Composing Time: Zeno's Arrow, Hindemith's *Erinnerung*, and Satie's *Instantanéisme*

DAVID TRIPPETT

Introduction

"Fall leaves after leaves fall." (not attributed)
"A man, a plan, a canal—Panama!" (not attributed)

Literary palindromes often appear precarious: They can only go so far before their lack of syntactic logic begins to defeat the semantic meaning their words embody. The same holds for palindromic music with a functional tonal center, though a small canon of notable exceptions exists from Machaut to Schubert.[1] This condition

I wish to express gratitude first to the readers who generously offered their thoughts and comments on earlier versions of this essay, including Carolyn Abbate, Daniel Albright, Chris Hasty, and Roger Parker, and second, to Schott publishers for their help in granting permission to publish copyrighted material. I owe special thanks to Alexander Rehding, whose continued advice and encouragement throughout my work on this project helped the essay reach its final form.

[1] Machaut's cancrizans in *Ma fin est mon commencement* is the earliest known example of a musical mirror technique. Notable palindrome structures that encompass the entire texture of a modal or tonal work (rather than melodic retrograde) include Byrd's *Diliges Dominum*, J. S. Bach's two-voice retrograde canon from *Das Musikalisches Opfer*, C. P. E. Bach's minuet in C (Wq 116/5, H 216), Haydn's minuet from Symphony no. 47 (recycled in the Piano Sonata no. 26, and Violin Sonata no. 4), and a 38 measure section from Schubert's melodrama *Die Zauberharfe*. The most recent research in tonal palindromes has been that of Robert Morgan, "Symmetrical Form and Common-Practice Tonality,"

The Journal of Musicology, Vol. 24, Issue 4, pp. 522–580, ISSN 0277-9269, electronic ISSN 1533-8347. DOI: 10.1525/jm.2007.24.4.522.

of a directional, linear function offers one explanation as to why, in a post-tonal context, there was a proliferation of mirror forms in the early 20th century.[2] But over and above the emancipated dissonances that enabled such structures, is there a more subtle connection between them and the period in which they proliferated? Putting the question more broadly, is there a deeper homology between compositional technique and *Zeitgeist* that underpins and regulates the burgeoning palindrome phenomenon?

While mirror structures ultimately discourage linguistic logic, in music they embody a logic of undoing, or more specifically, a mechanism that can imply either spatial inversion or temporal reversal, depending on whether music is treated as an abstract or narrative form. Time is of course vital for the perception of music, and—as commentators from Aristotle to Luhmann remind us—it forms a basic condition that distinguishes music from graphic or literary art forms. While all art demands a certain time from its witnesses, the vehicle of apprehension itself—i.e. the perception of time—went through critical changes in the early decades of the 20th century, largely in response to rapid technological innovations that seemed to embody (or at least imply) certain palindromic functions.[3]

Members of the Second Viennese School provide some of the more famous examples, but Ruth Crawford Seeger, Ives, Hindemith, Bartók, and Satie all demonstrated that retrograde was hardly a serialist prerogative in the 1920s and 30s. A well known example from Berg's *Lulu* suggests that the significance of this compositional technique was bound to

Music Theory Spectrum 20 (1998): 1–47; and Brian Newbold "A Schubert palindrome," *19th-Century Music* 15 (1992): 207–14.

[2] Mirror forms in the early post-tonal period can exist on too many different structural levels to cite here without due qualification. Some notable examples include: Webern's Symphony op. 21 and Piano Variations op. 27; Charles Ives's song "Like a Sick Eagle"; Paul Hindemith's *Ludus Tonalis*, Clarinet Quintet op. 30, Wind Septet, and *Hin und Zurück*; Ruth Crawford Seeger's String Quartet 1931 (iv); Béla Bartók's Fourth String Quartet; various sections in Berg's *Lulu*, *Wozzeck*, *Lyriksuite*, and *Kammerkonzert*, as well as mirror canons in "Der Mondfleck" from Schoenberg's *Pierrot Lunaire*. Equally, the literature on early post-tonal symmetries is too large to cite in full. Recent examples include David J. Hunter and Paul T. con Hippel, "How Rare Is Symmetry in Musical 12-Tone Rows?," *The American Mathematical Monthly* 110 (2003): 124–32; Jean-Louis Leleu, "Intuition et esprit de système. Réflexions sur le schéma formel du deuxième mouvement des Variations pour piano op. 27 de Webern," *Revue belge de Musicologie / Belgisch Tijdschrift voor Muziekwetenschap* 52 (1998): 101–22, esp. 106; Joel Chadabe, "The History of Electronic Music as a Reflection of Structural Paradigms," *Leonardo Music Journal* 6 (1996): 41–44; Kathryn Bailey, "Symmetry as Nemesis: Webern and the First Movement of the Concerto, Opus 24," *Journal of Music Theory* 40 (1996): 245–310.

[3] For a bibliographical survey of temporal approaches to music, see Jonathan Kramer, "Studies of Time and Music: A Bibliography," *Music Theory Spectrum* 7 (1985): 72–106.

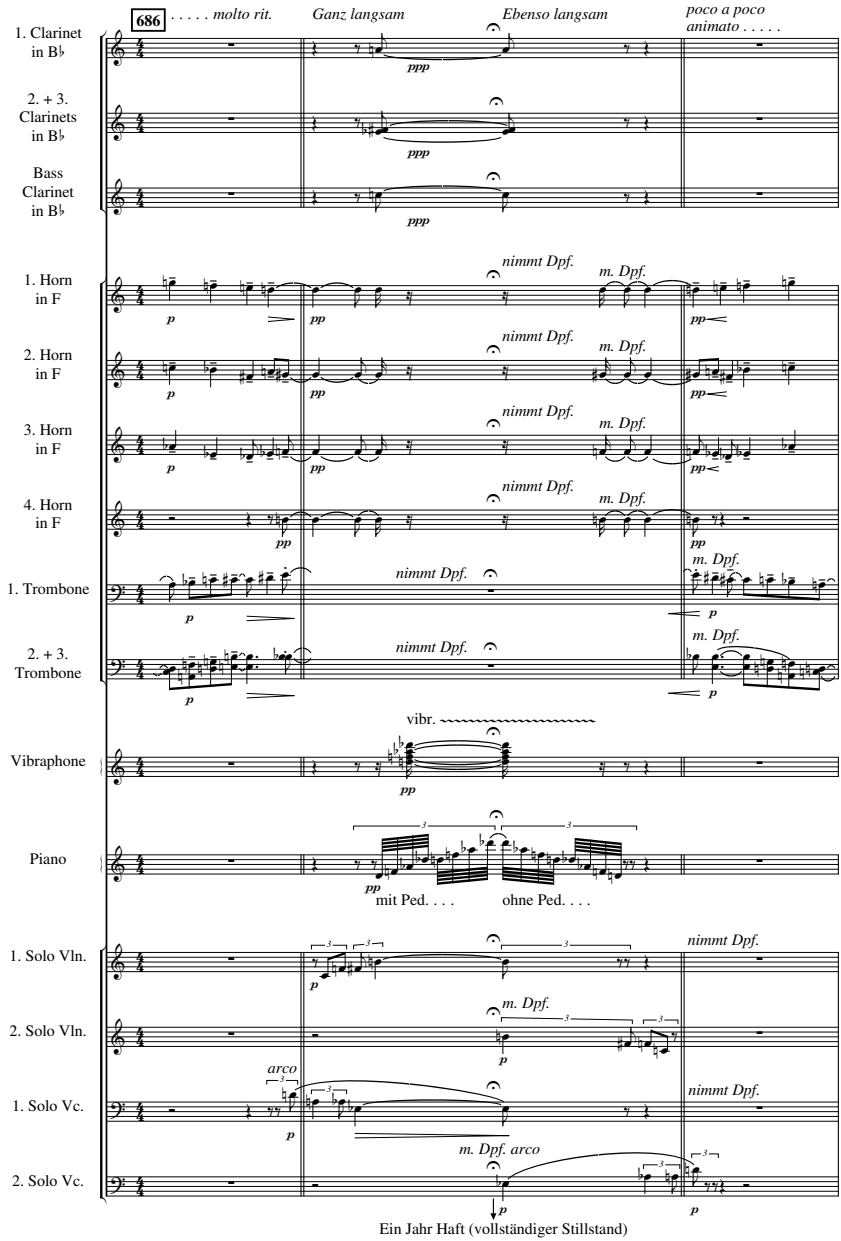
the idea of technological mechanism, in this case that of cinema. The *Filmmusik* interlude following act 2 scene 1 is a strict 48-measure palindrome that accompanies a silent film depicting Lulu's arrest, trial, and plans to escape: In other words, it presents an apparent disjuncture between linear narrative and musical reversal. In fact, George Perle's examination of Berg's *Particell* indicates that the composer "integrated [film] scenario and music," suggesting that the retrograde (accompanying Lulu's escape plan) was intended to reverse her path to prison—the "undoing" of her incarceration—with calculated precision. But this interpretation offers no coherent theory of the mechanics of time, and Perle refers to at least one "troubling discrepancy" between 12-tone theme and screen action as the subsequent publication of the orchestral score introduced errors in Berg's nomenclature and omitted the explanatory film scenario.[4] As Example 1 shows, the structure pivots around a single measure of formal stasis (m. 687) that delineates the axis of symmetry around a fermata over tied notes (or rests) in a kind of structural freeze frame. Appropriately, Berg's direction to slow down into the fermata, the point at which he calls for a "complete standstill," signals a moment approaching total gravity, a place without time. Similar mirror techniques also occur throughout *Wozzeck*, and provoked comment from one of Berg's most noted students. Adorno interpreted his teacher's pervasive "propensity for mirror- and retrograde formations" in terms of an explicit connection between compositional technique and time, or rather, anti-time: "Musical retrogrades are antitemporal," he surmised aphoristically in 1968.[5]

Whether affirming or negating time, musical palindromes challenge the assumption of linear chronometry by reversing the direction from a central axis, a condition that derives in part from Newtonian mechanics; in a complementary sense, a palindromic structure embodies the literal function of memory by recapturing the past. While mechanical time was understood to be real, a time of memory was only realized through imagination, opening a gap between perception and reality that would prove problematic for scientists but inspirational for certain composers. Any such claim requires an operative theory of both time and memory in the first place, neither of which are stable concepts in the early 20th century. Yet different musical palindrome procedures would seem able to embody

[4] George Perle, *The Operas of Alban Berg: Lulu* (Berkeley: Univ. of California Press, 1985), 150.

[5] "Auch seine [Berg's] Neigung für spiegel- und krebsartige Gebilde dürfte, abgesehen von der Zwölftontechnik, mit der visuellen Dimension seines Reagierens zusammenhängen; musikalische Krebse sind antizeitlich, bestimmen Musik, als wäre sie in sich simultan." Theodor Adorno, *Berg: Der Meister des kleinsten Übergangs* (Frankfurt am Main: Suhrkamp, 1971), 25.

EXAMPLE 1. Alban Berg's axis of symmetry in the "Filmmusik" interlude from *Lulu* (mm. 686–88). © Copyright 1964 by Universal Edition A. G., Wien. Revision © Copyright 1985 by Universal Edition A. G., Wien



Ein Jahr Haft (vollständiger Stillstand)

these instabilities. While the two literary quotations above are both palindromes, for example, they represent two quite different mirror techniques: using words and letters, respectively, to delineate the axes of symmetry, which relates to a basic paradox in our perception of duration as simultaneously momentary and continuous. The ancient Greek codification of this paradox presents a problematic of linear time, allowing for closer scrutiny of what can be termed the composition of modernist time.

Viewing 20th-century modernism as a chapter in a much longer story, the story of musical modernity, Karol Berger has suggested that a linear concept of historical time dates back to the late 18th century, when it replaced a more cyclic understanding. Inevitably, this affected the *Weltanschauung* of musical thought, Berger argues, for before then "music was simply 'in time,' it 'took time,' its successive events had to be somehow arranged one after the other, but the distinction between past and future, between 'earlier' and 'later,' did not much matter to the way it was experienced and understood."[6] Linear, Newtonian time forms the subject of this essay, but viewed through the lens of 20th-century technologies of mechanical reproduction that seemed to dent and even reverse time's pure linearity. While a time of modernism exists on the historical timeline, do we have a "modernism of time" that accounts for the temporal zigzags? What exactly did time mean in the decade that witnessed the distance-defying velocity of Lindbergh's transatlantic flight, the first radio broadcasts, and an increasing addiction to Edison's Duplex Telegraph wire? For composers such as Hindemith and Satie, the significance of duration can be inferred through a study that looks for a structural homology between historical and musical events, asking how and to what extent "time" and "motion" in the 1920s affected the composition of artworks. This essay will consider three such approaches: the phonograph as memory; *Hin und Zurück*, a one-act opera by Paul Hindemith, as time reversal; and *Entr'acte*, a Dadaesque film by René Clair, as *Instantanéisme*, or the obfuscation of understanding duration.

Zeno's Arrow

"Each of our acts aims at a certain insertion of our will into reality" (Henri Bergson)[7]

[6] Karol Berger, "Time's Arrow and the Advent of Musical Modernity," *Music and the Aesthetics of Modernity*, ed. Karol Berger and Anthony Newcomb. Isham Library Papers 6, Harvard Publications in Music 21 (Cambridge: Harvard Univ. Press, 2005), 14.

[7] Henri Bergson, *Creative Evolution*, trans. Arthur Mitchell (New York: Random House, 1944), 332.

So when was time first thought to "fly like an arrow"? Recorded in Aristotle's *Physics*, four paradoxes ascribed to the pre-Alexandrian philosopher Zeno of Elea (c.490–c.430 BC) concern the relations of time and motion. Zeno's arrow—the third paradox—characterizes apparently opposed states of existence, both of which are exclusively true yet mutually contradictory: An arrow in flight is always traveling, yet at any given point in time it is stationary. Although it is always in motion, it cannot have time to move unless it is permitted more than one instant—that is, permitted to occupy at least two successive positions. At any given moment, therefore, the arrow is at rest, motionless at each point in its swift course. This apparent contradiction was co-opted 2,300 years later by one of history's most ardent advocates of dialectics: Hegel knew that "pure motion" is a basic condition of dialectical thought, yet he argued that such motion did not exist in physical reality. In the surviving lecture notes for his History of Philosophy, he credited Zeno as the originator of the "true objective dialectic."[8] While Zeno's paradox of the arrow protests against what Hegel termed the untruth of "pure motion," it is precisely the quality of movement that led the arch-dialectician to explain: "The reason that dialectic first fell on movement is that the dialectic is itself this movement, or movement itself the dialectic of all that is."[9] By identifying dialectics with the idea of pure motion, an idea that Hegel argued has no basis in the material world, his position maintains a distinction between psychical and physical motion.

Incessant dialectical motion is defined for Hegel by states of mutual contradiction, whether of full and void, living and non-living, movement and stasis. While not embodying physical movement, these function as its imperfect analogue in the psyche. Without the possibility of not being, for example, there can be only continuous existence; but as the necessarily partial acceptance of continuous movement in Zeno's contradictory position implies, we all come into being and will die. Thus, in a demonstration of the paradox's multivalent application, pure being is no more absolute than pure motion.

A commingling of literal and dialectical movement led Henri Bergson in 1911 to explain the illusion of understanding duration, or any process of becoming, in terms of cinematography. Parallel technologies

[8] Altogether, Hegel taught nine courses on the history of philosophy, variously at Jena, Heidelberg, and Berlin. The *Vorlesungen über die Geschichte der Philosophie* was published posthumously in 1840 from an assemblage of lecture notes compiled by Hegel's student Karl Ludwig Michelet. The English translation by Haldane and Simson dates from 1892. See *Hegel's Lectures on the History of Philosophy*, trans. E. S. Haldane and F. H. Simson (Lincoln: Univ. of Nebraska Press, 1995), 1:263.

[9] Ibid., 1:266.

resulting from developments in chronophotography in the 1880s, such as Edison's Kinetoscope and the Lumière brothers' Cinématographe, provided a new visual basis for interpreting the mind and its cognitive processes. Preoccupied above all by the necessities of action, Bergson asserts, "the intellect, like the senses, is limited to taking, at intervals, views that are instantaneous and by that very fact immobile of the becoming of matter."[10] For Bergson, this illusion is embodied in the paradigm of moving-image technology, whose rapidly successive still pictures gave the impression of motion to audiences through the agency of the revolving mechanism. Figure 1, taken from Etienne-Jules Marey's study *Cycliste* (c.1894), illustrates the principle of chronophotography that Bergson had in mind. The paradox illuminated by such seemingly mobile images, as Bergson recognized, was that of Zeno:

> In order that the pictures may be animated, there must be movement somewhere. The movement does indeed exist here; it is in the apparatus. It is because the film of the cinematograph unrolls, bringing in turn the different photographs of the scene to continue each other, that each actor of the scene recovers his mobility. . . . Such is the contrivance of the cinematograph. And such is also that of our knowledge. Instead of attaching ourselves to the inner becoming of things, we place ourselves outside them in order to recompose their becoming artificially. We take snapshots, as it were, of the passing reality, and, as these are characteristic of the reality, we have only to string them on a becoming, abstract, uniform and invisible, situated at the back of the apparatus of knowledge, in order to imitate what there is that is characteristic in this becoming itself. Perception, intellection, language so proceed in general. Whether we would think becoming, or express it, or even perceive it, we hardly do anything else than set going a kind of cinematograph inside us.[11]

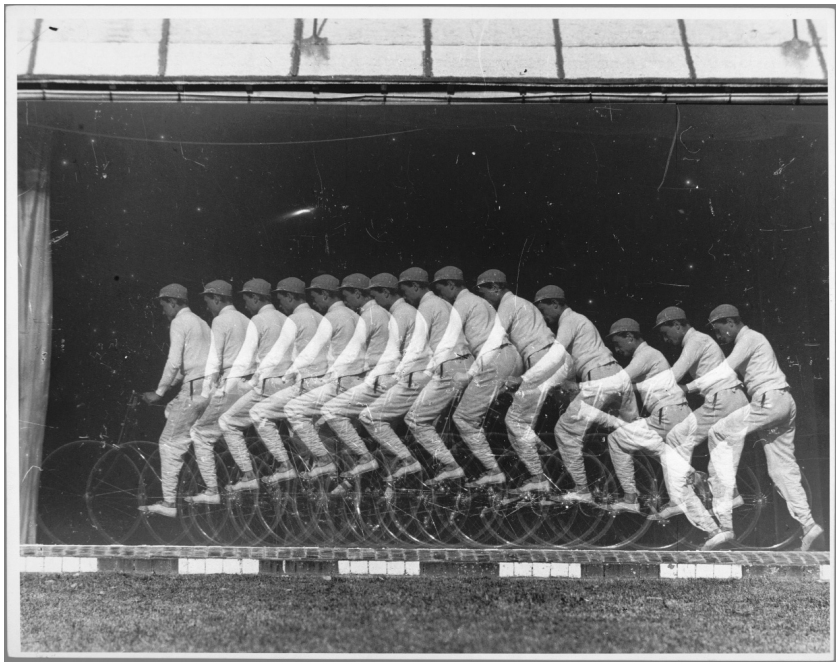
Interpreting cognitive functions in terms of new mechanical paradigms was widespread in the wake of the *Exposition universelle* of 1889 and 1900.[12] Bergson's insight into the Cinématographe mechanism was, however, to highlight not our ability but our failure truly to understand motion as a metaphor for becoming or duration. He regarded as foolish attempts to realize pure motion simply by intensifying the artifice, that is, by increasing the speed of cylinder rotation, thereby making the intervals between states infinitely smaller: "Before the interven-

[10] Bergson, *Creative Evolution*, 297.

