

**Barber and the Bomb:
Music's Response to Anxiety and Annihilation
in the Age of the Machine**

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Abstract

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In 1945, the United States navigated an unprecedented geopolitical landscape following World War II. The devastating attacks on Hiroshima and Nagasaki forced civilians and policymakers to confront an unbearable new truth: weapons now existed that could incinerate entire cities in seconds, radically changing the scope of modern warfare beyond the limits of imagination. The raw power of nuclear weapons became an inescapable presence in the collective consciousness of global citizens. This marked a critical transition into a more intricate geopolitical era, whose oppressive shadow would eventually permeate and transform classical music.

Yet, before the bomb, technology had already begun to alienate people from the natural world. Industrialization promised progress, but with this progress came also stress, fear, and disquiet. Factory noise replaced birdsongs, and assembly lines would move farmers from the

fields to the warehouses of industry. As these advancements transformed lifestyle, work, and leisure, something fundamental was diminished. Mechanization introduced a disquiet and estrangement from nature. Worse yet, the consequences of accelerating technological advancement reshaped individual identity, influenced cultural expression, and instilled anxiety in ordinary lives. These tensions, whether acknowledged or subconscious, became inevitably infused with musical composition, with the nuclear bomb emerging as the culmination of these technological pressures. But there are new technological advancements, such as artificial intelligence (AI), that promise to aid and influence everyday life in expedited and magnified ways.

This dissertation investigates how composers have translated technological anxiety into sound. The composers are six: Samuel Barber, Krzysztof Penderecki, Alexander Mosolov, Sergei Prokofiev, John Adams, and Aaron Copland. Each negotiated in their own way the encounter between nature and the emerging industrial landscape of the nuclear age, and their music. Three theoretical frameworks ground the musical evidence: Leo Marx's *The Machine in the Garden*, Jacques Attali's *Noise: The Political Economy of Music*, and Robert Pirsig's *Zen and the Art of Motorcycle Maintenance*. Marx names the tension. Attali argues that music anticipates social change, and Pirsig points toward integration. Across two centuries of music, I trace how composers have heard the arrival of the machine. Their responses tell us about living, listening, and reimagining humanity inside the acceleration of the technological present.

DEDICATION

This dissertation is dedicated to my wife, Chavaleh, and our three beautiful children, Raven, Cameron, and Erin. Finally, I dedicate this dissertation also to my mother and to Mikey. I kept my promise.

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I want to thank Tom Harper, who has been more than a teacher to me. He has encouraged me when needed and scolded me when necessary. When the road ahead was hard, he always insisted on the pathway toward excellence and personal responsibility. He will forever be the most important musical mentor in my lifetime. To Kelly, you have inspired my learning with curiosity and passion. Your great insight into the human condition is influential and perhaps the most crucial aspect I have learned about music from you. To Dr. Boers, you have inspired me to find the beauty and truth in music, bringing art, communication, and community to the forefront. Finally, thank you to Dr. McMains, whose fresh eyes and thoughts allowed me to explore the meaning of artistic truth beyond the confines of my core competencies.

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Introduction

What does it mean to be human in an age of machines? This question has challenged human consciousness since the first steam engines began transforming the landscape of daily life. The question takes on a renewed urgency today as humankind enters the new era of Artificial Intelligence (AI). Today, perhaps more than at any time in history, humanity stands at a technological crossroads. Technology aims not only to reshape how we live, work, and communicate, but also to change the ways we think and process information. Humankind has long felt this tension between nature and progress. We have witnessed the serene countryside pierced by trains during the great westward expansion of America, and the sounds of factory whistles replacing church bells as the organized sounds of community and life. Most dramatically, our lives were transformed by the atomic bomb, which was ushered in with the nuclear flash of destruction over Hiroshima and Nagasaki. In the midst of the benefits and tensions arising from advancing technology, we have sought to understand, articulate, and reconcile our lives with machines. We have used art, particularly music, to communicate the space between machines and humankind.

This dissertation argues that Western classical music has served as an important site for negotiating humanity's complex relationship with technology, and that our musical response to mechanization, nuclear power, and artificial intelligence reveals patterns of anxiety, accommodation, and coexistence. This musical dialogue has asserted itself from the hunting horns of eighteenth-century pastoral compositions to the graphic notation of Penderecki's *Threnody* dedicated to the victims of Hiroshima. It arises from the factory-inspired rhythms of Soviet industrial music to the mathematical and computational process of contemporary compositions. Music provides access to this existential turmoil of nature amid technological

transformation. By looking critically at musical dialogue across two centuries, what is sought is not just a historical perspective but also insight into how music is a mediator between human identity and a mechanized world.

Extending beyond the examination of music lies the question of cultural survival and what it means to be human. If composers have used their work to communicate the psychological and spiritual anxieties caused by the machine, then understanding their methods and meanings offers a resource for our own exploration. The very question of what “art” is will be examined in the context of AI, as it has now begun to compose music, generate art, and simulate human creativity. Expressions of emotion, intention, and the essence of what it means to be human are now confronted with the advent of machine intelligence. These machines are purported to equip themselves with the very constructs of human pathos, intelligence, and creativity.

