Title
Behaviors of impulses and instants

Permalink
https://escholarship.org/uc/item/1kp6t4j4

Author
Karre, Ross Patrick

Publication Date
2011

Peer reviewed|Thesis/dissertation
UNIVERSITY OF CALIFORNIA, SAN DIEGO

Behaviors of Impulses and Instants

A thesis submitted in partial satisfaction of the requirements for the degree
Master of Fine Arts

in

Visual Arts

by

Ross Patrick Karre

Committee in charge:

Professor Jean-Pierre Gorin, Chair
Professor Teddy Cruz
Professor Michael Trigilio
Professor Steven Schick

2011
The thesis of Ross Patrick Karre is approved, and it is acceptable in quality and form for publication on microfilm and electronically:

______________________________

______________________________

______________________________

______________________________  Chair

University of California, San Diego

2011
# TABLE OF CONTENTS

Signature Page ................................................................. iii

Table of Contents ............................................................. iv

List of Figures ................................................................. v

Vita .................................................................................... vi

Abstract of the Thesis ........................................................ vii

Chapter 1 Behaviors of Instants and Impulses ......................... 1
  1.1 The Golden Spike ...................................................... 1
  1.2 Stanford: Trains and Horses ....................................... 1
  1.3 The Wager ............................................................... 2
  1.4 The Other Side of the Pond ....................................... 8

Bibliography ...................................................................... 32
**LIST OF FIGURES**

<p>| Figure 1.1: | Promontory Point Utah | 2 |
| Figure 1.2: | The Steeplechase by Carl Aagaard | 3 |
| Figure 1.3: | The Hobbyhorse | 3 |
| Figure 1.4: | Edgard Degas “The False Start” 1869-72 (before Muybridge’s series) | 4 |
| Figure 1.5: | Degas “Horse with Jockey” 1890s (after Muybridge’s series) | 4 |
| Figure 1.6: | Eadward Muybridge “Full Speed Chronophotograph” | 5 |
| Figure 1.7: | Four Frames from Léger’s <em>Ballet Mécanique</em> | 14 |
| Figure 1.8: | <em>Substitue Judgment</em>. June 2006. Photo: Lisa Skaff | 20 |
| Figure 1.9: | Portable Circular Projections on Tour in California | 21 |
| Figure 1.10: | <em>Substitue Judgment</em>. October 2007. Seoul, Korea | 22 |
| Figure 1.11: | <em>Popol Vuh</em> by Karre, Trevino, and William Brent. 2008 | 23 |
| Figure 1.12: | <em>Popol Vuh</em> by Karre, Trevino, and William Brent. 2008 | 24 |
| Figure 1.13: | The Five Lives of Helios. 2010 | 25 |
| Figure 1.14: | <em>How to Fold Boxes</em>. 2010 | 26 |
| Figure 1.15: | <em>legerdemain</em>. Collaboration with Monica Duncan. 2011 | 27 |
| Figure 1.16: | <em>La Coupure</em>. Three-dimensional computer model. 2010 | 28 |
| Figure 1.17: | <em>La Coupure</em> by James Dillon. Performed by Steven Schick. 2010 | 29 |
| Figure 1.18: | <em>La Coupure</em> by James Dillon. Performed by Steven Schick. 2010 | 30 |
| Figure 1.19: | <em>La Coupure</em> by James Dillon. Performed by Steven Schick. 2010 | 31 |</p>
<table>
<thead>
<tr>
<th>Year</th>
<th>Degree</th>
<th>Institution, Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>B.M. in Percussion Performance</td>
<td>Oberlin Conservatory, Oberlin, OH</td>
</tr>
<tr>
<td>2007</td>
<td>M.A. in Music</td>
<td>University of California, San Diego</td>
</tr>
<tr>
<td>2009</td>
<td>D.M.A. in Music</td>
<td>University of California, San Diego</td>
</tr>
<tr>
<td>2011</td>
<td>M.F.A. in Visual Arts</td>
<td>University of California, San Diego</td>
</tr>
</tbody>
</table>
The dawn of the industrial revolution brought about a greater understanding of the phenomena related to music and the moving image. In the 20th century, experimentation in the combination of sound and image refined an attitude towards intermedia and its possibilities. The piece-specific practices of intermedia work and its necessity for reinvention with each new experiment has defined the nature of my personal practice.
Chapter 1

Behaviors of Instants and Impulses

1.1 The Golden Spike

May 10th, 1869. A.J. Russell’s iconic “Golden Spike” photograph taken at Promontory Point, Utah captures the moment at which speedy east-west continental traversal was made possible. The photograph marked the much-anticipated completion of an Herculean feat of labor and finance. “Leland Stanford drove the spike of California gold with a sledgehammer of Nevada silver that had been wired to connect to the telegraph lines that ran east and west along the railroad tracks. The instant Stanford struck the spike, a signal would go out around the nation. It was the first live national media event.” [Sol03, p. 58] The signal triggered fireworks in some cities, ball drops in others. It was an impulse that changed the American perception of time, the American experience of time, and a global artistic exploration of time.

1.2 Stanford: Trains and Horses

As the railroad baron responsible for expedited transcontinental traversal, Leland Stanford’s relationship with horses is slightly curious (as he put them out of
business). Stanford’s persistence with the transcontinental railroad project allowed for a coast-to-coast trip to be shortened by over thirty times the same trip via horse carriage. But Stanford’s horses were not to be completely outdone by the train. Their own properties of locomotion would be responsible for a further collapse in the human understanding of duration: the instant.

