camera pans up at the end of the last shot, to reveal a title, white font against black: "*Charlot présente Un Ballet mécanique.*"
52 frames (Dutch)
- 3 289 frames (MoMA) Woman on a swing, in a garden, seen from the waist up, she swings towards and away from the camera.
250 frames (Dutch)

[A realistic photographic image, the contents of which (a pretty woman, on a swing in a garden) rivet us to the image; in other words, its appeal is akin to the familiar spectatorial effects of photographic illusionism. More than that, the sequence alludes to the subject matter and method of much conventional art (in which photographic illusionism partakes): the image is Arcadian, presenting a scene that unfolds at a pastoral pace—and suggests a calm, gradually unfolding mode of perception appropriate to that context. This Arcadianism is in marked contrast to the accelerated and fragmentary perceptual modality that is one of the topics the film treats.

The shot also establishes the basic meter that governs the movement/animation of the various objects in this mechanical ballet. The motion of the swing traces out an arc of a circle, just as a pendulum or a metronome does; that movement establishes a metronomic "tick-tock," to-and-froing clockwork meter that informs the rest of the film.

The image of a woman on a swing was a recurrent image in nineteenth-century "philosophical toys"—as a dynamic image, it suits the moving-picture medium (though, of course, Léger was interested in pushing that dynamism

much further than those media typically did). Furthermore, its sexual implication ensured the image would act as a lure for the gaze; the last feature was certainly not lost on Murphy/Ray—indeed, Dudley Murphy’s print of the film included many shots of Katherine Murphy in the nude, and Man Ray is known to have taken shots of Kiki in that same state, for use in the film.]

- 4 2 frames (A still image). High-angle view of the top of a round, white hat with a rim, and a black hatband, with its bow to the left.

[This shot has a different character than the several preceding—it is harder and more graphic. This difference highlights the fact that the film is built from contrasts. Its brevity and unusual vantage point, along with the evenness of the lighting, convert the hat into one uniformly white oval within another—these characteristics are responsible for the image’s being almost graphic. This is the first example of making a real object into a quasi-graphic form. The capacity to transform real objects into quasi-graphic or graphic images is one of the features that make it possible for the cinema to incorporate everything—after all, if a real object (for which film is usually said to have an affinity) can be made graphic, then why cannot graphics be incorporated into the film? And so the next shot:]

- 5 1 frame (A still image). Black background, a numeral “1” in the lower left corner, a numeral “2” in the upper right corner and a small spherical shape in the centre.

[The three forms interweave typographic and geometric forms, that is, they interrelate different sorts of graphic forms. So much of the film relies on an effect related to the *phi*-phenomenon, creating an impression of movement by presenting still images in rapid succession. Because this dynamization of still forms by a means unique to the cinema is one intention of the term “ballet mécanique,” I have attempted to identify all the static shots, to indicate how many frames each is, and to highlight that this relative of the *phi*-phenomenon is fundamental to this film.]

- 6 2 frames (A still image). Three Bordeaux-style wine bottles form black figures against a white background; they are arranged on a diagonal pointed towards the upper left-hand corner of the screen, and away from the viewer (i.e., as the bottles approach the upper left-hand corner of the screen, they recede farther from the viewer).

[Shots 4, 5, and 6 are all compositions of three elements. With shot 6, Léger exchanges a white background for a black background. The wine bottles are arranged in much the same way the numerals and forms in the previous shot were; the brevity of the shot and the purity of the bottles' simple forms contribute to converting the contents of the shots into graphic (or at least quasi-graphic) forms.]

- 7 2 frames (A still image). The three bottles from shot 6 reappear, but now they are arranged along a line that recedes into the top right-hand corner of the screen.

[The exchange of shots here (shot 7 for shot 6) initiates an alternation between vectors whose direction is a rightward diagonal and vectors whose direction is a leftward diagonal (taking them as moving outward from the centre of the image). This alternation is metrically regular (*Ballet mécanique* was one of the first films to make systematic use of this sort of metrical construction), governed by the film's basic 1–2, 1–2 pulse, established at the very beginning, with the shot of the woman swinging—the film's dominant rhythm sometimes speeds up slightly, and sometimes slows down, but its basis remains a duple (1–2) pulse throughout; this meter structures almost every construction the film offers.]

- 8 3 frames (A still image). White triangle against a black background.

[This shot exchanges a pure graphic form for photographic images of real objects.]

- 9 3 frames A woman's angular face; its shape is similar to
(Not in the that of the triangle)
MoMA print)

[Highlights the similarities between the shape of real objects and graphic forms; pointing out those similarities constitutes an argument for allowing both types of forms into film.]

- 10 31 frames (A still image). Image of the hat that appeared in shot 4.
- 11 36 frames (A still image). A section from a painting by Léger, made up of mostly angular shapes, though a circular form in the top left corner dominates the image.

[What motivates the inclusion of this section of Léger's painting is the similarity of its forms to those of the hat and the triangle (the diagonal arrangement of the wine bottles resembles a triangle). By highlighting the similarity between these real-world forms and elements from his paintings, Léger evokes the issues that gave rise to Cubist painting (including his own unique version of Cubism) and their relation to the thematic of *Ballet mécanique*.]

12 35 frames (A still image). The hat that appeared in shots 4 and 10.

13 118 frames The frame is cut in half by a black matte that covers the top half of the screen, leaving the bottom half uncovered to present a close-up of lips: two peaks on the top lip and a peak at the ends of the lips create the impression the lips are made of triangles. The lips expand horizontally, exposing teeth (the woman smiles), the motion reverses, and the lips return to the original position; the action repeats, creating an up-down, up-down dynamic.

[This shot, too, demonstrates how simply a real object can be made into a graphic form—this can be achieved by isolating the form, using a matte (its effect is similar to that of a close-up, in isolating part of the face). The motion internal to the shot—the lips smiling, then ceasing to smile, then smiling again—conforms to the meter that gives the film its structure.]

14 35 frames (A still image). Image of the hat (that appeared in shots 4, 10, and 12).

[Again, this image of the hat provides an example of converting a real object into a graphic form.]

15 111 frames (MoMA) Same as end of shot 13 (peculiarly angular lips smile, then cease to smile; the motion repeats, creating an up-down, up-down dynamic).
98 frames (Dutch)

[The reoccurrence of elements relates to the “tick-tock,” clockwork meter that informs the film—we might think of this as the film swinging from A to B and back to A again (though this back-and-forth pattern is not strictly observed).]

16 47 frames Several striped, painted wheels roll past the camera (or the camera pans across them); because of their speed, these spinning wheels seem to be made up of triangles.

[The visual pulse created by spinning reels conforms to the metronomic meter that informs most of the film's constructions. A series of triangles appear within a circle—the interplay of circles and triangles is one of the film's visual leitmotifs.]

Léger's interest in reducing real-world shapes to geometric forms has its basis in the principle that the Cubists drew from Cézanne: to “treat nature by means of the cylinder, the sphere, the cone.” There are many examples of cylinders and spheres in *Ballet mécanique* (e.g., the wine bottles we have just seen, and the reflecting ball we are about to see in shot 20); but for the most part the elementary shapes into which Léger resolves nature are the circle (a relative of the sphere) and the triangle (a relative of the cone).]

- 17 101 frames (MoMA) A dark-toned object moves in a circle; it fills the screen as it gets closer to the camera (sometimes it even protrudes beyond the frame edges) and shrinks as it moves away from the camera; as the object moves, the background is uncovered—it is made up of a white square, a white diagonal line, and two circular white shapes on a black ground.
- 110 frames (Dutch)
- 18 183 frames The woman (Katherine Murphy) we saw at the film's opening, swinging in the garden—this time we see her from behind, though her head is turned towards the camera; the image is upside down.

[The trajectory the swing describes is made more evident simply by inverting the picture—the image seems somewhat more abstract (somewhat less realistic) simply because of that inversion (a rudimentary geometric transformation). The stratagem constitutes a forceful demonstration of the lability of an image's depictive status—it shows that a representational image loses some of its referential character and becomes somewhat more abstract just by being subjected to a simple transformation (inversion).

The contrast between shots 17 and 18 involves, *inter alia*, a contrast between non-human and human forms.]

- 19 39 frames (A still image). A graphic (extracted from a painting by Léger). The design involves the interpenetration of several opposites: a black line cuts through a white background and becomes white when it enters a black background; one pictorial element resembles black and white square tiles, like a checkerboard; an angled line turns upwards on
- (Not found in MoMA source)

one side, another downwards on the other side—each is the other's opposite.

[The image involves a marked contrast between black and white.]

20 162 frames

An anamorphic image repeatedly swings towards and away from the camera—the image is of two men standing in a room; one stands behind a camera mounted on a tripod, the other stands somewhat ahead, angled towards the camera. (The image is formed by the reflection of the room on the surface of a metal ball that swings back and forth.)

[The reflecting surface is a mirrored ball. To be sure, it reflects the world around it with as much scientific accuracy as a flat mirror does: after all, applying a Riemannian transformation to the image in the curved mirror would allow us to generate exactly the same representation as the flat mirror presents. Yet even though the image in the curved mirror is just as detailed a depiction of the world around it, it seems more abstract than an image in a flat mirror. Thus, Léger shows how mutable is the concept of representation.

The rhythm of the swinging ball conforms to the meter established early in the film, with the image of the woman (Katherine Murphy) on the swing; accordingly, it extends the tick-tock, 1–2, 1–2 clockwork pulse that forms the matrix that holds the film's diverse components together.]

21 210 frames

A vortograph—a cubistic photographic image. The object matter is a number of oscillating metal balls (Christmas ornaments); shooting them through a vortoscope produces a sort of kaleidoscopic image: the facets produced move from the edges to a focal axis that moves from left to right; the various sections move at different rates, so their combinations form new shapes within the frame.

[Returns to a visual motif involving an interplay of circular and triangular forms. The division of the frame into sections that move independently of one another was probably accomplished by shooting through a triangular tube lined with mirrors. Dividing up the image in this way has similarities with the Cubist painters' method of resolving an object into facets, and the differing directions of the movement of the various sections have effects similar to those created by the different perspective points implied by the painterly method of faceting.

The balls (Christmas ornaments), because they are isolated, are presented not as objects but simply as spherical forms (or, at least, they are presented as much as spherical forms as they are as objects)—in the process that generates our response to the *sensa* that come to our minds and to the associations with those *sensa* that our memory and intuition furnish, pure shape takes on greater valence than the objects' functional or sentimental significance. The effect of the mattes, then, resembles that of close-up shooting. Again, Léger demonstrates that very simple means can be used to make a realistic representation into at least a quasi-abstract form. They also highlight the potential of the cinema for a *poésie du quotidien*.

The facets' movement set against that of the balls produces a polyrhythm—a composite pulse, one layer of which conforms to the pendulum meter that regulates most the action in the film. The pace of the passage is relative to that meter—it is like a passage consisting of whole notes rather quarter notes (but still played in the same meter and with the same tempo marking).

The principal contrast in the shot is between circular (and spherical) forms and triangular forms.]

[The vortographic effect produced here is similar to that which Coburn created in his famous “Vortograph Portrait of Ezra Pound”: the bars and circles and black and white rectangles in that work constitute a highly abstracted form.]

22 96 frames

Light-toned, vertical, linear forms (probably formed by corrugated metal) fill the frame; a black rectangular object with two diagonal white lines that meet in a “T” configuration enters the frame, moving in from the lower corner; it then moves through the frame, describing a large arc—so large that it forms a diagonal from the upper left to the lower left of the frame.

[Another example of the interplay of triangular and circular forms: the “T” divides the screen into triangles, while the sign, as it passes through the frame, describes a large arc (part of the circumference of a large circle implied by the motion). Its movement is another of the many examples of pendulum movement, and its entering and exiting the frame conforms to the film's governing meter (derived from the initial instance of pendulum movement, viz., the to-and-froing of the garden swing with Katherine Murphy on it).]

23 87 frames

The background from the previous shot is shattered into a number of sections/facets (by using a vortoscope, i.e., a mirrored triangular tube) that move independently; the corrugations of

the metal plate, because they are disposed along a diagonal and because the facets intersect one another, form truncated triangles whose combinations create abstract forms (creating a “kaleidoscope” effect).

[The multiple images of this shot contrast with the single image of the previous.]

24 94 frames

Another image produced using a vortoscope, it consists of several similar sections (like the facets of a Cubist painting): the background consists of white stripes on black; a circle with a black spot at the centre (likely a saucepan lid) moves across the image.

[The light-toned stripes on the various facets that compose the previous image (shot 23) form triangles, and so do the light stripes on the black ground in shot 24; shot 24 adds a circular form to the triangles, so it provides another example of the interplay of circles and triangles. Moreover, the object-forms we see through the mattes used in both shots 23 and 24 resemble truncated triangles (the triangle from shot 24 is truncated to the point of being reduced to a diagonal). The circle with the spot in the centre (in shot 24) is likely a saucepan lid; like the objects that the Cubists painted—wine bottles, café tables, guitars, newspapers—it is an ordinary, everyday object. The photography turns the saucepan lid into a nearly pure geometric form—once again, in the process that generates our response to the *sensa* that come to our minds and to the associations with those *sensa* that our memory and intuition furnish, pure shape takes on greater valence than the objects’ functional or sentimental significance; so (given its quotidian provenance), this image provides another example of the continuity between realistic and abstract form. There are many other examples of everyday implements—ladles, skillets, funnels—converted into nearly pure, abstract forms in *Ballet mécanique*.]

[Like 21, this vortograph resembles Coburn’s “Vortograph Portrait of Ezra Pound” in including an all-over geometric composition (along with the principal subject)]

25 65 frames

Continuation of shot 23 (another vortoscopic image, with the screen is divided into several sections, a sort of kaleidoscopic effect).

26 3 frames

(A still image). A white circle against a black background.

[Shots 26 to 41 interweave circular and triangle forms. The sequence presents a dance of pure, abstract elements set in motion by the film: it constitutes a mechanical ballet. The rhythm of the passage is a double-time version of the meter that dominates the entire film: each image is two or three frames in duration (instead of the four or five or six frames pulse intervals that are the norm in the film). As a result, the sequence produces a strong *phi* effect that emphasizes the artifice behind film's dynamic character.]

27 3 frames (A still image). A white triangle against a black background.

28 2 frames (A still image). A white circle against a black background.

[The circles and triangles are contrasting forms. By juxtaposing the two at a rapid rate, Léger highlights the principle of contrast that constitutes one basis of the film's structure. The rapid alternation of the circles and triangles fuses the two, creating a dynamic unity whose vivacity is the result of the tension between opposites.]

29 2 frames (A still image). A white triangle (against a black background).

30 1 frame (A still image). A white circle.

31 1 frame (A still image). A white circle with its top cut off, a straight rather than a circular line on top.

32 3 frames (A still image). A white triangle.

33 3 frames (A still image). A white circle.

34 2 frames (A still image). A white triangle.

35 2 frames (A still image). A white circle.

36 3 frames (A still image). A white triangle.

37 2 frames (A still image). A white circle.

38 1 frame (A still image). A small white circle.

39 3 frames (A still image). A small white triangle.

40 3 frames (A still image). A small white circle.

41 2 frames (A still image). A small white triangle.

- 42 88 frames
(not found in
the MoMA print) (A still image). A graphic form—actually, it is extracted from one of Léger’s paintings, but it seems graphic when reduced to black-and-white and incorporated in a film. A chair-like form dominates, but we can also see a portion of a circle and a triangle; thus Léger shows the continuity between his painted oeuvre and this film (in which the *phi*-interactions of circles and triangles are crucial). The painting fragment also includes sinusoidal curve, the shape traced out by a mapping a pendulum’s displacement across time.
- 43 3 frames (A still image). A white circle, about half the size of the one in previous sequence, against black background.

[The white circle shrinks, seemingly receding into the screen. Issues concerning the illusory space seemingly behind the picture plane were among those Cubist painters had problematized. The faceted forms in Cubist paintings recede only slightly from the picture surface, and the shallowness of that space creates a tension, resulting from the conflict between our desire to apprehend a modelled form in three-dimensional space and its thwarting by the shallow picture space (articulated by the merely slight recession of the facets). Usually, that tension is resolved in the pleasure we take in the intricacy of the articulated form.

Lacking the means that Cubist painters used to explore these spatial issues, Léger develops an analogous tension—one that develops from putting visual forms through changes we can see in two different ways, either as a two-dimensional form that expands or contracts, or as a form receding or proceeding into a three-dimensional space.]

- 44 3 frames (A still image). A white triangle against a black background.
- 45 3 frames (A still image). A white circle.
- 46 3 frames (A still image). A white triangle.
- 47 2 frames (A still image). A white circle.
- 48 1 frame (A still image). A white triangle.
- 49 3 frames (A still image). A white circle.

- 50 3 frames (A still image). A white triangle.
- 51 3 frames (A still image). A white circle, half the size of that in previous shot (shot 50).
- 52 3 frames (A still image). A white triangle.
- 53 3 frames (A still image). A white circle.
- 54 3 frames (A still image). A white triangle.
- 55 3 frames (A still image). A white circle.
- 56 3 frames (A still image). A white triangle.
- 57 3 frames (A still image). A white circle.
- 58 3 frames (A still image). A white triangle.
- 59 2 frames (A still image). A white circle.

SECTION II: ELABORATIONS ON FORM AND RHYTHM (60–99)

General Remarks

Fragmentation and close-up framing convert machine parts and natural objects—a human being’s (Dudley Murphy’s) head and a bird’s head—into circles, triangles, and cylinders (tubular forms). Some of these images are naturalistic; some are abstract; and some fall at different points along the spectrum between naturalism and abstraction. Thus, the images evince differing degrees of realism (they form different sorts of contrast with one another with respect to the degree of their realism) and evoke different sorts of belief. Despite these differences, all these images are held together by a common rhythmic pulse.

Elaborate, anamorphic forms replace the quotidian or easily recognizable shapes (wine bottles, triangles, angular face) of Section I. A prismatic lens fragments an image into multiple kaleidoscopic parts; forms undergo anamorphic transformations as reflections on surfaces of a metal ball; filming upside down confounds our expectations. Extreme close-up shooting transforms and defamiliarizes the appearances of even common objects, and this defamiliarization has the phenomenological effect of making the image’s structure more apparent (and, thus, pushes the images in the direction of abstraction).

In a note published by San Francisco’s Art in Cinema Society in 1947, Fernand Léger commented on the beauty of the mechanical world:

The war had thrust me, as a soldier, into the heart of a mechanical atmosphere. In this atmosphere I discovered the beauty of the fragment. I sensed a new reality in the detail of a machine, in the common object. I tried to find the plastic value of these fragments of our modern life. I rediscovered them on the Screen in the close-ups of objects, which impressed and influenced me. However, I felt one could make their expression much stronger. In 1923 I decided to “frame” the beauty of this undiscovered world in the film. In this medium I worked as I had in painting. To create the rhythms of common objects in space and time, to present them in their plastic beauty, this seemed to me worthwhile. This was the origin of my *Ballet mécanique*.¹⁴

Explicit here is Léger’s conviction that his film has an important social function: framing appropriately close-ups of mechanical objects might encourage people to experience their harmony and the plastic beauty of their component forms—and that enriched experience might act as a remedy for the sensory disarray engendered by the welter of sensations that inevitably result from living in the modern world. Indeed, experiencing through art the harmony and beauty of the industrial world might provide the senses instruction on how to reconstitute themselves to accommodate themselves to present-day reality and to experience it in life-enhancing ways—here I am drawing on Marshall McLuhan’s ideas on the role of art to outline Léger’s. McLuhan’s ideas on the purpose of industrial art thus draw on the education Léger received as a soldier, as he came to experience the beauty of the new mechanical atmosphere.

The factor that holds these otherwise dissimilar forms together is rhythm—here this rhythmic constant is articulated by a periodic repetition of the film’s basic shapes: circles, triangles, and tubes. As I noted above, along with the clockwork meter, repetition (both literal repetition and repetition with variation) is one of the film’s principal integrating devices. Funnel-shaped objects (which sometimes resemble circles and at other times resemble cones), fragmented by prismatic effects, move from side to side; these forms resemble those in Léger’s *Contrastes des formes*. The sexual allusion is rather obvious. Another oscillatory movement appears as a T-shaped form swings back and forth over a complex array of fragmented lines out of which an angular human face emerges. Tubular shapes, again fragmented into kaleidoscopic facets, travel in circular motions around the screen. A simple action—a parrot’s repeatedly turning its head from one side to the other (and here the parrot’s head appears to be an extraordinarily angular construction)—is multiplied by a vortoscope.

Dudley Murphy’s interest in optical transformations was one motivation for these effects. Deeper aesthetic ideas also had a role. Indeed, similar

effects appear in some Cubist-derived photographs of the time, and Léger was certainly aware of some of those works. Even closer relatives of these images are the 1916 vortographic photographs of Alvin Langdon Coburn (1882–1966). Coburn had been encouraged in this work by his friend, Ezra Pound; the film’s use of vortographic effects recalls Pound’s aspiration to create a Coburn-inspired Vorticist film.¹⁵ Léger’s *Little Review* article on *Ballet mécanique* acknowledges “an important contribution due to a technical novelty of Mr. Murphy and Mr. Ezra Pound—the multiple transformation of the projected image.”¹⁶ The reference to Pound’s technical novelty should be noted: Léger does not restrict his acknowledgment of Pound’s role to bringing together the various parties who contributed to the film. The remark alludes to the Vorticist effects that Pound and Murphy created with a vortoscope—it is important to highlight Léger’s having noted that Pound had a role in producing these images (thus confirming Pound’s assertions that he and Dudley Murphy worked together on a Vorticist film). One imagines, given Pound’s estimation of Murphy’s talents, that Pound worked out the fundamental aesthetic/conceptual framework and motivation for these transformations and suggested some subject matter for them, while Murphy executed the sequence.¹⁷ Examining Pound’s writings and letters—both his epistolary critical commentaries for *Dial* and *The New Age* and his letters to friends and family—lead one to a different conclusion, that he had an even greater role than that.

One document to take into account is Ezra Pound’s letter to his father:

London 22 September 1916

Dear Dad: -/- Coburn and I have invented ‘vortography.’ I haven’t yet see[n] the results, He will bring them in tomorrow morning. They looked damn well on the ground glass and he says the results are O.K.

The idea is that one no longer need photograph what is in front of the camera, but that one can use ones elements of design. i.e. take the elements of design from what is in front of the camera, shut out what you dont want, twist the ‘elements’ onto the part of plate where you want ‘em, and then fire.

I think we are in for some lark. AND the possibilities are seemingly unlimited.

The apparatus is a bit heavy at present, but I think we can lighten up in time. -/-¹⁸

Similarly, on 13 October 1916 Pound wrote his patron John Quinn, telling him that “Coburn and I have invented the Vortescope [*sic*], a simple device that frees the camera from reality and lets one take Picassos directly from nature.”¹⁹

The date of the two letters gives Pound's claim to have had a role in—or at least to have been present at—the invention of the vortoscope a certain credibility: Coburn made only eighteen vortographs, and they were produced in late 1916 and 1917 (nearly all of them date from 1917, and the date of the invention of the vortoscope is generally given as 1917). And we know that the vortoscope was first used during a sitting with Pound, one of a series of portrait sessions he had with renowned writers and artists in this period.

Before embarking on vortography, Coburn had been a Symbolist photographer (he was a member of the Linked Ring Brotherhood). The background to the (temporary) shift from Symbolist photographer to vortographer is significant: a number of events that occurred between 1914 and 1916 prepared him for the change or, perhaps, even precipitated it. The key influence was likely Pound, whom Coburn met sometime in 1914: the two got on well and Coburn is on the list of faculty members for the College of Arts Pound proposed.²⁰ Pound conscripted Coburn to the Vorticist movement. But other incidents during this period affected his views on art and life, resulting in this shift from Pictorialist photographer to vortographer. In 1914, Coburn met the photographer and philanthropist George Davison, who was involved in Theosophy and Freemasonry, and Coburn himself took up the study of mysticism, Druidism, and New Age “metaphysics.”²¹

Coburn had established himself as a photographer at a young age. He had exhibited his work in Boston in 1898, when he was only fifteen, and two years later in London, at the “New School of American Pictorial Photography” show. In London he made the acquaintance of members of the Linked Ring, and when he returned to New York from London, he met the leading Photo-Secessionists, whose aspirations were similar to those of the filmmakers associated with the absolute film and the *cinéma pur* movements: they “strived to have photography accepted as an art in its own right,” Sadakichi Hartman explains. “Each image would not be seen as a document or snapshot but as a singular object to contemplate for the personal expression of the artist.”²² In this period, Coburn's photographs were aligned more or less with the principles of Pictorialist photography and displayed many of its staple features: they were gentle, somewhat soft-focus portraits and picturesque landscapes. There was something a little different about them, however, that Hartmann noted in a remark that offers an insight into the appeal his pre-vortographic work had for Ezra Pound. In 1903, he wrote that Coburn was “beginning to see objects, insignificant in themselves in a big way.”²³ He also noted that Coburn had “a natural gift for line and space compositions and has solved various problems which would have set a Stieglitz or a Steichen thinking.”²⁴ On 26 December 1902 Coburn was elected a member of the Photo-Secession; soon after that, he presented work in Steichen's *Camera Work*. Somewhere around

1914, members of Photo-Secession began to feel that they had accomplished their mission of having photography accepted as a legitimate art, capable of pictorial expression. Coburn became impatient for change. In 1915 he organized an exhibition at the Albright-Knox Gallery in Buffalo and at the Royal Photographic Society in London titled “The Old Masters of Photography,” where images were presented from Coburn’s personal collection of photographs, including work by Hill and Adamson, Julia Margaret Cameron, and Lewis Carroll. The exhibition shocked Photo-Secessionists on both sides of the Atlantic, for its purpose, in large measure, was to show the lack of progress in artistic photography over the last half-century. In 1916, Coburn published a statement declaring his desire to modernize photography:

It is this progress of the arts that has interested me. Where is it leading us? There are “Moderns” in Painting, in Music, and in Literature . . . If we are alive to the spirit of the time it is these moderns who interest us. They are striving, reaching towards the future, analyzing the mossy structure of the past, and building afresh, in colour and sound and grammatical construction, the scintillating vision of their minds; and being interested particularly in photography, it has occurred to me, why should not the camera also throw off the shackles of conventional representation and attempt to do something fresh and untried? Why should not its subtle rapidity be utilized to study movement? Why not repeated successive exposures of an object in motion on the same plate? Why, I ask you earnestly, need we go on making commonplace little exposures of subjects that may be sorted into groups of landscapes, portraits, and figure studies? Think of the joy of doing something which would be impossible to classify, or to tell which was the top and which was the bottom.²⁵

In the main body of the text (and in *Harmony and Dissent*), I have shown how pneumatic interests of the sort that Coburn adopted around 1914 helped motivate the quest for abstract art. Coburn’s repudiation of Photo-Secessionist and Symbolist methods in photography and his growing interest in abstraction also seem to have developed out of his increasing interest in pneumatic philosophy. Pound was interested in it for different, principally aesthetic, reasons—he described vortography as the effort to create an abstract photography:

The vortoscope isn’t a cinema. It is an attachment to enable a photographer to do sham Picassos. That sarcastic definition probably covers the ground. A chap named Mountsier has seen the stuff [and] is doing an article on it, also on Lewis and me and Coburn. He is going to N.Y.—on the Sun, I think.