The soundscape of our lives has been transformed, and its evolution has had profound implications on music. Composers, consciously or not, work within the changing culture of their time. The pastoral conventions of eighteenth-century music, with their inclusion of hunting gunshots, horns, and bird songs, reflected a world still predominantly connected to the wilds of nature. As that backdrop changed and mechanisms became an increasing part of everyday life, musical vocabulary also evolved, seeking new ways of expression. This did not mean that music’s relationship with technology was solely oppositional. In fact, technological advances and mechanisms were key to the development of musical expression. The question isn’t whether music engages with technology, but rather *how* it engages and what the consequences are for human identity.

I will explore three theoretical frameworks that will help guide my research, each with a distinct and complementary perspective of the relationship between music and technology. Leo Marx’s *The Machine in the Garden: Technological and Pastoral Ideal in America* explores the

persistent tension in American culture between the pastoral ideal and technological progress.

Marx argues that Americans have never yet resolved the contradictions and tensions between the two. He asserts that we simultaneously celebrate nature, fear the unnatural, but still desire industrial progress. His concept of the “middle landscape,” an idealized space where both technology and nature can coexist, provides a structure for exploring how composers have sought to reconcile the natural and mechanical dialogues in their music.

The second guidepost comes from Jacques Attali’s *Noise: The Political Economy of Music*. Attali argues that music does not merely reflect society, it predicts it. The new rhythms, harmonies, and tonal experiments of the early twentieth-century classical music were not reactions to the world the composers found. They were premonitions of the world to come. Consider the evidence: airplane propellers in *Ballet Mécanique*. Shostakovich organizes the orchestra into ranks that mimic factory cogs. Penderecki abandoned traditional notations for graphic symbols. None of these were mere stylistic choices. In Attali’s framework, they were forerunners of a world in which the boundary between music and noise would erode, and all sound would be amalgamated by the machine.

The final framework comes from Robert Pirsig’s novel *Zen and the Art of Motorcycle Maintenance*, which offers a different approach to technological anxiety. Where Marx maintains a fundamental tension between nature and machine, Pirsig proposes their integration through his definition of “quality,” which is defined as a pre-intentional and experiential encounter that dissolves the boundary between subject and object. For Pirsig, technological anxiety stemmed from a false division between the romantic and classical, between feeling and analysis, and between nature and machine. The solution for Pirsig was not in choosing one over the other but in achieving a kind of integration of the individual and object. His concepts intensely resonate

with the experience of musical performance, particularly improvisation. Just as a jazz musician enters the “flow state,” the boundary between performer and instrument dissolves.

Together, these three frameworks provide complementary lenses for examining music’s response to technology. Each illuminates different aspects of musical works, but together they may suggest that music’s engagement in technology is neither simple resistance nor accommodation. Instead, this engagement is a complex, evolving negotiation whose terms continue to expand and shift.

Chapter 1

Musical Symbolism of the Atomic Age in Samuel Barber's *Knoxville, Summer of 1915*.

"We are talking now of summer evenings in Knoxville, Tennessee in the time that I lived there so successfully disguised to myself as a child."—James Agee

Introduction

In 1947, a post-World War II United States was thrust into the new-world reality of the nuclear age. The subsequent "Cold War" pitted the two superpowers of the United States and the Soviet Union against each other, creating tension and anxiety that permeated daily life and marked a distinct change into a more complex geopolitical age. In parallel to this new and uneasy existence, American composer Samuel Barber began to recognize that the safe and stable time of his youth was rapidly shifting into a more uncertain and precarious season. As Barber composed *Knoxville, Summer of 1915*, he was undergoing one of the most emotionally challenging times of his life. After serving in the Army Air Corps during World War II, Barber experienced the impending loss of two family members who had shaped his musical path deeply. His aunt, Louise Homer, a celebrated contralto at the Metropolitan Opera who nurtured his early interest in music, was gravely ill. At the same time, his father, Samuel Le Roy Barber, to whom he would ultimately dedicate *Knoxville*, was also entering the last days of his life. This conjunction of impending losses created a period of deep grief and questioning for the composer. Perhaps fueled by this ennui, *Knoxville, Summer of 1915 Op. 24* (c. 1947) became a seminal work for Samuel Barber. Dubbed a "lyric-rhapsody" by the composer, *Knoxville* would at once reflect both Barber's personal journey through grief while exerting an over-arching musical

metaphor for the shifting social landscape of the United States caught within the perils of the nuclear age.

Composition Background

Knoxville was commissioned in 1947 by soprano Eleanor Steber. The work premiered with the Boston Symphony Orchestra in 1948 under the baton of Maestro Serge Koussevitsky. Barber, who was becoming an internationally known and sought-after American composer, was working exclusively on commissions at the time. This commission came with no stipulations or guidelines, so it was Barber himself who chose James Agee's essay as source material for his music. In Agee's work, Barber shared a deep connection with the themes of loss and change. As such, he found personal truth in the lugubrious sensibility of Agee's rich verse. For Barber, the themes of loss and unwelcome change seeped into the surface layers of Agee's narrative but were derived from the subconscious universal truths beneath the surface narrative. Barber found an artistic kinship and an emotional commonality within the waxing beauty of Agee's words and narrative symbols.