1.3 The Wager

The lore of the story is well-known; its accuracy is beside the point. Stanford entered into a wager with his friends and colleagues regarding the nature of horse locomotion. The primary question: at full gallop, is there a point at which all four horse hooves are off the ground at once? The horse’s mid-gallop pose-instant is represented in conflicting ways by painting and sculpture. The *Steeplechase* by
Carl Aagaard and the hobbyhorse both depict horses in physiologically improbable poses. The instant in question was impossible to capture perfectly but Stanford was determined to resolve the wager and hired Eadward Muybridge to attempt to capture a horse in mid-gallop with his camera. Muybridge’s success in resolving the matter meant that artists such as Edgar Degas would fundamentally change the way they depicted a horse’s locomotion. In essence, Degas began to paint the horse’s instant, not its pose. More skeptical of the technology, Auguste Rodin held that “it is the artist who is truthful and it is photography which lies, for in reality, time does not stop.” [Fra83, p. 79] The industrial revolution, the mechanical evolution, and their scientific and artistic exponents would go out of their way to prove Rodin wrong. “Everywhere the mechanical succession of instants replaced the dialectical order of poses.” [Del86, p. 4]
Muybridge is an unlikely figure in the capture of instants if one looks at the work that made him famous leading up to the wager. Muybridge packed hundreds of pounds of elaborate equipment onto mules and trekked into the wilderness of Yosemite in order to capture its natural features on mammoth colloidal wet-plates. [Sol03, p. 42] The “instant” was not among the many laborious steps. In fact, image-instants may have been simulated on a single, completed photographic print, however, the exposure times were measured in minutes, not instants. But Muybridge’s interest in time is revealed in his work with the long-exposure in Yosemite. “Muybridge, in his earliest landscape works, seems positively to seek of all things, waterfalls; long exposures of which produce a strange, ghostly substance
that is in fact the tesseract of the water: what is to be seen is not water itself but
the virtual volume it occupies during the whole time-interval of exposure. It is cer-
tain that Muybridge is not the first photographer to make such pictures; my point
is that he is the first photographer to accept the ‘error’, and then systematically,
to cherish it.” [Fra83, p. 79]

Gilles Deleuze describes the 19th century’s transition from poses to instants
in this way: “The modern scientific revolution has consisted in relating movement
not to privileged instants, but to any-instant-whatever. Although movement was
still recomposed, it was no longer recomposed from formal transcendental elements
(poses), but from immanent material elements (sections). Instead of producing an
intelligible synthesis of movement, a sensible analysis was derived from it.”[Del86,
p. 4] About the horse, Deleuze remarks, “...Muybridge’s equidistant snapshots
relate the organized whole of the cantor to any-point-whatever. If the equidis-
tant points are chosen well, one inevitably comes across remarkable occasions.
These may be called privileged instants, but not in the sense of the poses or gen-
eralized postures which mark the gallop in the old forms. These instants have
nothing in common with long-exposures (poses), and would even be formally im-
possible as long-exposures. The any-instant-whatever can be regular or singular,
ordinary or remarkable.”[Del86, p. 5] He goes on to describe science’s transition
from Euclidian to Cartesian to Leibnizean analysis. Plane geometry and three
dimensional geometry are, in this case, poses in an atemporal analytical method. The cartesian system moves in a direction of representation of geometric principles and physical principles by visually representing functions (i.e. the visual bridge between algebra and geometry of Descartes). Leibniz’s system of representation includes precise (infinitesimal) analysis of physical principals and accommodates descriptions (functions) of any-instant-whatever. A behavior which is represented by a function (algebra) can be charted graphically (cartesian) and analyzed at any-instant-whatever (for example, the derivative is the slope of the tangent line of any point along a function’s curve or the velocity at any point along a body’s acceleration). Mathematics had a system in place for accommodating the instant more than 150 years before the golden spike. Art simply needed to catch up and Muybridge was the catalyst for the chase.

Before the snapshot, instants were described in poses.[Ber60] Long-exposure photography simulated the instant via frozen poses which had to last minutes in order for the film to be exposed for the correct duration. Any-instant-whatever was theoretical; capable of representation only via simulation and memory. As a nation without instants, the railroad posed a variety of problems. If the train is to arrive at the station in a particular instant, then prospective passengers of all types must have some way of knowing when that instant might be. Further calibration of that particular instant to a series of consecutive instants would require a device capable of giving such information. Of course, the watch had been around for centuries and so the concept of a series of instants separated by a consistent duration (second, minute) was not new. But the wide-spread need for that series of precise instants had yet to arise. The Massachusetts-based Waltham Watch Company pioneered mass production of watches such that, by 1876, the dollar watch made the mechanism a universal method of knowing one’s location in the chronographic series of instants. Farmers and ranchers shifted from a heliocentric metric of time to a watch; a watch set and reset to the reliable clock of trains passing locations along the frontier. In 1876, the first watch precision contest took place at the Centennial Exposition in Philadelphia. By 1891, standards of precision for railroad chronometers were established by Webb C. Ball.[Mil29, p. 133 - 137]
The railroad and the snapshot, both the result of Leland Stanford’s idealism, changed America’s notion of time from that of a continuum with only theoretical conceptions of instants (poses) to an episodic understanding of time, where every instant is precisely positionable along an infinitesimal series of equidistant instants. The railroad and the chronograph lead to further precision parsing of American time via the invention of time-zones. For further convenience and calibration of train schedules, an infinite continuum of noon-instants across America’s 3000 mile breadth would no longer suffice. Instead, four precise longitudinal bands would reduce our continuum to four noon-instants per day; nationwide. What was once a spectrum of time is now a precisely calibrated grid of moments.[Mil29, p. 133 - 137]