The show of Coburn’s results comes off here in Feb. He and I are to jaw about abstraction in photography and in art, and old G.B.S. has promised to come out and perhaps chip into the jawing. The vortographs are perhaps as interesting as Wadsworth’s woodcuts, perhaps not quite as interesting.

At any rate, it will serve to upset the muckers who are already crowing about the death of vorticism.

It, the vortoscope, will manage any arrangement of purely abstract forms. The present machine happens to be rectilinear, but I can make one that will do any sort of curve, quite easily.

It ought to save a lot of waste experiment on plane compositions, such as Lewis' "Plan of War," or the Wadsworth woodcuts. Certainly it is as good as the bad imitators—Atkinson, and possibly some Picabia—and might serve to finish them off, leaving Lewis and Picasso more clearly defined.²⁶

Pound, it should be noted, lauded the potential of the vortoscope to produce geometric abstracts, which he suggested might almost equal that of Vorticist painting (though in truth his doubts on that parity seem to have been deep). Coburn had no such doubts: for him, at least at this point, vortography, exactly because it was an extended photographic medium, surpassed painting. "I affirm that any sort of photograph is superior to any sort of painting aiming at the same result. Design they have in common with other mediums, but where else in photography can you find such luminosity and such a sense of subtle gradations[?]"²⁷ To be sure, Coburn's interest in luminosity, which here he clearly privileged over colour, reflected his developing interest in the philosophy of the transcendent (which would soon lead him out of art altogether). Nonetheless, his interest in subtle gradations of tone that the peculiar luminosity that characterizes photographs (or, more particularly, the photographs of that era) have parallels in the monochromicity of Analytic Cubist painting. Léger's idiosyncratic quasi-Cubism, we have noted, was more closely associated with Synthetic Cubism (and this affinity actually pre-existed the development of the later phase of Cubism), and his theory of multiple contrasts ensured that the juxtaposition of strong colours would play an important role in this painting. However, the cinema in this era was a black-and-white medium, so Léger could not but have found appealing Coburn's understanding of tonal graduation—for one thing, Léger would have connected this cinematic attribute to the monochromicity of Analytic Cubist painting, whose qualities and procedures he knew so intimately. Even if *Ballet mécanique* gives no evidence of partaking in the interest in light as a transcendent phenomenon, the fact that the vortographic form is grounded in tonal gradations that have a real-world basis but tend with varying degrees of force towards abstraction would have drawn Léger towards the vortoscope.

A few weeks later (9 February 1917), after the *Vortographs and Paintings* show had opened, Pound wrote to Alice Corbin Henderson, describing the response to Coburn's February show of thirteen paintings and eighteen vortographs: "The vortograph show opened last week, jaw by Coburn, me, G.B.S. (in that order) last evening, audience mostly photographers, about a

third of them ready to 'admit' abstract art."²⁸ Pound's note on vortography for the exhibition also emphasizes the vortoscope's anti-mimetic potential:

The tool called the Vortoscope was invented late in 1916. Mr. Coburn had been long desiring to bring cubism and vorticism into photography. Only with the invention of a suitable instrument was this possible. In vortography he accepts the fundamental principles of vorticism, and those of vorticist painting in so far as applicable to the work of the camera... The vorticist principle is that a painting is an expression by means of an arrangement of form and colour in the same way that [a] piece of music is an expression by means of an arrangement of sounds.²⁹

Actually, Pound's description of the device somewhat overemphasizes its proclivity for pure abstraction. The real effect of the device makes its relevance to *Ballet mécanique* even clearer. Vortographs could be completely abstract, or they could multiply and distort recognizable objects. Pound's exhibition catalogue entry actually went a distance in acknowledging that. In it he noted: "A natural object or objects may perhaps be retained realistically by the vortographer if he chooses, and the vortograph containing such an object or objects will not be injured if the object or objects contribute to interest in pattern, that is to say, if they form an integral and formal part of the whole." Or, somewhat more expansively,

a painting is an arrangement of colour patches on a canvas, or on some other substance. It is a good or bad painting according as its patches are well or ill arranged. After that it can be whatever it likes. It can represent the Blessed Virgin, or Jack Johnston, or it need not represent at all... When a man begins to be more interested in "arrangement" than in the dead matter arranged, then he begins "to have an eye for" the difference between the good, the bad and the mediocre in Chinese painting.

Any organization of forms expresses a confluence of forces. These forces may be "love of God," the "life-force," emotions, passions, what you will. For example: if you clap a strong magnet beneath a plate full of iron filings, the energies of the magnet will proceed to organize form. It is only by applying a particular and suitable force that you can bring order and vitality and thence beauty into a particular plate of filings, which are otherwise as "ugly" as anything under heaven. The design in magnetised iron filings expresses a confluence of energies. It is not "meaningless" or "inexpressive"...

We do not enjoy an "arrangement of forms and colours" because it is an isolated thing in nature. Nothing is isolated in nature. This organization of form and colour is an expression; just as an arrangement of musical notes is an expression. The vorticist is expressing his complex consciousness.³⁰

The view coincides exactly with Léger's ideas on the inclusion of representational or quasi-representational images in a work constructed on the principles of his theory of contrasts (see the main body of the text).

The role of the various parties involved in making *Ballet mécanique* is difficult to sort, and various authors have attributed larger and smaller roles to various parties. I offer my views in the main text. But in summary, I believe that *Ballet mécanique* synthesized four projects, the first three being: a collaboration by Dudley Murphy and Ezra Pound on a project for an abstract vortographic film; Man Ray and Dudley Murphy's film project employing Ray's Dadaist approach to recording street footage and footage from Luna Park (a number of images in the film, for example 147, 156, 157, 158, 159, 160—perhaps especially 160—and 162 bear a striking resemblance to images that appear in Ray's 1926 film *Emak Bakia*, and it could provide a film historian considerable pleasure conjecturing about the extent to which Ray's artistic outlook and Ray's customary approaches to artmaking are reflected in such shots and about the extent to which Ray carried over to *Emak Bakia* lessons he had learned through his experiences on *Ballet mécanique* and its precursor projects); and the third, Man Ray's and Dudley Murphy's diaristic images of lovemaking (almost no images of this sort remain in the film, though there were shots of this sort in early prints).³¹ A note on Murphy's role as the likely vortographer is in order. Pound, I believe, had been interested in making a Vorticist film for some time. However, he and Coburn had gone their separate ways sometime in 1917, as Coburn's new-found interests in *Prisca theologia* were beginning to occupy him to the exclusion of any other engagements. But it seems that when Pound was introduced to Dudley Murphy, he was awakened to the fact that Murphy's interest in applying unconventional optical devices in cinematography might make him useful as a vortographer. They began working together, despite the reservations Pound expressed about Murphy's artistic and intellectual limitations. Progress on the work proceeded for some time. Pound learned later that Léger was interested in making a machine film, and he understood how similar their ideas on machine art were. They agreed to work together, and the work that Murphy and Pound had been doing on Vorticist film became part of *Ballet mécanique*. As I noted earlier, his article on *Ballet mécanique* published in the exhibition catalogue for the Internationale Ausstellung der Theatertechnik, Léger gives Pound and Murphy credit for "the multiple transformation of the projected image."³²

The three projects were brought together, and the footage prepared for them was combined with images and sequences based on Léger's ideas, derived partly from Purism, partly from Orphism and partly from the *rap-pel à l'ordre* movements, about how to bring harmony to the new industrial, urban reality. The fourth project I alluded to above was the machine art film Léger himself wanted to make and the footage gathered to achieve that end. It is the synthesis of the projects with Léger's ideas about the novel beauty of the industrial world, and the radical diversity of *Ballet mécanique* that results from that combination, that commands our interest. The diversity of

images is so unthinkable radical that I consider it inconceivable that such a synthesis was imagined before the projects were fused. I also believe that Léger's artwork (and his notion of multiplicative contrasts) provided a model for this synthesis. And it was in order to realize that model that Léger decided to assume a major role in editing the final work.

Léger understood well the vital importance of the abstract framework into which these images were gathered, and it was his wont in this period to understand that framework in essentially Purist, harmonic terms. This accounts for the privilege he accords to rhythm: throughout this section, the meter remains fixed. However, this section of the film works with contrasts achieved as much through acceleration and deceleration of the film's basic rhythmic pulse as through diversity in the image's degree of reality: as one example, the funnel-like shapes oscillate from side to side at a faster rate than the angular forms in their background do; as another, Murphy's head emerges slowly from the fragmented lines, as if lifted by the mechanical elements that surround it, while a T-shaped object oscillates across the image in a faster pendulum-like motion. These contrasts (for that is surely how Léger would have thought of them) produce polyrhythms. Other forms of contrast (or, more precisely, unity-in-contrast) appear in this sequence: the parrot head and the human head are forms that are both similar (both are heads) and contrasting (one is human, the other non-human); the juxtaposition of funnel-like concave shapes with convex tubular forms likewise brings together forms that are both similar (both are metal) and dissimilar (in their shapes). These metal forms also contrast with the animal forms in this section, though the shapes of mechanical objects and animals are also analogized (another type of unity-in-contrast).

Some themes in this passage:

(i) *Machinery*

A metallic key-like form set among several more abstract circular shapes appears for the first time in shot 63. A more defined image of a machine appears a little later on (65), and although it is still not clear what kind of machine it is, its metallic shine and spinning motion reveal it to be industrial. Once again, these movements are variants of the clockwork (tick-toc, 1-2, 1-2) motif, out of which so much of the film's imagery is generated (so this matrix is also an element that undergoes variation, and this variation at times seems almost systematic). The spinning structure moves at many times the speed established by the woman swinging, while the metal key swings at the same pace.

(ii) *Machines and human forms*

Two sequences of human eyes opening and shutting appear immediately following the spinning machine element (65)—the eyes are shown first as we would ordinarily see them (66) and then (67) they are shown upside down.

The effect of this inversion is profound: the first image is (ordinarily) representational, but the second is quasi-abstract (here, a slight change in the image fundamentally alters how we respond to it). The shape presented in the next shot, the elongated oval of the spinning machine part resembles that of an eye, and its spinning motion (with a band that time and again passes across the screen) alludes to the blinking eyes. The similarity of shapes of the eye and the spinning oval suggests the formal and functional proximity of the machine and the human forms: human parts and mechanical objects are shown to be equally adept at performing a ballet. Shot 68 presents the same object-matter as shot 65, but this time recorded with the vortoscope, which for this short produces an effect of compressing the form into the centre of the screen (and so of lifting the bottom of the image into the centre).

All of these structures emerge from the same metrical motif (established by the motion of the woman swinging on the swing and the oscillating ball/pendulum shown right at the outset of the film), and that meter, along with the many repetitions the passage incorporates, binds these three apparently dissimilar sequences together. The spinning metal element mimics the blinking eyes, but at several times the rate humans would ordinarily blink, and this loosens somewhat the bond between the image and what it represents. The upside-down image of the eyes reinforces this rhythm by loosening the movement's bond to the actual object.

(iii) *Human forms and non-representational forms*

Light-toned kaleidoscopic facets (geometric forms generated by vortography) seem to rise up the screen at a pace similar to that of the vortoscopic dynamic in the previous image, which gave the impression of compacting sections of the image and pressing the resulting facets together. As they do so, they uncover a person's head, then conceal it, then reveal it again. The semi-representational and representational forms in this image are bound together by a common rhythm; a flag-like form passing across the screen rhymes with the form in shot 68 that repeatedly passes across the screen at a much brisker pace than the vortographic abstractions. Forms of many different types participate equally in the underlying rhythm of the film.

(iv) *Parrot*

The parrot, too, participates with humans and the machine parts (the angular kaleidoscopic shapes) in a ballet that fuses human, animal, and machine elements. The parrot's movement conforms to the film's underlying meter (73).

(v) *Circle and triangle*

After several sequences of complex images and polyrhythmic structures (60–74), the film returns to simple forms and simple constructions—the basic circle and triangle (75–98) and the basic meter that dominates the film (serving as

a basic architecture comparable to the grid scaffolding that integrates the diverse facets in Cubist paintings and in Léger's painterly compositions). The purpose of this return is partly to release tension and partly to mark the end of one sequence and to introduce a new one. Once again, a flicker effect is produced by rapidly exchanging simple forms one for the other, following the basic meter established by the ball/pendulum and the swing. As simple as this sequence appears, it has several layers to it. First, as noted earlier, the shapes reduce in size more or less in conformity with the set rhythmic structure. Second, although these shapes appear to be simple, flat, geometric forms, their reduction in size implies a third dimension, since they seem to recede deep into the black background. Thus, simple geometric shapes become more complex through the use of (animated) motion.

Throughout the film, Léger and Murphy use a flickering series of circles and triangles to introduce new sequences. Another significance of these flicker passages is that the circles and triangles make love—as I have noted, the retinal superimposition of the circle and the triangle suggest the alchemical merging of Sol and Luna, the male and female principle.

Shot Breakdown

60 99 frames

Another image produced with the vortoscope: white rectilinear forms similar to those in shots 22 and 23 (probably by shooting corrugated metal in close-up); as in shot 23, the image is divided into a number of sections/facets that seem to move towards the centre—the stripes formed by the corrugated metal resemble the hard-edge forms used in Coburn's 1917 vortographs. The image is organized symmetrically around the axes near (but not at) the screen centre (the axes dividing the image on the screen into sections have a different position than they do in shot 23), and the overall effect resembles kaleidoscopic facets moving over one another.

[The straight lines form triangles, but they also seem to gravitate towards a single central point—that is, to move in towards the centre of a circle; the contrast/tension between circles and triangles is thereby sustained.]

61 94 frames (MoMA)

Another image produced using a vortoscope: the facets produced by the vortoscope each contain

- 26 frames (Dutch) circular forms with scallops at their perimeter, which move towards centre in a kaleidoscopic effect.

[The triangles of the previous shot are changed into circles—another example of the interplay of triangles and circles; furthermore, the straight lines divide the screen into several sections/facets (this effect was created using a vortoscope), and their intersection creates triangular forms—so the image offers circles within triangles. The sections' movements reveal that the circle is raised above the scalloped ground—so the shot elicits a tension similar to that between an illusory (but shallow) depth and flatness that is such a common feature of Cubist painting. The scallops in the background rhyme with the light stripes of the ground in shots 22, 23, and, most significantly, the previous shot, shot 60.

Furthermore, the source of the image is likely some sort of kitchen utensil—perhaps a cake or gelatine mould. So this shot, too, demonstrates that the cinema can easily make real-world objects into nearly abstract forms. The film medium might have an affinity for the surfaces of reality, but it can readily make the objects found there into purely formal elements. Thus, film can make almost any real-world object into a component that can be afforded entry into an artwork based on Cubistic principles.]

- 62** 92 frames (MoMA) Same as shot 60 (an image produced using a vortoscope), but the movement is in the opposite direction. This is another example of unity-in-contrast.
- 62 frames (Dutch)
- 63** 228 frames Same as shot no. 24 (produced using a vortoscope), continues with circular shapes jerking side to side. The camera moves down the circular shapes; when it reaches the bottom we see a metallic key-like form, swinging from side to side.

[As in shot 24, Léger uses a vortoscope to create a kaleidoscope effect by partitioning (faceting) a circle into several sections that meet at straight edges, and creates thereby an interplay between the triangles formed by the straight edges and their arc-shaped boundaries (that imply the possibility of being extended into circles). The image is likely of a sauce-pan lid, held by kitchen tongs (the key-like form referred to above); if it is, it provides another example of an everyday object being made into a nearly abstract form.

The object's jerky movement creates a peculiar effect: the object seemingly switches between being recessive and being processive; in fact, the convex sauce pan lid (if that is what it is) sometimes seems like a shallow funnel with

its spout pointed away from us (a concave form). This is another example of creating tension with an ambiguous space, one of the cardinal features of Cubist art.]

- 64 78 frames Three oval or circular forms, with small, scalloped indentations around their circumference, are stacked on top of one another—they swing from side to side.

[Another variant of a swinging pendulum, whose movement conforms to the film's governing meter. The contour of the object resembles that of forms Léger often used in his paintings. The source of the image is likely another kitchen utensil (perhaps the multilayered cake mould); hence, this image likely provides yet another example of converting an everyday, utilitarian object into a nearly abstract form; so it comments on the relation between the more abstract forms we see in Léger's paintings and the real world of modern experience (the world of mass-produced utilitarian objects).]

- 65 16 frames (MoMA) A highly polished, teardrop-shaped, mechanical form spins rapidly.
12 frames (Dutch)

[The teardrop shape is composed of two triangles with a common base and sides slightly bent into a curve; it is another relative of a cone, one of the basic forms Cézanne instructed the Cubists on using.

The image provides another example of the dynamism of industrial machinery, one of the themes of Léger's art—in this shot, Léger shows us the *ballet mécanique* that the industrial world is. The painter found machine forms appealing, for they spoke to him of the new world of energy; besides, machine parts usually have simple forms, like those of the facets into which Cubists resolved the natural or quotidian world. This form is simple and dynamic, and its movement is governed by the same meter that presides over most others in the film, though it is faster (it is like a motif played on eighth instead of quarter notes).

Nearly all the machine parts Léger and Murphy show us in this film are close-ups of parts isolated from their context. In this respect, *Ballet mécanique's* method resembles the one that Léger employed in works like *Les disques* (1918). The abstracted mechanical elements produce a feeling of dynamism and power; they are not meant to be identified and classified according to their object matter. What is more, a key issue of Léger's painting was the difference between pictorial space and real space; distancing everyday objects from their natural appearance—abstracting them—invokes a related distinction, that between the two-dimensional form in a painting and three-

dimensional objects in their natural appearance. The isolation of a fragment (e.g., a machine part) through close-ups exaggerates that distinction. The filmmakers convert everyday objects (funnels and other ordinary kitchen utensils) into abstract forms by photographing them from unusual angles, thereby taking this distinction to an extreme.]

66 34 frames Close-up of eyes and eyebrows; at first, the eyes are open, then they close.

[The outline of the eyes resembles the contours of the shape in the previous shot; thus, the filmmakers highlight the similarities among shapes that belong to different categories of things (in this instance, the apposition highlights Léger's interest in *l'homme machine* and his belief in the continuity between organic and mechanical forms). Léger recognizes our capacity to abstract the basic contours of the things we see, and this recognition is one of the grounds for his belief that visual forms belonging to different representational categories (by reason of having different relations to reality) can all claim a place in film: the last three shots have presented, in succession, objects of different types (first, kitchen utensils abstracted by close-up shooting to the point of being almost unrecognizable; second, a mechanical element that is also abstract, though in its case, its abstract character is endemic to its physical reality; third, a humanoid form that has, to a degree, become mechanical and in this sense abstract).]

67 32 frames Upside-down image of eyes opening.

[This sequence concerns our ability to abstract the basic contours of an object. The inversion makes the eyes' shape more pronounced—the device goes a distance (however short) towards abstracting the object. The shot, in fact, is literally the previous shot, turned upside down, so that the action runs in reverse—the eyes seem to open instead of close. Because the motion in this shot is simply an inversion of the motion in the first, the speed of the action in the two shots is identical, so the two shots taken together form an analogue of a pendulum swinging: it moves in one direction, then reverses. What is more, the shape of the eyebrow and a line drawn around the eye with eyeliner are structurally similar to the path traced out by a pendulum—and that similarity becomes all the more evident when the shot is inverted.]

68 118 frames Shot 65 continues. Now, however, the shot is subjected to a vortographic effect, though here it is very slight. Here, shooting through the vortograph produces the effect of compressing the form into the middle of the screen (an effect that

almost makes it seem as if the camera is drawing away from the spinning form and that in the process causes the bottom to move up the frame. We have already noted (in the main body of the text) that Blaise Cendrars refers in *Moravagine* to “the sexual fury of factories. The wheel that turns. The wing that soars . . . Rhythm. Life.” The machine imagery in the film suggests a similar sexual frenzy—this connects the machine imagery to the images of the woman winking and the dancing legs.

- 69** 64 frames (MoMA) Similar to shot 22 and, even more, to shot 23; a kaleidoscope effect is produced by a vortoscope, which divides the frame into several sections, each with ribbon-like forms in it (the source of which, most likely, is corrugated metal). The central section appears to move up from the bottom of the frame, and as it does so, it uncovers a face (Dudley Murphy’s); a flag-like object passes periodically across the image.
- 106 frames (Dutch)

[The juxtaposition of shot 68 and 69 draws attention to the similarity between the spinning form (in shot 68) and the man’s face (in shot 69) and articulates an allusion to the notion of *l’homme machine*.]

[Shots 68 and 69 present similar rising motions—motions that seem to occur at the same speed in both shots—even though the object matter of the two shots is very different.]

** The MoMA print seems to have a different shot here, without the flag-like form passing across the image.

- 70** 41 frames (A still image). The entire frame is taken up by (not found in a still image of a section extracted from a painting by Fernand Léger. The extracted content is the MoMA print) dominated by a rippled, shell-like form.

[The rippled, shell-like form resembles the corrugated metal of the previous shot. It also resembles an inverted form of the shape produced by heavy object swinging at the end of a non-rigid support; accordingly, the shot offers an allusion to pendulum movement, a leitmotif in the film. The image also contains a sinusoidal line, another allusion to wave forms.]

- 71 85 frames (MoMA) Another image produced using a vortoscope: it is divided by into numerous rectilinear sections/facets that move independently of one another, creating a kaleidoscope effect; decorative circular/spherical forms (Christmas ornaments) move against this fractured background.
- 91 frames (Dutch)

[Again, this shot offers the interaction between triangular and circular (spherical) forms: a dynamic unity is forged from contrasting elements (rectilinear and curvilinear forms). The tension between these contrasting forms vivifies the resulting form. The interplay between the movements of large sections and the movements within the sections creates a polyrhythmic effect, whose composite pulse coincides with the film's governing meter.]

- 72 257 frames (MoMA) A kaleidoscopic effect is produced by shooting through a vortoscope, which creates the impression that the image is divided into several sections/facets. The boundaries of the sections are straight edges; the sections move independently of one another (just as the facets in a Cubist painting have a degree of perspectival independence). Each facet depicts circular forms in scalloped glass with a tube in the centre. The tubes move jerkily from side to side.
- 260 frames (Dutch)

[The circular forms sliced into the triangular sections provide another instance of an interplay between circles and triangles, while the rippling of the glass forms rhymes with the stripes in the corrugated metal (and recall the hard-edge forms in Coburn's vortographs). A tube rises through the rippling glass, but the space into which it projects is ambiguous: we really cannot tell how far behind the scalloped glass surface the most distant parts of the tube are, nor can we tell how far in front of that surface its nearest points are. This ambiguity recalls the spatial character of Cubist painting, in which the relative dimensions of various objects cannot be sorted out with precision and certainty.]

This image also offers another variant of a design in which triangular and circular forms interact with one another; the decorative qualities of the glass and the corrugated metal help forge the contrasting components into a dynamic unity.]

- 73 95 frames A kaleidoscopic effect is produced as the image is divided into several rectilinear sections/facets (using a vortoscope); the sections move independently of one another, just as the facets in

a Cubist painting have a degree of perspectival independence. The head of a parrot dominates the centre of the shot; the parrot faces the camera, then turns to the left; the feathers on its head rise, then lower again as the parrot turns its head to the back.

[The parrot contrasts with the background; moreover, the spirited, organic character of its movement contrasts with the mechanical quality of the movement in previous shots—this contrast is peculiar, given the film’s general claim that mechanical and animal movements are so similar.]

74 77 frames

Same imagery as in shot 22, but treated with the “kaleidoscope effect” produced by shooting through a vortoscope; the object first passes from right to lower left; it leaves the frame and then passes from the left side and leaves at the lower right—the shot remains on the screen for a time after the object has left the frame, and the lack of action directs our attention to the Coburn-like linear forms in the background, which, really, becomes the foreground after an interval during which there has been no real action, and no other elements have been introduced to push it into the background—this sort of perceptual reversal sometimes occurs with the Cubists’ use of *passage*. The left and right sides of the “background” consist of diagonals directed towards the centre of the top of the frame, while the centre portion of the frame is made up of vertical lines.

75 2 frames

(A still image). A white triangle, set against a black background, fills the frame.

[Another sequence of “contrast in forms” begins, this one setting circular and triangular forms against one another. The brevity of the shots, and the resulting rapidity of the sequence, create a mechanical ballet made possible by the cinema’s basic mechanism, the *phi*-phenomenon.]

76 3 frames

(A still image). A white circle against a black background.

77 3 frames

(A still image). A white triangle against a black background.

- 78 3 frames (A still image). A white circle against a black background.
- 79 3 frames (A still image). A white triangle against a black background.
- 80 3 frames (A still image). A white circle against a black background.
- 81 3 frames (A still image). A white triangle against a black background.
- 82 3 frames (A still image). A white circle against a black background.
- 83 3 frames (A still image). A white triangle against a black background.
- 84 3 frames (A still image). A white circle against a black background.
- 85 3 frames (A still image). A white triangle against a black background.
- 86 1 frame (A still image). A white circle against a black background.

[The repetitions here could continue to fill a time-space of any arbitrary length. Accordingly, this passage offers an example of the application of Antheil's ideas to visual composition—this is evidence of the filmmakers' interest in creating audiovisual parallelism, of using similar musical and visual motifs.]

- 87 1 frame (A still image). A white circle with its top cut off, and small black hole in the bottom.
- 88 1 frame (A still image). A white circle against a black background.

[In shots 76 to 85, pulses occur at regular intervals of three frames. In shots 87 and 88 a sort of syncopation is introduced and the pulse seems to stagger. Antheil's music generally is highly syncopated—in 1920s Europe, extensive use of syncopation seemed very American (because of its association with jazz) and very modern. Furthermore, these passages, made up of short, metrically regularly components, highlight the mechanism that makes the mechanical ballet possible.]