For his part, Barber was struck by the uncanny similarity between his and Agee's childhood: both were five years old in 1915 and were raised by loving parents and an artistic aunt and uncle (for Barber, the composer Sidney Homer and contralto Louise Homer). The composer later wrote to his uncle, "It reminded me so much of summer evenings in West Chester, now very far away, and all of you are in it." Barber's Aunt Louise would pass away on May 6, 1947. His father, to whom the composer dedicated *Knoxville*, followed on August 12.¹

¹ Meyers, Chris. "Fascinating Insights into Barber's *Knoxville*: Summer of 1915." *Redlands Symphony*. September/October 2015. Accessed May 01, 2024. <https://www.redlandssymphony.com/pieces/knoxville-summer-of-1915>.

The Text

James Agee's *A Death in the Family* (the essay that would later become the preamble to Agee's Pulitzer Prize-winning novel of the same name) held a powerful gravitas for Barber, one that seems to have informed almost every aspect of his composition. Within the essay, Agee paints a free-flowing narrative of an idealized scene in Knoxville, Tennessee, in the summer of 1915. With vivid allure, he weaves before the reader the landscape of an evening cooling from a hot day and a family spending time together. His idealized imagery of American life at the turn of the last century paints a time when life was simpler. However, infused in the cinematic beauty of Agee's text is an underpinning of pending loss, sadness, and unwelcome change. It is the first line of the essay that is paramount in understanding Agee's message of ennui. Although this line is one that is not included in Barber's work, it holds important clues to Agee's message beneath the obvious: "We are talking now of summer evenings in Knoxville, Tennessee, in the time I lived there so successfully disguised to myself as a child." Profoundly, Agee is informing the reader that beneath the observed is a deeper, more haunting truth. Barber will use this obscured and inner artistic *id* to form and construct his music around Agee's prose.

Agee's free-formed text was written in one 90-minute sitting. This was important to the author as it suggested, at least to Agee, access to the subconscious, and from this subconscious, a greater truth could be revealed that the conscious mind could not fully communicate on its own. Agee asserted that his prose resembled the free-flowing form of jazz music. This is an important bridge that would be formed between the text of Agee and the music of Barber:

A Death in the Family is, by the consequences of this emphasis, arranged somewhat like a jazz composition. Within a recognizable framework, perhaps a rondo form, the lead figures improvise on a theme. In Agee's verbal composition, the lead voices similarly improvise on the theme of death within the events.²

For Agee, the themes that emerged from his subconscious writing, themes of loss, death, and radical transformation through tragedy, were deeply personal. As a young child, Agee experienced the sudden death of his father from an automobile accident in 1916. This personal tragedy emerged and not only articulated his personal pain but also provided a parallel to the perilous changes taking place in post-World War II America with the rise of the nuclear age. In its own way, the choice to place his work in 1915, a time in Agee's past that represents the months before his father's death, is a poignant message to the reader that we are on a precipice of change. It is a time when Agee's childhood innocence gives way to the brutality of innocence lost. These themes of lost innocence, idealism transformed by industry, and the impending doom that modernization brought into the unknowing lives of ordinary people would become prominent themes in Agee's text:

Agee chooses to intertwine his most sustained treatment of his childhood, the formative phase of the construction of his personality, with an awareness of place that moves well beyond any necessary emphasis upon setting for the story of his young life. His child's (Rufus's) sense of home becomes tied to an early exposition of the virtue and vice of emerging industrialization in a part of America that, to many observers, served as an exploited internal colony due to its geographical and cultural isolation and wealth of natural resources.³

² Sosnoski, James J. "Craft and Intention in James Agee's: A Death in the Family." *The Journal of General Education* 20, no. 3 (1968): 170-83.

³ Lofaro, Michael, "James Agee's *A Death in the Family*: Personal Identity and Conflict in Emerging Appalachia" in *Agee At 100: Centennial Essays on the Works of James Agee*, ed Michael Lofaro. Knoxville: University of Tennessee Press, 2014. P.197-208.

Agee's text is divided into seven distinct sections. This is important and curious to note. Important because these divisions provide helpful insight into understanding the duality of both the natural world that Agee as a child lived in and its juxtaposition to dangerous change at the mechanical hands of emerging technology. These defined sections of thought have organized themselves in an identifiable structure, even though they emerged from Agee's unconscious free-formed writing session.

Section One provides an opening scene of an idealized childhood; the narrative, unsurprisingly cinematic in scope (Agee would become a prominent Hollywood film writer, contributing to such cinematic classics as *The African Queen* (1951) and *The Night of the Hunter* (1955)⁴, paints a community that is content and slow-moving. He writes:

It has become that time of evening when people sit on their porches, rocking gently and talking gently, watching the street, and standing up into their sphere of possession of the trees, of birds' hung havens, hangars. ...people in pairs, not in a hurry, scuffling, switching their weight of aestival body, talking casually. The taste hovering over them of vanilla, strawberry, pasteboard and starched milk. The image upon them of lovers and horsemen, squared with clowns in hueless amber.