[11] Ibid., 297, 332.

[12] For an animated discussion of writers, scientists and philosophers who utilized the new technologies as paradigms for human functions, see Friedrich Kittler, *Gramophone, Film, Typewriter*, trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford: Stanford Univ. Press, 1999).

FIGURE 1. Etienne-Jules Marey's chronophotographic study "Cycliste" (c.1894). Image from "La Collection des appareils," Iconothèque, Cinémathèque Française, Paris



ing movement you will always experience the disappointment of the child who tries by clapping his hands together to crush the smoke."[13] Without entering into the lacuna between modes of cinema spectatorship such as states of rapture and absorption as compared to those of reflection and detachment, we may suspect that Bergson's metaphor for understanding the passing of time was conceived as unequivocal.

Like Zeno's paradox, the cinematograph metaphor is not limited to motion and stasis but applies to other contradictory states within the human condition: In particular, the cardinal mystery of living and not living. In this respect, the key question of how inert bodies—whether arrow or man—can move between two points, physical or temporal, was most eloquently formulated in modern times by Paul Valéry: "Who will tell me how," he asked, "all through existence, my whole person has been preserved? What was it that carried me, inert, full of life and

[13] Bergson, *Creative Evolution*, 335.

spirit, from one end of nothingness to the other?"[14] His question suggests that the appeal of duration can most reasonably be explained through the twinship between our perception of time and our own existence: A finite stretch of time is unique within infinity, and so too (Valéry implies) is a human lifespan. The suspicion is that understanding duration in all its fracturable complexity will somehow equip us better to comprehend the mystery of existence, indicating a somewhat provocative coupling between man and technology.

As is well documented, a macabre preoccupation with death and dehumanizing forms accompanied the new reproduction technologies that amputated and reproduced isolated sensory elements of an otherwise "indivisible" human subject. Sigmund Freud declared in 1929 that with the camera and the gramophone, man had become "truly magnificent" as a kind of "prosthetic God," whose modern consciousness was anesthetized by a "second skin" of sensory apparatuses.[15] But situating this in the context of his theory of *thanatos*, man's death instinct, Freud warns flatly that—at the end of the 1920s at least—"man does not feel happy in his Godlike character."[16] Such auxiliary organs as Lumière's Cinématographe of 1895, rotating pictures at between 16 and 20 frames per second, produced a moving visual field, but without speech or sound effects, divorcing the eye from the ear; similarly, Edison's phonograph prototype of 1877 revolved with the inventor's unstable crank handle, bringing to a kind of life the wax-inscribed wave forms of "Mary had a little lamb," but in the absence of any customary visual correlate.

Of course, rather than divorcing the human functions of looking and listening, the technologies merely replicated them in isolation, reflecting Edison's optimistic claim that his Kinetoscope would do "for the eye what the phonograph does for the ear."[17] The fluctuating position of cinema's spectator represents the act of vision not merely as it is

[14] Paul Valéry, *A. B. C.*, quoted in Gaston Bachelard, *The Dialectic of Duration*, trans. Mary McAllester Jones (Manchester: Clinamen Press, 2000), 23.

[15] Freud's key statement reads: "In the photographic camera [man] has created an instrument which retains the fleeting visual impressions, just as the gramophone disc retains the equally fleeting auditory ones; both are at bottom materializations of the power he possesses of recollection, of memory. . . . Man has, as it were, become a kind of prosthetic God. When he puts on all his auxiliary organs he is truly magnificent; but those organs have not grown on to him and they still give him much trouble at times." Sigmund Freud, *Civilisation and its Discontents* [1929], trans. and ed. James Strachey (New York: W. W. Norton, 1989), 43–44.

[16] Ibid., 45.

[17] Edison to Seeley, 8 October 1888, Patent Caveat 110, Cat. 1433, ENHS. For an account of the circumstances under which Edison's and W. K. L. Dickson's invention of the kinetoscope first occurred, see "Understanding Invention as a Cognitive Process: The Case of Thomas Edison and Early Motion Picture, 1888–91," W. Bernard Carlson, Michael E. Gorman, *Social Studies of Science*, 20 (1990): 387–430.

objectively seen, but also as it is introspectively lived by another. Vivian Sobchack has called this cinema's "viewing view," a model of vision as it is lived as "my own" by a body-subject, whose uniqueness is that it is visible for us in the same form as it is visual for itself.[18] Similarly, the etching on Emile Berliner's shellac discs inscribed not what was performed in a concert or cabaret, but the aural experience of a fictional, nonhuman listener.[19] Although these media may assume different prosthetic functions, they nevertheless remain tied to a single real variable: time. For the phonograph, this is self-evident; for cinema's visual field, however, it is motion as the physical analogue of time that becomes the master variable. The time-axis manipulation[20] of early media apparatuses altered not only perceptions of duration, but also implied—via the specter of prosthesis—a changing human self-perception in the realm of music.

Unforgettable Impressions

Who could forget Nipper, the dog sitting on its dead master's coffin? On hearing his master's recorded voice, he began sniffing at the bell-mouth of the phonograph in an act of vocal-physiological loyalty that was later captured in oils by painter Francis Barraud. Like many humans, Nipper was caught unawares by the technology of sound reproduction. Were it possible to communicate with him, we might find that his recollection was involuntary, a reaction triggered by the sensory input from an unexpected origin. If we could have asked Nipper to recollect the sound of his master through a feat of canine inner-hearing, would his reaction have been the same? Would he have been able consciously to recollect in the first place? In a wider sense, these questions

[18] Vivian Sobchack, 'The Active Eye: a Phenomenology of Cinematic Vision' *Quarterly Review of Film and Video*, 12, no. 3 (1991): 25.

[19] In a similar vein, Carolyn Abbate has made the more scientific observation that "phonographic recordings capture sound's impact on air and membrane, so if they suggest a body or body part, it is a fictional *listener* and his or her ear, someone sitting in a specific space and hearing a live performance, who is re-created within the real listener hearing the recording." In "Outside Ravel's Tomb," *Journal of the American Musicological Society* 50 (1999): 493.

[20] By this is meant the apparent bending of time by compression or augmentation of the cylinder rotation speed. This engineering term was first introduced to scholarly inquiry through Kittler's study *Gramophone, Film, Typewriter*, 34ff. In his history of phonographic recording, Roland Gelatt explains this as a normal, everyday phenomenon: "The hand-propelled instrument looked like a toy, and sounded like one too. Even the most practiced operator could not keep the turntable speed constant; and as the gramophone [or phonograph] record joggled fitfully round and round, the pitch would soar and tumble in diverting but hardly satisfying cacophony." In *The Fabulous Phonograph: 1877–1977* 2nd. rev. ed. (New York: Macmillan, 1977), 83.

point to an interdependency of time and memory that was destabilized by the innovation of the phonograph.

Before sound technology, memory could be nothing more than an inner, subjective faculty. The ability to reminisce—beautifully explored in literature such as Proust's *À la recherche du temps perdu* (1913–27) and Bergson's *Matière et mémoire* (1896)—is heralded as a defining characteristic of our individuated humanity, contingent on the history to which we have been subject and the will that has directed us. For the Romantics, it had come close to describing the action of a soul. Joseph Delboeuf's semi-metaphorical observation that "The soul is a notebook of phonographic recordings"[21] unwittingly reconstituted man's "soul" as a mental storage unit, however, provoking not only a critical defense of human subjectivity, but a reconsideration of that abstract canvas against which memory functions: time passing. By objectifying the functions of memory in relation to time, it became possible to relate them to the functioning of other objects.

Whereas motion concerns space, duration belongs to time; for Zeno these are infinitely divisible properties. Rural Burgundy evoked this intersection for the philosopher and historian Gaston Roupnel in 1932, but the relationship is equally embodied in the enigmatic topography of the gramophone disc:

> Different things and different times slowly adjust to each other . . . space acts on time and time reacts upon space. Ploughed fields depict figures of duration every bit as clearly as figures of space; they show us the rhythm of human toil. A furrow is the temporal axis of work and evening repose is the field's boundary mark.[22]

Just as the furrows of Roupnel's ploughed field depict an irrevocable duration or "rhythm" of activity, the runic grooves of Berliner's shellac discs inscribe on a static object the impressions of the passing of time—the "rhythm" (or amplitude) of a musical activity, now rendered quite literally unforgettable. By allowing for mechanical repetition, however, the gramophone interrupts the unfolding rhythm of duration; fields are incessantly ploughed, sown, harvested and re-ploughed—continually created; but the etchings of a needle inscribe a one-time acoustic event that is continually recreated through subsequent repetitions.

[21] Quoted in Jean-Marie Guyau, "La mémoire et le phonographe," *Revue philosophique de la France et de l'étranger* 5 (1880): 319–22.

[22] Gaston Roupnel, *Histoire de la campagne française* (Paris, 1932), paraphrased in Gaston Bachelard, *The Dialectic of Duration*, trans. Mary McAllester Jones (Manchester: Clinamen Press, 2000), 20.

The abstract concept of repetition is of course quite different from its sensory perception. To listen again to a recording is nevertheless to experience it through virgin time rather than to regain lost time. But it was the concept that led media theorist Friedrich Kittler to cite Jean-Marie Guyau's 1880 essay "La mémoire et le phonographe" as further evidence that in the age of psycho-neurology, human memory had essentially been reduced to an analog storage device.[23] In this context, Edison's suggestion that one of the principal uses of his invention would be to record and store the dying words of one's relatives takes on a darker complexion.[24] The case is not quite complete, however, for in interpreting the brain as an "infinitely perfected phonograph," Guyau's account also points to a distinction between storage and retrieval: "There is nothing finished in the brain, no real images; instead, we see only virtual, potential images [stored up] waiting for a sign to be transformed [or retrieved] into actuality. How this transformation into reality is really achieved is a matter of speculation. The greatest mystery of brain mechanics has to do with dynamics—not with statics."[25] In this analogy, phonograph sound reproduction merely mechanizes the dialectic between direct experience and our memory: Its actual movement replaces that conceptual motion from intuition to (stored) idea.[26] Thus, the acoustic factor in what occurred when you began reading this essay can both be re-presented cryptographically and stored as data streams (whether shellac grooves or binary code) rather than retained as memory; and it can be accessed via disc rotation rather than re-collected mentally. In essence, therefore, memory as a dual function of time past can be usurped by the curves of a needle.

But how can we define time in terms of memory? From the perspective of memory, the action of time is change. Indeed, it was this very confrontation between mutability and immutability that drew Zeno

[23] Kittler, *Gramophone*, 21–114.

[24] "*Family Record.*—For the purpose of preserving the sayings, the voices, and the *last words* of the dying member of the family—as of great men—the phonograph will unquestionably outrank the photograph." Edison gives a laundry list of possible uses for his invention, which he divides into the categories of letter-writing, dictation, books, educational purposes, music, family record, phonographic books, musical-boxes/toys, toys, clocks, advertising, speech, and other utterances. See "The Phonograph and Its Future," *North American Review* 126 (1878): 533–34.

[25] Jean-Marie Guyau, "La mémoire et le phonographe," see Kittler, *Gramophone*, 30.

[26] Gaston Bachelard had argued for a theory of temporal discontinuity in which he contends that experienced time is irreducibly fractured and interrupted, stating boldly that "*psychic continuity is not given but made.*" We exist, Bachelard asserts, in a constant dialectic between lived time—a chronometry of actions and matter—and thought time—a memory of psychic instants and intuitions. See *La Dialectique de la durée* (Paris: Presses Universitaires, 1950), 19. Published in English as *The Dialectic of Duration*, trans. Mary McAllester Jones (Manchester: Clinamen Press, 2000).

to formulate his paradoxes: It is a tangible change in form or relative position that documents the movement of time—whether Roupnel's furrowed fields, a musical performance, or an arrow's positions along a given path—just as static or unchanging objects defy the perception of time passing, substituting it for the illusion of ageless fixity, or pure stasis.[27]

Change, as a function of time, applies equally to human self-perception or the perception of objects. Since yesterday we were different both from ourselves the day before and ourselves today, we are resigned to the fact that human beings consist in a continuum of different beings at different points in time. The logical approach to the question "who am I?" thus lies in the attempt to retrieve all previous selves, in the manner of collected stills from Bergson's cinematograph metaphor; the effect is to form a virtual palindrome. This reading of memory counterpoints the static formation of an abstract self-identity at a particular point (the storage) against our dynamic recollection of this from a future perspective (the retrieval).

Returning to Hegel's terms of reference, such a distinction had been summarized decades earlier in his differentiation between *Erinnerung* and *Gedächtnis*. Both terms are commonly translated as "memory," though within Hegel's ontology of the mind they refer to different operations of the intelligence. *Erinnerung*, translated as "recollection," can be defined—temporally—as the dialectical reference between an image, idea, or person remembered and the intuition that originally granted it abstraction:

> Intelligence, as it at first recollects the intuition, places the content of feeling in its own inwardness—in a space and a time of its own. In this way that content is . . . an *image* or picture, liberated from its original immediacy and abstract singleness amongst other things, and received into the universality of the ego. The image loses the full complement of features proper to intuition, and *is* arbitrary or contingent, isolated, we may say, from the external place, time and immediate context in which the intuition stood. . . An image thus abstractly treasured up needs, if it is to exist, an actual intuition: and what is strictly called Remembrance [*Erinnerung*] is the reference of the image to an intuition.[28]

[27] According to Hegel, Parmenides asserted that "the all is immutable, for, in change, the non-being of that which is would be asserted, but Being only is; in saying that 'non-being is,' the subject and the predicate contradict themselves," whereas Zeno asserted "Assert your change; in it as change there is the negation to it, or it is nothing." See *Hegel's Lectures*, 1:261.

[28] Hegel, *Encyclopaedia of the Philosophical Sciences*, part 3: The Philosophy of Spirit (1830), C. Psychology Mind (a) Theoretical Mind, § 452–4 in *Philosophy of Mind*, trans. William Wallace (Oxford: Clarendon Press, 1971).

By contrast, *Gedächtnis*, translated as memory in the sense of "representation," relates—spatially—to the conscious synthesis by the intellect of a meaning with a particular object or idea: "Given the name lion, we need neither the actual vision of the animal, nor its image even: the name alone, if we *understand* it, is the unimagined simple representation. We *think* in names."[29] In setting forth a theory of such mnemonics, Hegel explicates the abstract, external nature of *Gedächtnis*:

> As the interconnection of the names lies in the meaning, the conjunction of their meaning with the reality as names is still an (external) synthesis. . . . But intelligence is the universal—the single plain truth of its particular self-divestments [*Entäußerungen*]; and its consummated appropriation of them abolishes the distinction between meaning and name. This supreme inwardizing of representation [*Erinnerung*] is the supreme self-divestment [*Entäußerung*] of intelligence, in which it renders itself the mere *being*, the universal space of names as such, i.e. of meaningless words. The ego, which is this abstract being, is, because subjectivity, at the same time the power over the different names—the link which, having nothing in itself, fixes in itself series of them and keeps them in stable order. So far as they merely *are*, and intelligence is here itself this *being* of theirs, its power is a merely abstract subjectivity—memory [*Gedächtnis*].[30]

The key distinction here is that *Erinnerung*, as a dialectical movement between past intuition and present image/idea, works internally through time, whereas *Gedächtnis*, as a one-time abstract representation, works externally through space. Given that such mental functions became a means of interpreting media apparatuses in the early 20th century (which often also served as compositional models), Hegel's compound definitions can usefully be applied to changing perceptions of time in the age of Edison and Lumière, affording an insight into the significance of the new sight and sound mechanisms within the spatio-temporal dichotomy outlined above.

While the appeal of a wax or shellac inscription points to the trans-temporal, the period in which such needles and their etchings gained commercial viability can be located securely in the 1910s and early 20s. A new concept of "gramophone time" steadily infiltrated the cultural consciousness in the early Weimar Republic, though in different ways. For Kurt Weill, the gramophone, like the automobile and the washing machine, was a metonym for modernity. In his farcical one-act opera of 1928 *Der Zar läßt sich photographieren* (The Czar Has His Photo Taken), the gramophone is incorporated on stage as a prop, playing a

[29] Ibid., § 462.
[30] Ibid., § 463.

pre-recorded jazz track—*Tango Angèle*—which signified the up-to-dateness of his *Zeitoper*. Now, of course, it has become a mark of the opera's out-of-dateness.[31]

The gramophone also came to symbolize changing perceptions of time. In sharp contrast to the stable, transcendent notion of clock time—whose uniformity had been legally standardized throughout Germany in 1891[32]—the gramophone, with its potential for subtle time-axis manipulation, withdrew the irrepressibility of time and asserted in its place a manipulable, contingent quality: In Ernst Krenek's formulation, *schnelles Grammophontempo*. This is the actual tempo indication for the "shimmy" instrumental interlude of his hit *Zeitoper*, *Jonny spielt auf* (1926). Life—conceived as a single duration—proceeded apace at gramophone tempo, for with the resulting knowledge that time could give and take came the frenzy to extend it. By showing an enormous clock face, for example, which is metric—apportioned into ten hours rather than twelve—and whose second hand stealthily circumnavigates with uncustomary haste, the opening scene of Fritz Lang's 1927 film *Metropolis* doubly symbolizes this constant feeling of a lack of time as an essential component in modern life (Fig. 2).[33] The effects of this phe-

nomenon even entered pathology as early as 1881 when an alarmist medical treatise entitled *American Nervousness* railed against mechanical watches and clocks because they incessantly pressured the individual, producing a sensation in which "a delay of a few moments might destroy the hopes of a lifetime."[34] Similarly in the realm of literature, Kafka's most famous creation becomes doubly distressed not only by the fact that he has awoken as a large invertebrate beetle but because he has already missed his train and is about to miss another.[35] The point of breakdown in Gregor Samsa's relationship to society is registered, symbolically, by a timetable.