89 3 frames (A still image). A white triangle against a black background.

90 3 frames (A still image). A small white circle against a black background.

[We have returned to the “pulse every third frame” meter. *Ballet mécanique* was the first film to be constructed with sections (a sort of time-space intervals) marked out by its metrical subdivisions.]

91 3 frames (A still image). A small white triangle against a black background.

92 3 frames (A still image). A small white circle against a black background.

93 3 frames (A still image). A small white triangle against a black background.

94 3 frames (A still image). A small white circle against a black background.

95 3 frames (A still image). A small white triangle against a black background.

96 2 frames (A still image). A small white circle against a black background.

97 1 frame (A still image). A small circle, brighter than the previous, against a black background.

98 2 frames (A still image). A smaller white triangle against a black background.

99 2 frames (A still image). The same as shots 4, 10, 12, and 14: an image of the hat against a black background.

SECTION III: ANIMATED STILL IMAGES AND FREE-MOVING SUBJECTS (100–198)

General Remarks

This section opens with an animated passage (100–120) that uses many of the images introduced earlier in the film: the familiar white hat, the wine bottles, the numbers in a grid, the geometric shapes. Along with these familiar images, a few new ones appear (for example, chairs and a crankshaft). The forms in this sequence are presented in quick rhythmic succession, as though

mimicking the earlier fast-paced rhythm used in passages that exchange a circle for a triangle and the triangle for a circle. The images here are simple and recognizable, and they lack the distorting effects produced by using a vortoscope (a triangular tube with mirrored inner surfaces) for multiplying images or by projecting an image onto a spherical surface. The rapid presentation, by highlighting that a film strip is made up of a series of rapidly presented discrete frames, stresses that the cinematic apparatus is a mechanical apparatus (or an ensemble of mechanical apparatuses) for producing movement from stills. This emphasis is partly the result of the movements in this section exhibiting what Léon Moussinac calls “external rhythm,” that is, a rhythm imposed on the images by a principle external to their content:

Rhythm exists, therefore, not only within the image itself but in the succession of images. In fact, cinegraphic rhythm owes the greater part of its power to such external rhythm. . . . To edit a film is nothing more than to give it rhythm . . . Few have understood that giving rhythm to a film is as important as giving rhythm to the image. . . . [It is] curious that no one has tried to encompass this rhythm in certain mathematical relations, in a kind of measure. . . —after all, these relations seem easy to determine since the value of the image and that of the film can be represented in time and space through figures or numbers.³³

A short intermediary passage that alternates a circle and a triangle follows. It serves as similar passages throughout the film do: to highlight the importance of the role that geometric forms (and specifically circles and triangles) have in the film; to indicate the relation between scale and depth; to foreground the *phi*-phenomenon; to emphasize the role of contrasts (between curvilinear and rectilinear forms); and to introduce a new idea or theme. The alternation becomes more erratic rhythmically as more elements (wine bottles, crankshafts, a typewriter, numerals) are incorporated into the dance—the frame count for the successive images (2, 3, 2, 2, 1, 2, 3, 2, 2, 3, 3, 4, 4) seems to have no pattern (other than of favouring a two-frame pulse). The rhythmic pulse created by the film’s matrical meter is re-established with the rapid alternation of circles and triangles.

The triangles-and-circles passage introduces a contrasting sequence (shots 139–148), in which more complex images and rhythms gradually replace simpler images and rhythms. The image is divided into separate zones with circular and triangular mattes—the different areas seem to slide over one another in an elaborate rhythm that is accentuated by an object sweeping across them in a simple, fixed meter (the film’s matrical meter). An eye, filmed in close-up to make it seem two-dimensional (its appearance suggests a parabola), is choreographed to do an odd, somewhat erratic dance: it closes, opens, looks up then down, to the right and then to the left. The camera joins the metal

ball in swinging first across the screen, then in and out of the depth of the screen in a sort of *pas de deux*.

The section beginning at shot 144 merges realistic, abstract, and semi-representational images—often the polyrhythms internal to the shots (created by the layers of pulses formed by the moving elements) are different variations of the film's metrical meter (performed at different tempi). This section is one of the few sequences in the film with a combination of images of this degree of complexity. The rhythmic structure is equally intricate. The metal ball swings back and forth while the camera moves in a slower, circular motion, and in doing so it uncovers other parts of the image—these circular camera motions relate choreographically to the wave-like movement of the swing and the pendulum.

This short sequence serves as an introduction to the remainder of this section. The simple, realistic images of the previous section develop into complex images, presenting real-life settings. This provides for a less controlled environment, both visually and rhythmically. A still image of repetitive circular forms on closer examination is revealed to be a collection of cups and saucers. The cups' and saucers' circular forms, and the wave-like patterns into which they are stacked (150), allude to the rhythm that underlies the film. Shots 151 and 153 are more obviously realistic images (game wheels), and their "natural" spinning motions participate in the film's overall pulse.

In shots 150–155, new shapes and images continue to articulate increasingly complex spatial and rhythmic forms. An image of crockery, arranged so that the plate to the left overlaps the plate to its right, suggests a form receding diagonally to the lower right—the image, presumably, is filmed from an illustration. The rotating gaming wheel of the following image (another circular form, probably shot at Luna Park) resembles the crockery; however, while the crockery is static, the roulette wheel spins—this is another example of conjoining forms that display both similar and dissimilar features.

The culmination of this progressive complexity is a series of shots (156–162), taken out of doors, that (like shots 153 to 155) give evidence of being a product of Ray's Dadaist approach. The tension here results from the challenge of making quotidian events, which are subject to rhythmic variability, conform to the film's metrical meter. Rapid pans follow people on fairground amusements (rides that spin people in circles, reminiscent of the spinning game wheels), and the resulting propulsion maintains the film's rhythmic pulse. Fairground cars shot at Luna Park—the mechanized amusement park is another exemplary site of the dynamism of the modern age—sweep across the frame, one after another; the back-and-white/light-and-dark pattern the movement articulates conforms to the film's basic metrical motif. The shaking camera seems to pick up the clockwork movement that structures the film

(156). A man sliding down a curving chute (157) crosses the frame with the same rhythm, as do the round carts as they pass through the frame one by one (161). The cinematic apparatus—itsself mechanical—shows us daring and dramatic spectacles and physical feats that we can only watch with wonder and admiration.

This section introduces another motif, viz., the identification of humans with machines, which is developed in the following section (for example, we see a man sliding down a curving narrow chute and carts whirling in circles, their trajectory fixed by bars [tubes] radiating from a central pillar [a tube], whose movements mimic that of the pump-like machines in this section, which also have tubular shapes and pistons extending from them). A Dadaist low-angle close-up of marching feet and another of two cars driving towards, and over top of, the camera repeat the film's matrical rhythm. The objects chosen, and their movements, highlight circular, angular, and tubular shapes, though their quasi-Dadaist juxtapositions come close to evoking nonsense.

Section Breakdown

The first part of this section animates images that have been introduced earlier in the film (a white hat, wine bottles, numbers in a grid, geometric shapes) as well as a few new ones that appear in quick rhythmic succession. These images are generally simple and recognizable (they lack the distorting effects produced by the vortoscope or anamorphic reflections on metallic spheres).

The section that comprises shots 100 to 140 follows a short intermediary section of the alternating circle and triangle. This, as usual, introduces a new idea or theme: in this case, it introduces a section in which complex images and rhythms are gradually replaced by earlier simpler ones. A kaleidoscopic complex of circular and linear shapes articulates a polyrhythm that is accentuated by an object sweeping across the shapes. An image of a single eye, rendered as almost two-dimensional, performs a complicated movement of closing, opening, looking up and down, to the right and to the left. Camera movement joins with animated motion and the familiar swinging metal ball in creating radical dynamic forms (this section is characterized, too, by formidable complexity in image and rhythm). Commentators on the film generally connect Léger's use of everyday objects here to his interest in a *poésie du quotidien*. This is correct (and I have done so), but there is another aspect to this use of ordinary objects that is not often acknowledged: another way to account for the interest Cubist artists showed in everyday objects is through Viktor Shklovsky's concept of *остранение* (*ostranenie*; estrangement or defamiliarization). *Остранение* is the antidote to the "over-automatization" of perception, which causes experience to "function as though by formula."³⁴

The purpose of art is to impart the sensation of things as they are perceived and not as they are known. The technique of art is to make objects “unfamiliar,” to make forms difficult, to increase the difficulty and length of perception because the process of perception is an aesthetic end in itself and must be prolonged. *Art is a way of experiencing the artfulness of an object: the object is not important.*³⁵

Cubist paintings, quite ordinarily, make ordinary objects “unfamiliar” in order to increase the difficulty and length of perception.

Léger takes objects that would normally evoke a thoroughly automated perception—the most ordinary, everyday utensils—and in shots 149 to 155 uses close-ups (Léger maintained that the cinema’s particular virtue is the close-up) to estrange and defamiliarize them, and to make their perception purposefully difficult. In her introductory blurb for the film in the *Unseen Cinema* DVD set, Susan Delson remarks on the “low-tech” means the film generally uses, in making whisks and funnels dance—as though what we experience were as simple as that. It is not. The phenomenology invoked is much more complex. The angles used when shooting some (not all) of the everyday objects and the use of close-ups—especially of the whisks, funnels, and cake moulds—isolate the objects and defamiliarize them: sometimes it is impossible to immediately identify them. And if we, of today, don’t immediately recognize the content of an image (e.g., as a funnel), how much greater would have been the difficulty that audiences of the time experienced. The close-ups and shooting angles increase the difficulty of perception—and that extends the length of perception (the time taken before the image is essentially exhausted). A filmmaker can control the time that the defamiliarized object is on the screen and, by making the shot sufficiently short, render it impossible to identify on first occurrence. And viewers can be made to wait for the images to reappear—and that extends considerably the length of the perception, drawing it into memory and, through memory, anticipation. (This is an example of Léger’s using film’s unique character, of being a visual art, i.e., an art of immediacy, that nonetheless shares with music an extended temporal existence that invites rhythmical structuration, to create a novel means of defamiliarization out of a method that was fundamental to the Analytical Cubist approach to painting.)

The culmination of this progressive complexity is a series of exterior sequences (shots 156 to 162). The unpredictable movements of the out-of-doors world are brought into conformity with the film’s underlying pulse. Marching feet and a sequence of two cars moving towards the camera repeat the film’s rhythm. Circular, angular, and tubular shapes (the circular rides, the angled bars, and the tubelike slide) are also emphasized; even the shapes of motion in this sequence, traced out by the rotating carts, the repeated footsteps (the swinging legs), and the man sliding down the tubular slide, have circular or angular contours.

Shot Breakdown

[The meter staggers, then new content is introduced into the sequence.]

100 3 frames A still, abstract image. In contrast to the previous (round) image, this image consists of sharp outlines and sharp corners. The image seems to be of part of a chair, upside down—two of the legs and bars connecting the legs appear in the frame, while rectangular white objects float behind the chair. (These rectangular objects are actually papers and a mat, lying on the floor beneath the papers, but they cannot be identified in the time they are on the screen, and they imbue the image with a certain Coburn-like effect.)

[This shot contrasts with the previous by its use of sharp lines. Furthermore, this shot, together with the image of the hat in shot 99, begins an alternating series—and this alternation can be considered to be a way of creating dynamic unity out of contrasting elements. It also furnishes an example of making an everyday object into an abstract form, by accelerating perception.]

101 2 frames (A still image). The same as shots 4, 10, 12, 14, and
(Not found in the 99: an image of the hat, now with the bow on its
MoMA print) hatband to the right.

102 3 frames (A still image). A dark-toned circle against a black
(Not found in the background.
MoMA print)

[Shot 101 presents a real-world object with a circular form, while shot 102 presents a circle. One can consider this apposition as the reduction of the real world to an abstract shape—seeing this, one might recall Cézanne’s advice that nature should be treated “by the cylinder, the sphere, and the cone.” It also creates unity-in-difference.]

103 3 frames (A still image). An abstract composition: it looks
like three bands or thick stripes that cross the
frame from the top centre to the right corner.

104 3 frames (A still image). Same as shot no. 5 (black back-
(Not found in the ground, a numeral “1” in the lower left corner, a
MoMA print) numeral “2” in the upper right corner, and a small
circular shape in the centre).

[This shot contains within itself a graphic representation of the film's underlying meter.]

105 2 frames (A still image). Three horizontal columns fill the frame, with the numerals "1 2 3" in them.

106 3 frames A vertical form extends to the top of the frame; the camera is angled slightly downward towards the object. The bottom of the form is circular and larger than the rest of the object, so it forms a base; the rest of the object is made up of small parts sitting on top of one other. The parts shift as though they had been stacked up precariously and are about to topple over.

[This form in this shot, whose architectonic stresses verticals, contrasts with the horizontal forms of the previous shot.]

107 2 frames (A still image). A dark-toned, upside-down triangle against a black background.

108 2 frames (A still image). The same as shots 4, 10, 12, 14, 99, and 101: an image of a hat, with the bow on its hatband to the right.

109 2 frames (A still image). A white circle, somewhat right of centre, fills most of the right part of the frame and protrudes beyond the frame at the top, bottom, and right side (as though too big for the frame).

[The hat in shot 108 is a real-world object with a circular shape; shot 109 is a pure white circle, a graphic form. Like shots 102 and 103, these two shots, together, suggest the reduction of a real-world object to a simple, abstract shape. That reduction was one of the fundamental methods of Cubist art.]

** 2 frames (not found in Dutch print). A straw hat.

110 2 frames (A still image). Horizontal, tubelike forms aligned in a row, as though seen from the lower left looking towards the upper right, and filling the frame at the centre.

**3 frames (not found in Dutch print). Various objects (a white rod, three small metal spheres, a large piece of white paper with straw hat and smaller piece of black paper) against white background.

111 3 frames (A still image). A small white circle in the centre of the frame, set against a black background.

[Shots 109 and 111 together offer similarity-with-difference, for they present a larger and a smaller circle, one of them off-centre and one centred.]

**2 frames (not found in Dutch print). Six wine bottles, lying on their sides.

112 2 frames (A still image). Two black bottles against a white background, one bottle on the left and one on the right side of the frame. The bottle on the left is a little closer than the one on the right.

113 2 frames (A still image). Three bottles in a sort of triangular arrangement, with the centre bottle slightly farther forward than the bottles on the left and the right.

[This shot contrasts with the previous by having a positive space at the centre of the shot rather than a negative space; nevertheless, the two shots' structural similarity fuses them into a dynamic unity. This provides another example of unity-in-difference.]

114 3 frames (A still image). Same as shot 105 (columns containing the numerals "1," "2," and "3").

115 3 frames (A still image). A single black bottle, upright at the centre of the screen, moves towards the camera (or the camera zooms in on the bottle).

[Most of the "motion" in this section of the film is created through cutting. This shot is different, for it offers actual movement. However, like the shots around it, its object matter is a bottle. Accordingly, this shot, in relation to surrounding shots, offers similarity-with-difference.]

116 4 frames (A still image). A faint image of a typewriter, shot from a high angle.

[Another industrial image.]

117 4 frames (A still image). Three black bottles, each slightly farther back than the bottle to its left.

118 2 frames (A still image). Same as 105, 114 (columns containing the numerals "1," "2," and "3").

119 2 frames (A still image). A white triangle, set against a black background, nearly fills the frame.

120 3 frames (A still image). A white circle, smaller than the triangle in shot 119, against black background.

[A sequence that alternates circles and triangles has begun. The circles and triangles are contrasting forms, insofar as one is curvilinear, the other rectilinear; yet both are similar in being flat (graphic) shapes on a flat ground. Hence, the sequence articulates a series of similarity-in-difference relations.]

[William Moritz's restoration of the film for the Deutschesfilmmuseum tints the sequences that alternate circles and triangles—usually with the triangles in one colour and the circles in another. This conforms to Léger's and Murphy's intention, and it introduces another set of contrasts into the film. Here I am analyzing a print that I believe circulated with Léger's approval.]

121 3 frames (A still image). A white triangle against a black background.

122 3 frames (A still image). A white circle against a black background.

123 3 frames (A still image). A white triangle against a black background.

124 3 frames (A still image). A white circle against a black background.

125 3 frames (A still image). A white triangle against a black background.

126 3 frames (A still image). A white circle against a black background.

[Shots 118 to 127 are very close to being a reprise of shots 75 to 85, another section that highlights the fact it is essentially a time-space interval that is subdivided into strictly metrical units. The meter staggers somewhat across shots 127 to 130, then the pulse resumes.]

127 2 frames (A still image). A white triangle against a black background.

128 43 frames (not found in the MoMA print) (A still image). An illustration or painting fills the frame.

129 1 frame (A still image). A circle, half the size of the triangle preceding it (shot 127).

- 130** 3 frames (A still image). A triangle.
- 131** 3 frames (A still image). A circle.
- 132** 2 frames (A still image). A triangle.
- 133** 1 frame (A still image). A circle.
- 134** 3 frames (A still image). A triangle.
- 135** 3 frames (A still image). A circle.
- 136** 3 frames (A still image). A triangle.
- 137** 3 frames (A still image). A circle.
- 138** 2 frames (A still image). A triangle.

****Total number of frames in circle/triangle alteration: MoMA print, 41 frames; Dutch, 49 frames.

- 139** 303 frames Another image produced by shooting through a vortoscope, made up of small, circular, white-and-black shapes and larger rectangles and stripes, in white, against a black background; the various sections/facets slide over one another, as though collapsing into one another. This creates irregular geometrical forms; as this happens, an object passes through the frame in a rapid, fanning motion, covering and uncovering the background as it does so.

[The layering of forms—the original object matter recorded by shooting through a mirrored triangular tube, the sectioning/faceting created by shooting with that lens, and the object that passes through the frame—and their different movements create a polyrhythm.]

- 140** 219 frames Another image produced by shooting through a vortoscope: it is divided into black-and-white sections/facets, whose perimeter is made up of straight lines at acute angles, forming quadrilateral and triangular forms as the sections assume different places in relation to one another; metal balls swing back and forth in front of these moving, rectilinear forms.

[This shot contrasts with the previous by being divided into rectilinear forms (which have similarities to triangles), whereas the previous shot was divided

into circular areas. However, in both shots the frame is divided into several sections, and that similarity helps join the two shots in a dynamic unity that is made vital by the tension between the contrasting forms. The inclusion of the balls makes this composition another variant of the film's circles-with-triangles motif.]

- 141** 16 frames A white rectangular opening cuts into a black frame and reveals an eye and eyebrow in close-up (the opening splits the frame in half, its top just below the top right side of the frame). The eye opens, looks up, and then down and to the right.
- 142** 6 frames Same object matter, but the opening is on the opposite side of the frame (left); the eye is closed.
- 143** 74 frames The rectangular opening is on the right side; the eye looks to the left and then closes, then opens, closes, opens, looks up, looks down to the right, then closes.

[Continues the left vs. right contrast, with a similar object matter.]

- 144** 67 frames Kaleidoscopic effect produced by shooting through
(Not included in the a vortoscope, similar to shot 139.
MoMA print.)

[The abstractive effect of shooting through is very strong, because the object matter is simple geometric shapes.]

- 145** 234 frames Same object matter as shot 139; however, this shot lacks the kaleidoscopic treatment; a metal ball swings from side to side, entering and leaving the frame; the background is reminiscent of the painted elements that appear in some of Coburn's 1917 vortographs—it is divided in two, a larger white portion on the left and a smaller black portion on the right. The white section contains a nearly rectangular form (its edges are slightly curved) that protrudes beyond the frame at the bottom—the form is tilted, so that one corner points up and the other points to the right. A white hat with a black hatband overlaps the rectangle. The black section consists of a small white circle in the top right corner, with a white bar that descends from the top right, touches the circle on

the right, and from there descends to the bottom right corner; in the bottom centre is a small long white form made up of three connected circular shapes; as the ball swings the camera moves in a slow circular motion across the background—as it moves left, it uncovers another black portion (and moves the white portion into the centre of the screen, then moves it up).

- 146** 75 frames (MoMA) An image displaying a high degree of anamorphosis moves towards and away from the camera.
81 frames (Dutch) The image is of the camera itself, reflected in a metal ball that swings back and forth (another pendulum movement).
- 147** 44 frames Another image produced by shooting through a vortoscope, this one made up of multiple thin, white, curved lines (they almost form a circle), clasped together in what careful inspection reveals to be the form of a spring or a whisk. An ellipsoidal form (the object appears to be a light) can be seen in the bottom centre of the frame, and a small portion of the same form can be seen at the top of the frame.

[Man Ray's *Emak Bakia* (1926) also contains shots of what appear to be bundled filaments, reminiscent of this image, and, as here, those sheathed-together fibres are treated in way that produces a spinning effect (though the character of the movement in *Emak Bakia* is quite different and certainly was not produced using a vortoscope). One can easily imagine that Ray's experiences on *Ballet mécanique* helped generate in him a deeper appreciation of vortical dynamics in cinema—and that this might have impelled him to create kinetic equivalents to these shots for the film he embarked on just over a year after *Ballet mécanique* was first shown publicly.]

- 148** 77 frames This vortographic image is composed of multiple thin, white, curved lines (similar to those in the previous shot); a form that resembles a thick needle spins in the centre, as though inside the whisk-like form.

***Shot 141 in the MoMA print appears to combine shots 147 and 148 in the Dutch print, to give a total frame count of 119 frames. (The combined frame count for shots 147 and 148 in the Dutch print is 121 frames.)

- 149** 136 frames Same as shot 13 (lips expand and contract; the gesture is repeated once).
- 150** 24 frames (A still image). The image is dominated by large overlapping circular forms on the left—the circle at the top left appears farther back, the circle at the bottom centre somewhat closer. The rest of the frame is made of rows of smaller irregular forms that similarly overlap one another.
- 151** 50 frames A large wheel used in a game of chance spins clockwise—the wheel has a point in the centre with a small black circle around it. There are numerals around the rim of the wheel (the top and the bottom of the wheel protrude beyond the edge of the frame, but on the left and right sides one can see the numerals on the wheel as it spins). A small sign sits at the centre of the frame, about the height of the small black circle; on it, we read “25c” and, in smaller letters below that, “*la partie*” (25 centimes each).
- [The framing, by making evident that the wheel extends beyond the frame’s boundaries, shows that the shape of a lens’s field of view is invariant: it is a fixed rectangle. That, of course, foregrounds the inevitability for filmmakers of making decisions relating to the relative proportions of objects—decisions regarding the harmony of forms.]
- [This and the next several shots, up to 161, are likely from the project Man Ray and Dudley Murphy embarked on together, using Ray’s Dadaist approach.]
- 152** 26 frames Similar to shot 149: the image is dominated by large, overlapping circular forms at the left (crockery of some sort).
- 153** 60 frames White background with small (circular) black spots that seem to protrude slightly (they are actually shadows on white background); in the centre there is an illustration, with two children, spinning clockwise.
- 154** 27 frames Same as shots 150 and 152, but reversed, with large forms on the right.

155 61 frames Same as shot 150 and 152 (their original orientation restored).

[This left/right reversal is another variant of the to-and-fro movement the filmmakers use to create unity-in-variety.]

156 91 frames A cityscape, taken with a rapidly moving (and shaky) camera. In the background is a male figure on a carnival ride. The camera follows the man (continuing to shake) as the car spins towards the foreground—as he spins, his body turns away from the camera, but he twists his head so that he continues to look into the camera. The camera continues to follow him as he turns his head away and descends the slide.

[This image and the next several (up to shot 161) give evidence of Ray's Dadaist approach. Ray's fondness for hand-held shots of this sort is well known.]

157 22 frames In the upper right corner of the frame, a man balances on a board as he descends the slide. (The top of the slide is in the upper right corner of the frame, and it slopes towards the bottom centre of the frame; the man's knees are bent and his arms are stretched out for balance.) The camera follows the man as he gets closer.

[The man's imbalance is mildly amusing.]

158 44 frames A ground-level view of a soldier's legs (we know they are soldiers from the boots they wear) as they advance down the cobblestone road (marching "through the frame"); in the background (far enough away to be quite small) we see a man in a suit, with a hat and cane, taking a walk (he crosses the upper part of the frame).

[The soldiers' movement contrasts with that of the man with the cane.]

[Man Ray's *Emak Bakia* (1926) contains a similar shot.]

159 25 frames The camera is tilted towards the sky. On the left side of the frame, we see part of a building, on the right, the upper parts of trees and sky. The top of

a car appears at a distance at the bottom of the frame and appears to scale the screen as it gets closer (it fills up more and more of the frame). As it passes over the camera (which is very low, close to the road) the frame becomes all black. The shot ends with the car leaving the frame.

[The mechanical movement contrasts with both the natural and the mechanized human movements in the preceding shot.]

160 31 frames

The camera is tilted towards the sky; in the lower left hand corner, we see part of a building, and in the right half of the frame, we see the upper section of a number of trees and the sky filling the rest; the top of a car emerges from the bottom left half of the screen and moves closer to the camera, progressively filling more of the frame as it gets closer; it fills the frame with black as it moves across the camera and then leaves the frame; the picture fades to white.

[The unusual vantage point, almost certainly a product of Ray's Dadaist approach—a similar shot appears in his *Emak Bakia*—provides an example of making perception difficult (a common Cubist tactic).]

161 95 frames

An amusement park ride: couples sit in carts that have a bar attached to their bottoms (for controlling their rotational movement). The carts pass through the frame, one by one, entering at the right side of the frame, moving down diagonally and approaching the camera until they fill the frame, then travel across the frame from the left and finally exit at the right.

162 219 frames
(MoMA print)

A mostly dark ground with bands of light (as though reflected on a rippled metallic surface).

105 frames
(Dutch print)

At the centre of the frame, protruding beyond the bottom of the frame, is a roundish elongated structure—its width diminishes towards the bottom. The bands of light at the sides of the form, and the circular shape atop it, flicker, suggesting the object is spinning rapidly.

[Here a flicker effect, which up until now has been associated with the intermittent image-darkness-image feature of the cinema, is produced by a real movement. That difference is a form of contrast; but underlying that contrast is a similarity: both the cinematic apparatus (which is based on the flicker effect) and this machine are manifestations of the accelerated industrial world—acceleration (the cinema's fast frame rate) is what makes possible the cinematic illusion, the impression that it can present continuous motion.]