The Transitional Space of the Front Porch

The front porch emerges as a symbol of transition in Agee's text, an outlying space that is neither entirely inside the protection of the home nor exposed to the dangers of the outside world. Rather, the porch may be seen as a hinge-point, a transition between what is known and comfortable and what is approaching from the outside world. Therefore, the people on the front porch at the beginning of Agee's text set up a direct parallel of anticipation and alertness,

⁴ Agee's film career was brief, but important. He wrote as a film critic throughout the '40;s

reflecting the psychological state of Americans in the post-war era, perched on the threshold between the remembered security of the past and the uncertain future of the atomic age.

The rocking chairs on the porch further emphasize this state of suspension. The rocking goes nowhere. There is comfort in that repetition, but there is also the uneasy recognition that such stillness cannot hold against what is coming. They rock because they cannot yet act. Their position on the porch allows them to observe but not participate, to witness the mechanisms of change without yet being fully engulfed by them.

Barber recognized the porch's symbolic power and translated it musically through the harp's rocking arpeggios in the opening section. This musical motif suggests both comfort and the unstable rhythms of a world in transition. This transitional space becomes the perfect vantage point from which both Agee and Barber could examine the collision between pastoral America and the mechanized future.

Mechanical Disruption

Section two, signified by Agee through his use of poetic text blocking, is essential as it is the first insertion of a significant industrial mechanism that is overtly disruptive to the setting:

A streetcar raising its iron moan; stopping, belling and starting; stertorous; rousing and raising again its iron increasing moan and swimming its gold windows and straw seats on past and past and past, the bleak spark crackling and cursing above it like a small malignant spirit set to dog its tracks; the iron whine rises on rising speed; still risen, faints; halts; the faint stinging bell; rises again, still fainter; fainting, lifting, lifts, faints foregone: forgotten. Now is the night one blue dew...

Within section three, the shortest section of the work, we see the repeated last line of section two, "now is the night one blue dew."

Now is the night one blue dew, my father has drained, he has coiled the hose...

Agee uses this repeated line like a jazz riff; a motif circled back for emphasis. This draws our attention to this repetition as a metaphor for the coming of twilight, the brink of change and transition. This transitional line is tied to the metaphor of the streetcar in the paragraph before and the father in the next section. This simple, “task-oriented” character is unaware of the transition that would soon overtake him. The repetition of the last line in section two and the first line of section three creates an important pathway between a symbolic change from day into night and that of the rise of the mechanism leading to the loss of the idyllic life punctuated by the impending death of the father figure.

Nuclear Foreshadowing

Section four offers a fascinating glimpse into the great apex of the mechanical age, the foreshadowing of nuclear weapons:

*Low on the length of lawns, a frailing of fire who breathes....
Parents on porches: rock and rock.
From damp strings morning glories hang their ancient faces...*

Seen at the edge of their lawns, the boundary of their safe reality, a weak but breathing fire is present. At face value, this can be seen as the setting of the sun or perhaps even a row of flowers, but it may also be viewed as the coming of a nuclear explosion, far off but impending. In reaction, morning glories or nature itself hang their ancient faces in sorrow. Parents (humanity), unaware of what is to come, rock unknowingly on their porches.

Section five, with the music of the locusts, draws the narrative back into the present idealism, intoxicating the senses and lulling the characters into a kind of sleep or hypnotic denial.

This refocuses the poem briefly on the scene at present and not on the impending change to come.

*The dry and exalted noise of the locust from all the air
At once, enchant my eardrums.*

Section six is the most complex of all the text blockings. The relationships between the boy, his parents, and his uncle and aunt are especially important and are emphasized in the first part of section six. The framework of the relationships is at once intimate, taking place on quilts in the grass, and also cosmic in nature, unveiled beneath the great universe with the stars looking down from galaxies above:

The stars are wide and alive, they seem each like a smile of great sweetness, and they seem very near. All my people are larger bodies than mine,...with voices gentle and meaningless like the voices of sleeping birds. One is an artist, he is living at home. One is a musician, she is living at home. One is my mother who is good to me. One is my father who is good to me.

In a sudden turn of awareness, the narrative shifts wildly, leaving the idealized scene with a jarring transition into a pained and plaintive outcry. With this crying-out to the universe above, there is an acknowledgement of the great questions of humanity, “How is it that we are here? Is our existence, our connection by chance? Who will remember and know our struggle to be here on this earth?” Agee writes:

By some chance, here they are, all on this earth; and who shall ever tell the sorrow of being on this earth, lying, on quilts, on the grass, in a summer evening, among the sounds of the night. May God bless my people, my uncle, my aunt, my mother, my good father, oh, remember them kindly in their time of trouble; and in the hour of their taking away

Loss of Innocence

In his final stanza, Agee returns the boy to peace and slumber as he is gently carried to bed. But even in childhood dreams, the fear of the future permeates his mind, signifying a loss of innocence that not even slumber offers an escape to what is to come:

After a little I am taken in and put to bed. Sleep, soft smiling, draws me unto her: and those receive me, who quietly treat me, as one familiar and well-beloved in that home: but will not, oh, will not, not now, not ever; but will not ever tell me who I am.