Like time-zones, Muybridge’s shutter speed also revealed a new conception of the instant. Because the precise any-instant-whatever of the horse entrechat was not obtainable via a single camera shutter-instant, Muybridge captured a series of instants, temporally equidistant, which were more than likely to capture the desired entrechat-instant. Indeed, the specific image revealed itself from the collection of twenty-four equidistant shutter instants. But it was not the resolution of Stanford’s wager that was the catalyst for a complete shift in temporal logic. It was the serial replaying of the twelve shutter-instants in Muybridge’s Zoopraxiscope that started the cinematic revolution. One year before Lumiere, Muybridge projected his sequence at the World’s Columbian Exhibition in Chicago in 1893.[B+98]

The impulse of the golden spike, transmitted across the United States as the first national simultaneity, left in its wake a percussive resonance. A resonance of constant, precise vibration which calibrated itself to each new innovation of the industrial revolution. The impact of this impulse-resonance was to be felt and interpreted by a variety of artists from the late-nineteenth century through the late 1920s. Impulses could be seen and heard in artistic experiments such that three categories emerge, particularly in music, cinema, and their combination: 1) The impulse as the impetus for an action or a behavior. 2) The series of impulses as the behavior itself. 3) The impulse as an elision between two behaviors. The spark of fire to create the steam for a train’s engine is impulse-impetus. The ticking
second hand on the dollar-watch is an impulse-behavior. Each impulse resembles the one prior and the one to follow: a pulse, a progression. An impulse-elision is the snapshot between other equidistant snapshots. Though related to the image before and after, the impulse-elision has qualities of autonomy. It is simultaneously the impetus for all things to come and a Deleuzian any-instant-whatever.

1.4 The Other Side of the Pond

The golden spike’s telegraphic resonance was not bounded by the coasts of N. America. Transit, communication, chronography, and photographic technology were advancing around the globe. While Muybridge took his animal locomotion sequences on tour in Europe, Richard Wagner completed his ring cycle after decades of innovation in the audio-visual domain. Apart from his well-known Gesamtkunstwerk concept, Wagner’s attention to detail is revealing with respect to impulses and their behaviors. Wagner, along with Hector Berlioz (who died in the same year as the golden spike), were well-known for introducing new sound-making objects into the fray of orchestration. The Habsburg empire’s exposure to turkish janissary music during their centuries-long conflict with the Ottoman empire was the “golden spike” of percussion’s inclusion in the western orchestra.\cite{SJ08}

Drums, cymbals, and other impulse makers were first introduced by C.W. Gluck (court composer for the Habsburgs), perfected by Mozart, Beethoven, Rimsky-Korsakov, and expanded upon in radical ways by Wagner and Berlioz. Berlioz’s famous quote that “any sound-producing object in the hands of a composer is a musical instrument,”\cite{Bla92, p.281} one hundred years before John Cage, incited radical experimentation in the realm of impulse and resonance. Examples abound but perhaps the most fascinating of these sonic experiments came when both Wagner and Berlioz attempted to emulate the sounds of their natural surroundings. For Berlioz, creating a storm required unprecedented use of timpani rolls, bass drum rolls, and tam tam vibrations. For Wagner, it meant creating an instrument which could emulate the wind. A barrel of wood was mounted on a spindle. When rotated, the barrel would create audible friction with a sheet of canvas which was
draped over the device. The resulting friction is eerily similar to gusts through pine bows in a dense forest. The tam tam and the wind machine are revolutionary in their impulse-behavior properties. Nearly all instruments behave similarly; a violinist initiates a string’s vibrational behavior via the impulse of the arm followed by friction from the bow hair. Breath is the impetus for the oboe’s tone. A hammer-stroke induces the piano’s pure string vibrations. But the behavior following an impulse of the tam tam mallet stroke is not a tone. It is a noise. To western ears, it is a noise analogous to natural forces but more closely related to the noises at the dawn of the industrial revolution. The same is true for the wind machine. The initiating muscular force on the hand crank yields a behavior of natural sonic forces as much as it evokes the whirring of motors, pulleys, cranks, and pistons along Stanford’s transcontinental railway. Seventy years before the futurists and the *Art of Noise*, Berlioz and Wagner sought out the sonic behaviors of industry for their operas and symphonies.