[Man Ray's *Emak Bakia* (1926) also contains shots of spinning machine elements reminiscent of this image.]

163 45 frames (not in the MoMA print) (A still image). An illustration or a section excised from a painting (probably from a painting by Léger): a black shape in the centre that resembles a stylized human figure dominates the picture.

[This painting-cinema amalgam highlights the fact that film (and this film) operate by making a cut in space.]

164 121 frames (Not in the MoMA print) Shot 161 continues

****Shot 154 in the MoMA prints seems to combine shots 162 and 164 of the Dutch print to give a total frame count of 219 frames. (The combined frame count for the Dutch print shots 162 and 164 is 226 frames.)

165 2 frames (A still image). A white triangle against a black background, original size.

166 3 frames (A still image). A white circle against a black background.

167 3 frames (A still image). A white triangle against a black background.

168 3 frames (A still image). A white circle against a black background.

169 3 frames (A still image). A white triangle against black background.

170 3 frames (A still image). A white circle against a black background.

171 3 frames (A still image). A white triangle against a black background.

- 172** 3 frames (A still image). A white circle against a black background.
- 173** 3 frames (A still image). A white triangle against a black background.
- 174** 3 frames (A still image). A white circle against a black background.
- 175** 3 frames (A still image). A white triangle against a black background.

[Shots 165 to 175 are nearly a reprise of shots 75 to 85, another section that highlights the fact that it is essentially a time-space interval subdivided into strictly metrical units. Note that the interval between shots 75–85 and shots 165–175 is just about the same as the interval between the beginning of the film and shots 75 to 85; we can take this as further evidence of the film’s having a harmonic structure.]

- 176** 3 frames (A still image). A white circle against a black background.
- 177** 3 frames (A still image). A white triangle against a black background.
- 178** 3 frames (A still image). A white circle against a black background.
- 179** 3 frames (A still image). A white triangle against a black background.
- 180** 2 frames (A still image). A white circle against a black background.
- 181** 2 frames (A still image). A white triangle against a black background.
- 182** 3 frames (A still image). A white circle, half the size it was on its previous sequence (shot 180), against a black background.

[Here, the pulse staggers a little, then settles into a slightly more accelerated pulse.]

- 183** 2 frames (A still image). A white triangle against a black background.
- 184** 2 frames (A still image) A white circle against a black background.

- 185** 2 frames (A still image). A white triangle against a black background.
- 186** 2 frames (A still image). A white circle against a black background.
- 187** 3 frames (A still image). A white triangle against a black background.
- 188** 3 frames (A still image). A white circle against a black background.
- 189** 3 frames (A still image). A white triangle, half the size of the triangle in shot 187, against a black background.

[Because of the change in size, the triangle seems to leap backwards—such processive-recessive leaps are additional gestures in the mechanical ballet.]

- 190** 3 frames (A still image). A white circle against a black background.
- 191** 2 frames (A still image). A white triangle against a black background.
- 192** 1 frame (A still image). A white half-circle with a triangular peak.
- 193** 3 frames (A still image). A white circle against a black background.

[This passage of rapid, metrically regular alternation becomes markedly syncopated.]

- 194** 3 frames (A still image). A white triangle, half the size of previous the triangle in shot 192, against a black background.

[Another balletic leap.]

- 195** 3 frames (A still image). A white circle against a black background.
- 196** 3 frames (A still image). A white triangle against a black background.
- 197** 3 frames (A still image). A white circle against a black background.
- 198** 3 frames (A still image). A white triangle against a black background.

199 2 frames (A still image). A white circle against a black background.

SECTION IV: MECHANICAL DEVICES AND HUMAN FORMS (200–244)

General Remarks

Shot 200 refers back to the previous section's image of a man sliding down a curving chute (157), but here the image is more abstract: the figure looks like a shadow of a person, and the chute has a grainy texture (produced photographically), which gives it a graphic quality. Shot 201 offers a close-up of a pump-like, tubular structure with a piston moving rapidly up and down (another comparison of human sexual activity with the pumping motion of machines). Shot 205 is a semi-representational, kaleidoscopic (vortoscopic) image of extended metal bars (tubes) referring back to the carts in the previous section (shot 160), which were steered by metal rods. Once again, the rotating movements of the circular metallic structures and the pumping motions of the pistons conform to the matrical rhythm established in the image of a woman on a swing at the beginning of the film.

Flickering circles and triangles end this short subsection (this construction has been used as a transitional device before) and introduce another, one that explores relations among pumps, pistons, and human forms. Thin metal lattices spin and dance (232, 233); and machine-like forms with rotating or spinning wheels (235, 237) are intercut with blinking eyes (236, 238). These mechanical and human shapes interrelate with one other through their similar movements, stressing once again the importance of film's rhythmic *gestus*. The woman trudges up the stairs and reaches out (240, the shot is looped, so it repeats): the action of her stretching out her arm is matched (through montage) with a moving circular shape from which a shaft-like element protrudes. The smiling lips from sequence 13 reappear in this section (240); the smiling is turned into a mechanical operation, which reinforces the machine dynamics presented in shots 234, 235, 237, 242, and 243.

Throughout the film, meter has been the device that binds the diverse images together. This insistent, matrical meter is even more important in this section, as the images are so different from one another. The mechanical shapes in this section contrast with the human forms, yet its fundamentally abstract (mathematical) character allows the film's rhythmic framework—the pulse that holds the film together—to accommodate both types of forms within the same matrix.

The tubular slide of the previous section is depicted more graphically—its image becomes almost an abstract composition. The slide is the first in a sequence of many tubular forms (all relatives of the “Tubist” forms Léger had earlier used in his paintings) that appear in this section. This graphic image

contrasts with a close-up of a mechanical device—perhaps a pump or piston—moving rapidly up and down. The graphic forms of these images contrast with one another; however, they are linked by their having similar dynamic characteristics: all depict something travelling through tubular forms (a set of sexual allusions). Various pump-like components are abstracted from their context and presented as pure rhythmic motion. Isolating these forms from their context (through the use of close-ups, which intrigued Léger) focuses attention on their mechanical (pumping and rotating) motions. An almost paradoxical—and ironical—double-signifier is formed: the images suggest the energy of the technological modern and the machinic dynamism of human sexual behaviour. The implication of that irony is to suggest that machinic desire drives humans just as electricity powers industrial machines.

Delicate metal lattices (actually, kitchen utensils) contrast with the heavy, mechanical parts of the previous section, yet they repeat the rotating and threading motions of the machine parts (another example of similarity-in-difference). The more delicate shapes serve as intermediaries between the bulky industrial shapes and flexible human forms (forming another spectrum of related qualities). A pair of human eyes blink and look around, mimicking the rotations of the machine parts and those of the more delicate metallic lattices. The erratic nature of the eyes' motion highlights its mechanical qualities. The machine-like character of human movement is again compared and contrasted with the fluid rotations of a machine in the famous sequence of the reiterated shot of an older woman climbing stairs and extending her hand as she approaches the top of the staircase—her arm moves through the same arc as that which a bar extending from the machine describes as it rotates (when considering this comparison, one should take into account that, like the bar, the arm is a sort of tubular form)—and the arm, like the bar, extends from a circular shape (the body is a large tubular form, that is, its cross-section is almost circular). (This image of the woman climbing the staircase is formed into a loop, so the motion repeats: the device of loop-printing was often used by structural filmmakers of the 1970s, whose work often displayed similar metrical properties and a similar interest in repetition to Léger and Murphy's.) The movements of both the machine and the laundry worker maintain the meter established at the beginning of the film.

Shot Breakdown

200 65 frames

A large white polygon (textured with hatching) stretches from the left to the right side—a small portion of the frame, at the top and bottom, remains black, and within the strips, irregular

bits and pieces also remain black. First the head, then the entire silhouette figure of a man, moves horizontally across the white shape. He sits on something, grasps hold of it, while the figure moves across the frame, and finally leaves. The same action repeats, with the figure entering on the left and exiting at the right.

[Likely another image shot by Ray.]

201 312 frames Close-up of a bulbous form within a sheath. The form occupies the centre of the frame and protrudes beyond the frame's top and bottom edges. The sheath moves up and down (becoming thicker and thinner in the process); this pumping action repeats.

[A very sexual image; one might recall that the Latin word for sheath is *vagina*.]

202 89 frames Shot 200 continues; the white shape is more curved. The figure moves across the frame, towards the centre and then back out. The picture reverses at times, changing the direction of the movement.

[Another example of left/right reversal.]

203 149 frames A dark image—another pumping movement. The image highlights the shape of a metallic object.

[Thes are images of “energetic piston and cylinder movement,” like those that filled Bloom's mind in *Ulysses's* “Ithaca” episode. Images likening machine movement to basic (sexual) human acts suggest that machines and humans have much in common—both are operated by energy—and the fact that machine movements appear to be human activities projected into the new electromechanical world suggest the energies that operate both are similar.]

204 15 frames (A still image). An irregular dark form against a white background. The form begins at the top centre of the frame, descends diagonally, assuming a fork-like shape at the bottom, and sweeps over to the left.

205 217 frames A kaleidoscope image created by shooting through a vortoscope: the frame is composed of

a central form surrounded by others that seem to collapse into it (in the manner of a kaleidoscope). The central image is of a mechanical device, with several jointed metal rods around a central core; the object moves with a treading motion (the rods dominate the image).

206 5 frames (A still image). A white triangle against a black background; the triangle is the same size as in shots 165 to 175.

[The triangle has leapt forward. Here begins an unusual sequence of alternating triangles and circles: the tempo is *rallentato*—at first the pulse staggers a little, and syncopated beats continue to appear throughout this section, then the base pulse pretty much settles into a regular meter whose marked beats occur at intervals twice as long as those earlier passages alternating the circle and the triangle. This confirms the comments I made earlier: that the film is held together by a steady, insistent pulse, with some sections regulated by doubled or halved intervals of that pulse.]

207 7 frames (A still image). A white circle.

208 6 frames (A still image). A white upside-down triangle.

209 6 frames (A still image). A white circle.

210 5 frames (A still image). A white triangle, twice the size as the triangle in shots 206 and 208.

[Here the contrasts between the circular and the triangular forms become more numerous and more complex, for they now include scale and orientation (of course, only the triangles can be re-oriented, not the circles). The relation between the shots with triangles in different orientation is one of unity-with-contrast.]

211 5 frames (A still image). A white circle.

212 2 frames (A still image). An upside-down white triangle.

213 4 frames (A still image). An upside-down white triangle, slightly larger than shot 212.

214 6 frames (A still image). A circle, same as the circle in shot 210.

215 6 frames (A still image). A triangle, same size as in shot 212.

- 216** 6 frames (A still image). A circle, larger than in shot 214.
- 217** 6 frames (A still image). An upside-down triangle, larger than in shot 215.
- 218** 6 frames (A still image). A circle, same size as in shot 215.
- 219** 6 frames (A still image). A triangle, larger than in shot 217.
- 220** 6 frames (A still image). A circle, larger than in shot 218.
- 221** 6 frames (A still image). An upside-down triangle.
- 222** 6 frames (A still image). A circle.
- 223** 6 frames (A still image). A triangle.

[The mechanical ballet involves several leaps and inversions. The repetitions here could fill up any arbitrarily long time-space—this is evidence of Antheil's influence on the visual form of the film and of the filmmakers' efforts to create an audiovisual parallelism.]

- 224** 6 frames (A still image). A circle.
- 225** 6 frames (A still image). An upside-down triangle.
- 226** 6 frames (A still image). A circle.
- 227** 6 frames (A still image). A triangle.
- 228** 6 frames (A still image). A circle.
- 229** 6 frames (A still image). An upside-down triangle.
- 230** 256 frames Another image produced by shooting through a vortoscope, similar to shot 205; different segments/facets shift in relation to one another, creating a series of variations in which the jointed rods are generally dominant.
- 231** 78 frames A graphic form: a black, a horseshoe-shaped object with its ends attached to a base, against a white background. The base of the shape occupies about 1/4 of the width of the frame at the bottom; another horseshoe form, with a bar connecting to the base, is entwined in the other. It pumps slowly, up and down.

[Another sexual image.]

- 232** 105 frames Same as shot 147, but without the vortoscopic effect.
- 233** 138 frames The midsection of three spinning whisks—the whisks on the left and right partly overlap the centre whisk.
- 234** 146 frames A component of some mechanical device, made up of a round form with a protruding rod that rotates (among other jointed structures); the overall form is laid out horizontally, and the rods meet the joints at the left; another shape that is too close to the camera and that moves too rapidly to be seen clearly (but resembles a wagon-wheel shape) spins across the frame.

[These forms, with their articulated rods, resemble human limbs; thus, this image offers a sort of schematized abstraction performing a mechanical ballet.]

- 235** 189 frames A dark image that highlights the outline of a section of a whirling mechanical device.
- 236** 73 frames Two closed eyes, eyebrows, and a nose fill the frame; the eyes open, blink, look up, first to the left and then directly into the camera.
- 237** 183 frames A component of a mechanical device—a pair of rods attached to a rotating mechanical device (a jointed structure)—the form is basically horizontal, with the rods meeting the jointed forms at the right.

[This machine bears comparison with the machines used to make films.]

- 238** 40 frames Shot 236 continues, but now the nose is cut off by the frame edge; the eyes are wide open and look directly into the camera, then they close.
- 239** 173 frames A circle with a hole in the centre (like a gramophone record) occupies the centre of the frame. A rod enters at the left side of the frame—it has a circular bulb at the end and moves along a circular path.

[The comparison of human and machine forms continues.]

- 240** 219 frames A shot from the top of an outdoor staircase, looking down: an older woman carrying a stuffed bag over her left shoulder walks up the stairs towards the camera—as she gets closer (her head leaves the frame), she raises her arm and hand in a gesture; this action repeats six times.
- 241** 138 frames Same as shot 13 (lips expand and contract, then expand and contract again).

[Human parts perform mechanical movements.]

- 242** 351 frames Shot 240 continues: the action repeats nine more times.

- 243** 122 frames A close-up of a rotating mechanical element.

[This shot contrasts with the previous several: while their object matter was a person, the object matter of this shot is a machine. Nonetheless, the contrasting forms are related since the movements the washerwoman and the machine perform are alike in being mechanical—the machine character of the woman’s action is heightened by repeating the shot fifteen or twenty-one times (depending on the print).]

- 244** 164 frames Shot 240 (same as 242) continues to be repeated, four more times. In a Sisyphean effort, the washerwoman mounts the steps, laden with laundry, climbs to the top—only to reappear instantly below, where she started, again to repeat her tiresome chore.

- 245** 87 frames A vortograph: the background is black; thick, white curved lines collapse into one another in the manner of the segments of a kaleidoscope.

****Shot 245 in the Dutch print seems to have been split into shots 200 and 201–203 in the MoMA print. In the MoMA print, shot 200 has 21 frames and shots 201 to 203 have 65 frames, yielding a total frame count of 86 frames.

SECTION V: TEXT AND NUMBERS (246–378)

General Remarks

While various shapes and parts of the human body and faces appear in this section, the primary performers in this mechanical ballet are text and numbers. The basic text, “on a volé un collier de perles de 5 millions” (a pearl necklace worth five million [francs] has been stolen) appears out of context,

for the form of film is not that of reportage (having to do with current affairs) nor that of a mystery novel. Nonetheless, we can draw associations between the text and the general themes of the film, though the connections are formal, not anecdotal—the necklace is a string of (spherical) pearls, and the numeral 5000000 ends with a string of (circular) “0”s (literal repetition, as we have seen, is a fundamental feature of the film’s construction, one likely motivated by the ideas of George Antheil and by Léger’s interest in creating parallels between Antheil’s music and the film’s visuals).

Because literation repetition plays such a large role in this section of the film, we are required to reflect further on that form of construction. An early, important reflection on cinema by Georg (György) Lukács (1885–1971), “Gedanken zu einer Ästhetik des ‘Kino’” (1911/1913), offers some fundamentally important insights into the cinematic basis for repetition.³⁶ Lukács notes that film images exemplify an “absence of presence.” In theatre, the actor’s physical presence is of capital importance: in each moment of the performance, the film actor’s presence impresses itself on the theatregoer—the actor’s physical presence is a shaping force that imposes itself on each and every moment of the performance, which is then to be lost forever. “The stage is the absolute present,” Lukács writes. “The transitory nature of its achievement is not a deplorable weakness, but rather a productive limit, the necessary correlate and most observable expression of destiny in drama . . . To be present, to truly, exclusively, and intensely live, is already itself fate.”³⁷ Accordingly, theatre images are characterized by complete spatial and temporal presence. Film images, by way of contrast, merely replicate the external appearance of life, and have no soul; accordingly, human movement and action are paramount in the cinema. Lukács takes this insight in the direction of establishing that the cinema is “uncannily lifelike” and “*fantastic*”—in sum, of establishing that the cinema is Surrealism *avant la letter*.³⁸ But this is not the theme of the Lukács essay I wish to pursue further, other than to note the extraordinary characterization of the fantastic that Lukács provides:

The fantastical element is not a contrast to living life, however, but is only a new aspect of the same: a life without the present, a life without fate, without reasons, without motives, a life without measure or order, without essence or value, a life without soul, of pure surface, a life with which the innermost of our soul does not want to coincide, nor can it . . . The world of the “cinema” is thus a world without background or perspective, without any difference in weight or quality, as only the present gives things fate and weight, light and lightness.³⁹

The temporality of the stage, Lukács concludes, is always paradoxical, riven between presentness and immediacy on the one hand and something eternal and at rest on the other. The temporality and flow of the cinema is different: it is pure and clear. “The essence of the ‘cinema’ is movement itself, an eternal

variability, the never-resting change of things.⁴⁰ Dedication to an art of “light and lightness” was at odds with the Analytical Cubists’ efforts to brake the disappearance of reality (*Verschwindenheit der Realität*) that resulted from the dissolution of the object and even with ideas about machine art that motivated the makers of *Ballet mécanique* to develop a machine that would include a projector and pianola and would use new technology to link the two in presenting a composite artwork that would comprise as well the fused sound and picture that they (projector and pianolo), operating in synchronism with each other, would project. Nonetheless, features of the film medium exfoliated by Lukács seem to have motivated this work, whose primary affiliation, certainly, is to an idiosyncratic Purism/Cubism but, nonetheless, exhibits traits shown by artworks affiliated with other artistic movements, including Futurism (Léger’s own highly individuated quasi-Cubism often displayed Futurist traits). *Ballet mécanique* does concern the “light and lightness” of the film image and the never-resting change of things.

Lukács infers from the contrast between the stage image and the film image that the stage is “purely metaphysical, distancing itself from all that is empirically alive,” while cinema is “strongly unmetaphysical, so exclusively empirically alive.”⁴¹ That is not a conclusion I agree with, but from it Lukács draws an insight into the metaphysical implications of the cinema (“a different metaphysics,” as he called it, that develops from the cinema’s “strongly unmetaphysical” character), and that insight, I believe, can help us understand *Ballet mécanique*:

The fundamental law of connection for the stage and the theater is inexorable necessity; for the “cinema” it is an unlimited possibility. Individual moments whose confluence is made possible only by the temporal sequence of the “cinema”-scenes are only connected insofar as they follow one another, immediately and without transition. There is no cause and effect that would tie them together, or, to be more exact, their causality is not bound and hemmed in by any particular content.⁴²

Another way of putting this point would be to say that the “light and lightness” of film images makes possible infinite paradigmatic substitutability: an image of an object or event belong to any category can always follow any image of an object or event belonging to any other category whatsoever. The cinema’s syntactical disposition, therefore, is for wild, completely unbridled parataxis. In the main body of the text, I show that Blaise Cendrars, a sometime collaborator with Fernand Léger, drew exactly that conclusion.

Discussions that took place between Léger and Pound in this period are relevant to this topic of unrestricted parataxis. Pound attended a lecture that Léger gave in 1923, when work on *Ballet mécanique* was just beginning, on

the topic of machine art: this lecture formed the basis of the two-part article by Léger published in *The Little Review* and dedicated to Pound. It was there that Pound met Blaise Cendrars, a friend of Léger's who had worked with him on *Création du monde*. A biographer of Pound points out that subsequently, "the three men discussed a notion Léger called simultanist art—using disruptive 'cutting' effects in film and 'close-ups' or moments of intense focus on familiar objects which would then be spliced into the narrative without any transitions or explanations."⁴³ The insight is exact, though the background to Léger's idea of simultanist art needs to be explained. Although his staunch independence of mind precluded his enrolling as a formal member of any group, Léger sometimes associated with the Orphists. A key member of that group was Robert Delaunay, who developed a theory of simultanism. Delaunay's version of simultanism is not identical to Léger's, but it has similarities to it and was no doubt an influence. Delaunay's simultanist ideas, like Orphist notions generally, were based on the nineteenth-century French chemist Michel Eugène Chevreul's colour theory and its *loi du contraste simultané des couleurs* "Law of the Simultaneous Contrast of Colours." Delaunay's own ideas on colour maintained that the effect of brilliant light and colour—and he took such colour as being key to modern art—was strengthened by a careful juxtaposing of colours, which he referred to as "simultaneous contrast." Léger's simultanism was a generalization of Delaunay's, for it concerns the sensory intensification that results from multiple contrasts, the simultaneous contrast between several features of work.

The biographer, John Tytell, goes on to note:

Léger's simulanist art had been confined to the canvas but his terms were evidently more appropriate to the cinema. He had met the filmmaker Abel Gance and wanted to make a film without a scenario or narrative structure to contain it which would use a prism in front of the camera to destroy perspective. Pound introduced Léger to Dudley Murphy, a cameraman who could work in this new manner. Léger supported the project with his own funds and called it *Ballet mécanique*.⁴⁴

Here a further comment on the genesis and evolution of Léger's conception of *Ballet mécanique* is in order: there is much merit in Tytell's comment, but some details need be supplemented. Léger's desire to discover new forms in visual art appropriate to postmodern experience had led, by 1922–23, to his theory of multiple contrasts, simultanism, and the object. Working with Gance reinforced his convictions about the object in postmodern art that had been intimated to him earlier. His work with Gance also led him to the notion that a unique feature of film, one that brings with it a new phenomenology of the object, is the close-up. He also had come to the realization that the effect of

the close-up, isolating the object from its surroundings, is reinforced by isolating the close-up formally, removing it from any narrative structure. These ideas predated Léger's meeting Pound. Pound, as we have seen, through his Vorticist desire overcome photography's mimetic proclivities and to make photography contemporary, had worked with Coburn, and, it seems, he had played a role in the development of the vortoscope—and now he and Murphy began work on a Vorticist film. Pound passed on this interest in creating a film by shooting with a vortoscope to Léger, who was interested in it for its capacity to expand the range of contrasts an artwork could incorporate. Léger apparently expanded on the repertoire of vortoscopic images that Pound and Léger had created.

The ideas on parataxis that Léger and Pound worked out (some of which were worked out separately, and some together), derived mostly from the cinema's proclivity for juxtaposition that eschews connecting devices, are evident in this passage. Animated zeros make up a large part of this section. Their animation dissociates their shape from meaning. These ciphers are no longer part of a meaningful numerical code, and the graphemes themselves are no longer lexemes in a syntactical relationship, but pure shapes that can be repositioned on the screen and dynamized in a species of choreography. The basic phrase ("on a volé...") appears occasionally, presented in full or divided into sections—the sections do not necessarily appear in order (the phrase "on a volé" appears, restoring the lexemic character of the grapheme, then a passage of animated zeros, which attenuates that character, is shown, followed by the appearance of the phrase "de 5 millions"). This fragmentation and recombination of components, this dissociation of forms from their usual meaning (and context), and the use of a stabilizing meter to reassociate these elements with a fixed significance (even if this significance has become formal rather referential) is analogous with the basic Cubist method—consider in this regard the Cubists' use of *points de capiton*.

Léger's idea of multiple contrasts is at the heart of this section (as it is with other sections). Léger's notion of multiple contrasts is close to Viking Eggeling's idea of *Kontrast-Analogie*—forms are juxtaposed as much because they share features as because they contrast with one another. This passage highlights constructions that employ the principle of *Kontrast-Analogie*, with the juxtaposition of a white graphical zero on a black background and dark circular horse collar on a white background. Both forms resemble parabolas (the later image, especially, resembles an eye—and a picture of an eye appears in this section, another example of unity-with-difference); however, the tonalities of the two images are reversed.⁴⁵ The zero's movement also contrasts with the eye's movement: the graphical zero moves gracefully, while the human eye moves abruptly (in circles). Once again, what unites these contrasting images is the rhythmic similarity of their movements.

In this passage, numerals, human heads, and text are all incorporated into the same metrical framework, which serves in this film a role similar to that which geometrical scaffolding plays in Cubist painting and in Léger's painterly compositions. The unifying power of rhythm (that principle that seems to have awed Antheil as it did Ezra Pound) and repetition (both literal repetition and repetition with variation) is highlighted in a passage that presents the angular head of a woman turning from a left profile to a right profile while she blinks her eyes. The letters "Z," "O," and "V" placed in a grid (the letters also switch into mirror inversions) resemble the angular and circular forms of a human head. Finally, we see the numeral 3, which contains both angular and curved shapes and resembles the shape of the woman's head (and like the woman's head, it rotates from right to left repeatedly).

Next the sequence offers a mask-like face turning from side to side. Judging from its similarity to a famous portrait by Man Ray, the face probably belongs to Barquette (1898–1973), a French cabaret performer famous for dressing in drag to perform as an aerialist.⁴⁶ So the alternation (turning from side to side) might suggest the duality of the character, the oscillation between male and female, and even the fusion of male and female (another version of the alchemical merging of Sol and Luna, the male and female principles).⁴⁷

Furthermore, if the face is Barquette's—and from here on, I shall assume that it is—the idea of a mask takes on even greater importance, for turning from one side to the other evokes the transition between illusion (Barquette as a female) and reality (Barquette would conclude his performances by removing his masquerade, to reveal his "real" nature).⁴⁸ Next we see a mask of Uncle Sam, apparently swinging into and out of the illusory depth. The image of Uncle Sam (likely taken at Luna Park, where other fairground attractions were shot), especially by way of comparison with the image of Barquette, is really an image of an image—a complex of illusion and reality (though, on reflection, we might come to realize that the image of Barquette's face likewise compounds illusion and reality). Picasso had earlier explored a similarly intricate amalgam of image (illusion) and reality in such works as *La chaise cannée* (Still Life with Chair Caning, 1912), in which what seems to be chair caning—indeed, it can be taken for the real object—is really only an imitation (on oilcloth). The angular, mask-like human head, with its stiff, machine-like turning motion, contrasts with the figure of Uncle Sam in several ways. First, ironically, its rigid mechanical motion conflicts with the more graceful (more lifelike) motion of Uncle Sam swinging back and forth—this is something of an anomaly, considering that the mask (of Uncle Sam) is artificial, while the mask-like face of the person is that of an actual person (or, more exactly, a gender masquerade adopted by an actual person who really cannot be seen). Second, there is a difference in levels of reality here: the mask is an image

(a filmic representation) of an image (a prop), while the face is simply an image; however, both present the same part of the body (another example of similarity-in-difference).