The Music⁵

Two Tone Poems in Miniature

Inspired by the free-flowing form of the verse, Barber set out to create a fluid and adaptive musical form. He would call *Knoxville* a “Lyric-Rhapsody,” one that was saturated in emotional expression. Barber leans into his romantic compositional style with a “tone poem” in miniature at the start of the piece. Here, the music paints a mood of idealism and simplicity. The music is first introduced with the intervallic expression of perfect fourths and fifths found in the reed instruments of the orchestra, reminiscent of the music of Aaron Copland and Virgil Thomson. This harmonic openness, diatonic spacing built on open fourths and fifths, was precisely the device Copland had deliberately cultivated to signify a “recognizably American” sound. It was used as a metaphor for pastoral spaciousness that scholars have identified as his

⁵ For prior scholarship on *Knoxville*, see Benedict Taylor, “Nostalgia and Cultural Memory in Barber’s *Knoxville: Summer of 1915*,” *The Journal of Musicology* 25, no. 3 (2008): 211–229 (reading the work through nostalgia and cultural memory); Barbara B. Heyman, *Samuel Barber: The Composer and His Music* (New York: Oxford University Press, 1992) (for biographical and compositional context).

signature contribution to the national musical vocabulary.⁶ Barber is pairing his music with the idealized musical imagery that Copland had curated. The lushness of the strings, which are next to be introduced, adds a sweeping and emotional element to the simplicity of the winds. Adding further to the impressionistic nature of the opening tone poem is an obscured meter, displaced with rapid metric shifting, first achieved by displacing the primary metric beat within measure one by introducing the eighth rest in beat one. This, along with a rapidly changing compound meter, creates a nebulous and free structure that mirrors Agee's poetic meter. Barber's rhythmic ambiguity allows tone to take on a primary focus. Sonoral colors and harmonic interactions richly paint a backdrop well suited to Agee's vivid text and work to further the idea of tonal coloring within both the opening tone poem and in subsequent sections of accompanied voice.

Finally, the function of the harp arpeggiates a simple motif of the rocking motion of the "people on porches" rocking in chairs.

⁶ Neil Lerner, "Copland's Music of Wide-Open Spaces: Surveying the Pastoral Trope in Hollywood," *The Musical Quarterly* 85, no. 3 (2001): 477–515. Lerner traces how Copland's open, diatonic textures (pedal tones, widely spaced fourths and fifths, and rustic melodic material) became codified as the sonic signature of an "American" pastoral.

KNOXVILLE: SUMMER OF 1915

For Voice and Orchestra

"We are talking now of summer evenings in Knoxville Tennessee in the time that I lived there so successfully disguised to myself as a child."

James Agee

Adagio ma non troppo ♩=66

Samuel Barber, op. 24

Flute (Piccolo)

English Horn)

Clarinet in A

Bassoon

Horn I in F

Trumpet in C

(Example A: The opening of the first tone poem in miniature, painting the scene of the idealized American life of 1915. The use of open P4 and P5 and their introduction in the reed sections give rise to a quintessentially “American” sound)

Barber returns to the idea of the tone poem in miniature when he uses the strings to mimic the “dry and exalted noise of the locusts.” Here, Barber creates some of his most haunting music . It is evocative of the languid and eerie sounds of thousands of locusts sitting in the grass fields with the narrator. The strings a compressed, unearthly sound without overtones. Later, Barber aptly uses this section of his lyric rhapsody to foreshadow the wild and dramatic music presented at the end of the work in its most unstable and emotive climax of pain and unwelcomed transformation.

(Example B: Tone Poem in Miniature-Barber mimics the sound of the locusts in the string section with a repeating figure of a dotted quarter (sometimes achieved through a quarter tied to an eighth note) followed by a figure of five eighth notes in chromatic neighbor tones)

The Use of Musical Symbolism to Signify the Imposition of Mechanism

Barber uses musical symbolism to signify the interjection of the modern into the serenity and peace of the narrator's idealistic and straightforward life. An example of this can be seen in the abrupt introduction of the "streetcar" with its "iron moan." Here, Barber harshly expresses a melodically angular theme in the flute and upper winds with rhythms that infect the rest of the orchestral parts and invoke images of a gear-laden mechanism. The primary vehicle for this idea is the rhythmic motive of a dotted sixteenth followed by a thirty-second note into the elongated quarter that is repeated throughout the upper winds in a staggered formation. This offset motive looks and sounds like the moving gears of a fast-working machine.⁷

⁷ The identification of this recurring offset figure as a "gear motif" and its reading as a sign of mechanical intrusion are my own analytical contributions. The method follows established topic theory, in which short melodic, harmonic, or rhythmic formulae carry lexical meaning; see Raymond Monelle, *The Musical Topic: Hunt, Military*



(Example C: Repeating “Gear” Motif in the winds signifying the imposition of mechanism into the idealized life)