[31] For a detailed discussion of this opera in terms of sound technology, see Alexander Rehding's "On the Record," *Cambridge Opera Journal* 18 (2006): 59–82.

[32] Count Helmuth von Moltke delivered an influential speech to the German Parliament on 16 March 1891 arguing that the five time zones of Germany hindered the railways and possible mobilization of the army. See *Documents Relating to the Fixing of a Standard Time and the Legalization thereof* (Ottawa: Queen's Printer, 1891), 25–27.

[33] Later in the film, however, the masters of the workforce are seen to retain their 12-hour clock. Ironically, the idea of decimal time may also refer to the attempt to liberate through fully rationalized time, established during the French Revolution as part of the French Republican Calendar (divided into ten months, each with three *décades* of ten days). Decimal division of the day into hours was introduced on 5 October 1793, along with *minute décimale* and *seconde décimale*. The experiment never caught on and was officially suspended on 7 April 1795.

[34] George M. Beard, *American Nervousness* (New York: Putnam, 1881), 103.

[35] " 'Vorläufig allerdings muss ich aufstehen, denn mein Zug fährt um fünf.' Und er [Samsa] sah zur Wecker hinüber, die auf dem Kasten tickte. 'Himmlischer Vater!', dachte

FIGURE 2. The 10-hour clock face from Fritz Lang's *Metropolis* (1927). Courtesy of Friedrich-Wilhelm-Murnau-Stiftung; distributor: Transit Film GmbH

Lang's vision of compression was not universally accepted. Ambivalent voices such as the music critic Hans Heinz Stuckenschmidt raised the question of direct realism, separating perceived time from "real" time: "Telegraph, telephone, automobile, subway all see to it that not a minute is squandered. But do they in fact? Or is the economy they suggest only a hint, a momentary thrill of superiority over temporal obstacles?"[36] It is no coincidence that Stuckenschmidt's reservation occurs in the context of what he calls the "theoretical problem" of musical time, namely that "music is capable of lengthening or shortening the duration of a minute in our perception."[37] While the premise of his

er. Es war halb sieben Uhr, und die Zeiger gingen ruhig vorwärts, es war sogar halb vorüber, es näherte sich schon dreiviertel. . . . Was aber sollte er jetzt tun? Der nächste Zug ging um sieben Uhr; um den einzuholen hätte er sich unsinnig beeilen müssen." Franz Kafka, *Die Verwandlung* (Stuttgart: Reclam, 2001), 7.

[36] "Telegraph, Telephon, Auto, Untergrundbahn sorgen dafür, daß keine Minute verschwendet wird. Können sie es in der Tat? Oder ist die Ersparnis, die sie uns suggerieren, vielleicht wirklich nur eine Suggestion, ein Rausch der Überlegenheit über temporäre Hemmnisse?" in Hans Heinz Stuckenschmidt, "Short Operas," *Musikblätter des Anbruch* 10 (1928): 204.

[37] "Die Dauer einer Minute kann durch Musik für unser Empfinden verlängert oder verkürzt werden." Ibid., 207.

question relies on the notion of clock time as an unassailable regulator, music functions here as a metaphor for relative duration, which, when recorded on disc, is then multiplied by the gramophone mechanism's own temporal flexibility.

As Gaston Bachelard observes, there is a certain darkness to the resultant knowledge that time gives and takes, for we become aware that it will take from us again.[38] This suggests that while the gramophone and reproduction technologies "inspire the hope for eternal life," they simultaneously represent a loss of time, as Hans Ulrich Gumbrecht has argued.[39] In essence, time is transmogrified into matter; and for many, the resultant hysteria to maximize one's time—suggested by Stuckenschmidt's psychology of compression—is felt all the more keenly. Equally importantly, however, the new technology placed "time" in a wooden box that neatly inverted the function of a coffin (a motif coined by Mann's tubercular convalescent Hans Castorp in *The Magic Mountain* when he referred to his gramophone as a "little coffin of violin wood").[40] Far from the domain of esoteric physics, time became a domestic artifact to touch and play with, a household toy-of-the-age to be manipulated, much like Nipper or a long-haired feline.

I rehearse a commonplace to state that the performance of insubstantial musical works is defined both in opposition to the statics of graphic and literary art, and metaphorically as akin to the transience of living beings. But ever since Edison heard his phonograph singing "Mary had a little Lamb" in December 1877, he destabilized this metaphor, challenging the uniqueness of any single duration. The resultant interplay of metaphors led to a startling conclusion: By fixing a reality, hitherto subject only to direct experience, Edison's invention also apparently fixed the unfolding of time. Correspondingly, the metaphysical implications extend over three levels: Sound could now be captured, commodified, and replayed; the passing of time, therefore, could be objectified, recalled, and re-lived; our existence—allied to that of time—could, with the aid of technology, be re-presented indefinitely. Our presence could thus quite literally be *re-membered*. If families do indeed listen to their deceased relatives, as Edison suggested, they—like Nipper—feel an eternalized presence; this, however, is nothing but the specter of one's remembrance, the flipside of which is that listeners experience the presence of their own mortality: an apparition inscribed as grooves onto a metallic tomb.

[38] Bachelard, *The Dialectic of Duration*, 51.

[39] See Hans Ulrich Gumbrecht, *In 1926: Living at the Edge of Time* (Cambridge: Harvard Univ. Press, 1997), 113.

[40] Thomas Mann, *Der Zauberberg* (Berlin, 1924); trans. H. T. Lowe-Porter (New York: A. A. Knopf, 1927), 642.

Hindemith's Time Reversal

Just as time could be used in *Zeitoper* both as a sign of the future and as a projection of our own inevitable end, it could also be used—under the auspices of the palindrome—as an agent of undoing. Hinting at the concept of living after you are supposed to have died, Stuckenschmidt again underscores the implication: "In the evening [the press] floods us with the following day's news; we can die on the thirty-first with the newspaper from the first in our pocket."[41] Of course, this can be taken a step further. In addition to speed, gramophones and cinema reels could alter the direction of their media presentation, reversing their intended playback function in a virtual palindrome. Cinematic motion in rewind—such as the famous horse chase in Louis Gasnier's *Le Cheval emballé* (1908)—captures the absurdity of time running backwards in a visual sense; but equally, if the inscriptions of a needle, with their metaphysical associations of memory and being, objectify the passing of time, it also becomes possible mechanically to *reverse* this passage. An altered gramophone could rotate its wheel anticlockwise; time can be made to run backwards; characters whose sounds are contained on the record "age" younger; the Hegelian dialectic of *Erinnerung* between past intuition and present image can apparently be re-synthesized.

This, at least, is the claim of a satirical one-act sketch by Hindemith and librettist Marcellus Schiffer, *Hin und Zurück* (There and Back Again, 1927). The opera forms a mirror construction in which, following a betrayal, a murder, and a suicide, dramatic time—and music—run backward from a central point and the whole scene is played in reverse so that we finish with the happy beginning (one of many parodies on operatic practice). The plot is concise: Robert returns home without warning only to find his wife—Helene—with a letter from her secret lover. He shoots her in a jealous rage, and while a fellow resident and the ambulance man carry out the body, he throws himself out the window. A Bearded Sage then enters and, deploring the tragedy, causes time to run backward to the opening of the opera—a "precious joke," as one reviewer commented.[42] Chronometric time is symbolized here by the mechanical regularity of the deaf Aunt's knitting: She remains oblivious both to the domestic affray taking place around her and its temporal-dramatic reversal—her scarf grows longer and longer from beginning to end, in a straight chronological flow. Indicating the reversal, the

[41] "Sie [die Presse] überschwemmt uns abends mit den Morgenblättern des nächsten Tages; wir können am 31. sterben und schon die Zeitung vom 1. in dr Tasche haben." Stuckenschmidt, *Musikblätter des Anbruch* 10 (1928): 205.

[42] "Ein kostbarer Ulk." See Max Unger: "Deutsche Kammermusik in Baden-Baden," *Allgemeine Musikzeitung* 54 (1927): 877.

Sage's words work on two levels: Locally, they drive this particular operatic narrative; and they also resonate with wider associations of reproduction mechanisms and their time-axis manipulation, where time is no longer an immutable quantity but rather a quality contingent upon technology:

> Nobody thought that a higher power might intervene. . . . Seen from above, it is of no importance whether a man's life proceeds from the cradle, until he meets his end, or whether he dies first, and is born afterwards. Let us reverse this fate and make things turn back, then you will see the logic does not change one iota, and everything will be well, as it was before.[43]

The *höhere Macht* here corresponds to technology; and Schiffer, in an ultra-objectivist comment, states that it makes "no great difference" if time runs forward or backward. Of course, for a phono- or cinematograph this simply means winding the crank handle the opposite way (or, after 1925, switching the direction of the electric current), though for a subject, the reversal of time is of monumental significance. In terms of *Erinnerung* and temporality, it entails the syntheses of time past with time present, and that of time present with time future; for *Gedächtnis* and spatiality, it entails the erasure of associative meanings (Hegel's "Lion" would no longer refer to the king of beasts, for example, and would become as a vacant phoneme to a child). Such an erasure complicates the customary theatrical relations between stage character and audience: How, in an age of realism and *Sachlichkeit*, can a character who has committed murder and suicide return to life and former innocence? This subversion of cause and effect dislocates our perception of the dramatic narrative from that of chronological time. The discomforting joke, for the audience, is the continued recollection of all the terrible events that precede the "happy beginning." As the action on stage is gradually defused, the listener is made to realize how fragile the couple's happiness is. In this view, Hindemith's conclusion is almost "sentimental" in a Schillerian sense, for it quite literally forms a reflexive harking back to a time of lost naïveté.[44] The Sage, as an atemporal *deus ex machina* (or, as a metaphor for moving picture technology, *deus ex cinematographo*), provides relief from the fact that man can be de-

[43] "Man hat nicht an den Eingriff höhrer Macht gedacht. / . . . Von ganz droben gesehn ist es ohne Belang, ob des Menschen Lebensgang von der Wiege vorwärts irrt, bis er verdirbt, oder ob er erst stirbt und nachher geboren wird. Laßt uns darum das Schicksal rückwärts drehen. Ihr werdet sehen, die Logik weicht nicht um ein Haar, und alles wird gut, wie es vorher war." Paul Hindemith, *Hin und Zurück,* op. 45a (Mainz: Schott, 1955), 14–15.

[44] Friedrich Schiller, *Über die naïve und sentimentalische Dichtung*, ed. Klaus Berghahn (Stuttgart: P. Reclam, 2002).

stroyed for petty reasons ("dass der Mensch sich wegen Kleinigkeiten umbringt") but cannot truly conjure a "happy" ending because, for the audience, he is unable to erase representation or re-synthesize the dialectic of recollection (qualities attained for the non-perceiving characters on stage). The confusion inherent in this dramatic quandary provides Hindemith with ample opportunity for a musical portrayal of time that distinguishes between the pure motion of reversal—*Erinnerung*—and that of a static, symbolic reordering of Bergsonian "snapshots" or cinematographic photograms—*Gedächtnis*—that divide time's path into discrete, instantaneous units. But how is this manifest as compositional technique? Let us briefly relocate our inquiry in the musical patterns underscoring Hindemith's strategies for time and its reversal.

In *Hin und Zurück*, there is a temporal disjuncture between drama and music. The plot reversal is experienced in perfect retrograde, as though it were a film reel wound backwards, reversing Zeno's arrow. While the musical equivalent would have been possible—in strict palindromes such as Hindemith's *Ludus Tonalis*, for example[45]—this would have had severe implications for both text and tonality, as mentioned in the introduction. Hindemith comically acknowledges that text and speech become meaningless when reversed; the only example is the Aunt's symbolic sneeze: "Haa-ptschü" when the curtain rises, "Ptschühaa" shortly before it falls. Its function as a signifier changes from an onomatopoeic lexical unit to simply the gibberish of a rewound script *en masse*. Indeed, for the most part, Schiffer's text is reversed not literally in pure motion—as a rewound gramophone would engineer—but clause by clause in the manner of a re-ordered mosaic, rather like Bergson's cinematic snapshots in rewind. In a similar vein, we may recall that any music dependent, however tentatively, on functional tonality or modal hierarchies appears to be unidirectional and therefore meaningless when reversed (at least in terms of any original "meaning"). Here the analogy of the rewound gramophone, or the illusion of pure motion, must end, for Hindemith employs a strategy—allied to Schiffer's text—in which literary/musical phrases are simply reordered as external blocks.

Beyond this general principle, there are three specific musical procedures through which Hindemith signals time reversal: first, gestural inversion of musical figures; second, precise internal reversion of phrasal components; third, freely modified musical fragments. The following music examples illustrate a combination of these techniques in four passages.

[45] Among the many mirror forms in *Ludus Tonalis*, a clear example is the *Epilogue*, which is simply a retrograde inversion of the *Prologue*.

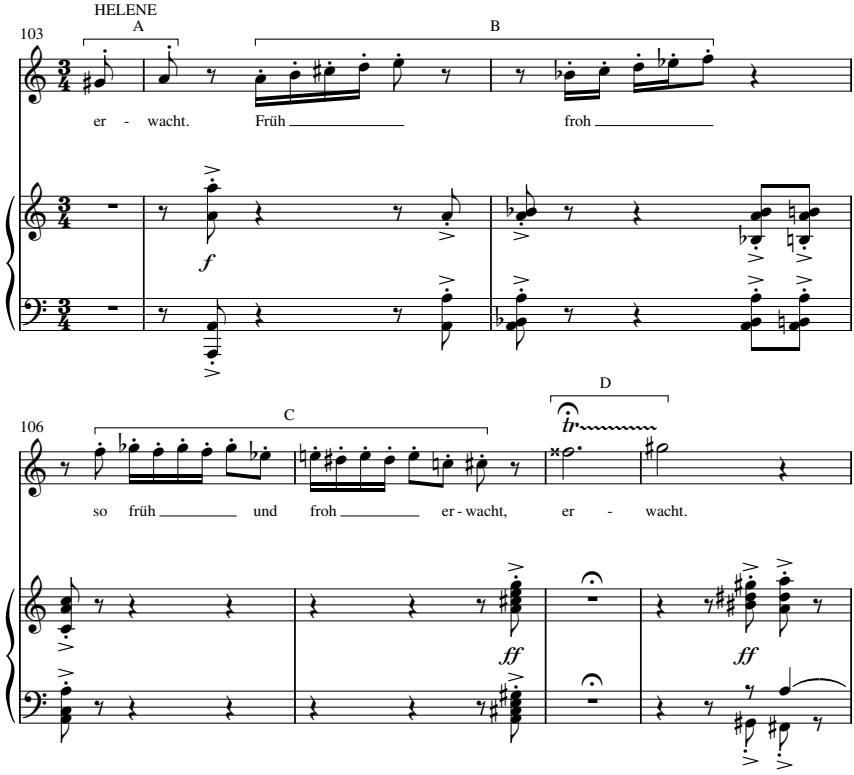
The spatial inversions of the first category do not affect the dramatic narrative; and with respect to memory, they correspond to Hegel's *Gedächtnis* as an external synthesis of sign and referent. If by analogy we can posit the musical figures as associative meanings, it is clear that simply by inverting the figures Hindemith can signal their erasure as demanded by the concept of time reversal. Compare the following passage from Helene's opening *Ariette* (Ex. 2a) with its appearance at the end of the opera (Ex. 2b).

Note that the phrase sections I have denoted as A–D are reversed quite precisely though internally not strictly. Phrase A, "erwacht," is a case in point—a gestural (not strict) inversion; phrase B on the other hand, the setting of "froh" and "früh," constitutes the only tonally strict inversion, though even here the rhythmic pattern  runs forward both times; phrase C is simply repeated—forward, illustrating the snapshot technique; phrase D is enharmonically mirrored (A♭/G♯) and altered through the absence of the chromatic neighbor note trill.

The strict internal reversion of phrasal components (unlike the gestures above) typically occurs when the harmony remains within a single key, inviting a mirror-like repetition. This is evident in the duet between Robert and Helene, which spills into argument and illustrates the process of strict mosaic/snapshot reversion, wherein the order of predefined segments is reversed while the segments themselves run forward.

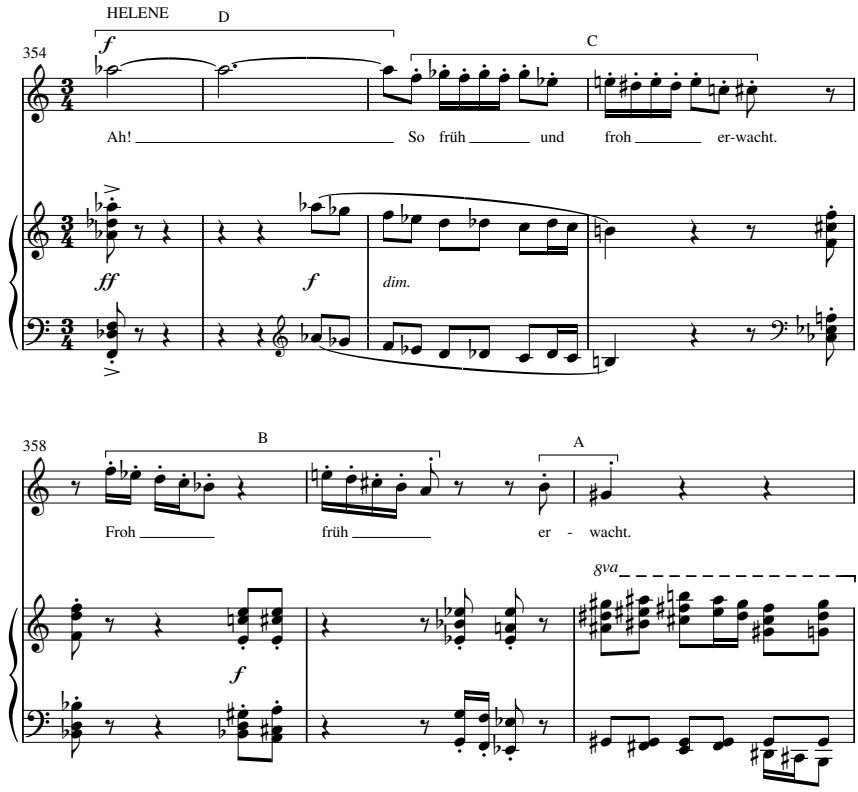
Comparison with the apex of the couple's argument leading to the murder shows a note-for-note, phrasal reversion (Ex. 3a and b). Arguably, time reversal in Hindemith's score is symbolized through the reversion of just such predefined segments (here labeled A–B) in which both drama and music run forward, so that the passage of time flows backward while the action (to remain comprehensible) proceeds normally. Hindemith's musical procedure thus mimics closely the psychic process identified by Hegel in that even a recollection is thought forward; it is the discourse from present to past that perceptually runs backward. Compare Example 3a with Hindemith's reversed version given as Example 3b. In the backward version, the phrasal segments A–B are reversed; and in section A the order of Helene's four sentences is also reversed, owing to their temporal significance: "I'm dy . . . ! Don't fire the pistol! He certainly wants to shoot! What is he going to do?" By contrast, Robert's three imaginative invectives signify no action that requires reversal and therefore (omitting the final insult: "Tück-'sches Krokodil!") are left in their original order: "Falscheste der Kröten! Hinterlist'ger Igel! Gräßliches Ichneumon!" (Falsest of Toads! Cunning Hedgehog! Horrible parasitic wasp!)