Mattes fragment the image (fragmentation is a basic Cubist method). The final sequence in this section shows the same woman's (actually Barbettes) face, which has become much more lively, though it is still confined behind rigid, cut-out circles and triangles, which move around, over the face, at a pace that conforms to the film's basic metrical motif.

This section, which started out with legible texts and numbers, led us, by its choreography, through various shapes and forms. We learned to bracket the forms and meanings behind these images and to understand that the link between them is rhythm and repetition (both literal repetition and repetition with variation). We connect the text and numbers from the beginning of the section with the human figures that appear at the end by using meter as the guide.

Shot Breakdown

- 246** 66 frames The numeral "0" in white against a black background appears in the centre of the frame; the camera moves back, making the "0" smaller and smaller.
- 247** 84 frames (A still image). Three lines of words, in white letters against a black background. First line: "ON A VOLÉ"; second line: "UN COLLIER DE PERLES"; third line: "DE 5 MILLIONS."
- 248** 44 frames
(Not found in the
MoMA print) (A still image). Likely a section extracted from one of Léger's paintings. The forms in the extracted section are difficult to describe, for they seem referential, but it is difficult to say exactly what they refer to: at the centre is a wheel-like shape with three horns or peaks. One, formed of two keys, occupies the upper-left corner, and leaf-forms appear at the left and right of the frame.
- 249** 38 frames
(Not found in the
MoMA print) (A still image). Same as shot 247.
- 250** 25 frames First there are two zeros, one at the left and one in the centre (in white against a black ground); then a third appears on the right; the left zero

then disappears; next the centre zero disappears; then the left and centre zeros reappear.

[The animation of these images, which are evidently stills, draws attention to the fact that this is a mechanical ballet, created by differences between very similar frames exceeding the *phi* threshold.]

- 251** 8 frames (A still image). A large zero fills most of the frame.
- 252** 15 frames (A still image). Three zeros in a row (one on the left side, one in the centre, and one on the right side of the frame).
- 253** 6 frames (A still image). A large zero (same as shot 251).
- 254** 33 frames Two zeros, in the centre and on the right side; the rightmost zero disappears; then right and left zeros appear; then the leftmost zero disappears, followed by the centre zero; then the two reappear.

[Here the dance of lateral leaps ends and a dance of two forms exchanging in place for one another begins.]

- 255** 8 frames (A still image). A large zero (same as shots 251 and 253).
- 256** 11 frames (A still image). Three zeros (same as shot 252).
- 257** 4 frames (A still image). A large zero.
- 258** 8 frames (A still image). Three zeros.
- 259** 11 frames (A still image). A large zero.
- 260** 3 frames (A still image). Three zeros.
- 261** 5 frames (A still image). A large zero.

[A jittery, uneven, somewhat awkward mechanical ballet, suggesting a serial presentation of forms from journalism or print advertising.]

- 262** 6 frames (A still image). Three zeros.

****Shots 207–209 in the MoMA print seem to have been broken into shots 250–262 in the Dutch print. Shots 207–209 in the MoMA print include a total of 133 frames; shots 250–262 in the Dutch print source have a total of 135 frames.

- 263** 18 frames (A still image). The words: “ON A VOLÉ.”
- 264** 95 frames A large zero recedes to the background (to the place of the centre zero in shots 258, 260, and 262); another zero appears to its left (in the place of the leftmost zero in those shots); then the rightmost appears and the leftmost zero disappears; then the centre zero disappears; then the leftmost and centre zeros reappear.
- 265** 1 frames (A still image). A large zero.
- 266** 36 frames Three zeros. First, the leftmost zero disappears, then the rightmost zero disappears; then the two reappear; then the leftmost zero disappears, then the centre zero disappears; then the leftmost and centre zeros reappear.
- [Here, too, the animation of these images, which are evidently stills, highlights the fact that this is a mechanical ballet, created by differences between very similar frames exceeding the *phi* threshold.]
- 267** 6 frames (A still image). A large zero.
- 268** 9 frames (A still image). Three zeros.
- [This alternation of three “0”s and one “0” creates a dynamic unity, in which the number of zeros constitutes the contrasting factor while the element itself, the zero, remains an identical form.]
- 269** 5 frames (A still image). A large zero.
- 270** 8 frames (A still image). Three zeros.
- [Sequence 264–270 is a variation on sequence 255–261; the variation is in temporal form, resulting from different frame counts. The theme and variation structure creates unity-with-difference.]
- 271** 11 frames (A still image). A large zero.
- 272** 5 frames (A still image). Three zeros.
- 273** 9 frames (A still image). A large zero.
- 274** 7 frames (A still image). Three zeros.

****Shots 211–212 in the MoMA print seem to have been split into shots 264–274 in the Dutch version (or to collect shots 264–274 in the Dutch print).

Shots 211–212 in the MoMA print contain a total of 219 frames; shots 264–274 in the Dutch print source have a total of 192 frames.

[In this sequence, as in sequence 255–261, the dimensions of the numerals change; the impression of forms advancing and receding is considerably attenuated, for we read them as numerals against a plane surface.]

- 275** 27 frames (A still image). The words: “DE 5 MILLIONS.”
- 276** 5 frames (A still image). A large zero.
- 277** 17 frames (A still image). Three zeros.
- 278** 8 frames (A still image). A large zero.
- 279** 36 frames Three zeros; the leftmost zero disappears, then the rightmost zero disappears; then the two reappear; then the action repeats.

[From shot 261 to 279, the meter is based on multiples of three. This is a departure from the film’s overall mechanical character (but not the only such departure), which is based on shot lengths that are multiples of two. Note, however, that the lengths of many of the shots are not multiples of three: the section also exhibits a remarkable degree of syncopation. Even more anomalously, the performers’ (the numerals’) movements are continuous (rather than intermittent or jerky) and apparently involve movement into and out of deep space (although, as I have noted, such movements are ambiguous, for they can also be construed, in a manner more in keeping with real facts of the matter, as shrinking and enlarging).]

- 280** 8 frames (A still image). A large zero.
- 281** 11 frames (A still image). Three zeros.
- 282** 5 frames (A still image). A large zero.
- 283** 7 frames (A still image). Three zeros.
- 284** 11 frames (A still image). A large zero.
- 285** 4 frames (A still image). Three zeros.
- 286** 7 frames (A still image). A large zero.
- 287** 6 frames (A still image). Three zeros.

****Shots 214–215 in the MoMA print seem to have been split into shots 276–87 of the Dutch print (or to have collected shots 276–87 of the Dutch

print). Shots 214–215 of the MoMA print have a total of 124 frames; shots 276–287 in the Dutch print source have a total of 125 frames.

[A variation of sequence 255–261 and 264–270.]

288 27 frames (A still image). The words: “ON A VOLÉ” (same as shot 262).

289 72 frames A large zero apparently recedes into the centre of the frame (actually it shrinks).

[Here we have continuous, actual movement rather than virtual movement. Including actual as well as virtual movement in this section highlights the differing phenomenological effects of diverse sorts of movement.]

290 26 frames (A still image). The words: “UN COLLIER DE PERLES.”

291 23 frames Two zeros—one on the left, one in the centre. A zero appears to the right of the pair, and the leftmost zero disappears; the centre zero disappears, then the two reappear.

292 7 frames (A still image). A large zero.

293 14 frames (A still image). Three zeros.

294 5 frames (A still image). A large zero.

295 41 frames Three zeros; first, the leftmost zero disappears; then the rightmost zero disappears; then the two reappear; then the action repeats (same as shot 279).

296 7 frames (A still image). A large zero.

297 10 frames (A still image). Three zeros.

298 4 frames (A still image). A large zero.

299 7 frames (A still image). Three zeros.

300 9 frames (A still image). A large zero.

301 4 frames (A still image). Three zeros.

302 7 frames (A still image). A large zero.

303 6 frames (A still image). Three zeros.

***Shot 219 in the MoMA prints seems to have been split into shots 289–303 in the Dutch print (or to collect shots 289–303 of the Dutch print). Shot 219 in has 141 frames; shots 289–303 in the Dutch print source have a total of 144 frames.

[A variation of sequence 255–261, 264–270, and 280–287.]

304 29 frames (A still image). The words “DE 5 MILLIONS” (same as shot 274).

305 64 frames An eye and an eyebrow appear within a white rectangle cut-out (carved into a matte that fills the rest of the frame): the opening splits the frame in half vertically—on the right, just below the top of the frame, we see an eye: it closes, opens, looks up, looks down and to the right, and then closes.

[This sort of matte effect is a variant of the vortographic effect that has been so important in the film—recall Léger’s reference to Pound’s contribution to the “multiple transformation of the projected image.” The parallels between matte effects and vortographic effects will become more evident with the juxtaposition of shots 371 and 372. But the similarities between this matte image (and others like it) and the film’s vortographic images make this image another example of similarity-with-difference.]

306 77 frames (Not found in the MoMA print) A large zero apparently recedes into the centre of the frame (actually it shrinks); then a zero appears to the left of it.

[This shot combines continuous motion (the zero receding) and virtual motion (the appearance of the zero to the left of a central zero.)

307 184 frames A horse collar against a white background; the screen flickers; the flickering stops and the horse collar begins to bounce.

308 35 frames The horse collar bounces horizontally from the left side.

309 4 frames (A still image). The words: “UN COLLIER.”

310 5 frames (A still image). A horse collar.

311 4 frames (A still image). The horse collar, with pointed end to the left.

312 4 frames (A still image). The horse collar, with pointed end down.

313 4 frames (A still image). The horse collar horizontal, with pointed end to the right.

[A mechanical ballet is created by the effect of that relative of the *phi*-phenomenon that provides *Ballet mécanique* with its basic method (the impression of movement that occurs when successive frames present an object at a different location on the screen or when the area that principally attracts the eye changes from one frame to the next). Furthermore, the horse collar resembles machine parts we have seen elsewhere. A formal trope of the film, and one of its themes, concerns the similarities between machine and organic forms. The sequence also evokes a semantic dance between different meanings/referents. The usual French term for horse collar is “col de cheval,” though “collier de cheval” is also correct. So the phrase “UN COLLIER” (309) could also refer to the object seen in shot 310. Accordingly, the relation between shot 309 and shot 310 could be construed as a simple token–referent relation. However, memory informs us that this *collier* is a *collier de perles* valued at 5,000,000 (old) francs—and that memory adds complexity to the relation, by creating an ambiguity in the reference.]

314 4 frames (A still image). The horse collar, with the pointed end up. Vertical.

[The horse collar resembles a triangle adjoined to its mirror image.]

315 4 frames (A still image). The horse collar, with the pointed end facing top left corner.

316 4 frames (A still image). The horse collar, with the pointed end facing the top-right corner.

317 4 frames (A still image). The horse collar, with the pointed end down.

318 4 frames (A still image). The horse collar, with pointed end to the left.

319 4 frames (A still image). The horse collar, now vertical.

320 2 frames A dark image: a wooden panel with six circular knobs or buttons, and a small white form at the centre bottom of the frame.

321 52 frames The horse collar rotates clockwise.

- 322** 3 frames The words: “UN COLLIER” (same as shot 309).
- 323** 3 frames (A still image). The horse collar, pointed end down.
- ****Shots 221–231 in the MoMA print correspond to shots 307–323 in the Dutch print. Shots 221–231 in the MoMA print include a total of 310 frames; shots 307–323 in the Dutch print have a total of 324 frames.
- 324** 31 frames (A still image). The words: “DE 5 MILLIONS” (same as shot 274).
- **Shot 232 in the MoMA print presents “DE 5 MILLIONS” reversed.
- 325** 9 frames (A still image). Pure black field.
- 326** 24 frames (A still image). The words: “UN COLLIER DE PERLES” (same as shot 289).
- ****Shot 233 in the MoMA print presents “UN COLLIER DE PERLES” in reverse.
- 327** 10 frames (A still image). The numeral “5” fills the frame.
- **Shot 234 in the MoMA print presents the figure 5 in reverse.
- 328** 39 frames A zero in the centre of the frame moves closer, becoming larger and larger until the left side of the figure protrudes beyond the left side of the frame.
- 329** 6 frames (A still image). The horse collar, pointed end down.
- 330** 19 frames (A still image). The words: “ON A VOLÉ” (same as shots 263 and 288).
- 331** 3 frames (A still image). The numeral “3” appears at the centre of the frame.
- 332** 4 frames (A still image). A larger numeral “3” appears at the centre of the frame.
- 333** 5 frames (A still image). A still larger numeral “3” fills most of the frame.
- 334** 4 frames (A still image). A yet larger numeral “3,” with parts of figure protruding beyond the edge of the frame.

[In part, this sequence provides a demonstration of the balletic movement possibilities of the cinema. It also compares and contrasts leaps (virtual motion) and actual, continuous motion (including their different phenomenological effects and their abilities to elicit different sorts of belief). Incorporating both virtual and actual, continuous movements into this mechanical ballet provides for another sort of variety-in-unity and unity-in-variety.]

- 335** 18 frames (A still image). The words: “ON A VOLÉ” (the same as shots 263, 288, and 330).
- 336** 4 frames (A still image). The same as shot 334.
- 337** 17 frames (A still image). The words: “DE 5 MILLIONS” (same as shots 275 and 324).

[Another unity-with-differences involves the pairing of “3” and “5” in this passage.]

- 338** 29 frames (A still image). The same as shot 327.
- 339** 16 frames (A still image). The words: “DE 5 MILLIONS” (same as shot 275, 324, and 337).
- 340** 6 frames (A still image). Same as shot 334.
- 341** 4 frames (A still image). Same as shot 333.
- 342** 6 frames (A still image). Same as shot 332.
- 343** 5 frames (A still image). Same as shot 331.
- 344** 7 frames (A still image). A smaller numeral “3.”
- 345** 58 frames A large “0” rotates counterclockwise.

[The large “0” resembles a circle, but its orientation matters; thus, its relation to the circles that appear in the film is a relation of similarity-in-difference, or difference-in-similarity.]

- 346** 5 frames (A still image). Three zeros.
- 347** 7 frames (A still image). A large zero.
- 348** 4 frames (A still image). The words: “UN COLLIER” (same as shots 309 and 322).
- 349** 6 frames (A still image). A large zero.
- 350** 5 frames (A still image). A large numeral “5” (same as shots 327 and 338).

351 6 frames (A still image). Three zeros.

352 6 frames (A still image). A large numeral “5.”

353 8 frames (A still image). A large zero.

[This use of “5”s and “0”s is tantamount to a faceting of the numeral 5000000 and dynamizing the resulting graphic forms, treating them as performers in a mechanical ballet.]

354 5 frames (A still image). A large numeral “5.”

355 4 frames (A still image). A large zero.

356 4 frames (A still image). A large numeral “5.”

357 5 frames (A still image). Three zeros.

358 4 frames (A still image). A large numeral “5.”

359 6 frames (A still image). A large zero.

360 4 frames (A still image). A large numeral “5.”

361 5 frames (A still image). Three zeros.

362 4 frames (A still image). A large numeral “5.”

363 4 frames (A still image). A large zero.

364 4 frames (A still image). The words: “DE 5 MILLIONS” (the same as shots 275, 324, 337, and 339).

365 4 frames (A still image). The horse collar, with its longer axis vertical.

[The forms of the horse collar, the “O” in COLLIER, and the numeral “0” all rhyme; earlier, the horse collar was rhymed with the adjoined triangles, so its form derives at once from the circle and the triangle. The point of this could well be to demonstrate the phenomenological insight that context (introduced by memory and intuition) influences perception, a key topic of Cubist painting.]

366 19 frames (A still image). The same as shot 364.

367 4 frames (A still image). The words: “UN COLLIER” (same as shots 309, 322, and 375).

368 2 frames (A still image). The horse collar vertical, pointed end to the left.

***Shots 237–238 in the MoMA print correspond to shots 329–368 in the Dutch print. Shots 237 and 238 in the MoMA print have a total of 102 frames; shots 329 to 368 in the Dutch print source have a total of 336 frames.

369 28 frames (A still image). Three horizontal columns: the column on the right contains a reversed “Z”; the centre column contains an “O”; the left column contains a “V.”

370 22 frames (A still image). Same as previous, but reversed (the left column contains a “Z,” and the middle column contains an “O,” while the right column contains a “V”).

[Shots 369 and 370 are mirror images of one another; this mirroring relates to the clockwork motion that provides the film with its underlying architecture, for it constitutes a transition between contrasting forms. The two shots have a unity-in-difference relation to each other.]

371 138 frames A woman’s (or androgynous, or cross-dresser’s, or *res bis*’s) profile, facing left, eyes closed; she turns towards the right until she appears in profile facing right.

372 30 frames A sort of large puppet that resembles an “Uncle Sam” (the figure could be from an amusement park). The camera moves in until it is quite close to the face, then moves away.

[The to-and-fro movement of the camera is a variant of the pendulum movement that provides the film with its governing meter. Shot 371 presents an image of woman’s face, shot 372 (and shot 374) present an image of a man’s face. Between the two there is a contrast in the order of representation and in scale.]

[Man Ray’s *Emak Bakia* contains strikingly similar shots of the face of person of similarly ambiguous sexual orientation.]

373 40 frames (A still image). A portion of an illustration or painting having four leaflike forms as its main focus.
(Not found in the MoMA print)

[Yet another contrast in the order of representation. Like the image of Uncle Sam swinging back and forth, this is an image of an image, but it is obviously a form that belongs to the same order of existence that a stylized image on a two-dimensional surface (like shots 372 and 374) has, not that of a form in the round representing a real being.]

- 374** 83 frames The “Uncle Sam” figure swings back and forth, towards and away from the camera; as the figure moves out, a white form appears on the right.
(Not found in the MoMA print)

[As I noted in the general remarks that preface this section, the shots with Uncle Sam raise the issue of the relation between image and actuality (or between an image of an image and an image of a real object/real event. But the juxtaposition of continuous movement and virtual movement raises similar issues. This explains why the Barquette, Uncle Sam, and typographic sequences belong in the same section of the film: all of them relate to one another in a sort of conceptual similarity-with-difference relation.]

***Shots 245 to 247 in the MoMA print appear to collect shots 372 and 374 of the Dutch print—shots 245 to 247 in the MoMA print contain a total frame count of 101 frames; shots 372 and 374 of the Dutch print contain a total of 113 frames.

[I have noted that Antheil was involved in several projects that made use of mannequins, puppets, and masks. This relates to his interest in a super-personal machine art (a great theme in early postmodern art).]

- 375** 43 frames (A still image). From a Léger painting.
(Not found in the MoMA print)

- 376** 81 frames A white circle at the centre of a black frame expands to fill the right side of the frame.

[The ground of the images in this section is mostly white (or light); interpolating frames that are pure black fields or have dark grounds create a flicker or a hard beat, reminding us of the basic mechanism that makes this mechanical ballet possible in the first place—any part of the mechanical ballet whatsoever, but especially the sequences that make pronounced use of virtual motion.]

- 377** 52 frames Three “shots” combined in one frame. This image seems to combine effects achieved through matting with effects achieved using a vortoscope. In this image, the abstractive effect of the vortography is slighter, and the result strikes one more as a composite of depictive elements. The centre shot is the largest and occupies most of the frame: it is of an androgyne’s/cross-dresser’s/*res bis*’s face with a hand in front of it—the hand passes over the face and the woman smiles, the hand passes in front of the face again and this time the androgyne’s/

cross-dresser's/*res bis*'s face takes on a more serious mien, with her lips compressed; she closes her eyes as she moves her head down slightly.

[This is an example of similarity-in-difference: the contrast is between different expressions on the woman's/androgyné's/*res bis*'s face.]

378 91 frames

An image similar to the previous, though in this case the composite is produced using mattes rather than a vortoscope: the woman now has a serious mien—she closes her eyes as a dark panel (a matte) moves across her face from the left, covering half the face and leaving one eye visible—the eye opens wide and turns to the left as the panel (the matte) covers the rest of the face. On the left side, a round opening (carved into a matte board) reveals the left eye, which is opened wide; the opening moves across the rest of the face, revealing two wide-open eyes and the bridge of a nose; as the window moves to the right edge of the face, it slides down to reveal most of the face. The eyes close, and the window slides up, leaving most of the woman's/androgyné's/*res bis*'s face covered by the matte; in the opening, we see a smiling mouth—the window moves farther up and reveals the nose, then the eyes (wide open), and the entire face. The matte slides across the face and covers the right eye, then moves slightly to the left.

[Shots 377 and 378 use different devices to create frames with multiple images. This produces another instance of similarity-with-difference.]

[The realistic images in this shot were gathered by shooting through a matte-board in which a number of circles or triangles had been cut—the abstract geometry of the matte-forms combines with the realistic images that appear in the openings in different ways: sometimes the abstract geometry attains greater valence, and sometimes the images seen through the openings make the stronger impression. However, generally, the abstract geometry of the circular and square windows creates a strong impression, which veers towards that of an abstract composition. In sum, the composition comprises both abstract and representational elements—it reconciles diversity.]

***Shots 250–253 in the MoMA print appear to collect shots 377 and 378 of the Dutch print. Shots 250–253 in the MoMA print contain a total of 152 frames, while shots 377 and 378 in the Dutch print contain a total frame count of 143 frames.

SECTION VI: CHOREOGRAPHY OF KITCHEN UTENSILS (379–479)

General Remarks

This section intercuts shots of ordinary kitchen utensils in a fascinating choreography. The entire passage is a remarkable example of *la poésie du quotidien*. Again, Léger uses rhythm and repetition (both literal repetition and repetition with variation) to unite images of a wide assortment of elements. The pots and pans, funnels, and lids oscillate, flicker, pan across the frame, turn in circular motions, swing back and forth, all in keeping with the basic rhythmic structure of the film (the same rhythm that had governed the movements of the circular and triangular cut-outs from the previous section). To contrast with this purely mechanical (and purely cinematic) ballet, the filmmakers also introduce a choreography of human body parts—though not one that could be presented on any stage: a single eye looks left, then up, then right, and then closes, mimicking the circular motions of the pots and pans. The juxtaposition reminds us that the cinema treats all objects similarly (it is an utterly promiscuous medium) and can create new choreographies. It also highlights the role of scale, an issue that relates to the use of the close-up, a device Léger identified as being uniquely cinematic.

The compositions in this section resemble those in Léger's *Contrastes des Formes* series.

Shot Breakdown

379 2 frames (A static image). A triangle the size of the frame.

380 4 frames (A static image). A circle fills the frame.

[Another triangle/circle sequence begins, incorporating white graphic forms set against a black background. This sequence provides another example of unity-in-difference: the triangle and circle are similar in being graphic forms of approximately the same area, while the difference between the former's rectilinearity and the latter's curvilinearity provides the contrasting element. These sequences highlight that film is a mechanical apparatus, made up individual frames, which the apparatus choreographs. This sequence is more markedly syncopated than the previous several.]

- 381** 4 frames (A still image). A triangle.
- 382** 4 frames (A still image). A circle.
- 383** 3 frames (A still image). A triangle.
- 384** 3 frames (A still image). A circle.
- 385** 4 frames (A still image). A triangle.
- 386** 4 frames (A still image). A circle.
- 387** 4 frames (A still image). A triangle.
- 388** 4 frames (A still image). A circle.
- 389** 4 frames (A still image). A triangle.
- 390** 4 frames (A still image). A circle.
- 391** 4 frame (A still image). A triangle.
- 392** 4 frames (A still image). A slightly smaller circle.
- 393** 4 frames (A still image). A slightly smaller triangle.
- 394** 4 frames (A still image). A smaller circle.
- 395** 4 frames (A still image). A smaller triangle.
- 396** 3 frames (A still image). A smaller circle.
- 397** 42 frames (A still image). An illustration or painting; a shell-like image is the main focus.
(Not found in the MoMA print)

[The shell-like form alludes to the shape described by a weight swinging at the end of a string.]

- 398** 1 frame (A still image). A triangle, slightly smaller still.
- 399** 4 frames (A still image). A circle, slightly smaller still.
- 400** 4 frames (A still image). A triangle, slightly smaller still.
- 401** 4 frames (A still image). A circle, slightly smaller still.
- 402** 4 frames (A still image). A triangle, slightly smaller still.
- 403** 4 frames (A still image). A circle, slightly smaller still.
- 404** 4 frames (A still image). A triangle, slightly smaller still.

- 405** 4 frames (A still image). A circle, slightly smaller still.
- 406** 4 frames (A still image). A triangle, slightly smaller still.
- 407** 4 frames (A still image). A circle, slightly smaller still.
- 408** 4 frames (A still image). A triangle, slightly smaller still.
- 409** 4 frames (A still image). A circle, slightly smaller still.
- 410** 4 frames (A still image). A triangle, slightly smaller still.
- 411** 4 frames (A still image). A circle, slightly smaller still.

****Shots 254–257 in the MoMA print appear to have combined shots 379–396 and 398–411 from the Dutch print. Shots 254–257 in the MoMA print have a total of 139 frames; shots 379–396 and 398–411 in the Dutch print contain a total of 120 frames.

[A graduated contrast in scale creates the impression of movement in depth. As was noted earlier, the alternation of these similar-but-contrasting forms relates these shots to the film's clockwork motif. This passage also draws attention to the role that meter and literal repetition play in drawing diverse imagery into a whole.]

- 412** 113 frames (MoMA) A high-angle shot of a circular object made of five layers, each having scalloped edges. The bottom circle is the largest and each higher layer is smaller than the one beneath it (the object appears to be stack of metal cake pans, the smaller inserted into the larger). The object swings back and forth towards the camera.
138 frames (Dutch)

[This swinging back and forth is a variant of the pendulum motif. These are pots and funnels, so what we see is a ballet of household objects.]

- 413** 22 frames (A still image). Five circular shapes aligned diagonally in the frame, one behind the other and each larger than the one in front of it; each has a bar/stripe extending from the centre to the upper right corner of the frame (at a 45-degree angle); to the left of the circular forms are several peaked forms that grow smaller towards the end.
- 414** 17 frames (A still image). A pure black field.