From this jarring interaction, we first hear “auto” as Agee describes “a loud auto, a quiet auto.” This is important and should not be missed. In a musically symbolic gesture, Barber, with a great understanding of Agee’s intent, composes a diminishing musical dynamic as if to pull back from the calamity of the street scene into nothingness. This is symbolic of Agee’s father, who died in a car accident, representing the soul leaving the body, as if sucked out of reality into nothingness. The ascending melodic line and expanding composite tessitura in the orchestra further symbolize pulling away and out of the action. While an argument may be made that the musical dynamic shift to diminuendo is influenced by a basic relationship to the text and the word “quiet” as a sole impetus for the change, it is the rising tessitura of the melodic line found first in the clarinet and then in the flute that becomes symbolic of the “pulling” or escaping from

and Pastoral (Bloomington: Indiana University Press, 2006). All musical examples are drawn from Samuel Barber, *Knoxville: Summer of 1915*, op. 24 (New York: G. Schirmer, 1949).

the scene. Therefore, the combination of rising tessitura and dynamic change symbolizes a soul pulled from this earth and moving beyond this life signified in an ever-diminishing musical moment.

(Example D: The theme of the diminishing “auto” is symbolic of the death of Agee’s father in a

The musical score for Example D is divided into three systems. The first system includes Flute (Fl.), Oboe (Ob.), Clarinet (Cl.), and Bassoon (Bn.). The second system includes Horn I (Hn. I), Horn II (Hn. II), and Trumpet (Tpt.). The third system includes Harp. The score is in 3/8 time with a key signature of three sharps (F#, C#, G#). A box highlights the first system, which shows a melodic line in the Flute and Oboe, a rhythmic pattern in the Clarinet, and a low, sustained line in the Bassoon. Dynamics include *mf*, *p*, and *pp*. The second system shows Horn I playing with *con sord.* (con sordina), Horn II playing *pp* (pianissimo), and Trumpet playing *pp*. The third system shows the Harp playing a sustained chord. The overall effect is a diminishing musical moment.

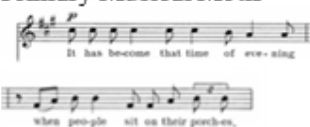
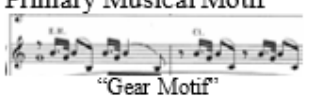
car accident. The diminuendo to a *pianissimo* in the wind section and to *piano* in the strings can be seen as symbolic of his father being pulled from life to death.)

The Musical Sections of Barber's Knoxville and How They Both Parallel and Diverge from Agee's Poetic Blocks

Agee separates his text into seven distinct sections through what this study terms "text blocking." This is the division of continuous prose into discrete and bounded units. Each unit carries its own image and mood. Reading these divisions as meaning-bearing follows the principle of segmentivity in poetics, in which significance arises less from meter or rhyme and instead from how language is segmented into smaller groups or units by way of line gaps.⁸ This is important to note, because it creates an identifiable structure within what Agee composed spontaneously in a single "flow-state," which he likened to jazz improvisation. The blocks are not a contradiction of that spontaneity. Instead, they are a superimposed formal structure that they took despite their free-form creation. Barber was keen to look critically at these text blocks and used them to his fullest musical advantage. Unlike Agee's seven distinct sections, however, Barber would introduce an eighth section, effectively dividing the largest (the sixth section) into two parts. Each section of Barber's music holds a different motif, key transition, and rhythmic expression that helps delineate it from the previous sections. These varied sections use motivic returns or quotes from the last music sections. These "returns" work efficiently to tie together larger compositional ideas, thus unifying the work.

⁸ On segmentivity (the creation of meaning through the segmentation of language into bounded units and "the negotiation of gap"), see Rachel Blau DuPlessis, "Manifests," *Diacritics* 26, no. 3/4 (1996): 31–53, esp. 51; and Brian McHale, "Beginning to Think about Narrative in Poetry," *Narrative* 17, no. 1 (2009). Agee's preamble, though lyric prose rather than lineated verse, organizes meaning through precisely such bounded units.

Table 1: Examination of Text and Musical Sections

Section 1 (mm 1-40) Text: <i>It has become that time of evening... The image upon them of lovers and horsemen, squared with clowns in <u>hueless</u> amber.</i>	Primary Key A Major Meter: Compound (9/8 12/8 15/8 6/8)	Primary Musical Motif 
Section 2 (mm 41-98) Text: <i>A Streetcar racing its iron moan... Now is the night one blue dew</i>	Primary Keys A minor, D minor, C minor Meter: Mixed—both simple and compound	Primary Musical Motif 
Section 3 (mm 99-111) Text: <i>Now is the night one blue dew. My father has drained, he has coiled the hose</i>	Primary Keys C# minor Meter: 3/2 and 4/4	Primary Musical Motif 
Section 4 (mm 112-121) Text: <i>Low at the length of laws, a <u>frailing</u> of fire who breathes. Parents on porches rock and rock... morning glories hand their ancient faces.</i>	Primary Keys F# minor and A Major Meter: Mixed—both simple and compound	Primary Musical Motif  There is also a return to Motif #1