Back in the American West, it is important to acknowledge that the innovation which allowed Muybridge to capture Stanford’s horse in a perfect airborne entrechat a quatre. In addition to the brilliant use of twelve equidistant trackside cameras, the feature which truly enabled Muybridge to capture this instant was a percussive impulse. Two slats of wood on a spring-loaded mechanism opened and closed with the speed and intensity of a hammer-blow. The light was allowed to the plate for (according to Muybridge’s claim) 1/1000 of a second. The amount of light was so low that Muybridge erected a white background on the opposite side of the track for the entire length of the locomotion in question. The result was a high-contrast image of Stanford’s dark horse “Occident” against a white surface: the famous photos known world-wide today.[Sol03, p. 179]

The confluence of a variety of impulse-types made the resolution of the wager possible. First, the impetus-impulse of the camera had to happen with just the right speed and intensity in order for the any-instant-whatever to be captured. For this, Muybridge developed his wooden shutters powered first by spring and rubber band and later by electricity. Second, the impulse-behavior had to have a high enough frequency such that the likelihood of capturing the entrachat-instant
in question was optimized. To do this, Muybridge allowed the horse’s movement down the track to trigger trip wires which induced the shutter’s impulse for each of the cameras. Third, in order to prove that each shutter was an elision-impulse in a series, he printed the sequence on one sheet of photographic paper, creating one of the earliest continuous chronophotographs (the first by Juilienne Etienne Marey in 1870)[SoL03, p. 196]. It was printing onto the photographic paper that lead to the creation of the Zoopraxiscope. This device combined zoetropic mechanisms with the magic lantern to create a projected chronophotographic series.

What Muybridge and Berlioz brought to the impulse and its resonance is a similarity of phenomena that enables cinema to be discussed musically and music to be discussed cinematically on a temporal level. Further, the two can be discussed interchangeably in many metaphysical and phenomenological theories. This is evidenced by the quantity of observations made by Bergson and Deleuze regarding one medium which have direct analogs in the other. Muybridge, Berlioz, and the Industrial Revolution made way for Lumiere (projected cinema), Thomas Edison (kinetoscope and phonograph), Gustav Mahler, and Richard Strauss (sonifying natural phenomena) to codify the experiments, polish the mechanisms, and increase awareness of innovations in the transferable phenomena of impulses and their resonance. Perhaps the most distilled and coherent aggregation of these principles comes forty years after the horse was suspended in mid-air by Muybridge. Luigi Russolo’s Art of Noise outlines each of the three impulse-types in the clearest of fashions:

To Russolo, impulse-behavior is described as a noise produced repeatedly at the right rate (minimum 16/second) such that a sound is produced from a totality of noises; “a noise whose successive repetitions will be sufficiently rapid to give a sensation of continuity like that of sound.”[RPoLS86, p. 37] Russolo distinguishes (non-pejoratively) between noise and sound by indicating that sound has a regular, periodic vibration; noise’s vibrations may be irregular or aperiodic and plural. “Noise is much richer than sound”[RPoLS86, p. 39]

Deleuze and Russolo use similar analogies to discuss the notion of superimposed impulse-behaviors. Deleuze’s analogy involves a bird circling overhead at a
regular, slow period but the critical periodicity is that of the bird’s flapping wings, keeping it aloft.[Del86] To expand that to sound, if the bird’s wings flap at a fast enough rate, one will also hear an audible pitch like that of a humming-bird. Russolo’s analogy involves a toy boat which is pushed across a pond not only creating small wakes of a regular period but also, as it’s pushed, is shaken such that it creates a faster periodic set of waves on the water’s surface. “Noise is produced when the secondary vibrations are more numerous than those that produce the initial sound”[RPoLS86]

On the heels of Russolo and the futurists were pivotal artists of impulse and resonance in the 20th century: Edgard Varèse, Fernand Léger, Kurt Schwitters, and George Antheil figure prominently. Antheil and Léger intended to collaborate on a multimedia piece which would combine the temporal phenomena of cinema and music with mechanisms not far from Russolo’s industrial collection of sound makers. “However, since it was soon discovered that one could not synchronize a motion picture score that closely (during 1924 and 1925),” the collaboration was never realized as intended. Antheil further clarifies the nature of his intentions which also correct a common misconception of Russolo’s manifesto; that futurism was concerned with celebrating the mechanisms of industry. Russolo was simply interested in adding the noises and sonic behaviors that industry revealed to the palette of sounds in western orchestration. Antheil never “intended to demonstrate the beauty and precision of machines. Rather it was to experiment with and thus, to demonstrate a new principle in music construction, that of ‘time-space’; or in which the time principle, rather than the tonal principle, is held to be of main importance.”[Ant03]

Antheil, along with a number of other American-born bicontinentalists, extended Stanford’s transcontinental innovations into a transatlantic artistic movement. And, like the train’s influence on the “time-canvas” [Ant03] of N. America, the airplane (the soon-to-be method of transatlantic travel) had a profound effect on Antheil and was also the icon of the futurist manifesto.[HG00, p. 180] Antheil’s first machine-influenced work was titled *Airplane Sonata*. During his childhood, Antheil lived across the street from a machine shop. His passion for composition
drove him to take lessons in Philadelphia and then take a train to New York for study with Ernest Bloch.[HG00, p. 180] The machine shop, the train, and finally the futurist airplane rounded out a symphony of noises which were to become the foundation of Antheil’s “machine style.”[HG00, p. 187]

The oft-cited “time-canvas” terminology coined by Antheil refers to a perpetual or cyclic impulse-behavior. The radical, almost prophetic notion that Antheil exploits in a pre-Cage, between-war period is the notion that silence is its own perpetual impulse-behavior. His expanses of silence at the end of the original *Ballet Mecanique* are “long stretches where no single sound occurs and time itself acts as music.”[HG00, p. 187] Francis Picabia also cites this notion of the perpetual motion machine in the October 1924 issue of *391* where he establishes the concept of instantaneisme.[pic] “Instantaneisme believes only in perpetual motion,” writes Picabia. A collision of innovations were uncovered not unlike those discovered by Muybridge, Stanford, Lumierre, and Edison fifty years prior. Hyperspace, or studies in the fourth and fifth dimension, were on the cusp of becoming the scientific vogue. This, coupled with the futurist and dadaist obsessions with perpetual cycling noises of trains, machines, and airplanes, inspired Antheil and others not to think of time as something that is started, stopped, and parsed via human-derived rhythmic composition but as a fourth dimensional continuum of impulse-behaviors which have no impetus; only intervention. The behaviors of time are meant to be “baldly exposed,”[HG00, p. 187] not created.