[The alternation of images and black frames intensifies the effect of that relative of the *phi*-phenomenon that constitutes the basic method of *Ballet mécanique*.]

[Note the use of literal repetition in the following sequence, a good example of the filmmakers' applying Antheil's ideas of time-space to the construction of the visual sequences in the film; this is evidence of their interest in creating audiovisual parallelism.]

- | | | |
|-----|-----------|---|
| 415 | 17 frames | (A still image). Same as shot 413. |
| 416 | 17 frames | (A still image). A pure black field. |
| 417 | 17 frames | (A still image). Same as shots 413 and 415. |
| 418 | 17 frames | (A still image). A pure black field. |
| 419 | 8 frames | (A still image). Same as shots 413, 415, and 417. |
| 420 | 8 frames | (A still image). A pure black field. |
| 421 | 8 frames | (A still image). Same as shots 413, 415, 417, and 419. |
| 422 | 8 frames | (A still image). A pure black field. |
| 423 | 8 frames | (A still image). Same as shots 413, 415, 417, 419, and 421. |
| 424 | 7 frames | (A still image). A pure black field. |
| 425 | 9 frames | (A still image). Same as shots 413, 415, 417, 419, 421, and 423. |
| 426 | 9 frames | (A still image). A pure black field. |
| 427 | 5 frames | (A still image). Same as shot 413, 415, 417, 419, 421, 423, and 425. |
| 428 | 5 frames | (A still image). A pure black field. |
| 429 | 6 frames | (A still image). Same as shots 413, 415, 417, 419, 421, 423, 425, and 427. |
| 430 | 5 frames | (A still image). A pure black field. |
| 431 | 6 frames | (A still image). Same as shots 413, 415, 417, 419, 421, 423, 425, 427, and 429. |
| 432 | 5 frames | (A still image). A pure black field. |

- 433** 6 frames (A still image). Same as shots 413, 415, 417, 419, 421, 423, 425, 427, 429, and 431.
- 434** 5 frames (A still image). A pure black field.
- 435** 3 frames (A still image). Same as shots 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, and 433.

[This section is a flicker section, alternating a black leader and a quasi-abstract image of domestic materials. The flicker dynamizes the object—the metrical construction makes evident that this is a mechanical choreography of household utensils. The flicker effect alludes to the *phi*-phenomenon, which is the basis for all cinematic dynamism; highlighting the *phi*-phenomenon (or, more precisely, the relative of that phenomenon on which the film relies) draws our attention to the material basis for the cinematic dance—of course, machine art generally leaned towards materialism, and Cubism emphasized the material nature of an artistic construction (so much more than Futurism did).]

****Shots 260–262 from the MoMA print collect the material from shots 413–435 from the Dutch print; shots 260–262 of the MoMA print have a total of 124 frames; shots 413–435 from the Dutch print have a total of 217 frames.

[The tempo in this section is slightly slower than usual (more commonly, the filmmakers use three or four frame alternations). However, the intensity of the flicker somewhat attenuates the effect of this change in tempo.]

- 436** 4 frames (A still image). Two diagonal rows of circular forms, extending from the top left to the bottom right; one row is made up of larger forms and is positioned more centrally in the frame; the smaller row consists of forms each with a small black hole in the centre—this row is to the right of the larger row and ends just above the lower right corner of the frame.
- 437** 5 frames (A still image). A left-for-right transformation of same as shot 436.

[This shot contrasts with the previous since it is organized along opposite diagonals; because the shots are mirror images of one another, they unite the contrasting pair in a dynamic unity.]

- 438** 5 frames (A still image). Same as shot 436.
- 439** 5 frames (A still image). Same as shot 437.

[This sequence consists of an alternating series. The series consists of shots that are mirror images of one another—an example of contrasting elements that nonetheless have a similar architectonic.]

[The tempo continues to be based on an interval of five frames between pulses.]

440 5 frames (A still image). Same as shot 436 and 438.

441 5 frames (A still image). Same as shots 437 and 439.

[Note the use of literal repetition in the following sequence.]

442 5 frames (A still image). Same as shots 436, 438, and 440.

443 5 frames (A still image). Same as shots 437, 439, and 441.

444 4 frames (A still image). Same as shots 436, 438, 440, and 442.

445 4 frames (A still image). Same as shots 437, 439, 441, and 443.

446 5 frames (A still image). Same as shots 436, 438, 440, 442, and 444.

447 5 frames (A still image). Same as shots 437, 439, 441, 443, and 445.

448 5 frames (A still image). The image is reversed once more, this time top to bottom.

[Another reversal, another contrast-among-similar.]

449 5 frames (A still image). Same as shots 436, 438, 440, 442, 444, and 446.

450 3 frames (A still image). Same as shots 437, 439, 441, 443, 445, and 447.

***Shots 263–266 in the MoMA print correspond to shots 436–450 in the Dutch print. Shots 263–266 in the MoMA print contain a total of 55 frames; shots 436–450 in the Dutch print contain a total of 71 frames.

451 106 frames (MoMA) A vertical rod—at various heights other shafts protrude horizontally; each of the horizontal rods is connected to a metal plate. The object turns first in one direction, then in the other, moving rapidly enough to abstract it—the form seems to
180 frames (Dutch)

be made up of lines, then circles, then lines again (as a round object, turning on its axis, might).

452 44 frames

An eye within a rectangular opening cut into a matte; the eye looks to the left, closes, opens, and looks up.

453 42 frames
(Not in MoMA source)

(A still image). Likely a section extracted from a Léger painting—basically a geometric graphic without representational, or even exemplificatory, import.

454 14 frames

An eye within a rectangle: the eye looks to the right, then closes.

****Shot 270 from the MoMA appears to combine (or to have been split into) shots 452 and 454 from the Dutch print. Shot 270 in the MoMA print has 54 frames, while shots 452 and 454 in the Dutch print have a total of 58 frames.

455 9 frames

(A still image). Three metal cooking pots aligned diagonally (the pot handles are directed towards the top left corner); the largest is at the top right corner, the smallest at the bottom left corner; the camera moves in on the pots with a circular motion (the camera describes an arc).

456 6 frames

(A still image). The pots are shot from the reverse angle (so we have a mirror image, with a left-for-right reversal; the pot handles are directed towards the bottom left corner); the image also includes baking pans and a ladle.

[Once again, a variant of a mirror-form (which itself is a relative of the pendulum motif) creates similarity-in-difference.]

457 11 frames

(A still image). Again, a reflection (in the sense this term is used in affine geometry) of the previous image, this time so that pot handles directed towards the top of the frame; a ladle can also be seen.

[Again, a mirror variant, a relative of the pendulum motif, creates similarity-in-difference.]

458 5 frames

(A still image). There are pots in the top part of frame; three funnels aligned diagonally at the

centre; two circular baking pans with scalloped edges occupy the bottom (and larger) part of the frame.

[This image is a relative of the both the graphic circle and the graphic triangle.]

459 10 frames (A still image). The previous image turned upside down (another reflection of the previous image, in the sense in which that term is used in affine geometry).

[A different mirror-form variant, yet another relative of the pendulum motif, that creates similarity-in-difference.]

460 4 frames (A still image). The pots are right side up again (a reflection of a reflection).

461 1 frame (A still image). Yet another reflection: now the pot handles are directed towards the top right corner.

[The following images are relatives of both the graphic circle and the graphic triangle.]

462 8 frames (A still image). Yet another reflection: the pot handles are directed towards the bottom right corner.

463 12 frames (A still image). Another reflection: the pot handles are directed towards the top right corner.

464 6 frames (A still image). Another reflection: the pot handles are directed towards the bottom right corner.

[The various images are affine reflections of one another—the object matter of these shots is similar, but their orientations differ. Once again, therefore, we have a contrast-with-similarity. These alternating directions evoke the pendulum movement that structures the film's governing matrix.]

465 7 frames Several pots in a row; the camera moves along the row, causing the frame to move to the left; the pots are arranged in a diagonal that stretches from the top right corner to the bottom left corner.

[The forms in this image are relatives of both the graphic circle and the graphic triangle; the image's movement is continuous, in contrast to the static images that have dominated the sequence to this point.]

466 9 frames A mirror image (or affine reflection) of the previous shot: the camera moves across a row of pots, sliding along a diagonal from the bottom right corner to the top left of the frame.

[Here, too, the alternating direction of the movement evokes the pendulum movement that structured the film's engendering matrix.]

467 5 frames (A still image). A row of pots, arranged along a diagonal stretching from the top right to bottom left.

468 9 frames Similar to shot 466, but the frame/the camera slides down the row of pots (rather than moving up it).

[This change in the camera's motion creates a back-and-forth relation between the previous shot and this one.]

469 9 frames A row of pots arranged along a diagonal from top right to bottom left; the frame/the camera slides down the row (cf. made sliding down the ramp in shot 157).

[These images are relatives of both the graphic circle and the graphic triangle.]

470 10 frames A mirror image (or affine reflection) of the previous: a row of pots arranged along a diagonal from top left to bottom right—the frame/the camera moves down the row.

[A variant mirror-form, which adds a new element to the developing mirror series.]

471 11 frames Similar to shot 469, but the frame/the camera moves up.

[The relation between shots 469 and 471 is also a back-and-forth relation.]

472 10 frames A row of pots arranged along a diagonal from the top left to the bottom right; the frame/the camera moves up the row.

473 4 frames A row of pots arranged along a diagonal from top right to bottom left; the frame/the camera moves up the row.

[More affine transformations (reflections), used to create unity-in-difference. The opposing dynamic forms evoke the back-and-forth movement that gave rise to the film's basic architecture.]

- 474 10 frames A still image of three pots (appears to be the end of the row) in the upper part of the frame.
- 475 10 frames A row of pots forms an arc from the top right to the bottom left of the frame. The frame/the camera moves down the row.
- 476 10 frames A row of pots forms an arc from the bottom right to the top left of the frame. The frame/the camera moves up the row.

[In this sequence, too, affine transformations (reflections) are used to create unity-in-difference—they create a variant of the pendulum motif.]

- 477 10 frames A row of pots forms an arc from the top right to the bottom left of the frame. The frame/the camera moves down the row.
- 478 10 frames A row of pots forms an arc from the bottom right to the top left of the frame. The camera is still.

[The object matter of shots 477 and 478 are similar, but the geometric organization of the two shots, taken together, is designed to produce contrast; once again, therefore, we have a contrast-with-similarity. These affine transformations (reflections) create a variant of the pendulum motif.]

- 479 8 frames A row of pots forms an arc from top left to bottom right; camera moves down the row.

***Shots 271–274 from the MoMA appear to be divided into shots 455–478 from the Dutch print. Shots 271–274 in the MoMA print have a total of 196 frames, the same number of frames as in shots 455–478 in the Dutch print.

SECTION VII: RHYTHMS OF ORDINARY OBJECTS (480–713)

General Remarks

This section extends the *poésie du quotidien*. The objects used in this section—mannequin legs, which, at one time, were commonly displayed in women's clothing stores (generally to show off silk stockings and garters); a hat and a shoe, which are ordinary daily wear; and an alarm clock, which is a standard item in home furnishings—reinforce the point that Léger had a lively interest

in the objects of the everyday world. (I have noted previously that urbanization and the acceleration in the pace of life made clock time an exigent reality for postmoderns.) I pointed out in the main body of the text (and, more briefly below, in commenting on shot 484) that Dudley Murphy took the credit for the idea of using the mannequin legs. When we are assessing that claim, we should keep in mind that in his article in 1923 in *Querschnitt* 3, nos. 3–4 (several months before the first screening of *Ballet mécanique*), Léger celebrated the *étalagiste* (window dresser) as a worthy craftsperson whose work often exceeds in artistic value that of the most expensive canvases (see *Fonctions de la peinture*, 87–102, esp. 98–99). From 1919, shortly after returning from the front, Léger produced paintings like *Les hommes dans la ville* (Men in the City, 1919) that treat figures in ways that make them resemble mannequins. He was, at this time, much taken with the idea of *l'homme machine*.

In 1944, Léger was invited by Hans Richter to participate along with a number of Surrealist artists in a compendium film that would be released under the title *Dreams That Money Can Buy*. In August of that year he responded to the invitation by outlining his idea for his segment: “My notion is to do something with the kind of mannequins of brides there are on Grand St. [New York], and some other things from the Jewish quarter on Avenue B”—note the centrality of the object to his conception of the film.⁴⁹ He suggested as well that the film would be on an “American Folklore” theme. The film would make use of props that Léger would cull from shops in Lower Manhattan, and would be released in 1947 as a part of Richter’s anthology film with the title *The Girl with the Prefabricated Heart*. The film recounts with considerable humour a fantasy love affair between a female mannequin with luridly coloured lips (there are suggestions she may be a prostitute) and a male mannequin who seems to be an international playboy. Like the storyline itself, the song that accompanies the film, composed by scandal-prone lyricist John Latouche (1914–1956) and performed by the famously profligate Libby Holman (1873–1966) and singer, guitarist, and civil-rights activist Josh White (1914–1969), set to music by the Toronto composer and arts administrator Louis Applebaum (1918–2000), offers a much less rosy view of the object than Léger expounded in his theoretical writings: “*Oh Venus was born out of sea foam / Oh Venus was born out of brine / But a goddess today if she is grade A / Is assembled upon the assembly line // Her chromium nerves and her platinum brain / Were chastely encased in cellophane / And to top off this daughter of science and art / She was equipped with a prefabricated heart.*”

The editing makes it seem that the mannequin’s legs, which have a small round clock between them, open and close. This creates a mechanical ballet of a different sort than the film has presented to this point; furthermore, the (seeming) opening and closing of the mannequin’s legs articulates another

of the film's many sexual allusions. But there is more to the passage with mannequin legs than that. Its formal meaning derives from its relation to a subsequent sequence, which alternates a hat and a shoe: the half-circle shape of the open legs around the circular clock resembles that of a round hat, while the shape formed by the opening between closed legs resembles the shoe's more elliptical form. The sequences alternating (still) images of open and closed legs, and those with rapidly alternating (still) images of the hat and the shoe, resemble other movements that appear in the film—for example, of blinking eyes and turning heads, two of the film's principal leitmotifs. The mechanical “blinking” produced by alternating these still images is in some respects similar to the actual opening and closing of the eyes and in other respects different—the latter action is done more slowly and is clearly a biological rather than a mechanical movement. So this flicker effect, in relation to the image of the eyes opening and closing, offers an instance of *Kontrast-Analogie*.

We see the woman's (actually Barquette's) face again—the image itself is static, and so impassive as to be almost mask-like. The filmmakers intercut short shots of the face taken from two different positions, which are intercut to create an artificial and virtual (that is, cinematic) movement of the head that imitates nodding viewed from a peculiar low angle. The cinema, not the actor, is responsible for the movement: its mechanisms are responsible for the onscreen (seemingly human) movement (the dance)—so this is truly a *ballet mécanique*. The cinema also makes inanimate wine bottles glide and dance around the screen—if anything with greater fluidity than characterizes the movement of the head.

The animated figure of “Charlot cubiste” reappears after the dance of the wine bottles—his reappearance refers back to the film's beginning, giving the film a circular form. The woman we saw at the beginning of the film (Katherine Murphy), swinging on the garden swing, reappears at the very end (reinforcing the film's circular form). This time, she is standing in front of a bush: she picks a bloom, lifts it to her nose to smell it, turns her head away, then lifts the bloom to her face once again.

Shot Breakdown

- | | |
|---|---|
| 480 69 frames | A white circle in the centre of a black frame becomes larger until it fills the right half of the frame. |
| 481 83 frames (MoMA)
131 frames (Dutch) | (A still image). It seems to be a display in a store window, with boxed products piled up on one another in a spiral staircase formation. |

482 151 frames A large white circle that initially fills the left half of the frame shrinks (recedes) into the centre of the frame, then expands (advances) again to fill the left half of the frame.

[As with shot 43, Léger puts a visual form through changes we can respond to in two different ways, either as a two-dimensional form that contracts, or as a form receding or proceeding into a three-dimensional space. The next shot is similar, though the change is in the opposite direction.]

483 142 frames A large white circle shrinks/recedes from the right of the screen into the centre, and expands/advances towards the right half of the frame.

****Shot 278 in the MoMA print appears to correspond to shots 482 and 483 of the Dutch print. Shot 278 of the MoMA print has 186 frames, while shots 482 and 483 from the Dutch print have a total of 293 frames.

[Here ambiguity about the nature of the motion (expansion/contraction or receding/proceeding) is joined with a new variant of a mirror-form.]

484 34 frames (A still image). The legs of a mannequin set against a black background; the legs are side-by-side; both have their feet directed towards the left and their knees slightly bent.

[Dudley Murphy takes credit for introducing the mannequin legs into the project: "I was intrigued to do something with the artificial legs that exhibit silk stockings and decided to do a stop motion dance with those legs around a clock. In bringing the legs to the studio, I drove through Paris in an open cab, with a leg over each shoulder, screaming. Even the Frenchmen were startled by this."⁵⁰

Some have detected in this passage a sense of play consistent with the spirit of Murphy's account, but utterly opposed to Léger's calculated schematics. Against this, one could note that the construction is a mathematically complex structure, involving the repetition of elements that are one unit in length (with a unit being, at the beginning of this section, 5 frames, then 3 frames, and finally 2 frames), the repetition of elements that are two units in length, and the repetition of elements that are three units in length. The resulting dance highlights the rhythmic regularity of the structure.]

[I have noted that Antheil was involved in several projects that made use of mannequins, puppets, and masks, and he might have encouraged Murphy in this direction. Antheil's use of mannequins and puppets relates to his

interest in a super-personal machine art (a great theme in early postmodern [or electrologic] art).]

[This shot belongs to a different representational category than do most shots in the film, for its object matter is a three-dimensional display, an image of the collective imaginary's idea of appealing legs. The back-and-forth movement of the mannequin is a variant of the pendulum movement (of the woman on the swing) that from the beginning of the film has constituted the film's governing motif.]

485 41 frames The two legs, with the feet up top and the soles together so that they form an arch; there is a clock between the two legs.

[Shots 483 and 484 begin a series of short, alternating shots that highlight the cinema's basic mechanism: still frames, when projected one after the other in rapid sequence, can constitute a *ballet mécanique*—so the sequence that starts here is a *ballet des jambes* that is also a *ballet mécanique*. We take considerable delight in recognizing that this “ballet des jambes” is actually a dance of static images. This sequence lasts, with some variation, until shot 554. At shot 498, the alternating series is augmented as a third element is introduced, which alternates with shot 484 to form an ABACABAC pattern.]

[Léger was concerned with the way that the proliferation of inharmonious visual forms was jangling people's nerves and distorting their sensibility. He would have been aware of the Taylorization of time experience and, perhaps, even of Nietzsche's remark, in *Die fröhliche Wissenschaft*, about American life: “Even now one is ashamed of resting and prolonged reflection almost gives people a bad conscience. One thinks with a watch in one's hand even as one eats one's lunch whilst reading the latest news of the stock market, one lives as one might always ‘miss out on something.’” On the other hand, clock time can also harmonize activity and experience. Clock time is a basic theme of this film, and here we see a clock.]

486 5 frames (A still image). Same as shot 484: mannequin legs against a black background; the legs are side by side, both have their feet directed towards the left and knees slightly bent.

487 9 frames (A still image). Same as shot 485: two legs form an arch; their feet are at the top of the frame and their soles together; there is a clock between the two legs.

[These two shots create an amusing sexual allusion, through a sort of to-and-fro, back-and-forth movement. Like the others in this sequence, these two shots have a different representational status from that of most shots in the film: their object-matter, as I have noted, is a three-dimensional display—an advertising image formed by the collective imaginary's idea of appealing legs. While drawing and painting can make an imaginary element their object-matter, film cannot do so directly and immediately.]

488 14 frames (A still image). Same as shot 484 and 486: mannequin legs against a black background; the legs are side-by-side; both have their feet directed towards the left and knees slightly bent.

[Unlike most sequences in the film, this one (of legs) has not been dominated by a regular meter—the pulse has seemed erratic. At this point, a regular meter takes hold, though the interval between pulses gradually increases.]

489 12 frames (A still image). Same as shots 484 and 486: two mannequin legs with the feet at the top of the frame; their soles are together so that they form an arch; there is a clock between the two legs.

490 12 frames (A still image). Two mannequin legs (seen in shot 486); they rotate clockwise slightly.

[Note the use of literal repetition in the following sequence.]

491 17 frames (A still image). Same as shots 485, 487, and 489: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

492 20 frames Shot 490 continues: the two mannequin legs rotate a full 360 degrees clockwise, ending in same position as in shot 484 (both feet facing left).

493 5 frames (A still image). Same as shots 485, 487, 489, and 491: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

494 13 frames (A still image). Same as shot 484, 486, and 488: mannequin legs against a black background; the

legs are side by side, both have their feet directed towards the left and knees slightly bent.

[The beginning of shot 494 creates a syncopated pulse, but the near metric regularity that began with shot 488 is restored with this shot. The back-and-forth alternation of shots continues.]

495 6 frames (A still image). Same as shots 485, 487, 489, 491, and 493: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

496 6 frames (A still image). The two mannequin legs, side by side as in shot 484, but in this shot the feet and bent knees are directed to the right.

497 4 frames (A still image). Same as shots 485, 487, 489, 491, 493, and 495: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

[This series here extends the usual alternation—the back-and-forth of two-beat meter—to three terms. As this occurs, the tempo increases so that the interval between pulses is about one-third what it is in previous iterations. It turns out, then, that the syncopation created in the appearance of shot 493 was anticipatory.]

498 4 frames (A still image). Same as shot 496: two mannequin legs, feet and knees towards the right).

499 6 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, and 497: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

[As the lengths of the shots become shorter and more regular, the (virtual) motion becomes more mechanical.]

500 5 frames (A still image). Same as shots 496 and 498: two mannequin legs, feet and knees to the right).

501 5 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, and 497: a pair of mannequin legs,

their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

- 502** 1 frame (A still image). Same as shots 484, 486, and 488 (and similar to 496): the legs of a mannequin against a black background; the legs are side by side, both have their feet directed towards the left and knees slightly bent.

[Though in this sequence the pulse created by the exchange of the images has verged on becoming completely regular, here it becomes irregular. This irregularity establishes a counter-dynamic to the regular back-and-forth, two-beat meter that dominates other parts of this sequence (and much of the rest of the film). However, it soon settles into a slightly accelerated two-beat meter.]

- 503** 6 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, and 501: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

- 504** 6 frames (A still image). Same as shots 496, 498, 500, and 502: two mannequin legs, feet and knees to the right.

- 505** 5 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, and 503: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

- 506** 4 frames (A still image). Same as shots 496, 498, 500, 502, and 504: two mannequin legs, feet and knees to the right.

- 507** 6 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, and 505: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

- 508** 5 frames (A still image). Same as shots 484, 486, and 488: the legs of a mannequin against a black background; the legs are side by side; both have their feet directed towards the left and knees slightly bent.

509 6 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, and 507: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

[Note that this passage as a whole offers combinatorial transformations of the ordering of three shots—the last few combinations have alternated two shots, but the third shot will soon be reintroduced.]

510 5 frames (A still image). Same as shots 484, 486, 488, and 508: the legs of a mannequin against a black background; the legs are side by side; both have their feet directed towards the left and knees slightly bent.

511 5 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, and 509: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

512 4 frames (A still image). Same as shots 484, 486, 488, 508, and 510: the legs of a mannequin against a black background; the legs are side by side; both have their feet directed towards the left and knees slightly bent.

513 3 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, and 511: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

[The last two shots—512 and 513—introduce an *accelerando* that continues until shot 521, when the film settles once again into the one-pulse-every-three-frames tempo.]

514 4 frames (A still image). Same as shots 496, 498, 500, 502, and 504: two mannequin legs, feet and knees to the right.

- 515** 3 frame (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, and 513: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 516** 2 frames (A still image). Same as shots 484, 486, 488, 508, and 510: the legs of a mannequin against a black background; the legs are side by side; both have their feet directed towards the left and knees slightly bent.
- 517** 2 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, and 515: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 518** 2 frames (A still image). Same as shots 484, 486, 488, 508, 510: the legs of a mannequin against a black background; the legs are side by side, both have their feet directed towards the left and knees slightly bent.
- 519** 2 frames (A still image). Same as shots 496, 498, 500, 502, 504, and 514: two mannequin legs, feet and knees to the right.
- 520** 2 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, and 519: a pair of mannequin legs their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 521** 2 frames (A still image). Same as shots 496, 498, 500, 502, 504, 514, and 519: two mannequin legs, feet and knees to the right.
- 522** 3 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, and 519: a pair of mannequin legs, their feet at the top of the frame, with their soles

together so that the legs form an arch; there is a clock between the two legs.

[From here to shot 539 the pulse is completely regular; at 540, the pulse begins to fluctuate ever so slightly.]

- 523** 3 frames (A still image). Same as shots 484, 486, 488, 508, 510, and 518: the legs of a mannequin against a black background; the legs are side by side; both have their feet directed towards the left and knees slightly bent.
- 524** 3 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, and 522: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 525** 3 frames (A still image). Same as shot 496, 498, 500, 502, 504, 514, and 519: two mannequin legs, feet and knees to the right.
- 526** 3 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, and 524: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 527** 3 frames (A still image). Same as shots 484, 486, 488, 508, 510, 518, and 523: the legs of a mannequin against a black background; the legs are side by side; both have their feet directed towards the left and knees slightly bent.
- 528** 3 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, and 526: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 529** 3 frames (A still image). Same as shots 496, 498, 500, 502, 504, 514, and 519: two mannequin legs, feet and knees to the right.

[This section permutes three shots at a completely regular meter. It provides another example of a visual time-space construction, evidence of the film-makers' interest in creating forms in which the image and sound parallel each other (Antheil's music uses similar blocks consisting of simple motif repeated insistently and percussively).]

- 530** 3 frames (A still image). Same as shot 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, and 528: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 531** 3 frames (A still image). Same as shots 484, 486, 488, 508, 510, 518, 523, and 527: the legs of a mannequin against a black background; the legs are side by side; both have their feet directed towards the left and knees slightly bent.
- 532** 3 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, and 530: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 533** 3 frames (A still image). Same as shots 496, 498, 500, 502, 504, 514, 519, and 529: two mannequin legs, feet and knees to the right.
- 534** 3 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, 530, and 532: a pair of mannequin leg, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 535** 3 frames (A still image). Same as shots 484, 486, 488, 508, 510, 518, 523, 527, and 531: the legs of a mannequin against a black background; the legs are side by side; both have their feet directed towards the left and knees slightly bent.