EXAMPLE 2a. Helene's *Ariette*, mm. 103–9 [forward]. © 1927 Schott Music. © Renewed. All Rights Reserved. Used by permission of European American Music Distributors LLC, sole U.S. and Canadian agent for Schott Music



Music fitting into the third category—freely modified—fluctuates greatly as to the degree of modification introduced in the second appearance. Certain phrases are entirely distinct from one another, while others such as Robert's declaration that he must jump out the window are recognizably mimetic in the voice part with only the chromatic bass motion inverted (Ex. 4a and b) The differences here, while potentially of analytical consequence, would be overlooked by an audience because—occurring only 28 measures apart—the contour, the rhythmic values and the sustained peak (A♭) remain constant. Differences creep in with the inverted voice-leading of the accompaniment(s), whose contrary motion moves outward in the forward version, though inward in the backward version; as if in sympathy, the decrescendo of the forward

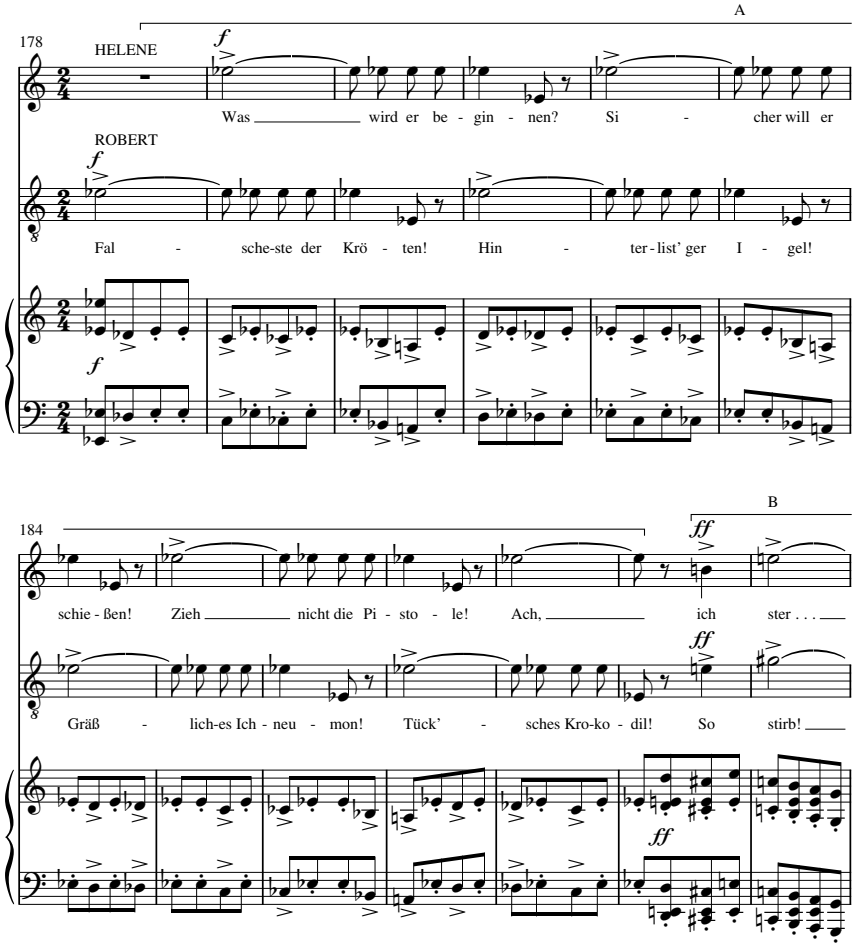
EXAMPLE 2b. Helene's *Ariette*, mm. 354–60 [backward]. © 1927 Schott Music. © Renewed. All Rights Reserved. Used by permission of European American Music Distributors LLC, sole U.S. and Canadian agent for Schott Music



part is reversed into a crescendo in the backward part. Such differences, however, are minor in comparison to other predefined sections.

Helene's opening greeting to her aunt is a case in point, for the forward and backward versions display different rhythmic, tonal, and metrical identities (Ex. 5a and b). They can again be divided into three phrases, labeled A–C. Phrase A spans a perfect fifth going forward, outlining a G-minor triad, while going backward, it spans a tritone, directed toward a G♯ tonal center (m. 385). The question "Wie geht es Dir?" (phrase B) outlines an F♯ minor triad going forward, while going backward, a G♯ minor center is again signaled. Phrase C shares the same enharmonic span in both versions (perfect fifth), though the tonal center in the forward version is a D-A axis, while going backward,

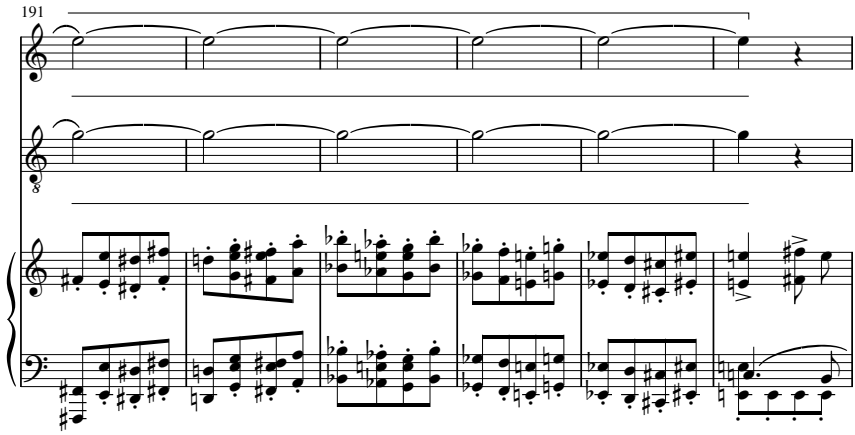
EXAMPLE 3a. Robert / Helene's *Duett*, mm. 178–96 [forward]. © 1927 Schott Music. © Renewed. All Rights Reserved. Used by permission of European American Music Distributors LLC, sole U.S. and Canadian agent for Schott Music



it is D♯–G♯. Additionally, and underscoring a general disparity, the changing meter throughout the first version contrasts with the stable meter in the second.

With such a wealth of techniques, the effect of portraying time flowing backward is wholly convincing as a cinematic spectacle, and amid an imbroglio of metaphysical implications, begins to question any assumptions that modernist conceptions of time were fundamentally

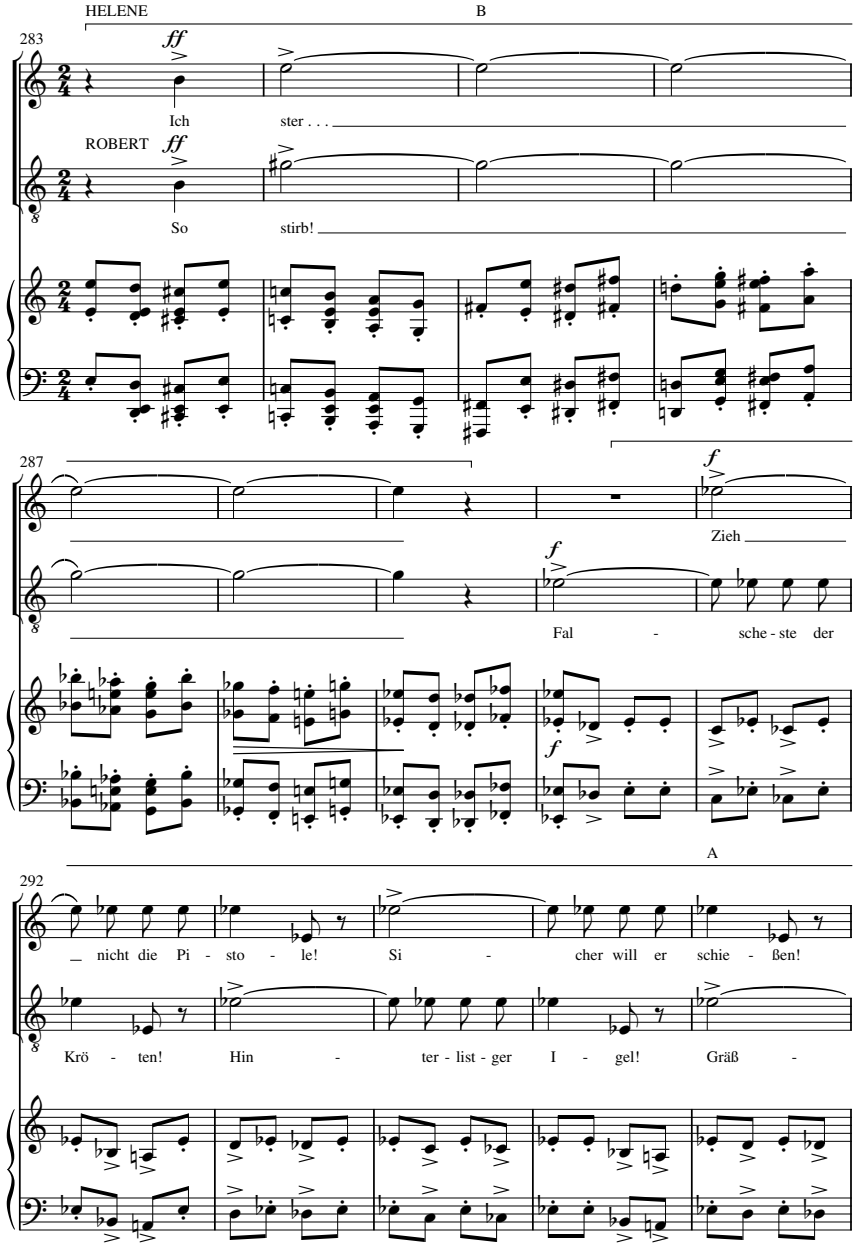
EXAMPLE 3a. (*continued*)



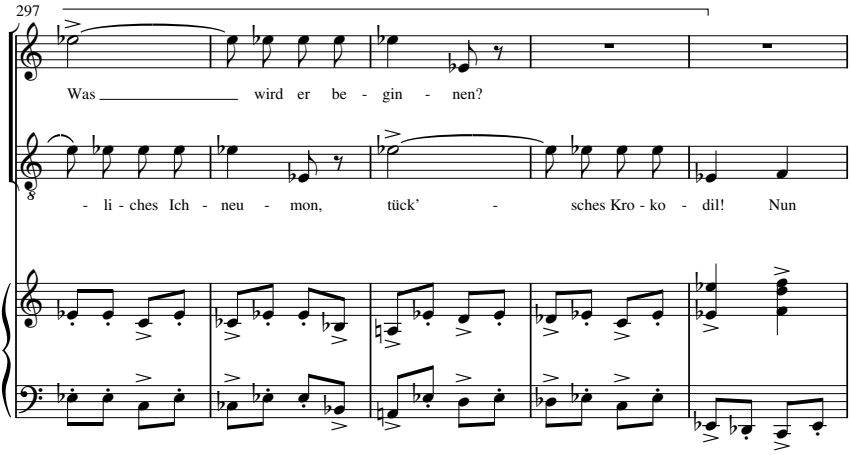
chronometric. In its external spatiality, exact intervallic inversion suggests the erasure of Hegelian *Gedächtnis*; the strict mosaic reversals point to the conceptual apparatus of Bergson's rewound cinematograph reel—rewinding our snapshots of existence and thereby retracing the path of our *Erinnerung*. Without this combination, Hindemith's dramatic reversal of music and time would scarcely have been possible. Nevertheless, there is a disparity between this snapshot time quality written into the musical structure and the pure backward motion of actors on stage who reverse their movements exactly—the illusion of a cinema reel in rewind (though actually more akin to a gramophone's non-snapshot mechanism). The cinematic illusion, by virtue of the opera's spectacle and brevity (the work lasts a mere 12 minutes),[46] dominates the perception of narrative. Just as a grief-stricken Robert jumps out the window, the Sage's machinations cause him 28 measures later to jump back in. The effect is like one of Méliès's cinematic tricks —an instance of art imitating art, rather than life, in which the artwork itself becomes part of objective reality. In drawing a structural connection between processes in mechanical devices and human memory, Hindemith's music can be interpreted as a form of surrealist thought,

[46] It may be entirely coincidental that Stuckenschmidt thought the maximum duration for one side of a 12″ gramophone record in 1928 to be six minutes, precisely half the length of the opera. In fact it was closer to four minutes and 30 seconds. This nevertheless lends credence to a view of the gramophone as one of Hindemith's compositional paradigms. Stuckenschmidt indicated an awareness of this fact when he explained in 1928: "Vielleicht ist es kein Zufall, daß die Schallplatte mit ihrer begrenzten Spieldauer von höchstens sechs Minuten sich so überraschend durchsetzt." See "Short Operas," *Musikblätter des Anbruchs* 10 (1928): 207.

EXAMPLE 3b. Robert / Helene's *Duett*, mm. 283–301 [backward]. © 1927 Schott Music. © Renewed. All Rights Reserved. Used by permission of European American Music Distributors LLC, sole U.S. and Canadian agent for Schott Music



EXAMPLE 3b. (*continued*)



for it corresponds strictly to André Breton's definition of the movement when formulated in his First Manifesto of 1924: "psychic automatism in its pure state, by which one proposes to express . . . the actual functioning of thought."[47] With regard to memory, Hegel's dialectic of *Erinnerung* finds its own acoustic representation in the intuition of past events (forward music) from a present irreality (backward music); the irreal refers here to a past state that could not exist except as projected through the present imagination. In such an analogy, irreality is distinguished from reality by the musical modifications introduced in the backward half of the opera. On a purely symbolic level, the distinction between reordered musical snapshots and what we can term the perception of pure linear reversal exemplifies Zeno's paradox of an arrow in flight that is simultaneously in motion and immobile. It is at the gap in between these states, at the very paradox itself, that Hindemith's operatic epigram would seem to be laughing, reveling in the artifice of our understanding.

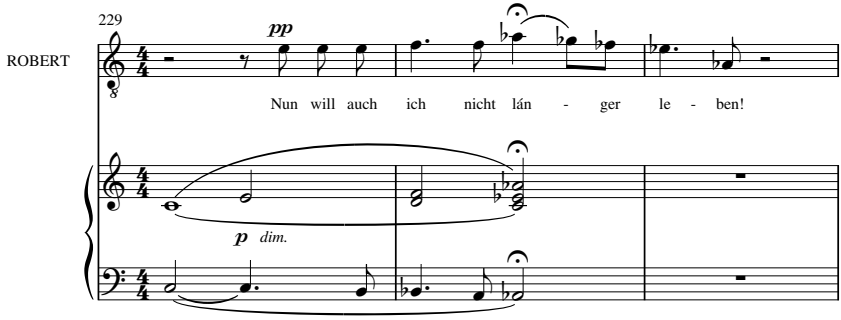
From Sound to Sight

"And the film? . . . Time goes by (*and doesn't come back again*). I fear you may have forgotten me."[48]
(Eric Satie to René Clair)

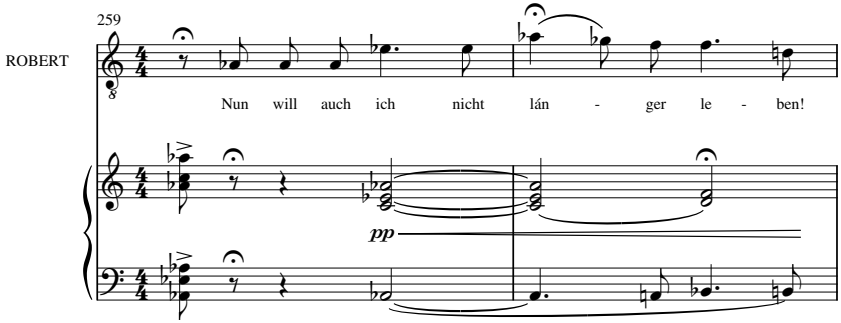
[47] Breton's manifesto is reprinted in *Modernism: An Anthology of Sources and Documents*, ed. Vassiliki Kolokotroni, Jane Goldman, and Olga Taxidou, (Edinburgh: Edinburgh Univ. Press, 1998), 309.