Silence is the blank canvas of time to be exposed and repetition is the ongoing impulse-behaviors which serve as the material to fill the time-canvas. The cyclic repetition of whirring motors and the driving ostinati of pistons, shafts, and belts are the inspiration for this repetition. These mechanisms made such repetition audible in a way that was not possible in the “quiet times before industrial noise.”[RPoLS86] Antheil confessed that he “did not hesitate to repeat one measure one hundred times or leave the pianola roll blank for 62 bars!”[Ant03] Machines, including the pianola, without need for the respiration of a wind player, the tiring fingers of a pianist, or the retake of a violin bow, facilitated this continuum of literal cyclic repetition in the fourth dimensional time-canvas. For Léger and
Antheil, perpetual impulse-behaviors of the film projector and pianola can interact in an analogous way.

The film Ballet Mecanique is a sequence of mechanistic behaviors which are captured and then formally interpreted in a number of ways: 1) via the filmic mechanism’s temporal abilities: repetition, flash frames, slugs, stop motion. 2) via the filmic mechanism’s graphical abilities: mattes, optics, flops. 3) via captured motion: along z, x, and y axes and combinations thereof. 4) via camera movement: zoom, pan, tilt, follow. Each of these methods is employed to execute a recurring gesture in the film: finding and capturing mechanical movement in the world and recasting an analogous movement via other means. Oscillating pistons become a woman ascending a staircase, repeated every forty frames in order to convert her progress of ascension into repetitive oscillation. A swinging woman becomes a mirrored pendulum. Bottles become zeros. Legs become heads. Each object is subject to any and all methods of movement so that all become one. Human, animal, object, and machine are put through the same mechanistic methodology.

Antheil applies a similar methodical transferability to the motivic development of his music. The oscillations of repetition are subject to varying orchestration, tempi, volumes, and pitch modulations. Passages that are performed via the pianola’s cyclical design are also interpreted by human performers on xylophones. The fluttering of propellor blades is also performed as bass drum tremeli. In other words, both Antheil and Léger use impulse-behavior as a transferable method. The behavior of one image sequence or rhythmic fragment can be performed or captured in myriad ways. The same is true for impulse-impetus. At the opening of the 1953 version of Ballet Mecanique the tam tam, tenor drum, and bass drum function as punctuation, like the film’s cuts. It signals the start of new musical fragments. By the thirteenth measure, the same drums are already functioning as a cycling repetition of continuous eighth notes. Impulse-impetus becomes impulse-behavior.

Impulse-elision figures prominently in sound and image. Léger (like René Clair in Entre’acte discussed later) uses the match-on-action cut as a way of smoothing an otherwise jarring non-sequitor. It further solidifies the linkage between mechanical behaviors of machines and the non-machinic images to which
they are compared (woman walking, swinging, smiling, etc). The entirety of Léger’s image bank is intercut with triangles and circles, the geometric building-blocks of the captured images.

![Image of Léger's Ballet Mécanique frames]

**Figure 1.7:** Four Frames from Léger’s *Ballet Mécanique*

They also serve as impulse-elisions between the kaleidoscopic matting techniques and hats, between smiling mouths and opening eyes. Simple white on black geometry serves as the base layer against which all other image currency is measured. It thereby converts image specificity of meaning into any-image-whatever. Images can be played like cards from a deck, shuffled, reordered, repeated, and combined without fear of miscommunication. Noise serves the same function in Antheil’s score. Tam tams and piano clusters are so devoid of pitch that they render all pitches and pitch collections as equivalent or equidistant. The opening b-dorian pitch collection does not evoke the qualities of b-dorian because the piano nullifies its modal qualities by sounding accented pitch-clusters in the low-
est register of the instrument. Specific pitch collections (with dangerous ethnical referentiality) become any-pitch-whatever.

*Ballet Mecanique* can claim a host of innovations related to impulse. Stravinsky tried to incorporate the pianola one year prior to *Ballet Macanique* in his piece *Les Noces* and failed. He eventually settled on a four-piano version for human performers, percussion, and voices. *Les Noces*’ percussion is a clear predecessor to every instrumental selection that Antheil made. Though the recipient of many slanderous comments from Antheil, it is also true that nearly every piece that Antheil wrote has a clear parent in Stravinsky. *Ballet Mecanique* has *Les Noces*, *Airplane Sonata* has Stravinsky’s string quartet, the *Jazz Symphony* has *Ragtime* and *L’Histoire du Soldat*. In fact, by the time Antheil was writing Stravinsky-like pieces in the mid-twenties, Stravinsky himself had already moved onto his neo-classical period. Antheil relished his title as the “bad boy” who distanced himself from “les six” and Stravinsky but he is quite guilty of borrowing a lot of their innovations. Edgard Varèse, on the other hand, distinguished his sound from the techniques of Stravinsky and created his own language which would have the most profound influence over transatlantic orchestration to follow. Antheil distilled the concepts of impulse from Russolo and Stravinsky into an unprecedented multimedia spectacle. Varèse then took those principles, combined them in an idiosyncratic way, and made music that is truly the culmination of everything that could be gained from the period between the golden spike and WWII.