- 536** 3 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, 530, 532, and 534: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 537** 3 frames (A still image). Same as shots 496, 498, 500, 502, 504, 514, 519, 529, and 533: two mannequin legs, feet and knees to the right.
- 538** 3 frames (A still image). Same as shot 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, 530, 532, 534, and 536: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 539** 3 frames (A still image). Same as shots 484, 486, 488, 508, 510, 518, 523, 527, 531, and 535: the legs of a mannequin against a black background; the legs are side by side; both have their feet directed towards the left and knees slightly bent.
- 540** 2 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, 530, 532, 534, 536, and 538: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

[The pulse fluctuates slightly, between two intervals of 2-frame durations, then two intervals of 3-frame durations (another form of alternation), then settles into a slightly more accelerated tempo.]

- 541** 2 frames (A still image). Same as shots 484, 486, 488, 508, 510, 518, 523, 527, 531, 535, and 539: mannequin legs against a black background; the legs are side by side; both have their feet directed towards the left and knees slightly bent.

- 542** 3 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, 530, 532, 534, 536, 538, and 540: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 543** 3 frames (A still image). The two mannequin legs have moved—the feet are now to the right. This shot is a transformation of the form in shot 496: the legs have rotated 45 degrees clockwise so that the feet are now directed to the right.
- 544** 2 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, and 542: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 545** 2 frames (A still image). Similar to shot 543 (a transformation of shots 498, 500, 502, 504, 514, 519, 529, 533, and 537): the two mannequin legs have moved from their position towards the front and are now directed towards the right back—they have been turned 90 degrees counterclockwise (270 degrees clockwise) from their position in shot 496.
- [The set of images that undergoes the combinatorial operation of permutation is expanded to include an affine transformation of one of its elements.]
- 546** 2 frames (A still image). Same as shots 485 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, and 544: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.
- 547** 1 frame (A still image). The mannequin legs: its feet are now turned backward at 180 degrees from their position at shot 496.

548 3 frames (A still image). Same as shots 496, 498, 500, 502, 504, 514, 519, 529, 533, and 537: two mannequin legs' feet to the right.

549 5 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, and 546: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

[Another transformation of a set of images undergoing the combinatorial operation of permutation, created by adding an affine transformation (displacement) of one of its elements. The pulse returns to the five-frame interval that dominates this part of the film.]

550 5 frames The mannequin legs: its feet are now facing left-forward at about 45° counter-clockwise from their position in the previous shot. The legs are shifting rightward.

551 5 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, and 549: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

552 5 frames Continuation of shot 550: the mannequin legs continue to be shifted towards the right.

[A further affine transformation (displacement) of one of the set's elements.]

553 3 frames (A still image). Same as shots 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 549, and 551: a pair of mannequin legs, their feet at the top of the frame, with their soles together so that the legs form an arch; there is a clock between the two legs.

554 47 frames Continuation of shot 552. The mannequin legs continue to shift rightward for 1 1/2 rotations,

finally with the feet facing left as in shot 484.

****Shots 281–89 in the MoMA print appear to combine shots 486–523 in the Dutch print. Shots 281–289 in the MoMA have a total of 360 frames, while shots 486–523 in the Dutch print contain a total of 362 frames.

555 72 frames A central white rectangle extends from top to bottom of the frame; two metal balls inside the rectangle, one at the top left, the other at the bottom right, swing back and forth.

556 2 frames Same as shots 4, 10, 12, 14, 99, 101, and 108: a still image of a boater hat—the bow on its hatband is on the left (screen left).

557 6 frames (A still image). High-angle view of a white shoe, positioned along the frame's horizontal axis; the shoe is cut off on the right-hand side by the frame edge; the shoe with its tip pointing towards the left.

558 6 frames (A still image). Same as shot 556: a boater hat—the bow on its hatband is on the left (screen left).

[The construction of this sequence (shots 557–616) conforms to Antheil's idea of time-space, which so impressed Ezra Pound, partly because it resulted in constructions (like those that Gertrude Stein favoured), in which a repeated element elicits different responses on different appearances: a basic module (shots 557–558) is repeated many times, eliciting a different response each time it appears. Antheil's music employed insistent repetitions of simple motifs. Léger wrote that in creating the loop of the washerwoman climbing the stairs, he "wanted to first to *astonish* the audience [Léger uses "public"], then gradually to trouble them and then to push the adventure into exasperation. In order to calibrate the needed 'adjustment,' I gathered around myself workers and people from the neighborhood and I studied the effect *produced* on them. In eight days, I knew what I could get."⁵¹ But this is really an extension of Antheil's ideas on composition, right down to the idea of trying to exasperate an audience. Antheil and Léger strived to develop a form of mechanical unity in which in principle the basic module, here the shot of the washerwoman climbing the stairs, could be repeated any arbitrary number of times.]

559 6 frames (A still image). Same as shot 557. A view of a white shoe, from above; the shoe is positioned along the frame's horizontal axis; the shoe is cut off on the

right-hand side by the frame edge; the shoe with its tip pointing towards the left.

560 8 frames (A still image). Same as shots 556 and 558: the boater hat—the bow on its hatband is on the left.

[The sequence that started with shot 557 (actually, it is introduced with shot 556) has been metrically regular; a syncopated pulse occurs here.]

561 6 frames (A still image). Same as shots 557 and 559: view of a white shoe, from above, positioned along the frame's horizontal axis; the shoe is cut off on the right-hand side by the frame edge; the shoe with its tip pointing towards the left.

562 5 frames (A still image). Same as shots 556, 558, and 560: the boater—the bow on its hatband is on the left.

563 5 frames (A still image). Similar to shots 557, 559, and 561, but the shoe is reversed so that the shoe's tip points towards the right.

[From here until shot 580, a pattern of pulses is established, consisting of two intervals of five frames, then two intervals of six frames (another form of alternation). A pulse every fifth or sixth frame is close to normative in the legs ballet/shoe ballet sections of the film.]

564 6 frames (A still image). Similar to shots 556, 558, 560, and 562: the boater—the bow on its hatband is now on the right.

[These shots resemble affine transformations of shots 556 and 557; again, this creates unity-in-difference.]

565 6 frames (A still image). Similar to shot 563 (an affine transformation of 557, 559, and 561), but the shoe is reversed so that its tip points towards the right.

566 5 frames (A still image). Similar to shot 564 (an affine transformation of shots 556, 558, 560, and 562): the boater—the bow on its hatband is on the right.

567 5 frames (A still image). Similar to shots 563 and 565 (an affine transformation of shots 557, 559, and 561), but the shoe is reversed so that the shoe's tip points towards the right.

[The tempo of this section, made up of still images of a hat and shoe, is the same as that of the foregoing *ballet des jambes* sequence. In a sense, the hat-and-shoe ballet can be considered a continuation of *the ballet des jambes*.]

- 568** 6 frames (A still image). Similar to shots 564 and 566 (an affine transformation of shots 556, 558, 560, and 562): the boater—the bow on its hatband is on the right.
- 569** 6 frames (A still image). Similar to shots 557, 559, and 561: the shoe—its tip is pointing left.
- 570** 6 frames (A still image). Same as shots 556, 558, and 560: the boater—the bow on its hatband is on the left.
- 571** 5 frames (A still image). Similar to shots 557, 559, 561, and 569: the shoe—its tip is pointing left.
- 572** 5 frames (A still image). Same as shots 556, 558, 560, and 570: the boater—the bow on its hatband is on the left.
- 573** 6 frames (A still image). Same as shots 557, 559, 561, 569, and 571: the shoe—its tip is pointing left.
- 574** 6 frames (A still image). Same as shots 556, 558, 560, 570, and 572: the boater—the bow on its hatband is on the left.
- 575** 6 frames (A still image). Similar to shots 557, 559, 561, 569, 571, and 573: the shoe—its tip is pointing left.

[This sequence, which started with shot 556, is metrically regular, though the pulse shifts ever so slightly as the intervals between them fluctuate between five and six frames. This is another sort of to-and-froing that produces a dynamic unity.]

[This sequence provides an outstanding example of literal repetition, a form of construction that Antheil theorized and that I have suggested interested him partly as a form of construction that would allow him to cope with the vagaries of the film's production and the constant re-editing of the film. To be sure, Antheil had started to work out his idea of time-space before starting to work on *Ballet mécanique*—his interest in the notion was motivated by his concern to develop theoretically ideas about machine art that he had been working out implicitly in compositions he wrote in America between 1919 and 1922 and in Berlin in 1922–23. But trying to compose a piece of

music that would synchronize with a film that was constantly undergoing change made a musical form that could incorporate any number of repetitions extremely appealing.]

- 576** 6 frames (A still image). Same as shots 556, 558, 560, 570, 572, and 574: the boater—the bow on its hatband is on the left.
- 577** 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, and 575: the shoe—its tip is pointing left.
- 578** 5 frames (A still image). Same as shots 556, 558, 560, 570, 572, 574, and 576: the boater—the bow on its hatband is on the left.
- 579** 5 frames (A still image). Same as shots 557, 559, 561, 571, 573, 575, and 577: the shoe—its tip is pointing left.
- 580** 6 frames (A still image). Same as shots 556, 558, 560, 570, 572, 574, 576, and 578: the boater—the bow on its hatband is on the left.
- 581** 3 frames (A still image). Same as shots 557, 559, 561, 571, 573, 575, 577, and 579: the shoe—its tip is pointing left.
- 582** 4 frames (A still image). Same as shots 556, 558, 560, 570, 572, 574, 576, 578, 580: the boater—the bow on its hatband is on the left.
- 583** 4 frames (A still image). Same as shots 563, 565, and 567: similar to shots 557, 559, 561, 571, 573, 575, 577, and 579, but the shoe is reversed so that its tip is pointing towards the right.

[The hat-and-shoe ballet continues. The choreography involves switching object matter (hat and shoe) and orientation (left and right).]

- 584** 5 frames (A still image). Similar to shot 556: an image of a hat, but the bow on its hatband is at the right.

[From shot 580 to 583, the pulse begins to fluctuate a little more broadly; here, however, it becomes more regular again, with the interval between pulses fluctuating between five and six frames.]

- 585** 5 frames (A still image). Same as shots 563, 565, 567, and 583: similar to shots 557, 559, 561, 569, 571, 573,

575, 577, and 579, but the shoe is reversed so that its tip is pointing towards the right.

586 5 frames (A still image). Same as shot 556, 558, 560, 570, 572, 574, 576, and 578: the boater—the bow on its hatband is on the left.

[At this point, the clockwork alternation of orientations (between left and right) ceases: the bow and shoe consistently face left.]

587 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 577, and 579: the shoe—its tip is pointing left.

588 6 frames (A still image). Same as shots 556, 558, 560, 570, 572, 574, 576, 578, and 586: the boater—the bow on its hatband is on the left.

589 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, and 587: the shoe—its tip is pointing left.

[The frame counts suggest that the passage makes use of hemiola; one can divide the passage into groups of two and groups of three shots—divided into groups of two, we see some groups displaying repetition (e.g., shots 564/565—6 frames; shots 566/567—5 frames) while others display diminution (shots 580/581—6 frames/3 frames) or augmentation (shots 586/587—5 frames/6 frames). Divided into groups of three, we see that most groups display repetition (for example, shots 557–559—6 frames) while others display “erratic” variation, shots 560–562—8, 6, 5 frames respectively). Altogether, the rhythm in the passage displays variety-within-unity.]

590 6 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, and 588: the boater—the bow on its hatband is on the left.

[Here the pulse returns to the completely regular pattern of one beat every six frames, which is almost regulatory in this section of the film.]

591 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, and 589: the shoe—its tip is pointing left.

592 6 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, and 590: the boater—the bow on its hatband is on the left.

- 593** 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, and 591: the shoe—its tip is pointing left.
- 594** 6 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, and 592: the boater—the bow on its hatband is on the left.
- 595** 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, and 593: the shoe—its tip is pointing left.
- 596** 6 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, and 594: the boater—the bow on its hatband is on the left.
- 597** 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, and 595: the shoe—its tip is pointing left.
- 598** 6 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, and 596: the boater—the bow on its hatband is on the left.
- 599** 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, and 597: the shoe—its tip is pointing left.
- 600** 6 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, and 598: the boater—the bow on its hatband is on the left.
- 601** 5 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, and 599: the shoe—its tip is pointing left.
- 602** 6 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, and 600: the boater—the bow on its hatband is on the left.
- 603** 5 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, and 601: the shoe—its tip is pointing left.

[This provides another example of the application of Antheil's idea of time-space to the construction of a visual sequence, indicating the filmmakers' interest in audiovisual parallelism.]

[An *accelerando* begins here.]

- 604** 2 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, and 602: the hat with the bow on its hatband to the left.
- 605** 2 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, and 603: the shoe—its tip is pointing left.
- 606** 6 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, and 604: the boater—the bow on its hatband is on the left.

[The tempo returns to its most common speed.]

- 607** 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, and 605: the shoe—its tip is pointing left.
- 608** 6 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, and 606: the boater—the bow on its hatband is on the left.
- 609** 5 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, and 607: the shoe—its tip is pointing left.

[Here the tempo increases slightly.]

- 610** 5 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, and 608: the boater—the bow on its hatband is on the left.
- 611** 5 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, and 609: the shoe—its tip is pointing left.

612 5 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, and 610: the boater—the bow on its hatband is on the left.

613 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, and 611: the shoe—its tip is pointing left.

[The pulse returns to its most common tempo.]

614 6 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, and 612: the boater—the bow on its hatband is on the left.

615 5 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, and 613: the shoe—its tip is pointing left.

[A slight accelerando begins.]

616 4 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, and 614: the boater—the bow on its hatband is on the left.

[The pulse begins to fluctuate, before settling (with shot 619) into a more rapid meter.]

617 6 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, and 615: the shoe—its tip is pointing left.

618 3 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, and 616: the boater—the bow on its hatband is on the left.

619 4 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, and 617: the shoe—its tip is pointing left.

- 620** 4 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, and 618: the boater—the bow on its hatband is on the left.
- 621** 4 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, and 619: the shoe—its tip is pointing left.
- 622** 4 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, and 620: the boater—the bow on its hatband is on the left.
- 623** 4 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, and 621: the shoe—its tip is pointing left.
- 624** 4 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, and 622: the boater—the bow on its hatband is on the left.
- 625** 4 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, and 623: the shoe—its tip is pointing left.
- 626** 4 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, and 624: the boater—the bow on its hatband is on the left.

[This provides yet another example of the application of Antheil's idea on time-space to the construction of a visual sequence, indicating the filmmakers' interest in audiovisual parallelism.]

[From shots 619 to 626, the pulse has been completely regular (one beat every four frames), but here it begins to fluctuate.]

- 627** 5 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, and 625: the shoe—its tip is pointing left.
- 628** 3 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, and 626: the boater—the bow on its hatband is on the left.
- 629** 3 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, and 627: the shoe—its tip is pointing left.
- 630** 4 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, and 628: the boater—the bow on its hatband is on the left.
- 631** 4 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, and 629: the shoe—its tip is pointing left.
- 632** 4 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, and 630: the boater—the bow on its hatband is on the left.
- 633** 5 frames (A still image). Same as shots 557, 559, 561, 569, 571, 573, 575, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, and 631: the shoe—its tip is pointing left.
- 634** 2 frames (A still image). Same as shots 556, 568, 570, 572, 574, 578, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, and 632: the boater—the bow on its hatband is on the left.

****Shots 291–293 in the MoMA print appear to combine shots 556–634 in the Dutch print. Shots 291–293 in the MoMA print contain a total 410 frames; shots 556–634 in the Dutch print contain a total of 400 frames.

635 10 frames A row of pots arranged along a diagonal from the bottom left to its top right; the camera moves up the row.

[At this point, the intervals between pulses become close to being twice as long as the section's standard tempo—I noted earlier that the tempo of the film sometimes doubles or halves.]

[This image is a relative both of the graphic circle and the graphic triangle.]

636 11 frames (A still image). A row of pots arranged along a diagonal from the top left of the frame to the bottom right.

637 11 frames A row of pots arranged on a diagonal from the top right of the frame to its bottom left; camera moves down the row.

638 10 frames A row of pots arranged on a diagonal from the top left of the frame to its bottom right; camera moves down the row.

639 10 frames A row of pots arranged on a diagonal from the top right of the frame to its bottom left; camera moves down the row.

[This alternation of diagonals receding left and diagonals receding right is a variant of the pendulum motif that constitutes the film's matrix and gives rise to its content.]

640 7 frames (A still image). A row of pots arranged on a diagonal from the bottom right of the frame to its top left.

641 6 frames (A still image). A row of pots arranged on a diagonal from the top right of the frame to its bottom left.

642 54 frames Two thick white lines, extending from the top nearly to the bottom of the frame; part of a pot can be seen in the top right corner. The camera moves up to reveal another pot on the right and

the figure “2” above the lines; the camera moves back down.

- 643** 47 frames A row of pots arranged along a diagonal from the bottom right of the frame to its top left—the camera moves down the row. There is a numeral “2” to the left of the pots and the numeral “3” above.

[Each pair of shots from 635 to 643 are (affine) reflections of one another, a variant of the alternation of opposites—these alternations (along with related clockwork movements) provide the film’s key structuring dynamic.]

- 644** 8 frames (A still image). Kitchen utensils, viewed from slightly above (so as to abstract them somewhat). The utensils—several funnels linked together and several pots piled into one another—are arranged along a vertical axis. The background is black.

- 645** 6 frames The previous image, now presented upside down, with the row of funnels shifting to the left, away from the pots.

[This shot is nearly an affine transformation of the previous. The pulse settles into the same regular meter and tempo as governs much of *ballet des jambes* section.]

- 646** 6 frames The previous image, now right side up. The funnels spin and wobble inside one another, over top the pots.

- 647** 6 frames Similar to the previous image, but upside down.

[This interchange of a shot and its reflection around the horizontal axis is another relative of the pendulum motif; hence, it creates unity-in-contrast. From shots 645 to 650, the meter is completely regular, and its tempo is the regular tempo for this part of the film. As a result, the metric tension relaxes briefly.]

- 648** 6 frames Same as shot 646.

- 649** 6 frames Same as shot 647.

- 650** 6 frames Same as shots 646 and 648.

- 651** 10 frames Same as shots 647 and 649.

[An alternating pattern.]

652 5 frames Same as shots 646; 648, and 650—the funnels begins to shift to right, away from the pots.

653 17 frames A row of upside-down funnels, suspended above the pots, and spinning.

[The pulse begins to fluctuate broadly.]

654 3 frames Similar to the previous image, but now the funnels are right side up.

[The funnel combines the motifs of the circle and the triangle.]

655 9 frames Similar to shot 653; the stack of funnels moves farther upward.

656 2 frames Right side up, the row of spinning funnels rises up from the pots, then back towards the pots.

657 4 frames Same as shots 653 and 655.

658 4 frames Same as shot 654.

659 4 frames Same as shot 653, 655, and 657.

***Shots 635-659 in the Dutch print are not found in the MoMA print.

660 153 frames A shot of the same object as in shot 412, though the object is flipped upside down in this shot—that is, it offers an (affine) reflection around the screen's central horizontal axis (rather than vertical axis, as is much more common in this film). The object is made of five circular layers, each having scalloped edges—the bottom circle is the largest and each subsequent layer is smaller than the one beneath it (the object appears to be stack of metallic cake pans, the smaller inserted into the larger, but its overall form more or less resembles the funnel's). A ladle moves back and forth in front of the object (it appears to beat against the object). When the object moves forward, it becomes abstracted. The object then begins to move back and forth and the ladle starts to swing side to side.

661 166 frames Three pots arranged along a diagonal from the top right of the frame to its bottom left. The row

swings continuously (in the fashion of a pendulum) from the right side of the screen to the left and back again. An object in the foreground repeatedly moves up into the frame and back down (leaving the frame)—as the pots swing towards the camera, they are abstracted. The shot includes a cone-shaped object, possibly a funnel.

[The image is made up of circles and cones—and a cone, of course, combines the form of the circle and the triangle.]

662 22 frames

Another vortographic image: the central image, which occupies most of the frame, presents a woman's face—her mouth is abstracted; at first, her eyes are closed, then she opens them wide and raises her eyebrows.

[A ballet of small facial parts (eyes and mouth) begins. Such a ballet is possible only because of film's affinity for the close-up and the close-up's ability to magnify movement.]

663 196 frames

(Contains the same object matter as the previous shot, though in this case, the multiple image effect is produced using mattes rather than a vortoscope.) The face is seen through a circular opening. As the window (matte) moves up the face, the woman opens her eye—the image also becomes somewhat abstracted. As the matte shifts, a rectangular opening appears at the bottom of the screen—it reveals a smiling mouth, then, as it moves up the screen, a nose, then eyes, then the entire face. A panel then moves in from the right side—the corner of the panel covers the right eye. As the panel moves, uncovering the lips, the lips straighten to a serious position. The panel then moves down the side of the face, while the eyes close, another panel moves down from the top of the frame, covering the forehead, then the eyes, the nose, and finally the mouth. The circular opening appears on top, uncovering the forehead, then the eyes (which look up); as it reveals the rest of the face, the woman opens

her eyes wide—they stare into the camera. The circular opening moves down, covering the eyes and uncovering the mouth—the mouth rises into a smile. The window continues to move down and covers the mouth and uncovers her squinting eyes—her eyes squint as the whole face is revealed. The head turns down slightly.

[A relative of shots 305 and 378; this set of shots makes evident that the film repeats shots at widely spaced intervals as well as the short intervals that punctuate many of the film's repetitions. Furthermore, shots 662 and 663 repeat shots 377 and 378.]

****Shots 291–293 in the MoMA print correspond to shots 662 and 663 in the Dutch print. Shots 291–293 in the MoMA print contain a total of 222 frames; shots 662 and 663 have a total of 196 frames.

[In some versions of the film, these images of Kiki's mouth and eyes were intercut with images of Dudley Murphy's wife, nude.]

664 103 frames Same as shot 371: the woman's face turns from the right to the left.

[From one profile to the other, from looking in one direction to looking in the opposite—this is another instance of a transition between opposites, which relates to the pendulum principle that has such an important role in integrating the diverse elements the film contains.]

665 225 frames Upper torso and head of a woman in a garden (Katherine Murphy)—she holds a branch (of a shrub) and brings it up to her nose, turns her head away, then back again while she once again brings the branch up to her nose.

[The woman's pulling the branch towards herself, turning away from it, and pulling it towards herself again is another instance of motion belonging to the back-and-forth type.]

****Shot 665 in the Dutch print source appears to be the final shot in the MoMA version.

Frame count for the MoMA version is 218 frames.

666 3 frames (A still image). Katherine Murphy's face straight-on, towards the camera; her eyes are closed, and her closed eyes, eyebrows, and nose fill the frame.

- 667** 6 frames (A still image). Katherine Murphy's face, now titled up and away from the camera. Her (closed) eyes, nose, and lips fill the frame.
- 668** 5 frames (A still image). Same as shot 666: Katherine Murphy's face is filmed straight-on, turned towards the camera; her eyes are closed, and her closed eyes, eyebrows, and nose fill the frame.
- 669** 6 frames (A still image). Same as shot 667: Katherine Murphy's face is now tilted up and away from the camera. Her (closed) eyes, nose, and lips fill the frame.
- 670** 6 frames (A still image). Same as shot 666 and 668: Katherine Murphy's face is filmed straight-on, turned towards the camera; her eyes are closed, and her eyes, eyebrows, and nose fill the frame.

[The movement of the head has a mechanical quality, evoking the notion of *l'homme machine*. The jerky movement also relates to the flicker rhythm that is basic to film.]

- 671** 5 frames (A still image). Same as shots 667 and 669: Katherine Murphy's face is now titled up and away from the camera. Her (closed) eyes, nose, and lips fill the frame.
- 672** 5 frames (A still image). Same as shots 666, 668, and 670: Katherine Murphy's face is filmed straight-on, turned towards the camera; her eyes are closed and her eyes, eyebrows, and nose fill the frame.
- 673** 6 frames (A still image). Same as shots 667, 669, and 671: Katherine Murphy's face is now titled up and away from the camera. Her (closed) eyes, nose, and lips fill the frame.
- 674** 6 frames (A still image). Same as shots 666, 668, 670, and 672: Katherine Murphy's is filmed straight-on, turned towards the camera; her eyes are closed, and her eyes, eyebrows, and nose fill the frame.
- 675** 6 frames (A still image). Same as shots 667, 669, 671, and 673: Katherine Murphy's face is now tilted up and

away from the camera. The eyes (closed), nose, and lips fill the frame.

****Shots 297 and 298 from the MoMA print correspond to shots 668 to 677 from the Dutch print. Shots 297 and 298 of the MoMA print have a total of 51 frames; shots 668 to 677 from the Dutch print contain a total of 53 frames.

676 1 frame (A still image). A row of four Bordeaux-style wine bottles, in black against a white background; photographed so that the row recedes towards the left.

677 5 frames (A still image). The same object matter as previous shot (a row of four Bordeaux-style wine bottles) but now photographed so that the row recedes towards the right.

[The arrangement of the bottles in shot 677 presents an affine transformation (reflection) of their arrangement in shot 676—the juxtaposition of the original and its transformation constitute a variant of the pendulum motif (the transition between opposites).]

[Note the use of literal repetition in the following sequence.]

678 4 frames (A still image). Same as shot 676 (a row of four Bordeaux-style wine bottles, in black against a white background, photographed so that the row recedes towards the left.)

679 6 frames (A still image). Same as shot 677 (same object matter as shot 676—a row of four Bordeaux-style wine bottles—but now photographed so that the row recedes towards the right.)

680 11 frames (A still image). Same as shots 676 and 678. (A row of four Bordeaux-style wine bottles, in black against a white background; photographed so that the row recedes towards the left.)

681 6 frames (A still image). Same as shots 677 and 679 (same object matter as shot 676—a row of four Bordeaux-style wine bottles—but now photographed so that the row recedes towards the right.)

[Shots 676–712 provide yet another example of the application of Antheil's idea of time-space to the construction of a visual form, indicating the filmmakers' interest in audiovisual parallelism.]

682 5 frames (A still image). Same as shots 676, 678, and 680. (A row of four Bordeaux-style wine bottles, in black against a white background, photographed so that the row recedes towards the left.)

683 6 frames (A still image). Same as shots 677, 679, and 681. Same object matter as shot 676. (A row of four Bordeaux-style wine bottles, but now photographed so that the row recedes towards the right.).