[48] "Et le film? . . . Quand? . . . Le temps passe (*& ne repasse pas*). Ai la 'frousse' d'être oublié par vous." Satie to René Clair, Paris, 23 October 1924 in *Eric Satie: Correspondance*

EXAMPLE 4a. Robert's suicide, mm. 229–31 [forward]. © 1927 Schott Music. © Renewed. All Rights Reserved. Used by permission of European American Music Distributors LLC, sole U.S. and Canadian agent for Schott Music



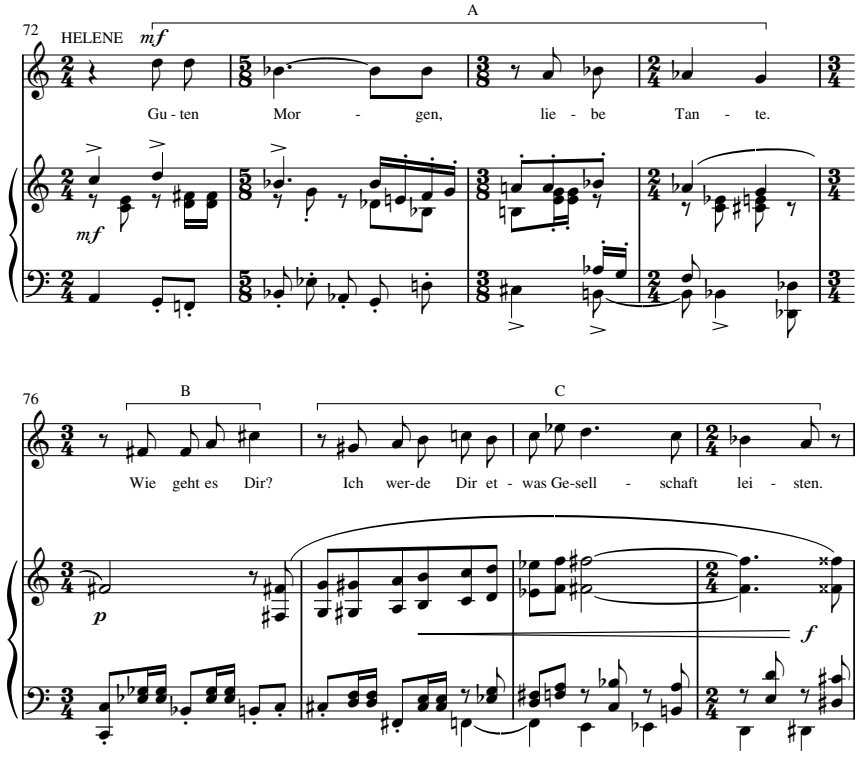
EXAMPLE 4b. Robert's suicide, mm. 259–60 [backward]. © 1927 Schott Music. © Renewed. All Rights Reserved. Used by permission of European American Music Distributors LLC, sole U.S. and Canadian agent for Schott Music



Hindemith's satirical mini-opera of 1927 was written for the Baden-Baden festival (relocated that year from Donaueschingen), where the featured genres were film music and one-act opera. Following *Hin und Zurück*'s adoption of the cinematograph and gramophone as conceptual apparatuses, Hindemith further interrogated the boundaries of mechanical realism in two quite different directions: first, in the creation of

presque complète, ed. Ornella Volta (Fayard: IMEC, 2000), 639. This comment concerns specifically their collaboration on the film *Entr'acte*.

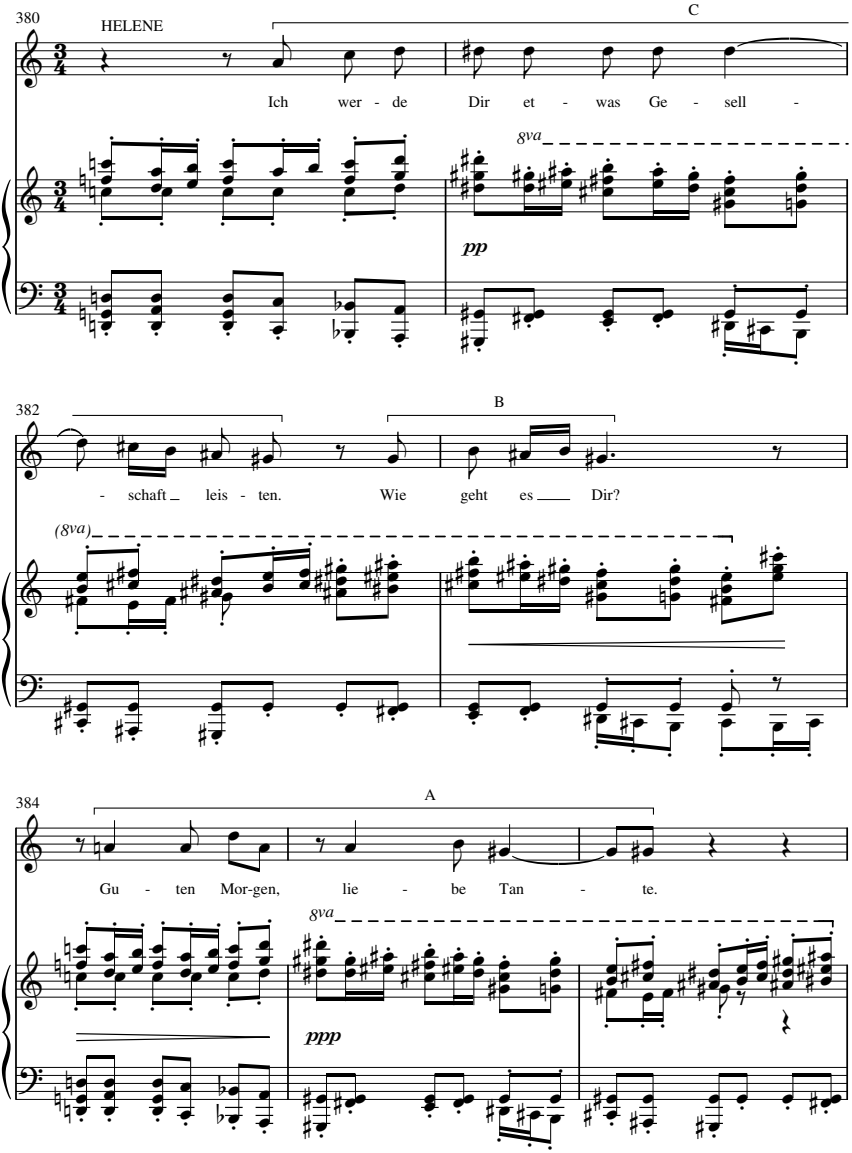
EXAMPLE 5a. Helene's opening greeting, mm. 72–79 [forward]. © 1927 Schott Music. © Renewed. All Rights Reserved. Used by permission of European American Music Distributors LLC, sole U.S. and Canadian agent for Schott Music



a mechanically synchronized film that he brought to Baden-Baden in 1928; second, in the composition of *grammophonplatten-eigene Stücke*, which he undertook in 1930.[49] Like Edison's mechanical memory, both of Hindemith's subsequent media enterprises eliminated human agency in a search for objectivity and modern relevance; the apparent slippage here between mechanical paradigm and literal machine is of course

[49] Recent studies of Hindemith's compositions for gramophone disc include Martin Elste, "Hindemiths Versuche 'grammophonplatten-eigener Stücke' im Kontext einer Ideengeschichte der Mechanischen Musik im 20. Jahrhundert," *Hindemith-Jahrbuch* 25 (1996), 195–221; Mark Katz, "The Rise and Fall of *Grammophonmusik*," in *Capturing Sound: How Technology has Changed Music* (Berkeley: Univ. of California Press, 2004), 99–113; and, less directly concerned with Hindemith but nevertheless relevant, Thomas Levin, "Tones from out of Nowhere: Rudolf Pfenninger and the Archaeology of Synthetic Sound," *Grey Room* 12 (2003): 32–79.

EXAMPLE 5b. Helene's opening greeting, mm. 380–86 [backward]. © 1927 Schott Music. © Renewed. All Rights Reserved. Used by permission of European American Music Distributors LLC, sole U.S. and Canadian agent for Schott Music



more than that. At this boundary lie the remnants of a subjectivity out of sync with its historical time, as well as the status of untouchable distance that Walter Benjamin would famously term "aura." On the other side is a post-metaphysical condition that Peter Sloterdijk has recently summed up in extreme form as "Anthropo-technology": The technologizing of the human being through genetic manipulation, generalized as a scientific principle.[50] While Hindemith did not engage directly in this kind of *Kulturkritik*, his artistic directions nevertheless register a psychological impulse within the Weimar Republic that for Sloterdijk cynically exposes the "false premises of the Enlightenment,"[51] namely a differentiation of soul and thing, spirit and matter, subject and object.

In an address to the 1927 festival public on mechanical music, Hindemith drew a comparison between the relation of mechanical music to performed music and film to pantomime (which implied an audiovisual coupling as well as a rigid organic-mechanic dichotomy). Prior to the festival he had remarked with puckish glee that despite widespread popularity in periodicals, "mechanical music is, for 99 out of 100 musicians, like a red rag to a bull."[52] His advocacy of mechanical music in the context of cinematic technology (he was joint head of the festival committee) highlighted the need for an appropriate, accommodating platform; finding the means for mechanical performance to interact with a burgeoning medium could, he claimed with more than a modicum of irony, create a new kind of "organic artwork."[53] For Hindemith this concerns principally the problem of synchronization in film, but it also entails music that is conceived, and therefore specifically appropriate, for cinema:

> The listener hovers constantly in fear of whether the music really will correspond to the picture—it is ridiculous if the timpani struck below is too late for the cannon shot above; if they coincide, it is hardly any less absurd . . . but because music must now be made for film . . . why not then likewise a mechanical reproduction? And why not music that

[50] Peter Sloterdijk, "Anthropo-Technology," *New Perspectives Quarterly* 17 (2000): 40–47. See also his controversial essay "Regeln fur den Menschenpark: Ein Antwortschreiben zum Brief über den Humanismus," first given at a 1999 conference "Jenseits des Seins / Exodus from Being, / Philosophie nach Heidegger" and available at: http://www.wlb-stuttgart.de/referate/philosoph/sloter.html [accessed 10 June 2007].

[51] "falsche Prämisse der Aufklärung," Peter Sloterdijk, *Kritik der zynischen Vernunft* (Frankfurt am Main: Suhrkamp, 1983), 651.

[52] Hindemith to Otto Ernst Sutter, 5 January 1927, quoted in Geoffrey Skelton, ed. and trans., *Selected Letters of Paul Hindemith*, (New Haven: Yale Univ. Press, 1995), 48.

[53] "Man wird entdecken, dass sie zu der durch Menschen reproduzierten Musik etwa im gleichen Verhältnis steht wie guter Film zur Pantomime . . . warum nicht eine Musik, die mit dem Film zusammen ein organisches Kunstwerk darstellt, da sie mit ihm zusammen entworfen und ausgeführt wurde?" from "Zur mechanischen Musik," in *Aufsätze, Vorträge, Reden*, ed. G. Schubert (Zürich: Atlantis Musikbuch, 1994), 22, 24.

> would be designed for and performed together with the film? A music that would always be consumed only for the film to which it belongs and that would only be delivered to the cinema together with the film!
>
> And even if played with all the other cited opportunities, why not by means of qualitatively superior and good and rationally working mechanical instruments?[54]

This optimistic embrace of technology—uniting prosthetic eyes and ears—is very much in the spirit of *neue Sachlichkeit*. But as James Lastra reminds us, "synchronisation" did not always mean a perfect coupling of sound and image; it could be thought of as any fixed or purposeful relationship between sound and image.[55]

In fact, the principle of a precise audiovisual synchrony was prefigured as early as 1913 by Edison's Kinetophone (and later by Vitaphone) technology,[56] which aspired to couple phonograph (and later gramophone) recordings to specific moving pictures. Yet in making his appeal for mechanically aligned sound and vision, Hindemith was not thinking as a scientist but as a composer. And by reading history backward, we see that Hans Richter's and Hindemith's Dada film *Vormittagsspuk* ("Ghosts before Noon") for Baden-Baden in 1928 retroactively clarifies the aims of the composer's speeches a year earlier. Along with a

[54] "Der Zuhörer schwebt beständig in der Angst, ob die Musik wirklich mit dem Bild übereinstimmt—es ist lächerlich, wenn zum Kanonenschuß oben der Paukenschlag unten zu spät kommt; kommt er zur richtigen Zeit, ist es kaum weniger albern. . . . Da nun doch einmal Musik zum Film gemacht werden muß . . . warum dann nicht eine ebenfalls mechanisch wiedergegebene? Und warum nicht eine Musik, die mit dem Film zusammen entworfen und ausgeführt wurde? Eine Musik, die immer nur für den zugehörenden Film verbraucht und die vom Verleih dem Kinotheater nur mit dem Film zusammen geliefert würde!

Und wenn schon bei all den anderen angeführten Gelegenheiten gespielt wird, warum nicht mit Hilfe qualitativ hochstehender und gut und rationell arbeitender mechanischer Instrumente?" Paul Hindemith "Zur mechanischen Musik" [1927] in *Aufsätze*, 24.

[55] James Lastra, *Sound Technology and the American Cinema* (New York: Columbia Univ. Press, 2000), 94.

[56] The Kinetophone, developed in 1913, connected a special cylinder machine with oversized long-playing cylinders to a film projector by means of an overhead belt with three-inch pulleys. The speed was governed by the phonograph behind the screen. The projector at the other end of the theatre in the projection booth had a braking device to slow the film speed to maintain synchronization. If the gramophone constitutes a mechanical instrument, then this prefigures Hindemith meaning; but if we hold mechanical music to mean machines built to make music in and of themselves, he acknowledges that the Welte company had achieved this in 1926. See, for instance, Hindemith's comment in the lecture "Zu unserer Vorführung 'Film und Musik' " from the Baden-Baden festival 1927: "Die Firma M. Welte Söhne in Freiburg, die schon in den vergangenen Jahren in freundlichster Weise meine Versuche, Musik für mechanische Instrumente zu schreiben, unterstützt hat, hat uns einen neuen Synchronisationsapparat zur Verfügung gestellt, der es ermöglicht, die Notenrolle mit dem Filmprojektor ohne jede Zwischenschaltung aneinander zu koppeln." Hindemith, *Aufsätze*, 31.

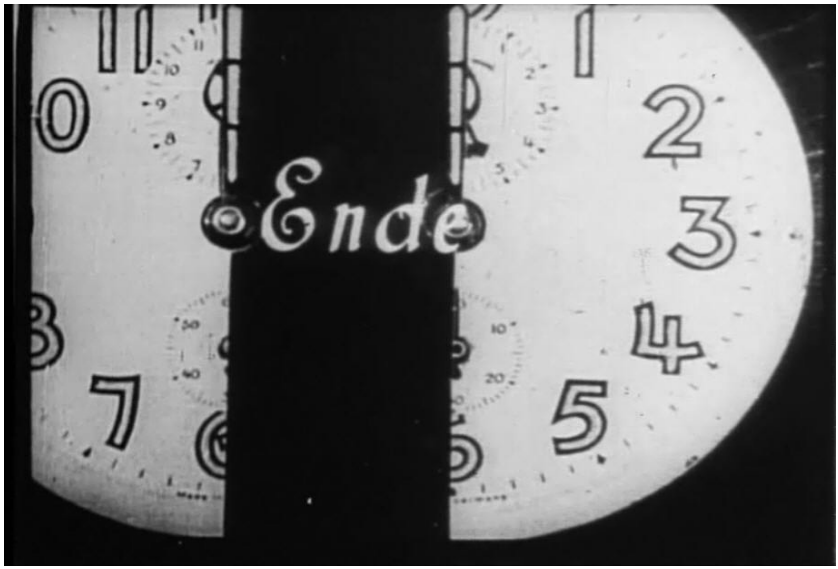
synchronized score in *Felix der Kater im Zirkus* ("Felix the Cat in the Circus," now lost),[57] *Vormittagsspuk*'s score for *Welte* pianola would bring to fruition this prophesied principle of mechanical coupling in a "sure unity of picture and sound," as one reviewer put it.[58]

Given the repeatable nature of the medium, it is ironic that this first experience of mechanical synchrony was tantalizingly transient, for Hindemith's score and original materials were destroyed as *Entartete Musik* in 1938, and the mechanical pianola roll was destroyed in the *Welte-Mignon*'s Freiburg factory during a bombing raid on 27 November 1944; no replicas have come to light. The film reel—the visual element—remains, however, and establishes a series of connections with *Hin und Zurück* through the comic exploration of irreal feats of time and motion completely freed from natural laws: A clock moving improbably fast between single hours punctuates the sequences, reminding us both that time is counting down to lunch (noon) and that concepts of time passing remain the enigmatic toy of the short film; a tray of crockery is dropped and smashes in slow motion [1.00] only to reform toward the end of film [7.50] after which coffee is served with marvelous etiquette—surely an outgrowth of the bearded Sage's motto that "alles wird gut, wie es vorher war." A fire hose uncoils, water is sucked back in, and it is then recoiled [3.30], erasing any trace of its motion. Equally, two Columbia records rotate along the wrong axis [7.30], hinting at a more subtle connection with the complications of "memory" in Hindemith's 12-minute operatic time reversal. The film closes with a striking image (Fig. 3) of time splitting the clock face into two halves (when 12:00 noon is reached), in between which *Ende* appears. The symbolism is ambiguous: One meaning would hold that the finite countdown must end, therefore time must stop—the clock must break, and Zeno's arrow will hit its target; another more symbolic reading is that in between the passage of continuous, dynamic time (represented by the clock face moving with exaggerated speed) is its nemesis: stasis—Bergson's snapshot lurking behind the illusion of motion; equally plausible, however, is the lighthearted inverse view that the clock itself is merely a symbol and no more commands time than accurately represents it. The broken clock becomes a joke, it is the fallacy of controlling time—the falsifying record of time passing, ironizing the filmic techniques of reversal—that breaks apart. The viewers, after all, leave the cinema and continue about their lives. Richter's purposeful ambiguity extended to his self-

[57] Written by Hindemith for a Welte-Cinema-Organ, this was the very first to synchronize mechanical media.

[58] "eine gewisse Einheit von Bild und Klang wird erreicht," from Karl Holl, "Deutsche Kammermusik in Baden-Baden," *Allgemeine Musikzeitung* 55 (1928): 897.

FIGURE 3. The closing image of Hans Richter's *Vormittagsspuk* (1928)



commentary on the meaning of Dada: "After I have stated this fact 'Dada equals abstract art' " he equivocated, "I wish to insist on the other point, 'Dada equals non-abstract art.' And this is also true if not truer."[59] Thus in the absence of Hindemith's *Welte* score which may lend credence to an analytical approach, no single interpretation of the broken clock is secure.

As mentioned above, *Vormittagsspuk* embodied Hindemith's vision for a future of specifically mechanical film music, essentially making explicit what was implicit in the palindromic mechanism of *Hin und Zurück*—a mechanism that had been prefigured in his other mirror works from the 1920s.[60] Yet even during the 1927 festival Hindemith explained that "I preferred to write music for mechanical instruments . . . because I am firmly convinced that a mechanically reproduced

[59] Willy Verkauf, ed., *Dada: Monographie einer Bewegung* (Teufen AR: Arthur Niggli, 1957), 68.