In the same year as *Ballet Mecanique*, René Clair, Francis Picabia, and Erik Satie collaborated with Ballets Suedois on Relâche, an “instantaneist” ballet. In the middle of the ballet was an intermezzo screening of *Entre’acte*. The film shares numerous characteristics with Léger’s film including non-sequitor match-on-action cuts and superimposition (compositing). “[Clair] treated the camera like a new-found toy and organized his playful images with remarkable array of effects: complex rapid-fire editing, dense superimpositions, rhythmic manipulations from slow to fast motion and back, all in the interest of developing a new language for cinema; “...developed a new spirit of appreciation for the unique properties of the film medium.”[Mar97, p. 169] It was Clair’s first film and this is revealed in its
freshness of approach. On the other hand, it is one of Satie’s final compositions and, as such, shows clear (almost tongue-in-cheek) command over and suppression of compositional norms. “Satie did not cue such rapid fire changes in the score. Instead the music matches the films content via character... buoyancy, fast-paced momentum, fragmented, subject to unpredictable recurrences, as the images they accompany.” The music and film share a common tone, both detached and humorous. There are no cadences to confirm the absurd key changes. The chords lose their functional meaning in terms of harmonic relationships. One might say, the chords are liberated from such relationships, just as Clair sought to liberate the film’s images.”[Mar97, p. 174]

Russolo and the futurists innovated in the realm of impulse-behavior by welcoming the aperiodic, unpredictable iterations of impulse as much as they would pure sinusoidal sustain. Clair, Satie, and the dadaists expanded on this notion by pushing against the conventions of cinematic continuity (the match-on-action) and traditional musical transitions (the cadences of functional harmony). The impulse-impetus is therefore the remaining element which yearns for a radical rethinking. In the traditional model, the spark of energy that initiates a resonance or sonic vibration is included in the musical gesture by default. A sound cannot be without its initiation. But, in cinema, the ability to cut into the middle of a take accommodates an interrupting impulse-impetus. In other words, a shot of a tam tam being struck must not necessarily include the strike. The in-point of the shot can just as easily come after the stroke as before it. The impetus is created mid-behavior. But how can this exist in sound? Antheil would answer this question by incorporating mechanisms of the industrial revolution into the sound world. Like Russolo, Antheil wanted the temporal relationships of noises (not “sounds”) to play a role in Ballet Mecanique. The mid-behavior impulse impetus is achieved via two sizes of airplane propellors (or fans). The propellors rotate the entire time. The impetus of their rotation is initiated prior to the concert. Attached to the blades are leather straps that splay out when the propellor reaches full speed. The notation indicates the moments at which a “thin board”[Ant03] is inserted into the leather tornado. This creates an impetus of sound, followed by a behavior which
is periodic but not pitch-like (or sinusoidal). Further, the behavior has been in motion since before the concert. It just required intervention by the performer for the noise to be audible.

If propellors are unavailable, Antheil suggests using tape loops of airplane propellors made in the field. “Either of these play constantly, but the electricity is only turned up” when the score indicates. Whether leather tornado or tape loops, the behavior is set in motion prior to the concert. The audible impulse-impetus is thus actually an intervention-impulse. John Cage made use of intervention-impulse twenty-five years later in his Imaginary Landscape No. 4 (March No. 2) where twelve radios (whose signals flow through the air perpetually) are played as instruments. The sounds are continuous but only made audible via the intervention-impulse of the twenty-four performers who adjust the volume, tone, and tuning knobs according to precise instructions. Also in the 1950s, Karlheinz Stockhausen’s experiments in the radio studios of Cologne produced tape pieces edited in much the same fashion as film, accommodating the same mid-behavior interruption as the mid-shot cut (for example, Gesang der Junglinge).

Media, which was once only at the service of other media, now co-exists in a mutually informative relationship. The currency of the single frame or the single noise belongs to an economy of a sequence of impulses in all media. No longer bound by chronology, order, regularity, or purity, the 20s brought reciprocating influence to music, film, and theatre. Traditionally, the oldest media influence the newer medium. Cinema was “theatre for the screen” until experimentation allowed it to influence theatre as in Picabia’s experiment one year after Relâché titled, Cinesketch.[pic] A clear predecessor to Samuel Beckett’s Play, Cinesketch uses lights to illuminate sections of the visual tableau in which action is to commence. Like hard cuts in cinema, light illuminates and is the impetus for the behavior to follow. The same interplay of impulse-behaviors is apparent between Ballet Mecanique’s sound and image as well as in Entre’acte, perhaps leading to a culmination of media impulse currency with Dziga Vertov’s Man with a Movie Camera in 1929.