[This alternating series is a variant of the pendulum motif (the transition between opposites).]

684 6 frames (A still image). Same as shots 676, 678, 680, and 682. (A row of four Bordeaux-style wine bottles, in back against a white background, photographed so that the row recedes towards the left.)

685 6 frames (A still image). Same as shots 677, 679, 681, and 683: Same object matter as shot 676. (A row of four Bordeaux-style wine bottles, but now photographed so that the row recedes towards the right.)

686 6 frames (A still image). Same as shots 676, 678, 680, 682, and 684. (A row of four Bordeaux-style wine bottles, in black against a white background; photographed so that the row recedes towards the left.)

687 3 frames (A still image). Two Bordeaux-style wine bottles, one in the foreground at the left (the left side of this meets the right edge of the frame), the other towards the back on the right (the right side of the bottle meets the right frame edge).

[The pulse becomes erratic.]

688 17 frames (A still image). Four Bordeaux-style wine bottles, a pair on each side; in each pair, the bottle closer to the edge is slightly nearer the camera, while the other bottle, the bottle closer to the centre of the frame, is slightly farther from the camera.

- 689** 4 frames (A still image). A bottle appears at the centre of the frame so that there are now five in total.
- 690** 1 frame An overexposed shot of four bottles, two on the left side of the frame and two on the right.
- [The choreography here alternates shots in which the centre of the screen is occupied with shots in which the centre of the screen is empty.]
- 691** 5 frames (A still image). A clearer exposure of the previous shot (690)—four bottles, two on the left side of the frame and two on the right.
- 692** 5 frames (A still image). Three bottles, one at the centre of the frame, one at the left, and one at the right.
- 693** 4 frames One Bordeaux-style wine bottle.
- 694** 15 frames (A still image). Three Bordeaux-style wine bottles in row that recede to the right.
- 695** 5 frames (A still image). Three Bordeaux-style wine bottles in a row that recede to the left.
- 696** 5 frames (A still image). Same as shots 676, 678, 680, 682, and 684: a row of four Bordeaux-style wine bottles, in black against a white background, photographed so that the row recedes towards the left.
- 697** 5 frames (A still image). Same as shots 677, 679, 681, and 683: same object matter as shot 676. A row of four Bordeaux-style wine bottles, but now photographed so that the row recedes towards the right.
- 698** 5 frames (A still image). Same as shots 676, 678, 680, 682, 684, and 696: a row of four Bordeaux-style wine bottles, in black against a white background, photographed so that the row recedes towards the left.
- 699** 5 frames (A still image). Same as shots 677, 679, 681, 683, 697: same object matter as shot 676. A row of four Bordeaux-style wine bottles, but now photographed so that the row recedes towards the right.

[A delayed beat announces a shift to a slightly slower tempo.]

- 700** 11 frames (A still image). Same as shots 676, 678, 680, 682, 684, 696, and 698. A row of four Bordeaux-style wine bottles, in black against a white background, photographed so that the row recedes towards the left.
- 701** 6 frames (A still image). Same as shots 677, 679, 681, 683, 697, and 699: same object matter as shot 676. A row of four Bordeaux-style wine bottles, but now photographed so that the row recedes towards the right.
- 702** 6 frames (A still image). Same as shots 676, 678, 680, 682, 684, 696, 698, and 700: a row of four Bordeaux-style wine bottles, in black against a white background; photographed so that the row recedes towards the left.
- 703** 6 frames (A still image). Same as shots 677, 679, 681, 683, 697, 699, and 701: same object matter as shot 676, a row of four Bordeaux-style wine bottles, but now photographed so that the row recedes towards the right.)
- 704** 6 frames (A still image). Same as shots 676, 678, 680, 682, 684, 696, 698, 700, and 702: a row of four Bordeaux-style wine bottles, in black against a white background; photographed so that the row recedes towards the left.
- 705** 6 frames (A still image). Same as shots 677, 679, 681, 683, 697, 699, 701, and 703: same object matter as shot 676. A row of four Bordeaux-style wine bottles, but now photographed so that the row recedes towards the right.
- 706** 6 frames (A still image). Same as shots 676, 678, 680, 682, 684, 696, 698, 700, 702, and 704: a row of four Bordeaux-style wine bottles, in black against a white background, photographed so that the row recedes towards the left.

[This alternation of diagonals receding leftwards and rightwards is a variant of the pendulum motif that constitutes the film's governing matrix, giving

rise to its content. This alternation of shots offers still another example of the application of Antheil's idea of time-space to the construction of a visual sequence, an indication of the filmmakers' interest in audiovisual parallelism.]

707 3 frames (A still image). Same as shot 687: two Bordeaux-style wine bottles, one in the foreground at the left (the left side of this bottle meets the left edge of the frame), the other towards the back on the right (the right side of the bottle meets the right frame edge).

708 17 frames (A still image). Same as shot 688: four Bordeaux-style wine bottles, a pair on each side; in each pair, the bottle closer to the edge is slightly nearer the camera, while the other bottle, the bottle closer to the centre of the frame is lightly farther from the camera.

[Another delayed beat, followed by a rapid (syncopated) pulse, prefacing a return to a slightly accelerated tempo, which is, essentially, the regulatory tempo for this passage.]

709 3 frames (A still image). Same as shot 692: three bottles, one at the centre of the frame, one at the left, and one at the right.

710 5 frames (A still image). Same as shot 691: four bottles, two on the left side of the frame and two on the right.

711 5 frames (A still image). Same as shot 694: three Bordeaux-style wine bottles in row that recede to the right.

712 5 frames (A still image). At first there is a single Bordeaux-style wine bottle at the left side of the screen, then a second appears to its right, then a third, again to the right of the previous, and a fourth, still farther to the right—each bottle is a little farther back than the previous.

[From shots 710 to 712, the pulse becomes, however briefly, completely regular, and its one-beat-every-five-frames pattern coincides with the common tempo of the *ballet des jambes* section.]

713 14 frames (A still image). Same as shots 694 and 711: three Bordeaux-style wine bottles in row that recede to the right.

714 4 frames (A still image). Same as shot 695: three Bordeaux-style wine bottles in a row that recede to the left.

[The opposing diagonals between these two shots (and between other pairs in the “bottle dance” section) is a variant of the clockwork motif. The pulse has become irregular again.]

715 18 frames (A still image). Two bottles in the background on the left side; the bottle on the left is a little farther than the bottle to its right. A third bottle appears, then a fourth, each a little closer to the camera than the bottle to its right.

716 21 frames (A still image). Three bottles, one on the left side in the foreground, two bottles farther back (with the leftmost bottle a little farther back than the one to its right). The two bottles at a greater distance from the camera disappear, leaving one bottle on the left, then a second appears, then a third and then a fourth.

[This “dancing bottles” section rhymes with the *ballet des jambes* section; however, it is much more metrically irregular. Like the “dancing legs” section, the dancing forms here are still images—that relative of the *phi*-phenomenon that provides *Ballet mécanique* with its basic method (the impression of movement that occurs when successive frames present an object at a different location on the screen or when the area that principally attracts the eye changes from one frame to the next) is entirely responsible for the motion dynamics in this sequence. The disappearance and reappearance of forms is another variant of the back-and-forth pattern that constitutes the film’s matrix.]

717 13 frames (A still image). Same as shot 715: two bottles in the background on the left side; the leftmost bottle is a little farther away than the bottle to its right. A third bottle appears, then a fourth, each a little closer to the camera than the bottle to its right.

718 586 frames The Cubist Charlot, who opened the film, appears at the centre of the frame, against a grey background; the various parts that he is made up of shift around, combining with one another in a variety of ways, then separating. Charlot shifts to different areas in the frame; bounces about, rotates, his parts come apart, his head rotates.

Eventually most of his parts move out of the frame, leaving his head behind; his head bounces about, rotates, and, finally, exits the frame.

[A series of permutations of the figure, as the foregoing sequence was a series of permutations of a set of wine bottles; the sequence is a (partial) set of permutations of an original ordering.]

719 21 frames The word “einde.” appears (in the print that belonged to Dutch Cine-Club).

Notes

- 1 Dudley Murphy created these “prism” shots using a triangular tube with a mirror on each face.
- 2 On this topic, see Matthew S. Witkovsky, “Surrealism in the Plural: Guillaume Apollinaire, Ivan Goll and Devětsil in the 1920s,” *Papers of Surrealism 2* (summer 2004), 1–14, http://www.surrealismcentre.ac.uk/papersofsurrealism/journal2/acrobat_files/witkovsky_article.pdf.
- 3 Eleonora Duse (1858–1924), who often was referred to simply as La Duse, was an Italian actor best known for her association with the sensuous and mystical Decadent writer and prophet Gabriele d’Annunzio (1863–1938). The point is that the ФЕКС theatre-makers were more interested in low comedy (plays that presented characters whose arses were administered electric shocks) than in what they doubtless thought of as d’Annunzio’s (and La Duse’s) highfalutin’ twaddle.
- 4 The authors proclaimed that Экспентризм (Ekstsentrism) was appearing in “Ekstsentropolis, the former Petrograd.” Altogether, the manifesto is not a bad piece of work for a group of (roughly) twenty-year-olds.
- 5 Ivan Goll, “Brief an den verstorbenen Dichter Apollinaire” [1918], published 1919 in *Die weißen Blätter*; reprinted in Yvan Goll, *Dichtungen. Lyrik, Prosa, Drama*, ed. Claire Goll (Darmstadt: Luchterhand, 1960), 42–43.
- 6 Ivan Goll, “Chapliniade ou Charlot poète. Poème, drame, film.” *Vie des lettres* 7, no. 5 (July 1921): 534–51.
- 7 An English translation of “Die Chapliniade. Eine Kinodichtung,” with introduction and notes—and complete with reproductions of Léger’s splendid drawings—appears in Ivan Goll, Clinton J. Atkinson, and Arthur S. Wensinger, “The Chaplinade: A Film Poem,” *The Massachusetts Review* 6, no. 3 (Spring-Summer 1965): 497–514; the quoted passage appears on page 502. Seeing the reproductions leaves no doubt whatsoever that the path from a Cubist dancing block-figure to a Cubist mechanical ballet (*Ballet mécanique*) was a direct one. To my view, that is almost enough by itself to discredit Moritz’s views on the roles of different contributors to the film. See William Moritz, “Americans in Paris: Man Ray and Dudley Murphy,” in Jan-Christopher Horak, *Lovers of Cinema* (Madison: University of Wisconsin Press, 1995), 118–36.
- 8 Eusebio Ciccotti, *Avanguardia e cinema in Cecoslovacchia* (Rome: Bulzoni, 1989), 23–24.
- 9 Judi Freeman, “Bridging Purism and Surrealism: The Origins and Production of Fernand Léger’s *Ballet Mécanique*,” *Dada/Surrealism* 15 (1986): 26–45; collected in *Dada*

- and *Surrealist Film*, ed. Rudolf E. Kuenzli (New York: Willis Locker & Ownes, 1987), 28–45; at 44n31 in Kuenzli, she reports that that Léger was smitten enough with Charlot that he remarked on his “mechanical” possibilities in an unpublished article, “L’avenir du cinéma” (n.d., but Freeman suggests 1923), and some three years later devoted an admiring article to describing his first impressions of Charlot (“Charlot Cubiste,” also unpublished). She further notes that Léger contributed a short piece on the comedian/filmmaker “Temoignage” to a special Chaplin issue of *Les Chroniques du Jour* (15–31 December 1926). On the topic of Léger’s interest in Charlot/Charlie Chaplin, see Matthew S. Witkovsky, “Surrealism in the Plural: Guillaume Apollinaire, Ivan Goll and Devětsil in the 1920s,” *Papers of Surrealism*, Issue 2 (Summer 2004), 1–14; online at http://www.surrealismcentre.ac.uk/papersofsurrealism/journal2/acrobat_files/witkovsky_article.pdf
- 10 Léger, “Charlot the Cubiste,” in Patrice Blouin, Christian Delage, Sam Stourze, eds., *Chaplin in Pictures* (Paris: NBC Editions, 2005), n.p.; the script can also be found in Jennifer Jane Wild, *L’imagination cinématographique: The Cinematic Impression on Avant-garde Art in France, 1913–1929* (Iowa City: University of Iowa Press, 2006). Judi Freeman states (“Bridging Purism and Surrealism: The Origins and Production of Fernand Léger’s *Ballet Mécanique*,” in Kuenzli, 36 and 44n33) that there were five drafts of this scenario and that Léger was unable to find financial backing for the project. In 1933, Léger published, in *14, rue du Dragon* (which issued from the same office where Christian Zervos published *Cahiers d’Art*), an ink drawing and collage *La Jocande amoureuse de Charlie Chaplin*. The work takes up Mona Lisa’s love for Charlot, and at the centre of the collage is a drawing Léger had done thirteen years earlier, for Goll’s “Die Chapliniade.”
 - 11 Walter Benjamin, “The Formula in Which the Dialectical Structure of Film Finds Expression,” in *Walter Benjamin: Selected Writings*, vol. 3: 1935–1938, ed. Michael W. Jennings, trans. Edmund Jephcott (Cambridge, MA: Harvard University Press, 2002), 94.
 - 12 Walter Benjamin, “The Work of Art in the Age of Its Technological Reproducibility,” in *Walter Benjamin: Selected Writings*, vol. 3, 111.
 - 13 Standish D. Lawder, *The Cubist Cinema* (New York: New York University Press, 1975).
 - 14 Cited in Scott MacDonald (ed.), *Art in Cinema: Documents towards a History of the Film Society* (Philadelphia: Temple University Press, 2006), 85.
 - 15 One of Coburn’s Vortoscope images, *The Centre of the Vortex*, was a multi-image portrait of Ezra Pound in silhouette. Lawder reports that Pound later wrote Alfred Steiglitz: “Coburn I haven’t seen since we rigged up the vortoscope with my old shaving mirror—hence ultimately the Ballet Mechaniques [*sic*], Antheil’s, Léger’s Murphy’s try.” In Lawder, *The Cubist Cinema*, 265n67.
 - 16 Fernand Léger, “Film by Fernand Léger and Dudley Murphy, Musical Synchronism by George Antheil,” *Little Review* (Autumn–Winter 1924–25), 43. As an indication of Pound’s importance in helping extend his ideas on machine art, the “Aesthetics of the Machine” article Léger published in *The Little Review* (1924) was dedicated to Ezra Pound.
 - 17 Léger’s note seems to me to bring into question Moritz’s claim that Murphy was the project’s instigator.
 - 18 Paige carbons, Yale University Library. It appears in Ezra Pound, *Ezra Pound to His Parents: Letters 1895–1929*, ed. Mary de Rachewiltz, A. David Moody and Joanna Moody (Oxford: Oxford University Press, 2011), 378–79 at 379. It also appears in a slightly different (somewhat tidied up) transcription in Pound, *Ezra Pound and the Visual Arts*, ed. Harriet Zinnes (New York: New Directions, 1980), 293.

- 19 Pound, *Ezra Pound and the Visual Arts*, 241.
- 20 Regarding the faculty of the abortive College of the Arts project, see Pound, *The Letters [...] to Alice Corbin Henderson*, ed. Ira Nadel (Austin: University of Texas Press, 1993), 90. As Pound's letter to his father makes clear, the two continued to work together: in September 1916 (the same month as Pound's letter to his father), Elkin Mathews brought out a private edition (of 200) of Pound's *Lustra*, with a frontispiece photograph of the poet by Colburn.
- 21 After his 1917 exhibition of vortographs at the Camera Club in London, Coburn joined the Masonic Lodge and the *Societas Rosicruciana* (and from 1923 to 1930 devoted himself completely to the life of the Universal Order, a syncretic religious group teaching a version of the Renaissance doctrine of the *Prisca theologia*, in this case tracing that theology back to the "Lost Isle of West"; the teachings from the Golden Age before the Deluge were said to be buried in myths and more recent literature, and could be discerned by adepts—Godfrey Higgins's *Anacalypsis* [1836] was said to be extraordinary at decoding these messages). Coburn also read Claude Bragdon's writing on the fourth dimension and studied Swami Vivekananda and the Cabala.
- 22 Nancy Wynne Newhall, *From Adams to Stieglitz: Pioneers of Modern Photography* (New York: Aperture, 1989), 28.
- 23 Hartmann published this remark under the name Sidney Allan; the remark is cited in *ibid.*, 27.
- 24 *Ibid.*
- 25 In Alvin Langdon Coburn, "The Future of Pictorial Photography," in *Photograms of the Year*, 1916, ed. F.J. Mortimer (London: Hazell, Watson, and Viney, 1916), 23–24, cited in Alison Devine Nordström, Thomas Padon, and J. Luca Ackerman, *TruthBeauty: Pictorialism and the Photograph as Art* (Vancouver: Vancouver Art Gallery, 2008), 127.
- 26 Letter to John Quinn, London, 24 January 1917; reprinted in Pound, *Ezra Pound and the Visual Arts*, 281. Coburn himself described the device this way: "This instrument is composed of three mirrors fastened together in the form of a triangle, and resembling to a certain extent the Kaleidoscope. The mirrors acted as a prism splitting the image formed by the lens into segments." So he recalled many years after his Camera Club show. Quoted in Robert Morse Crunden, *American Salons: Encounters with European Modernism, 1885–1917* (New York: Oxford University Press, 1993), 262.
- 27 Coburn, "Postscript," in *Vortographs and Paintings* (London: Women's Printing Society, 1917), n.p. (seven pages).
- 28 Pound, *The Letters [...] to Alice Corbin Henderson*, 187. Malcolm Arburthnot (1874–1967), a photographer and signatory of the Vorticist Manifesto, also spoke, and Pound (*ibid.*) characterized his remarks as "intelligent."
- 29 Pound, *Ezra Pound and the Visual Arts*, 154. Pound is correct in suggesting that Coburn had become interested in introducing Cubist devices and Cubist effects into photography. It seems that he affiliated himself with the Vorticists in part to learn more about Cubism; to that end, he associated himself with a group in London whose aesthetics overlapped those of the Cubists. An article by Mark Antliff ("Alvin Langdon Coburn among the Vorticists: Studio Photographs and Lost Works by Epstein, Lewis and Wadsworth," *The Burlington Magazine* 1290 [September 2010]: 580–89, esp. 584), points out a fact that previous historians of photography overlooked: that annotations on the envelopes containing the negatives for the vortographs of Ezra Pound divide those works into two subgroups: some of them are identified as being in the Cubist manner and others as being in the Vorticist manner.

- 30 Ezra Pound, "Affirmations, II: Vorticism," *The New Age* 16, no. 11 (14 January 1915), 277; reprinted in Pound, *Ezra Pound and the Visual Arts*, 7.
- 31 *Emak Bakia* also offers literal representation uncharacteristic of Ray's work (in the passage showing women—from the knee down—descending from an automobile); two passages reminiscent of the ballet of the mannequin legs (one a section where a woman performs the Charleston and the other a scene where a woman lies on a beach and draws her legs up provocatively); a remarkably prolonged single-image passage (again, where the woman performs the Charleston) that resembles the washerwoman sequence in *Ballet mécanique*; scenes presenting pulsing and rotating anamorphosis—many of them created by shooting reflections in warped plastic—that bear comparison with some the vortographic images in *Ballet mécanique* (especially the vortographic images of machines) and with the images projected on the surface of the sphere in that film; a scene with a male cross-dresser; Kiki opening and closing her eyes, and Kiki smiling; and a section with sculptures of a cylinder, a cube, and a cone ("mathematical objects" Ray had created). Of course, in Ray's hands these all become images suggesting the mind operating in acute states that generate wild imaginings.
- 32 Quoted in Lawder, *The Cubist Cinema*, 127.
- 33 Léon Moussinac, "Du rythme cinégraphique," *Le Crapouillot* (March 1923), 9–11; English trans. "On Cinegraphic Rhythm," in Abel, *French Film Theory and Criticism: A History/Anthology 1907–1939*, vol. 1 1907–1929 (Princeton: Princeton University Press, 1988), 280–83 at 281. (In 1923, Moussinac formally joined the Parti communiste français, which provided his intellectual home for decades; *Le Crapouillot* was a left-leaning, anti-racist, anti-anti-semitic magazine founded by Jean Galtier-Boissière, founded in the trenches of the Great War—the term *crapouillot* [literally, little toad] designated, in the language of the soldiers of the time, trench mortars—and after the Great War became a left-anarchist magazine with a highly satirical tone. I mention this to point out that, despite commentary aligning them with the forces of reaction, Orphist/Purist principles were sometimes propounded with artists and thinkers on the left—which, I insist, is where Léger's allegiances lay.) My analysis reflects this mathematical / Pythagorean conception of rhythm that was a fundamental constructive principle among the Orphists and the Purists.
- Moussinac also states, "Cinema has an interior rhythm, that of the image, and an exterior rhythm, *between* the images; that means they are created by the order of succession of the images and their fixed durations" ("Théorie de cinéma," *Cinema* 95 [1 July 1923]; cited in Lawder, *The Cubist Cinema*, 145).
- 34 Viktor Shklovsky, "Art as Technique" (1917), translated and anthologized in *Literary Theory: An Anthology*, ed. Julie Rivkin and Michael Ryan (Malden: Blackwell, 2004), 15–21, esp. 16.
- 35 *Ibid.* Ellipsis and emphasis in source.
- 36 Georg Lukács, "Gedanken zu einer Ästhetik des 'Kino,'" *Pester Lloyd* (Budapest) 90 (16 April 11): 45–46; republished, in a slightly expanded version, in *Frankenfurter Zeitung*, 10 September 1913, 1–2; translated by Janelle Blankenship and published as "Thoughts towards an Aesthetic of Cinema" in *Polygraph* 13 (2001): 13–18; reprinted in *The Promise of Cinema: German Film Theory 1907–1933*, ed. Anton Kaes, Nicolas Baer, and Michael Cowan (Berkeley: University of California Press, 2016), 377–81.
- 37 *Ibid.*, in Kaes, Baer, and Cowan, eds., *The Promise of Cinema*, 378.
- 38 *Ibid.*, emphasis in original.
- 39 *Ibid.*

40 Ibid.

41 Ibid., 379.

42 Ibid.

43 John Tytell, *Ezra Pound: The Solitary Volcano* (New York: Doubleday, 1987), 189. Tytell goes on to point out, quite rightly, that such “ideas had their effect on Pound’s design of *The Cantos* on a line-by-line basis as he shifted from one culture to another without bridging” (Ibid.). As importantly, he offers a keen insight into the connection between the Dadaist elements of *Ballet mécanique* and Léger’s theory of simultanism: “The Dadaists had demonstrated a highly kinetic anti-logic that permitted swift directional changes without signalling” (ibid., 190). *Ballet mécanique* involves many swift directional changes, without signalling, though their point is less anti-logic and more the simultanist amplification of multiple contrasts.

44 Ibid.

45 The comparison of the graphic “0” and the eye raises the issue of representation with a special force and rigour: graphic forms, such as the “image” of a man or woman near a toilet, or a prone baby near a baby-changing room, sometimes serve as signs, and their semiotic function depends on their being schematized icon forms. One of the delights of *Ballet mécanique* is that the film invests a range of elementary forms with semiotic (meaning-producing) functions by deploying photographic and paratactical devices to create schematized icons.

46 Barbettes, who was born in Austin, Texas (né Vander Clyde Broadway), and raised in America, made his European debut in 1923 (around the time *Ballet mécanique* was filmed), first in London and then in Paris. He appeared at the Casino de Paris, the Moulin Rouge, the Empire, the Médrano Circus, the Alhambra Theater, and the Folies Bergère. He returned to America in 1924.

Jean Cocteau was enthralled by Barbettes—he wrote to his Belgian friend Paul Col-laer: “Next week in Brussels, you’ll see a music-hall act called ‘Barbettes’ that has been keeping me enthralled for a fortnight. The young American who does this wire and trapeze act is a great actor, an angel, and he has become the friend to all of us. Go and see him... and tell everybody that he is no mere acrobat in women’s clothes, nor just a graceful daredevil, but one of the most beautiful things in the theatre. Stravinsky, Auric, poets, painters, and I myself have seen no comparable display of artistry on the stage since Nijinsky.” Cited in Francis Steegmuller, *Cocteau: A Biography* (Paris: Buchet-Chastel, 1973), 365.

He wrote to another friend, about his show at the Casino de Paris: “Ten unforgettable minutes. A theatrical masterpiece. An angel, a flower, a bird” (ibid., 313). Cocteau gave Barbettes a role in his film *Le sang d’un poète* (Blood of a Poet, 1930) and commissioned Man Ray to document, through portraits, the process by which Barbettes changed from a man to a woman for his performances. This transformation, from a man to a woman and back again (implied by this image in *Ballet mécanique*), seems to have been what enthralled Cocteau: he published an essay, “Le Numéro Barbettes” (The Barbettes Number), in *Nouvelle Revue Française* in 1926, which takes up the themes of theatre as anti-naturalistic and artifice, of the masquerade of female and male appearances, and of the ambiguity of androgyny (the article can be found in Cocteau’s *Oeuvres complètes de Jean Cocteau*, vol. 9 [Paris: Marguerat, 1946]). The mask-like nature of this portrait might evoke Cocteau’s idea of the artificial and constructed nature of gender appearance.

- 47 Much as Duchamp made use of similar dualities, such as a door being both open and shut at the same time. Given the similarities of the images of the face with Man Ray's famous photograph of a woman smoking, and the general interest in dual existence in his work, I would speculate that these shots were among Man Ray's contributions to *Ballet mécanique*; but I do not have solid evidence that they are.
- 48 Though this reading would have to be balanced with one closer to Cocteau's—that the alternation is between one form of artifice (illusion) and another.
- 49 Carolyn Lanchner, Matthew Affron, and Jodi Hauptman, *Fernand Léger* (New York: Museum of Modern Art, 1998), 351.
- 50 From Dudley Murphy, "Murphy on Murphy," cited in Susan Delson, *Dudley Murphy, Hollywood Wild Card* (Minneapolis: University of Minnesota Press, 2006), 46.
- 51 Léger, "Autour du Ballet mécanique" (1924–25) in Léger, *Fonctions de la peinture*, édition établie, présentée et annotée par Sylvie Forestier (Paris: Gallimard, 133–39 at 138. Readers can compare my translation with that found in Fernand Léger, "Ballet Mécanique" in Léger, *The Functions of Painting*, trans. Alexandra Anderson, ed. Edward F. Fry (New York: Viking Press, 1973), 48–51, at 51.