[60] The last of the five movements in the Clarinet Quintet op. 30 (1923) is a strict palindrome (in pitch, rhythm, and dynamics) of the first movement. The only break in symmetry is the cello's sustained D in m. 66, linking the first and second movements. Less strictly, the first movement of the Sonata op. 11 no. 1 for violin and piano is divided into sections, the last of which—"Wie am Anfang"—forms a quasi-palindrome by framing the movement with material only heard at its beginning and close.

music belongs to a mechanically unrolled sequence of pictures."[61] Appropriate to this vision, the score to *Vormittagsspuk* contained no trace of human performance, the results of which led to characterizations of a "cold duplicity."[62] Rather than being played into a keyboard, it was constructed for the Welte system by having holes cut directly into the paper, an arduous task that Hindemith delegated to two of his Berlin students in 1928.[63] (Composing for mechanical instruments was not new, of course—earlier examples include Busoni's "Für die [sic] Pianola" [1908] and Stravinsky's "Etude pour Pianola" [1917]—but Hindemith's aim was to write for so-called musical machines "in authentic fashion,"[64] as Stuckenschmidt put it, which in Hindemith's view required total abstinence from traceable human activity.)[65]

As it turns out, technological experiments toward a synchrony of mechanical sound and cinematic vision postdated a synchronized film score for "real" sounds by the grandfather of *Les Six*, Eric Satie. The first film with a soundtrack composed frame by frame thus answered

[61] "Ich habe vorgezogen, die Musik für ein mechanisches Instrument zu schreiben . . . weil ich der festern Überzeugung bin, dass zu einer mechanisch abrollenden Bildfolge auch eine mechanisch zu reproduzierende Musik gehört." Hindmith, "Zu unserer Vorführung 'Film und Musik,' " *Aufsätze*, 31.

[62] "aber es ist eine kalte Duplizität, die rein reactiv anmutet." from Karl Holl, "Deutsche Kammermusik in Baden-Baden," *Allgemeine Musikzeitung* 55 (1928): 897.

[63] Darius Milhaud, a featured composer at the Baden-Baden festivals of both 1927 and 1928, described seeing Hindemith's frantic completion of the rolls: "I shall always see him scribbling furiously and passing each page as he finished it to two of his students who immediately transcribed it on a pianola roll. It was for a score for an imaginative film by Hans Richter called *Vormittagsspuk*." in *Notes without Music*, trans. Donald Evans, ed. Rollo Myers, (New York: Knopf, 1953), 205. Only two of Hindemith's pianola rolls survive: (i) "Rondo aus Klaviermusik, op 37" [roll 4107] and (ii) "Toccata" [4108] as listed in the Welte-Mignon catalogue, see Charles Davis Smith, *The Welte-Mignon: Its Music and Musicians* (Vestal, NY: Vestal Press, 1994), 251–52.

Of course, in line with Benjamin's diagnosis that mechanical art liberates the artwork from "parasitical dependence on ritual," composing for mechanical musical instruments dispensed with the contingency of live performance, freeing the composer from the "momentary disposition" of a performer which Hindemith lauded as the "possibility of establishing the composer's intentions absolutely" (Möglichkeit der absoluten Festlegung des Willens des Komponisten, Unabhängigkeit vonder augenblicklichen Dispositionen des Wiedergebenden). This, as Andrew Fraser put it in 1929, was the logical conclusion to his famous directive for "Ragtime" from *Suite 1922*: "play this piece wildly, but always in very strict time, like a machine. Consider the piano here as an interesting kind of percussion." (Spiele dieses Stück sehr wild, aber stets sehr stramm im Rhythmus, wie eine Maschine. Betrachte hier das Klavier als eine interessante art Schlagzeug). See Hindemith, "Zur mechanischen Musik," *Paul Hindemith: Aufsätze*, 21; and Andrew Fraser, "Paul Hindemith," *Music and Letters* 10 (1929): 170.

[64] "Aber die wesentliche Bedeutung dieser Maschinen liegt in der Möglichkeit, authentisch für sie zu schreiben." Hans Heinz Stuckenschmidt, "Die Mechanisierung der Musik," *Pult und Taktstock* 2 (1925): 6.

[65] See Thomas Levin's extensive discussion of the genealogy of synthetic sound in "Tones from out of Nowhere."

Hindemith's call three years before he made it.[66] René Clair's *Entr'acte* was inserted between the two halves of Francis Picabia's ballet *Relâche* at the Théâtre des Champs-Elysées on 4 December 1924.[67] Set to music by the aging Satie, this 22-minute film was a *succès de scandale*, anticipating *Vormittagsspuk* by four years in the exploration of mechanical qualities of movement and stasis in the visual field, just as Hindemith's opera would do in the aural.

A preoccupation with the manipulation of time and movement predominates no less in *Entr'acte* than in *Hin und Zurück*. Hindemith's dramatic project was overtly concerned with the portrayal of temporal equidistance and equivalence–the passage of time in a linear guise. Signaling an equally prominent role for time in Picabia's ballet, the frontispiece to Satie's score for *Relâche* (sketched by Picabia) showed a nude man, wearing only a wristwatch and top hat, silencing another, fully besuited man holding a sign that asks: "When will people get out of the habit of explaining everything?" (Fig. 4). The wristwatch is the clue, for it is the only accoutrement—indecently so—that marks out Picabia's figure as more than a random nudist (the top hat belongs to the besuited man). In fact, Picabia later denied the immanence of temporal ideas in *Relâche* and *Entr'acte*: "From the mechanical standpoint, I tried to use the cinematic device for the device itself, I want to say by this that *I did not try to return the eternal hourglass of existence, the terrible moonlight between the trees!* / There is nothing more divine than the demon."[68]

Rather than a metaphysics of cinema, Picabia's "eternal hourglass of existence" mocks the link between chronometric time and its cognition through technology. But to do this so explicitly suggests that the idea of time had touched a raw nerve. Returning to the master paradigm of Zeno's paradox, similar denials of time theory had come from the most learned quarters. When Aristotle recorded the paradoxes in 350 BC (*Physics*, book 6, chap. 11), he appended a critique questioning Zeno's assumption that "time is composed of 'nows' which are indivisible." This, for Aristotle, is the mistake in Zeno's reasoning "for . . . if everything is always at rest when it occupies a space equal to itself, and

[66] The first film with a sound track actually recorded on the film next to the picture was not until René Clair's *Sous les toits de Paris* (1930). See Richard S. James, "Expansion of Sound Resources in France, 1913–1940, and its Relationship to Electronic Music" (Ph.D. diss., Univ. of Michigan, 1981), 313.

[67] Several writers have given summary accounts of the first performance. For a recent study see Judi Freeman, "Relâche und Entr'acte" in *Picabia: 1879–1953* (Stuttgart: Galarie Neuendorf, 1988), 15–26.

[68] "Du point de vue méchanique, j'ai essayé de me servir de cet appareil du cinéma pour cet appareil lui-même, je veux dire par là que j'ai essayé de ne pas retourner l'éternel sablier de l'existence, ce terrible clair de lune entre les arbes! / Il n'y a pas plus divin que le démon." Picabia, "Entracte," *This Quarter* 1 (1927): 132.

FIGURE 4. Francis Picabia's frontispiece for Satie's score to the ballet *Relâche* (1924). Reproduction, including downloading of Picabia's works, is prohibited by copyright laws and international conventions without the express written permission of Artists Rights Society (ARS), New York.

what is moving is always 'in the now,' the moving arrow is motionless."[69] To an extent, this merely restates the paradox, protesting at its absurdity; yet in another sense, Aristotle emphasizes the notion that for Zeno, time must be a static monolith, for it is always the enabling factor of any movement; "duration" becomes a conceptual unity after all, as argued by Parmenides (Zeno's Elean teacher and lover); and it follows that our faculty of *Erinnerung*—as the only way we know time has passed—flows ever backward, while conceivably, time stands still in the instant of the present. This curious perspective is self-evidently illogical for Aristotle, hence his description of Zeno's "mistake." The complementary knowledge that motion is possible and time moves forward offsets Zeno's paradox as a critique of mathematics, of our understanding whole entities as the sum of an infinite number of discrete parts.

Instantanéisme: "the opportunity to dynamite Paris"[70]

Fast forwarding to the 20th century, we see that the perplexity of the "now" still eluded and seriously worried even Albert Einstein, who—according to Rudolf Carnap's report—famously remarked that "there is something essential about the Now which is outside the realm of science."[71] Needing no further endorsement, the artistic rationale for living "in the now" was embraced in Picabia's anti-surrealist, anti-Breton theory of *Instantanéisme* ("instantaneity" or "snapshot") from 1924, although Picabia was probably unaware of Einstein's views. What exactly is *Instantanéisme*? While no official manifesto was published, the final issue of Picabia's Dada journal *391* (n. 19, October 1924) assumed that role, being newly entitled "391: Journal de l'Instantanéisme pour quelque temps." Proclaiming it as "not a movement. It is the perpetual movement!" the cover (Fig. 5) listed the (anti-) movement's tenets.

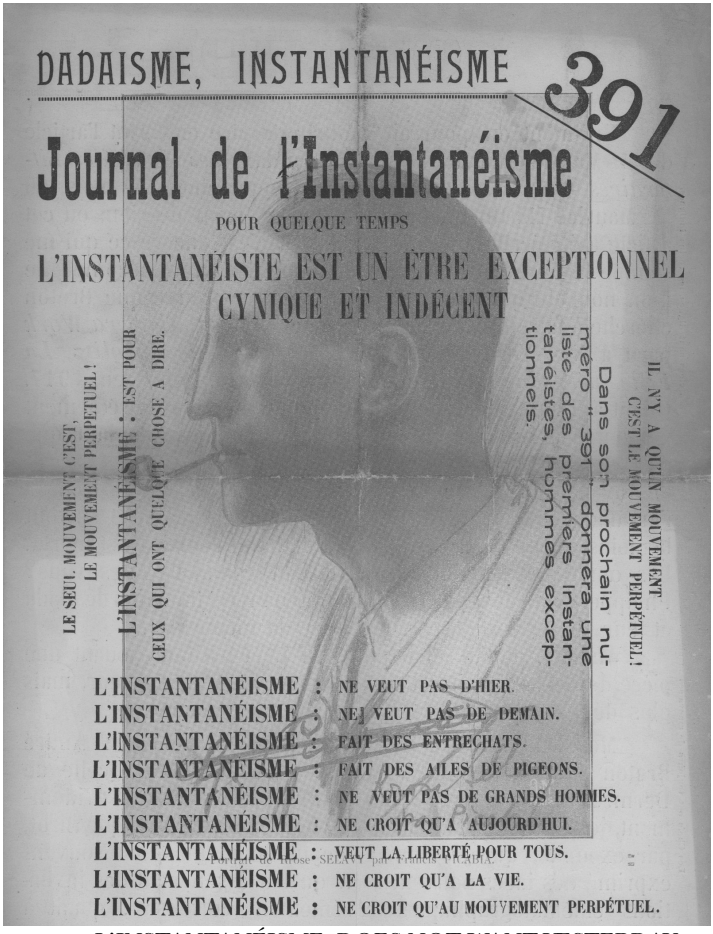
In an instance of historical irony, Picabia's "perpetual movement" was destined to survive no more than an "instant": just long enough to create *Relâche* and *Entr'acte*. His contradictory notion of an instant in perpetual motion, rhetorically emphasized as the final tenet, sat directly

[69] *Physics*, book 6, chap. 9, 239b5–7, quoted in S. M. Cohen, P. Curd, and C. D. C. Reeve ed., *Readings in Ancient Greek Philosophy: From Thales to Aristotle* (Indianapolis: Hackett, 1985), 62.

[70] Pierre de Massot's phrase for Satie, Jean Borlin, Rolf de Maré, and Clair and Picabia's collaboration on *Relâche* and *Entr'acte*, in a letter to Picabia, 3 February 1924 in *Satie Seen through His Letters*, 191.

[71] Carnap reports Einstein's view that "the experience of the Now means something special for man, something essentially different from the past and the future, but . . . this important difference does not and cannot occur within physics." See *The Philosophy of Rudolph Carnap*, Library of Living Philosophers, vol. 11, ed. Paul Arthur Schlipp (La Salle, IL: Open Court Publishing, 1963), 38.

FIGURE 5. The cover of Picabia's final edition (n.19) of the Dada journal *391* (1924). Image from the collection of the International Dada Archive, Special Collections, The University of Iowa Libraries



L'INSTANTANÉISME: DOES NOT WANT YESTERDAY.
L'INSTANTANÉISME: DOES NOT WANT TOMORROW.
L'INSTANTANÉISME: MAKES ENTRECHATS.
L'INSTANTANÉISME: MAKES PIGEON WINGS.
L'INSTANTANÉISME: DOES NOT WANT ANY GREAT MEN.
L'INSTANTANÉISME: ONLY BELIEVES IN TODAY.
L'INSTANTANÉISME: WANTS FREEDOM FOR ALL.
L'INSTANTANÉISME: ONLY BELIEVES IN LIFE.
L'INSTANTANÉISME: ONLY BELIEVES IN PERPETUAL MOTION.

in the center of Zeno's paradox, perceiving the motionless present as forever moving. But while Picabia's "ballet instantanéisme" and Clair's film reflect the concept's ideals of being absurdly in the present, to what extent, if at all, can the overarching contradiction be manifest in these two artworks? Speaking in relation to the "instantaneity" of cinematic experience, Picabia proclaimed that it "must make us dizzy, be a sort of artificial paradise, a promoter of excessive sensations surpassing the *looping the loop* of the airplane and the pleasure of opium, for that it must orient itself towards the spontaneity of invention that will always be more alive than the stupidity of a beautiful photograph."[72] Painting, portraiture, and photography are all lambasted for their pre-modernist stasis, highlighting the key distinction between being instantaneous and being motionless. Thus, while *Instantanéisme* also means "snapshot" in the photographic sense, Picabia is clear that it is not the same as Bergon's "snapshots . . . of passing reality": The former is defined as an ahistorical moment in perpetual motion, the latter as part of the means of knowing duration—an intellectual recording whose combined parts summon the artificially reconstructed experience of duration. In short, the one rejects the possibility of ever explaining experience while the other aspires to forge understanding.

Zeno and Picabia, ancient and modern, are surely the most unlikely bedfellows. Yet if we accept Aristotle's argument that the Elean paradoxer assumes time is composed of "nows," then he and the French avant-gardist of 1924 share an outlook on the nature of time as "instantanist." Bergson, we recall, regarded this as artificial: the intellectual reconstruction of "real life." But reconstructing is an act of memory which by definition is not being in the instant, an indication that memory and the instantaneous present serve opposite cognitive functions. "Why reflect," asks Picabia. "Why have a convention of beauty or of joy?"[73] *Instantanéisme*, he asserts, is synonymous with negating memory—that is,

[72] "Le cinéma devrait, lui aussi, nous donner le vertige, être une sorte de paradis artificiel, promoteur de sensations intenses dépassant le *looping the loop* de l'avion et le plaisir de l'opium, il devrait pour cela s'orienter vers la spontanéité de l'invention qui sera toujours plus vivante que la bêtise d'une belle photographie." In a similar vein, Picabia's earlier comment that "the theatre is to the cinema what the candle is to the electric lamp, the donkey to the automobile, the kite to the airplane," underscores his belief in the progress of technology. Being in the instant, for Picabia, therefore means being on the brink of the future as well as being in the "now" (though not the "here and now"). See "Instantaneisme," *Comoedia* 21 (November 1924), 4. Reprinted in *Francis Picabia: Écrits 1921–1953 et posthumes*, ed. Oliver Revault d'Allonnes and Dominique Bouissou (Paris: Pierre Belfond, 1978), 159–60.

[73] The full statement read: "*Relâche*, *Entr'acte* promenades in life with a great burst of laughter. Eric Satie, Borlin, Rolf de Maré, René Clair and I created *Relâche* a little like God created life . . . *Relâche* is the happiness of instants without reflection; why reflect, why have a convention of beauty or of joy?" (*Relâche*, *Entr'acte* se promènent dans la vie avec

forgetting our past, or what we commonly term escapism: "One does not go to the cinema to rediscover one's night table there, one's slippers, one's cooker or one's check book, but, on the contrary, to forget all that as much as possible and thus take an essential rest that alone provides distraction and laughter."[74] The escape from our inward reflections—or *Gedächtnis*—is precisely what is attractive about "instantanist" cinema, which draws viewers into an eternal present. The phonograph, by contrast, inscribes memories of people, qualities of experience and forgotten events, that draw a listener into the past, into a reflective state, and away from the present. As opposites, the two media become, in this sense, complementary.

Yet perhaps we read too much into Picabia's Dadaist provocations, which date from the artist's self-styled "silk-stocking period."[75] Speaking of *Entr'acte* in 1927 as "instantanist" cinema, he dismissed "this small film" with the assertion that it "does not want to say anything, for there is nothing to understand in life."[76] This, however, merely rehearses the anti-meaning, anti-movement *Instantanéisme* project. In the performance program written three years earlier, comments penned during the conception and preparation of the joint enterprise, he wrote contrariwise:

> The intermission of *Relâche* is a film that interprets our dreams and the unrealized events that take place in our brain; why describe the things everyone sees, or can see everyday? *Entr'acte* is a real entr'acte,

un grand éclat de rire; Eric Satie, Borlin, Rolf de Maré, René Clair et moi les avons créés un peu comme Dieu créa la vie, dans un instant de bonheur sans réflection; pourquoi réfléchir, avoir une convention de beauté ou de joie?) " '*Entr'acte"* un peu de Picabia au star" in *Le Journal des hivernants,* January 1927, 19. Quoted in *Picabia: Ecrits,* 181.

[74] "On ne va pas au cinema pour y retrouver sa table de nuit, ses pantoufles, sa cuisinière ou son carnet de chèques, mais, au contraire, pour oublier tout cela le plus possible et prendre ainsi un repos indispendable que procurent seuls la distraction et le rire." Picabia, "Instantanéisme," 4.

[75] Ibid., 190. *Relâche* means "closed" or "no performance," and when the premiere, originally scheduled for November 29, was actually "relâche" owing to the sudden illness of Jean Borlin (the principal dance choreographer), Picabia's assembled audience of about 3,000 felt as though they had fallen for the ultimate Dada trick. Other, intentional, antics included signs on stage saying "If you are not satisfied, go to hell!" and "Whistles are for sale at the door," as well as the use of car lamps with reflective metal disks on stage glaring out at the audience (reversing the customary effects of stage lighting), and Picabia's advertising in *391* that advised audience members to bring dark glasses and ear plugs. See William Camfield, *Francis Picabia: His Art, Life and Times* (Princeton: Princeton Univ. Press, 1979), 209–12, and for the set designs see Maria Lluïsa Borrás, *Picabia* (New York: Rizzoli, 1985), 286.