What pieces like Ballet Mecanique and Entre’acte reveal is more than a
vocabulary for cross-disciplinary discourse but also the foundations of multimedia practice. Both pieces involve a collaboration between progressive artists combining media in the space of the concert hall or auditorium which had yet to be combined in this way. Opera and silent film dealt with the complexities of this combination but always with a clear hierarchy of primary and accompanimental media. Though Erik Satie would like the viewers to believe that the music for *Entre’acte* was accompanimental “furniture music,” he also wanted the music to accompany the natural sounds of the audience during intermission.[Mar97] In this way, the audience would become a part of the multimedia event as much as the orchestra, a very fresh (and very dadaist) approach to the relationships of elements in the space.

The innovative way in which these pieces engaged impulse-behaviors also required new thought as to the integration of various media within them. The overlapping phenomena spawned from the behaviors of impulses and instants in both the moving image and sound was the fertile ground of experimentation for artists such as John Cage. Cage shared his enthusiasm for experimentation across media with his students at the New School in New York and among other students, Dick Higgins seems to have interpreted the spirit of media integration in the most clear manner. In his *Statement on Intermedia* in 1966, he says that “for the last ten years or so, artists have changed their media to suit [the] situation, to the point where the media have broken down in their traditional forms, and have become merely puristic points of reference. The idea has arisen, as if by spontaneous combustion throughout the entire world, that these points are arbitrary and only useful as critical tools, in saying that such-and-such a work is basically musical, but also poetry. This is the intermedial approach, to emphasize the dialectic between the media. A composer is a dead man unless he composes for all the media and for his world.”[VW66] To elaborate on Higgins’ point, I will add that the intermedial approach is not only to emphasize the dialectic between media but to emphasize an alterity with any specific medium. In other words, there is no generalized intermedial approach except perhaps non-approach, a method which has awareness for other systems but whose only obligation is adherence to
its idiosyncratic algorithm. As Dick Higgins concludes, “we must find the ways to say what has to be said in the light of our new means of communicating. For this we will need new rostrums, organizations, criteria, sources of information. There is a great deal for us to do, perhaps more than ever. But we must now take the first steps.” Higgins statement has resonated like a mantra in my own practice as an intermedia artist. Yes, there is a great deal to do because the practice of intermedia and the progression of technology has made it impossible to set up specific tendencies or patterns of working models. There can be no routine with intermedia because each new work demands a piece-specific set of skills; an idiosyncratic selection of media which have codified practices but whose integrated forms require constant reinvention.

However, consistent, transferable issues and points of interest have arisen in my experiences creating and collaborating in intermedia. Not approaching the production checklist that theatre and cinema have established, these issues present themselves more as phenomena to be managed than as practical production concerns. The first consistent concern has been scale relationships between elements within the space. Secondly, the interaction between analogous and non-analogous sound and image behaviors (strongly related to the discussion of impulse and instant explored earlier) has become more apparent. This is ultimately a function of analogous temporal relationships. Finally, the conflict between site-specificity and portability has revealed important problems and compelling solutions. My work from 2006 to the present highlights some of these points of interest.

A series of performance opportunities around the world serendipitously lead to an uncovering of some of the issues inherent to spacial relationships of elements within the performance tableau. In 2006, Jeff Trevino and I collaborated on a short work for a collection of percussion instruments and video titled *Substitue Judgment* (Figure 0.8). Among the instruments that Trevino selected was a large, 36” circular gong called a tam tam. Because of its size and shape, the gong is a focal point of the instrument array. In work prior to *Substitue Judgment*, I had already discovered the virtue of non-cinematic screen shapes and scales. For this piece, I continued the exploration of that alterity with cinema by creating three
circular projection screens which complete a quadrant of similarly scaled circular shapes with the gong.

The piece was performed in Santa Barbara where the 36” tam tam and projection screens could be transported in my van. The following summer, the work traveled to other locations in California but also New York and Ohio. Space in the van became cramped and the tam tam had to be reduced in size. (Figure 0.9) Accordingly, the size of the three projection circles also changed size. Finally, when asked to take the piece to Seoul, Korea, the entire array of instruments, screens, and technology had to be reduced to checked luggage. The three stages of screen and instrument sizes brought about by practical limitations revealed interesting discoveries regarding the first and third issue described above. By scaling the instruments and screens smaller, their relation to my body changed and gave the appearance of command over a sculptural device. (Figure 0.10) The screen-instrument combo gained a machine-like appliance quality which reinforced the
The portability of the piece required a complete ignorance of all concerns of site-specificity. The piece became a transferable, three-dimensional machine which was isolated in its own pool of light and made no use of its surroundings (except acoustically, of course).

From *Substitue Judgment*, a series of pieces with similar scale relationships arose. Understanding the impending practical considerations to be faced, pieces that follow *Substitue Judgment* make use of smaller scale and portability as part of the concept. (Figures 0.11, 0.12, and 0.13)

For works that involve projection of images of the human body, different concerns of scale must be addressed. In *How to Fold Boxes* (Figure 0.14) the images of the body must dwarf the physical size of my own body in the tableau such that the relationship to the sonic amplitude is matched and the playful interaction of giant human features and normal bodily scale is exaggerated. Similar concerns were
addressed in the creation of legerdemain, where the movement of the segmented body on the screen matches the scale of my body but also my body’s shadow cast on the wall behind. (Figure 0.15) For portable pieces, the scale relationships must be internally justified (internal to the system of the piece and that piece alone) and externally aware (aware of conventions, cliches, tropes, and pitfalls).