Section 5 (mm 122-140) Text: <i>The dry and exalted noise of the locusts from all the air at once entrance my eardrums (tone poem 2)</i>	Primary Key B minor, D minor and sections of chromatic ambivalence Meter: Compound (9/8 12/8 15/8 6/8) and simple	Primary Musical Motif 
Section 6 (mm 141-186) Text: <i>On the rough wet grass of the back yard....one is my mother who is good to me. One is my father, who is good to me</i>	Primary Keys F Major, D minor, F minor Meter: Mixed—both simple and compound	Primary Musical Motif  Theme 1 is also quoted
Section 7 (mm 186-233) Text: <i>By some chance, there they are all on this earth....may God bless my people...and in the hour of their taking away.</i>	Primary Keys Fm, Gm, D minor, F# minor Meter: simple and compound	Primary Musical Motif 
Section 8 (mm 234-267 -FIN') Text: <i>after a little, I am taken in and put to bed....but will not; not now; not ever, no never ever tell me who I am.</i>	Primary Keys A Major (briefly implied F# Major) Meter: Mixed—both simple and compound	Primary Musical Motif Return to Motif #1

Through careful examination of sectional comparisons, a bigger picture of Barber's musical ideas can be observed. The first, perhaps most critical observation is the use of both compound and simple rhythms interspersed liberally throughout the work. In fact, Barber changes meter no less than 81 times in a composition of 267 measures. The metric shifts of Barber's music parallel the free form of Agee's "stream of consciousness" writing style and is an important tool in his attempts at an obscured meter to achieve the feeling of a free metric structure. Secondly, it can be observed that in Barber's section seven, he utilizes a rising tonal shifting to mimic the text "May God bless my people in the hour of their taking away," where the keys shift from Fm, rising then a whole key upward to Gm, then to the minor fifth of Gm to Dm, and finally to the raised third of

Dm to F#m. The moving harmonic tessitura reinforces the feeling of “up and out” and is a symbol of the text and the “taking-away” of loved ones.

Finally, a comparison of the motivic material of each section yields some important musical truths. In sections related to Agee’s text, Barber uses motifs that are primarily stepwise in motion when the author reminisces about the idealized. This can be seen in sections 1, 4, 6, and 8. In contrast, the sections that express an interruption to the idealized, often through the imposition of the modern/mechanical, employ motivic expressions that begin with leaps and escape tones, as seen in sections 2, 6, and 7. These leaps create melodic tension founded upon an angular and disjointed melodic line. Section 5 contains motivic material and stands apart from the rest. The chromatic neighbor tones in the motif form the foundation of tone poem number 2, the symbolic singing of the locusts. Section 5 relates directly to the opening music found in mm 1-6, in that its function is not as a crucial motivic substance but as “tonal painting.”

Musical Symbolism and Nuclear Commentary

Barber’s fear and unrest for a changing future are palpable in their musical incarnations. From this fear and anxiety, Barber composes the ending of his *Knoxville* as if it were a great crying out to the universe, strengthened by Agee’s text: “By some chance, here they are all on this Earth. And who shall ever know their sorrow of being on this earth, lying on quilts in the grass...” The music is emotive and lamenting, evoking the crying out of humanity in one melodic voice, pleading for help. While Barber’s music ominously portrays this transition of the ideal and simple life into a world of atomic annihilation through his use of harmonic coloring and strong melodic leaps of ascending minor sevenths, he leaves the listener with his infusion of hope in a nod to a return of the idealized diatonic theme found in the opening of section one. With this, Barber has expressed in the last musical gasps of his lyric-rhapsody a message of possibility and

optimism amid fear. In this moment of hope, Barber leaves the listener with a final and dim pathway of the possibility of triumph over atomic atrocities, a way of peace found simply in the fortitude of the human condition.

Conclusion: The Porch as Metaphor for America's Nuclear Transition

In both Agee's text and Barber's musical setting, the porch emerges as the central metaphorical space. It is neither entirely inside the protected domestic sphere nor fully exposed to the dangers of the outside world. This liminal position mirrors America's uncomfortable transition into the nuclear age, as a country still holding onto pastoral ideals while confronting unprecedented technological threats. Just as Agee's characters rock gently on their porches, passively observing the approaching dangers, America in 1947 was rocking between peaceful aspirations and nuclear anxiety.

Barber's musical representation of this threshold space becomes most evident in his treatment of transitions between sections. The gentle harp arpeggios suggesting rocking chairs give way to the angular, mechanical motifs of the streetcar, just as America's rural innocence was being displaced by industrial and atomic power. The musical shifts between stepwise motion (representing the idealized past) and leaping intervals (signifying mechanical disruption) create the sonic equivalent of the porch's liminal position.

What makes Barber's achievement in *Knoxville* so remarkable is his transformation of personal nostalgia into a metaphor for America's collective psychological passage into the nuclear age. The work is a cultural document of America's collective experience in the atomic age, mourning what was lost while anxiously confronting what was coming. Through his intimate musical setting of Agee's text, Barber created an artistic response to the nuclear threat that neither surrenders to despair nor retreats into naive optimism.

The final passage, with its cautious return to the opening diatonic material, suggests that even in the face of atomic uncertainty, some essence of human fortitude might endure. Just as the porch stands between house and street, between safety and danger, Barber's *Knoxville* occupies the emotional territory between memory and prophecy, between what was cherished and what was feared. Both composer and author capture the complex American response to the dawning nuclear age, a country rooted in nostalgia yet forced to confront an uncertain future, while rocking gently on the porch, watching the horizon for signs of fire.