[76] "ce petit film ne veut rien dire, car il n'y a rien à comprendre dans la vie" from "*Entr'acte* un peu de Picabia au star," *Le Journal des hivernants,* January 1927, 19; quoted in *Picabia: Ecrits,* 181.

> an intermission in the monotonous boredom of life and conventions full of ridiculous, hypocritical respect.[77]

At the risk of taking Picabia at his word, only selectively, unrealized cognitive events do form the subject of the film to the extent that they reproduce impossible—which is to say barely imaginable—aspects of motion, much as *Hin und Zurück* centered on a musical characterization of time through the perceived functions of memory. As such, the film was designed to inflame those adapted to "the monotonous boredom of life," and while the lively premiere was recorded in several contemporary reviews,[78] Clair's own later account is most apropos and is quoted here at length. From the very first frames, he explained:

> A noise composed of discreet laughter and muttered grumbling rose from the crowd of spectators, and a slight shudder ran up and down the rows of seats. This is the sign of a coming storm, and soon the storm broke. Picabia, who had wished he could hear the audience yell, had every reason to be satisfied. Shouts and whistles mingled with the melodious clowning of Satie, who undoubtedly had the connoisseur's appreciation of the harmonic support the protesters were lending his music. The bearded ballerina and the mortuary camel were received as was fitting, and when the whole audience felt itself swept away on the roller coaster of the amusement park, their howl brought the general disorder and our pleasure to their peak. Imperturbable, [the conductor] Roger Desormiere, with furious forelock and set features, seemed to be simultaneously conducting the orchestra and unleashing a burlesque hurricane with his commanding baton. Thus was born, amid sound and fury, this little film, the end of which was greeted with applause as loud as the catcalls and whistles.[79]

[77] "L'entr'acte de *Relâche* est un film qui traduit nos rêves et les événements non materialises qui se passent dans notre cerveau; pourquoi raconter ce que tout le monde voit, ou peut voir chaque jour? *Entracte* est un veritable entr'act, un entr'acte á l'ennui de la vie monotone etdes conventions pleines de respenct hypocrite et ridicule." The program text is reproduced in *Francis Picabia: Ecrits 1921–1953 et posthumes* (Paris: Pierre Belfond, 1978), 166–67.

[78] The known reviews of the premiere are by P.M., "Relâche," *Paris-Journal*, 5 December 1924, 1; Paul Achard, "Soirs de Paris," *Le Siècle* [Paris], 6 December 1924, 4; Maurice Bouisson, "La Musique. Relâche-Entr'acte de Picabia et Erik Satie," *L'Enénement* [Paris], 4 December 1924, 2; Ferdinand Léger, "Vive 'Relâche,' " *Paris-Midi*, 17 December 1924, 4; J. L. Croze, "Entracte," *Comoedia* [Paris], 5 December 1924, 4. Negative reactions were recorded by Georges Auric, "Relâche, les ballets suédois," *Les Nouvelles littéraires*, [Paris], 13 December 1924, 7; Eugène Marson "Relâche," *Le Siècle*, 6 December 1924, 96; Louis Schneider, "Music in Paris," *New York Herald* [Paris], 8 December 1924.

[79] René Clair, *Cinema Yesterday and Today*, trans. Stanley Appelbaum, ed. R. Dale (New York: Dover, 1972), 11–12.

The sensational experience of Clair's Dadaesque creation revolved around portrayals of non-linear time in combination with immobile yet often rapid feats of motion, followed by a sequence of supreme directional movement in the form of a chase. Like Hindemith's opera, the film renounces any sensible narrative direction, in particular through comic absurdities juxtaposed in the cutting room, which is where, Clair asserted, the film "came together."[80] His motivation for obfuscating narrative is to poke fun at the hubris of claiming to explain or understand the idea of a complete duration, reflecting a rationale for the newly minted *Instantanéisme*: "Too often in the cinema, the viewers get the idea—which becomes an annoying one—that they are gods who know all the reasons for everything and the future as well as the past."[81] This intriguing stance on cinematic time protests against logical causality rather than palindrome mechanics, but it nevertheless finds common ground with Bergson's earnest belief that "becoming" materialized as pure motion is incomprehensible except through an artificial process. In constructing a meaningless succession of images ("snapshots"), Clair takes Bergson's cinematograph paradigm a stage further, effectively derailing those who would claim to understand time's course, whether in art or life.[82] Of course, we cannot be too serious about such weighty intent, because the film scenario was in fact dashed off after dinner by Picabia on restaurant paper (Maxim's) in high spirits as follows:

Intoduction to *Reláche*

[Curtain.
Picabia and Satie load cannon in slow motion, shot should make as much noise as possible. Total time: 1 minute.

[80] R. C. Dale, *The Films of René Clair* (Metuchen, NJ: Scarecrow Press, 1986), 1:35.

[81] René Clair, *Comoedia* 11 (1922): 3.

[82] The Dada principle of photomontage was arguably born of an ideology to disrupt logic and rational order more than anarchism. By cutting up, rearranging, and splicing the "real life" produced through mass media, the Dadaists aimed to expose it as an illusion. Film sequences from newsreels and popular films could similarly be spliced together, suggesting that Clair's practice in the first half of *Entr'acte* was less innovative than it was illustrative. For an informative overview of Dada cinema, see Rudolf Kuenzli's introduction to *Dada and Surrealist Film*, ed. R. Kuenzli (New York: Locker & Owens, 1989), 1–12.

Motionless images

1st Boxing between white gloves on black screen: 15 seconds.
Title for explanation: 10 seconds.
2nd Chess game between Duchamp and Man Ray. Stream of water directed by Picabia hosing down the game: 30 seconds.
[3rd Juggler and old geezer: time 30 seconds.]
4th Hunter shooting at ostrich egg on stream of water. Dove comes out of egg, comes back to perch on hunter's head; second hunter shooting at it, kills first hunter: he falls, bird flies off: time 1 minute, title 20 seconds.
[5th 21 people on their backs showing bottoms of their feet. 10 seconds, manuscript title 15 seconds.]
6th Ballerina on transparent glass, cinematographed from beneath: time 1 minutes, title 5 seconds.
7th Blow up balloons and rubber screens, on which faces and inscriptions will be drawn. Time 35 seconds

Directional motion

8th A burial: hearse drawn by camel, etc. Time 6 minutes, title 1 minute.[83]

Clair retained this basic structure, dividing his film into two sections: (1) 1 to 7 (omitting Picabia's third and fifth ideas) and (2) 8. To achieve audio-visual synchrony, Satie demanded to know the precise timings for each sequence: "And the film? . . . When? . . . Time is passing (*and will not pass again*). I fear you may have forgotten me."[84] His words resonate equally with Hindemith's aesthetic of reversal and, as we shall see, are thematized in the second half of the two-part film. The first section depicts immobile movement in its absurd glory; the second, directional motion as it accelerates increasingly out of control.

At the outset, a ballerina's up-and-down motion is comic because we view the movement from beneath her (actually, his) feet through a transparent surface (Fig. 6). The leaps and pirouettes that "she" executes, while forceful movements, are self-contained and hence directionless by virtue of the curious camera angle. The dancer rests motionless in the very center of "her" movement. Likewise, the white boxing gloves extend and retract to the same position: They move, but they

[83] Quoted in Dale, *The Films*, 1:33.

[84] "Et le film? . . . Quand? . . . Le temps passe (*& ne repasse pas*). Ai la 'frousse' d'être oublié par vous." Satie to René Clair, Paris, 23 October 1924, in *Eric Satie: Correspondance presque complète*, ed. Ornella Volta (Fayard: IMEC, 2000), 639.

FIGURE 6. An "immobile" ballerina leaping. Courtesy of Janus Films

move nowhere; there is no visual record of their ever having moved (Fig. 7). These images dislocate the relations of cause and effect because the gloves hit nothing, they set no other object in motion; the dancer likewise moves nowhere. It was precisely this centrifugal quality that Hegel remarked on in Zeno's fourth paradox: "if I have gone two feet forwards and two feet backwards, although I have walked four feet, I have not moved from the spot; the motion is then nil, for by going forwards and backwards an opposition ensues which annuls itself."[85]

The principle of containment governs the remaining visual subjects of the first half: the egg that contains a pigeon; the chess board that contains the Place de la Concorde; the balloon faces that incessantly inflate and deflate; the scalp that contains ignited matches. No directional motion permits these images to break through their absurdly immobile state, and only a few traveling witticisms offer relief from this otherwise static sequence: a paper-boat montage that floats aimlessly over the Parisian cityscape, and Picabia's violent jet of water that breaks up the chess board intersection.

[85] *Hegel's Lectures*, 1:277.

FIGURE 7. Boxing gloves that move nowhere. Courtesy of Janus Films

How are these static images to be interpreted? The seemingly illogical cutting in between snapshots creates motion of its own, but without establishing connections. Arguably, the intellectual appeal of this half of the film lies precisely in its denial of any logic between contiguous shots.[86] In 1925 Clair defined this principle as "inner movement"[87] or "the movement of the shots in relation to one another. . . . The primary base of cinematic lyricism."[88] The critical point is that a successive sequence of immobile pictures would seem to define the mechanism of cinematography itself—a sequence of static shots—except that Clair's images are unrelated and thus pervert, rather that give the illusion of, qualities of continuous motion.

[86] Clair illustrates his anti-logic convictions rhetorically through a linguistic metaphor in his little known "Essay on Rhythm" from 1925: "Sentences can't carry illogic in their breast for very long without working toward their own destruction. But why should this sequence of images, to which no absolute meaning is attached and which isn't bound by any old cords or thought, be encumbered by some sort of logic?" Clair, "Rhythm," *Les Cahiers du mois*, 1925.

[87] Clair, "Essay on Rhythm," from *Les Cahiers du mois*, 1925.

[88] Quoted in Dale, *The Films*, 1:35.

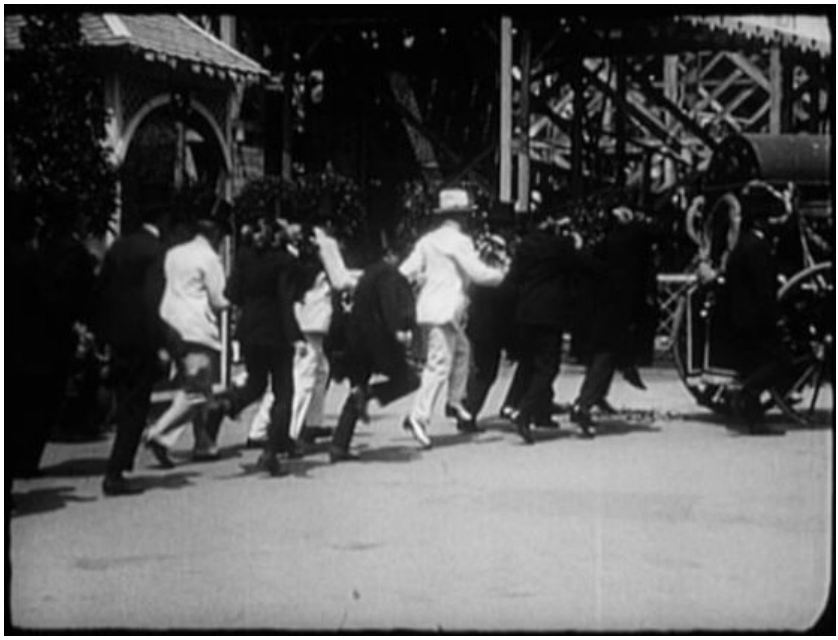
What follows in the second half of the film is motion of an entirely different kind: directional and relentless, the moving arrow. Against the static opening shots it counterpoints a long funeral procession that gradually accelerates. Beginning in slow motion, the mourners leap along absurdly behind the camel-drawn hearse as the speed increases imperceptibly until motion proceeds at "normal" walking speed (Fig. 8). It continues to increase, however, as gravity pulls the hearse along ever faster and Clair heightens the impression of movement by intercutting rapidly between the people running and the escaped coffin. A host of moving images are then spliced into the chase: a rollercoaster (Fig. 9), a fleet of bicycles, houses flashing past, and trees passing overhead. Indicating a process of time reversal, the dizzying camera speed tips the picture upside down as time proceeds so quickly it seems to move the rollercoaster backward along its path [17.41]. Thus when the coffin is eventually relinquished by the flying hearse, parallel to Hindemith's reversal of "fate," Borlin, the dance choreographer, jumps out alive. As Picabia puts it: "When living one would find death, the corpse rediscovers life."[89] Just when the end title appears and the film seems to be over (Fig. 10a), Borlin leaps through it, refusing to allow the motion to stop (Fig. 10b), but his leap is rewound by Rolf de Maré (the producer) and the exhausting film finally closes. In an irony between conflicting layers of artifice, only Maré's actual mechanism of reversal is able to undo Borlin's mechanically accelerated motion from death to life.

By evading his finite lifespan, Borlin also seems to control the passage of time. As with Hindemith's opera, there is a modernist drive to cheat death by revoking the authority of chronometric time. Unlike the operatic narrative, however, the Dadaist aesthetic does not invite an explanation, and while it would be foolhardy to offer one, it is perhaps no coincidence that the film was expressly located between two halves of what should constitute a whole: *Entr'acte*. Far from either being or not being real, from wholly moving or being static, it inhabits the gap of perception in between these states. It both exposes and revels in the discomforting space between Bergson's snapshots of the intellect. It is the smoke that the child's hands cannot capture, and it laughs at the disappointment we experience in realizing that the smoke, like the idea of pure motion or being, can only evade us.

Perhaps unwittingly, Satie spoke directly of a parallelism between life and death, hinting at Borlin's resurrected corpse, when he remarked to Picabia's partner during the late stages of composition: "I'm as bored as in an oven. Yes. . . . I'm going up in smoke with anger

[89] "Le où vivant trouverait la mort, le cadavre retrouve la vie," in Picabia, "*Entr'acte* un peu de Picabia au star," *Le Journal des hivernants*, January 1927, 19.

FIGURE 8. Mourners leaping along in slow motion behind the camel-drawn hearse. Courtesy of Janus Films



(French tobacco). . . . Yes. . . . Life is too much like Death—like Death-Bach (A 'Hun' swearword)."[90] The peculiar mention of the Bach family name is neither coincidental nor necessarily insulting in this context, for Satie sketched 20 graphs of different mirror forms,[91] thereby indicating that he was preoccupied with writing the ballet music as a palindrome (with all the frustrated second attempts that this would entail). J. S. Bach's mirror canons from *Das musikalische Opfer* or perhaps C. P. E. Bach's C Major Minuet palindrome[92] may just have served as inspirational models. As Robert Orledge's detailed study of the score to *Relâche* demonstrated, the thematic mirror structure between the two acts of the ballet is broken in only two places.[93] Yet, when comparing

[90] "Je m'ennuie comme dans un four. Qui. . . . Je fume de colère (du tabac français). . . . Oui. . . . La vie ressemble trop à la Mort – à la Mort-Bach (un gros mot des 'boches')" Satie to Germaine Everling, 27 August 1924, in *Eric Satie: Correspondance presque complète*, 628.

[91] The manuscripts are housed at Houghton Library, Harvard Univ., as MS Mus 193 (74).

[92] Wq 116/5, H 216.

[93] Robert Orledge, *Satie the Composer* (Cambridge: Cambridge Univ. Press, 1990), 179–80.

FIGURE 9. Rollercoaster motion is cut into the hearse chase sequence. Courtesy of Janus Films

Satie's score to his sketched proportional graphs (which divided the work from *Entr'acte* as the central point into halves, thirds, fourths, fifths, sixths, sevenths, eighths, ninths, and even tenths), Orledge relied on two dates in the graphs ("29 August" and "September 1924"; see Fig. 11b) to conclude that "Satie was . . . trying to rationalize [the ballet's] two halves into proportionally divided mirrors of each other through a scale plan . . . [but] the number of mirror plans Satie tried out suggests that his attempts to rationalize *Relâche* after the music was complete were unsuccessful."[94] Following the discovery of a graph in the Harvard Collection dated 22 April 1924 (Fig. 11a)—that is, before Satie began composing the score—it now seems more likely that it was not a rationalization *ex post facto* but that Satie must have set out with the express intent of creating *Relâche* as a proportional mirror, because these structures appealed to his philosophy of *instantanéiste* time. Practicalities of choreography and synchronization during the later stages of

[94] Ibid., 181.