For works that treat instruments and screens less sculpturally and more environmentally, the space of the performance venue cannot be ignored. In the collaboration to resurrect James Dillon’s La Coupure from 2001, the number of instrumental set ups in the space meant that performer Steven Schick would move in and among the stations as opposed to commanding a single, isolated area of the stage. To match this environmental interaction with the instruments, a screen array was designed to parse the space. (Figure 0.16) Like the smaller solo pieces such as the Five Lives of Helios, the array of projection surfaces was internally,
conceptually justified. As a subset of Dillon’s Nine Rivers cycle, *La Coupure* is the movement whose compositional algorithms are based in fluid dynamics of water flowing through canals. These canals “cut” (the English translation of *La Coupure*) the landscape of a city. In the design of the environmental screen array for *La Coupure*, the angles of the screens are modeled on canal walls and the bass drum which protrudes through the rear screen is drawn from a recurring geometric theme of the piece, that of the circular portal or drain; the egress and exit of the canal system both physically and sonically (as the bass drum is the punctuating sonic force that begins and ends the four primary phases of the sixty minute work). (Figures 0.17, 0.18, and 0.19) In the piece’s installation in two venues in San Diego, CA and one in Glasgow Scotland, adaptation to the space came in the form of shifting the proximity of the three screens. In the smallest spaces, the screens overlap maximally and in the large space in Glasgow, the screens were suspended much higher such that their interactions created upward spiraling gestures that
Figure 1.12: Popol Vuh by Karre, Trevino, and William Brent. 2008

complimented the space’s tall ceilings. Whereas the small, portable pieces attempt to isolate the instrumental sculpture such that the space is ignored by the spectator, large environmental pieces draw attention to the space.

But what La Coupure revealed about intermedia was not only the first and third issues of space and site-specificity but also the temporal considerations that are paramount to this type of work. Music’s primary parameters - pitch, volume, and time - have been a holy trinity of jealousy for moving image media artists. A large collection of artists who create “visual music” have longed for the opportunity to shape and structure moving image media in the same way that a composer designs a musical score. Chief among those interested in appropriating the working method of the composer for visual purposes are two icons of animation in California: Oscar Fischinger and John Whitney. As these two luminaries were making their initial experiments in the 30s and 70s respectively, it was impossible to know that their goals were dubious. Their mission seems to make sense.
Music and the moving image are both defined by the organization of material in time.\cite{Whi81} Music deals with sounds. Animation deals with images. Otherwise, the two crafts are the same. My work catalog is broken into two periods. The period where I believed in Whitney and Fischinger’s mission and the period after which I understood its dangerous simplicity.

For example, a cut is not a rhythmic attack. The pacing of cuts exists on a spectrum from continuity editing (also appropriately called “invisible editing”) to visceral, montage editing. On one side, the cut is hardly noticed. On the other, the cut is a structural event and is meant to be noticed, even felt. However, even on the edit-as-event side of the spectrum, the pacing of the edits cannot be confused for how rhythmic musical attacks function in a score. A simple experiment which I have executed by means of developing rhythmic integration of sight and sound proves that these two temporal methods are not interchangeable. When a set of unrelated (more accurately, randomly selected and only coincidentally related) images or abstract graphics are cut together in a familiar musical rhythm (for example, \textit{William Tell Overture} or \textit{Bolero}), the cuts are not felt as the same musical rhythms feel. They do not affect those familiar piece’s musicality in the
slightest. On the other hand, select randomly from a bin of sound clips and place them in a timeline at the same rhythm as *Bolero* and one will hear *Bolero*. Almost regardless of the nature of each clip, the splice will be the felt event; more so than the content. Therefore, the rhythm of splices in sound is felt at each clip change while the rhythm of film cuts is softened by the content. Cuts in film are more typically an impulse-behavior whereas splices in sound are impetus. These simple examples may be banal or obvious but a vast list of artists (including Fischinger and Whitney) depend on these examples being false. But, to reiterate, it is only the mission of these artists that is problematic. The results of their experiments are very interesting in that they discovered compelling methods of image manipulation over time.

A further discovery was that the method of softening a splice in audio design, the cross-fade, does not have a similar softening effect in the moving image. The image cross-fade, the “dissolve” is a felt event more so than cuts made in continuity editing (such as reverse shots or matches on action) because of the image doubling that occurs in the middle of the dissolve. In fact, the analogous transition is the reveal. An audio cross-fade reveals a new sound via an amplitude

---

**Figure 1.14**: *How to Fold Boxes*. 2010
shift just as the edge of the frame reveals a new subject as it pans or tracks past. The work I created before *La Coupure* used the cross-fade and dissolve as interchangeable sound-image phenomena. There are countless parameter-by-parameter analogs and non-analogs that will doubtless be discovered by continued work in intermedia. In fact, perhaps it is these discoveries that Dick Higgins eludes to in his declaration that there is a “great deal to do.”

**Figure 1.15:** *legerdemain*. Collaboration with Monica Duncan. 2011
Figure 1.16: *La Coupure*. Three-dimensional computer model. 2010
Figure 1.17: *La Coupure* by James Dillon. Performed by Steven Schick. 2010
Figure 1.18: *La Coupure* by James Dillon. Performed by Steven Schick. 2010
Figure 1.19: *La Coupure* by James Dillon. Performed by Steven Schick. 2010
# Bibliography