FIGURE 10a. The final curtain threatens to halt the accelerating motion. Courtesy of Janus Films

FIGURE 10b. Jean Borlin leaps through the curtain, refusing to allow the movement to cease. Courtesy of Janus Films

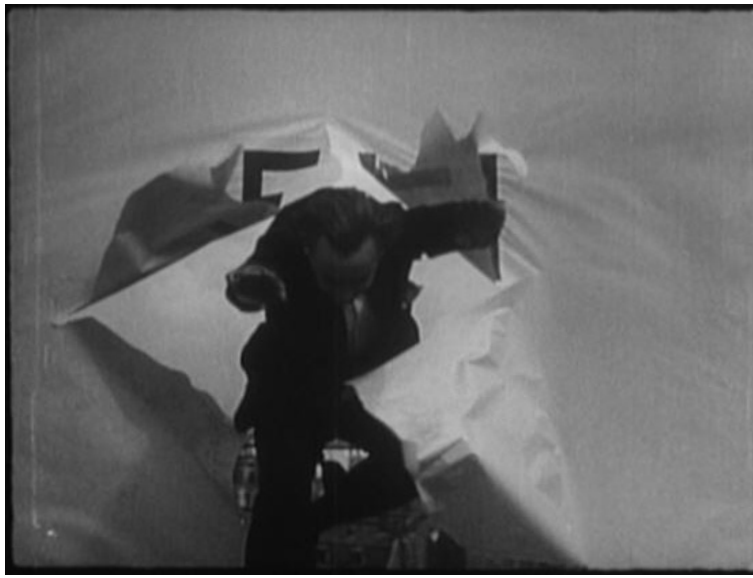


FIGURE 11a. Satie's early graph of a mirror form for *Relâche,* dated 22 April 1924. MS Mus 193 (74). By permission of the Houghton Library, Harvard University and the Eric Satie Archive, Paris

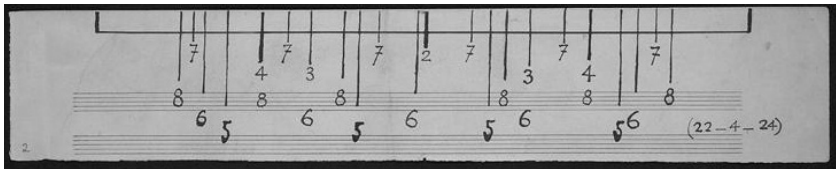
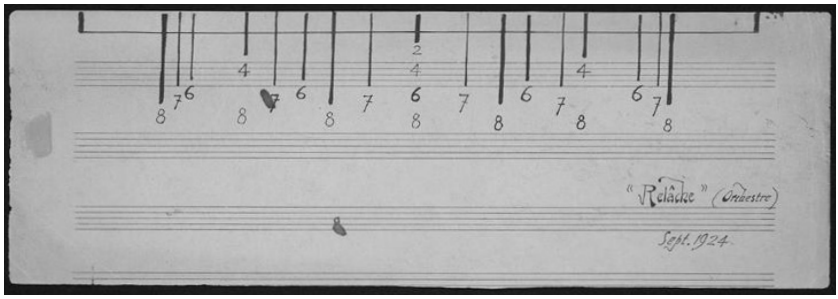


FIGURE 11b. Satie's later graph of a mirror form for *Relâche,* dated September 1924. MS Mus 193 (74). By permission of the Houghton Library, Harvard University and the Eric Satie Archive, Paris



composition, rehearsals, and editing, however, most likely prevented him in both cases from achieving strict forms.[95]

The mirror graphs contain evidence of measure counting, and, as Orledge's study pointed out, Satie numbered each measure individually in both the piano reduction and the orchestral score of *Relâche,* thereby suggesting an equivalence between his measure-counts and the proportions in his graphs. While the measure numbers and subsections of the score fail to reveal a consistent mirror, Satie's time signatures and tonality still offer alternative mirrors that vary the axes of symmetry. As Tables 1a and b show, each act is composed of one $\frac{6}{8}$ section, eight sec-

[95] The April graph is clearly one of earliest because is it not neatly copied (though pencil measurements beneath the ink indicate it was far from arbitrary), and Satie does not yet align the numbers "2, 4, 8" at the central axis of symmetry as he does in later graphs. Dating the ballet's stages of composition is possible through Satie's correspondence with Germain Everling, Paul Collaer, and Pierre de Massot in 1924. The first-act piano score was completed by late July, while the second act was completed in August, with the orchestration following during September and October 1924. See *Satie Seen through His Letters,* 194–96.

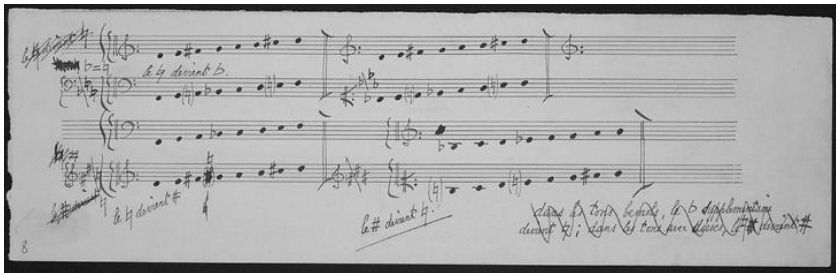
tions in $\frac{2}{4}$, and two in $\frac{3}{4}$,[96] thereby creating, if not a symmetry, a certain metrical balance that may represent the remnants of an earlier ideal mirror. Furthermore, as demonstrated by a brief sketch that Satie included with his graphs (Fig. 12), the tertiary relationships between the entirely major keys of each section actually functioned as a set of tonal mirrors in which (using the staff as the axis of symmetry) a key is reflected, so to speak, through different clefs: D (in treble clef) becomes F (in bass clef); D becomes B♭; B♭ becomes G, and so on. Satie used different inks to draft (black) and modify (red) this tonal mirror outline. Taking the top left staff as an example, the original scale treated D major as the center, with an F major scale carved from the key signature of B♭ major (i.e. both surrounding third relations). Sharps were first reflected into naturals (D→F: ♯ = ♮), but this is crossed out in black and replaced by flats reflecting into naturals (F→D: ♭ = ♮), suggesting that Satie changed his mind about the direction of reflection. Like the measure proportions, however, the final tonal structure of *Relâche* does not bear this out as a closed form (see Tables 1a and b), yet the tertiary key relations between most contiguous sections of the score suggest that the idea of reflecting a key through the stave nonetheless appealed to Satie. Whether or not we regard these as valid axes for a mirror, it suffices to conclude that Satie always intended to compose music for the *Instantanéiste* evening that embraced mirror paradigms of one sort or another.

As noted above, *Entr'acte* is divided into two sections, contiguous snapshots and a hearse chase. Satie's score almost achieves a perfectly balanced form with these two halves, each of which lasts 188 measures, and pivots around the central *Marche funèbre*, lasting 32 measures. But three anomalous seven-measure phrases are interpolated into the second half (§XVIII and XIX) to upset the symmetry. The fact that all other phrases in the score are built from even-numbered units—often repeated—whose cumulative ostinato figures resist any sense of forward movement, suggests that Satie added three odd-numbered phrases out of necessity to set additional frames that Clair inserted into the chase sequence during editing.[97] Like the score to *Relâche*, it indicates a pragmatic solution rather than idealist choice.

[96] The anomalous $\frac{5}{4}$ "Danse de la Brouette" in the second act can be considered a composite of $\frac{2}{4}$ and $\frac{3}{4}$, that maintains the symmetry if its strict 2-plus-3 articulation is seen to privilege its duple identity. A short musical sketch for this section exists in the same collection as the graphs. By virtue of its being the only musical sketch in the collection of graphs, it seems reasonable to suspect that Satie may have considered $\frac{5}{4}$ as just such a composite.

[97] A restored version of Clair's *Entr'acte*, released by The Criterion Collection as *À Nous la liberté*, uses multiple repeats in Satie's score to ensure synchronization between music and film reel. Attempts to obtain further information about this sound recording have been unsuccessful.

FIGURE 12. Satie's sketch of tertiary key relations as mirror reflections through the staff. MS Mus 193 (74). By permission of the Houghton Library, Harvard University and the Eric Satie Archive, Paris



Notwithstanding its palindromic façade, the form is thus quite different from that of *Hin und Zurück*. Unlike Hindemith, Satie does not attempt a consistent thematic retrograde or inversion to symbolize reversal, though a "death" motive that first appears at the outset of the *marche funèbre* is inverted into a "life" motive when the resurrected Borlin leaps out of his coffin (Ex. 6a–d). But in an approach similar to Hindemith's, Satie's use of a proportional mirror form clearly invokes the concept of time reversal. Perhaps this is how Picabia and Clair/Satie are *Instantanéiste* in their art from 1924, for any linear mirror is built on a single axis of symmetry that requires a given instant from which it begins and to which it returns. Instant engenders form, and form makes the instant audiovisual. It is a cinematic instant projected and then reflected, both literally and metaphorically.

* * *

If the problem of understanding time lies in the deconstruction of a unified duration, modernist time itself—whatever we may hold that to be—can best be described as an *a priori* that is only signified by restless clock hands, by writing into a record, or by capturing an image sequence. The suspicion that it may be more directly part of these mechanisms is what fuels the works examined above and, in essence, forms the subject matter of *Entr'acte*. By gaining independence from the intangible reality it signifies, pure linearity—as metaphorical time—can be twisted and manipulated so as to alter the meaning of the mechanisms that claim to signify it. In effect, time's arrow, newly unmoored from its analogous concept, becomes tactile—clay in modernist hands—whose erstwhile line is deflected and rebounds against the imagined mirrors created for it by Hindemith and Clair. In the first half of *Entr'acte*, Clair

TABLE 1a

Tonal and metric synopsis of *Relâche,* act 1, with cinematic introduction

Key	meter	mm.	subsection
D	2/4	52	Ouverture
F	2/4	28	Projection
A	2/4	8	Rideau
A	2/4	20	Entrée de la Femme
D	2/4	32	« Musique »
B♭	2/4	38	Entrée de l'Homme
G	3/4	52	Danse de la Porte tournante
E	6/8	34	Entrée des Hommes
C	2/4	30	Danse des Hommes
E♭	3/4	64	Danse de la Femme
G	2/4	68	Final

TABLE 1b

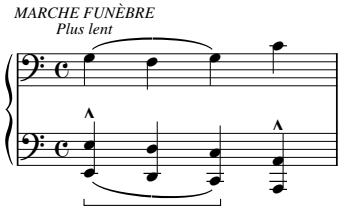
Tonal and metric synopsis of *Relâche,* act 2

Key	meter	mm.	Subsection
D	2/4	38	Musique de Rentrée
A	6/8	16	Rentrée des Hommes
F	2/4	40	Rentrée de la Femme
D	2/4	32	Les Hommes dévêtissent
G	3/4	60	Danse de l'Homme et de la Femme
B♭	2/4	40	Les Hommes regagnent leur place et retrouvent leur pardessus
D	5/4	32	Danse de la Brouette
A	3/4	52	Danse de la Couronne
F	2/4	44	Le Danseur dépose la Couronne sur la tête d'une spectatrice
E♭	2/4	20	La Femme rejoint son fauteuil
D	2/4	32	Petite Danse Finale

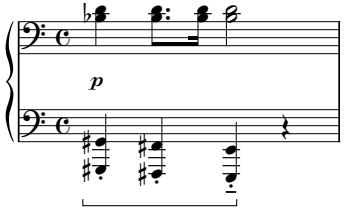
designs an antinarrative, an illogic and illudent picture sequence that celebrates the lack of unity or meaning implicit in the ballet score's titular question: "When will people get out of the habit of explaining everything?" But the binary structure of the film—counterpointing

EXAMPLE 6. Excerpts from Erik Satie's score for René Clair's *Entr'acte*. CINEMA: ENTRACTE. Réduction par Darius MILHAUD de l'entracte symphonique du ballet RELACHE pour le film de René Clair ENTR'ACTE. Music: Erik SATIE. © 1924 by Editions SALABERT

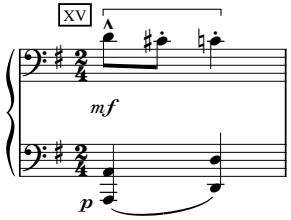
a. Transposed opening theme from the *marche funèbre* in *Entr'acte*, m. 189



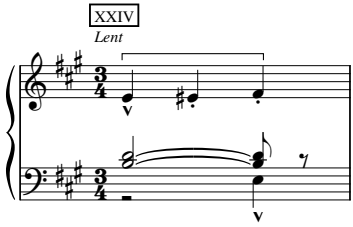
b. Funeral theme overlaid with Chopin parody, m. 205



c. Resulting ostinato theme, chromaticized and in duple meter at the beginning of the hearse chase, m. 245



d. Chromatic theme inverted as Borlin exits the coffin alive, m. 378



non-consequent fragments against flowing continuity—also incorporates both elements of Zeno's paradox. That is to say, it embodies a construction of time from the perspective of one who purports to understand its contradictory properties. Castigating Clair's film as a waste of sponsors' resources, a bemused reviewer revealed that the nub of the issue was not fiscal but focal—the lack of comprehension, the elusion of meaning: "[I'd be] damned well hard put to explain what [Clair] meant to express," he complained ebulliently.[98] And rightly so, for in taking the (apparent) mechanism of understanding time and creating nonsense with it, Clair elegantly articulates the very fraudulence of understanding in the first place. In this sense, he steps beyond Bergson's characterization of an infinitely fractured duration and actually defeats the idea that there is any way of comprehending such a thing. Instead of setting out to illustrate the artifice of our reconstruction of duration with a cinematograph metaphor, Clair uses cinema to artize the entire project of meaning. It is a Dada triumph.

Or is it? To dismiss *Entr'acte* entirely as meaningless fun would be to ignore the sincerity it its convictions: "I am not myself in a position" Clair recounted in 1968, "to make out what is provocation, mystification or seriousness in my own contribution to a work improvised for a few evenings and which chance has allowed to survive." He then baited the trap: "I hope that one day some future Ph.D. will write a thesis called: 'On the Role of Mystification, Conscious or Unconscious, in Contemporary Art'. Believe me, it is not a negligible subject."[99] Whether Clair's was a sincere enterprise in this sense or a snare for those humorless enough to take it seriously is beside the point.

Although this essay aims to have drawn structural connections between Hindemith's opera and Clair's film, both of which explore

[98] R. C. Dale, *René Clair*, 26.

[99] René Clair, *Classic Film Scripts: A Nous la Liberté, Entr'acte*, trans. R. Jacques and N. Hayden (New York: Simon and Schuster, 1970), 111–12.

modernist ideas of time in terms of an Elean paradox, the attitudes they bring to it are differentiated by their significations of duration. Hindemith aspired to create an illusion of time moving backward through the reordering of Bergsonian "snapshots" that had already been experienced by an audience in real time—a "duration" structured by memory; the first half of Clair's film, by contrast, orders the sequence of images precisely to destroy (and thereby to reveal) the illusion of time moving forward—an "instant" of perpetual motion. *Hin und Zurück* employs mechanical artifice to mimic our understanding of a psychic as well as cinematic process; *Instantanéisme* strives joyfully to expose the artifice of cinema, and by implication, to expose our ignorance of time, the illusion that we know duration in any sense. And yet, by "interpreting our dreams" and the "unrealized events that take place in our brains" (as Picabia asserted),[100] *Entr'acte*'s profound instantaneous *non-sense* may be closer to reflecting a mental activity that can only be symbolized, rather than *real*ized by Hindemith's time-axis manipulation. In the film's second half, on the other hand, the velocity of the accelerating hearse inverts death into life, thus appealing to Stuckenschmidt's psychology of compression as well as nodding to Einsteinian relativity and anticipating discourses of objectivity that Hindemith's Sage would provoke three years later.

In all this discourse, Satie's and Hindemith's palindromes function as a basic formal principle that not only allows for sophisticated characterizations of time but that satirizes the artifice of attempting to comprehend it. While it would be difficult to argue that all musical palindromes imply a conscious temporal function, their symmetrical form in this context displays a self-reflexivity that can reflect both the perception and apperception of duration. Newtonian mechanics—still the dominant physics in European popular consciousness at the beginning of the 20th century—defined time as equivalent in its past and future. By studying the motion of particles in the present, for example, it was theoretically possible to determine not only their future movement but the entire history of their movement: Future and past are determined by a mechanical codependence. This model applies directly to certain musical palindromes to the extent that a central axis of symmetry can look forward and backward with indifference: The direction matters "not one iota," in Hindemith's words. But following Rudolf Clausius's second law of thermodynamics in 1850, the discovery of entropy argued for a time that was unidirectional rather than equivalent in its temporal path. The resulting scientific theories of time entered new

[100] *Francis Picabia: Ecrits 1921–1953 et posthumes* (Paris: Pierre Belfond, 1978), 167.

realms of complexity that relate to music only insofar as there was an increasing discrepancy between what is acknowledged to be imagined and what is imagined to be real. (In recent times Stephen Hawking has postulated that we construct "real" time because we can't understand imaginary time. His proposal suggests that the modernist play on our lack of temporal cognition is still very relevant.)[101]

Like Zeno, both Clair and Hindemith probe a lack of coherence between what is real and what is perceived. On these grounds it is the cinema and the phonograph that first allow for the sensory appreciation of a methodical, distinct separation between real and symbolic time, between *instantanéisme* and *Erinnerung*, which is to say the paradox of immobile motion itself. This irreal concept, as an impossible condition, can be presented as real for satire or amusement, yet there is a subversive, darker side to such mockery because art, like technology, has no answer to the question posed in the introduction by Valéry about knowing our mortal duration.[102] Even if such answers were forthcoming through media, what kind of modernist would desire to see things "as they are"? For Valéry, this perfect clarity is a fearful prospect: "The real, in its pure state, stops the heart instantaneously. . . . To a handful of ashes is the past reduced, and the future to a tiny icicle. The soul appears to itself as an empty and measurable form."[103] Apparently, Clair can reassure in this regard that any certitudes of understanding media and demystified time were safely out of reach in the 1920s: "Will our generation know," he pondered, "what to think of any given question posed by a film and by film itself?" His laconic dismissal "I doubt it"[104] speaks far beyond its literal meaning. When applied to media kinetics more broadly, his question intimates the unknown and the unknowable—an imaginary grain of truth between the contradictory properties of a paradox.

Harvard University

[101] "In real time, the universe has a beginning and an end in singularities that form a boundary to space-time and at which the laws of science break down. But in imaginary time, there are no singularities or boundaries, so maybe what we call imaginary time is more basic, and what we call real time is just an idea we invent to help us describe what we think the universe is really like." Stephen Hawking, *A Brief History of Time* (London: Bantam, 2005), 144.

[102] Paul Valéry, *Dialogues*, trans. William Stewart (London: Routledge and Kegan Paul, 1957), 2.

[103] Ibid., 52.

[104] Clair "Essay on Rhythm," 29.

ABSTRACT

The concept of linear time as an irreversible succession of events dates back to the late 18th century. Though fundamental to the experience of music written thereafter, time's pure linearity was dented by technologies of mechanical reproduction during the early 20th century. Imagining possible temporal zigzags provided modernists such as Paul Hindemith and René Clair with mechanical paradigms through which to explore the manipulation of time and motion—as infinitely divisible properties—in the decade that witnessed Lindbergh's transatlantic flight, the first radio broadcasts, and an increasing addiction to Edison's Duplex Telegraph wire. Apart from the modernism that exists on the historical timeline, this essay looks for a structural homology between historical and musical events in attempting to establish a distinct "modernism of time" for the 1920s; it argues that differing concepts of time were reflected in certain pieces from the early 20th century.

Hindemith's one-act operatic epigram *Hin und Zurück* (1927) plays with conceptions of time as a narrative of reversal from domestic disaster to "happy beginning." The music, running forward and backward, evokes different processes of memory to illustrate this "Time Axis Manipulation" as it is intuitively lived by the stage characters. Clair's contrasting Dadaeque film *Entr'acte* (1924), set to Satie's music, is an illogical picture sequence that also embodies a construction of time, *Instantanéisme,* but denies that it can be understood. Both works were conceived as proportional, imperfect mirror forms, indicating an implicit temporal reversal, though from antithetical perspectives. Drawing on the master paradigm of Zeno's arrow, this enquiry explores qualities of musical and visual time as both construction and manipulation of the modernist imagination.

Key words:
Paul Hindemith
palindrome
Eric Satie
sound reproduction technology
time-axis manipulation