Chapter 2

Music as Mediator Between Nature and Technology

By the time Agee wrote of Knoxville, 1915 already lay twenty years in the past. For the author, that year marked a personal and forced coming of age—an unwelcome thrust into a harsher sphere of existence. This transition paralleled the evolution America itself was undergoing, as the nation moved away from a life held in balance between nature and mechanism and into the relentless march of the machine age.

Barber's music traced a second kind of threshold. Where Agee stood at the edge of the machine age, Barber stood at the edge of nuclear annihilation and its ceaseless dread. Both would mourn the loss of natural innocence at the crossing of these thresholds. That fragile balance, once lost, is the very thing Leo Marx's concept of the "middle landscape" would name: a battleground where the pastoral and the mechanical meet. Yet Marx would suggest that this meeting ground is less a site of conflict than of longing, a place where the American psyche desires an idealized harmony between machine and natural world.

But where Barber and Agee use *Knoxville* to signify the turning of an idealized past into a harsher, more dangerous future, music had faced these same questions of transition long before. Its dialogue between the natural and the mechanical reaches back across a divide older than the bomb and the idealized days of early Americana, and its discourse has long offered a pathway toward reconciliation between nature and technology.

Historical Foundations of the Pastoral-Technological Dialogue

While Barber and Agee depicted technology as a threat, music, by contrast, can act as a mediator that holds the pastoral and the mechanical in a balanced tension. This tension can create

a dialogue that neither rejects nor fully embraces nature or machine. This mediating function can be compared to music's capacity to hold opposing sounds, rhythms, and harmonic relationships in dynamic tension. These tensions, ultimately represented in the wake of nuclear annihilation of all things natural, take on even greater significance as art seeks to balance the unbalanced threats of technology. In contrast to this idea of exploring the balance between nature and technology, composers have translated innate technological anxiety and fear into music. Musical expressions of this anxiety have been conveyed through tonal dissonances or rhythmic disruptions that symbolize the intrusion of machines into natural spaces. Yet music also offers the sonoral expression of reconciliation itself. Music has the power to enact the "process" of negotiation between harmonies, pitch clusters, and tonal coloring, creating consonance where dissonance and tension once existed. Music, then, is poised to articulate what author Leo Marx calls a "middle landscape."

In 1964, Leo Marx introduced a groundbreaking study titled *The Machine in the Garden: Technology and Pastoral Ideal in America*⁹, in which he examined the propensity of American culture and literature to idealize the rural and pastoral imagery and to assert shock when industrial technology intrudes on idyllic scenes. This tension between the pastoral and the technological has been prevalent in American culture, according to Marx, and has been essential to American identity since the colonial period. In Marx's "middle landscape," idealized space is represented through imagery of farmland, small towns, and the peaceful aspects of nature coexisting with a safe, unindustrialized life. A place where a balance between the "savage wilderness" and the "squalor" of industry is achieved in a harmonious middle ground. This desire for nature is in direct odds with the relentless drive toward industry. This has created a tension

⁹ Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (New York: Oxford University Press, 1964).

between reverence for nature and the driving force to move forward into a new technological age. It is this tension that Marx calls a “dialectical struggle” with each defining itself against the other. Marx asserts that Americans have never freed themselves of this ongoing tension or fully resolved their contradictions to the idealized life.

Marx describes the tension between the idea of the “pastoral” and American idealism in the context of technology by suggesting that these opposing forces have shaped American identity from the beginning. Marx writes:

The pastoral ideal has been used to define the meaning of America ever since the age of discovery, and it has not yet lost its hold upon the native imagination. The reason is clear enough. The ruling motive of the good shepherd, a leading figure of the classic Virgilian mode, was to withdraw from the great world and begin a new life in a fresh, green landscape. And now here was a virgin continent! Inevitably, the European mind was dazzled by the prospect. With an unspoiled hemisphere in view, it seemed that mankind actually might realize what had been thought a poetic fantasy. Soon the dream of a retreat to an oasis of harmony and joy was removed from its traditional literary context. It was embodied in various utopian schemes for making America the site of a new beginning for Western society.¹⁰

Marx argues that Americans experience a profound crisis of conscience when technological progress interrupts their idealized connection to nature. This interruption of the pastoral by the mechanical reveals a cultural paradox that forms one of the foundational pillars of American identity. Rather than viewing this tension between nature and technology as negative, Marx suggests these seemingly opposing forces coexist as essential social drivers.

While Marx defines his middle landscape as embodying the ideal where technological advancement enhances rather than overwhelms nature, he asserts that in this quest for balance, there is a predisposition to embrace nature and a fear of modernization. According to Marx, this

¹⁰ Marx, Leo. *The Machine in the Garden: Technology and the Pastoral Ideal in America*. New York: Oxford University Press, 1964

fear permeates the American psyche. Marx believes these anxieties stem from the works of Thoreau, Hawthorne, and Melville, which have seeped into our cultural consciousness from the great literary canon of these American writers.

Hawthorne used the imagery of pastoral scenes shattered and disrupted by technological intrusion in several of his essential writings. In “The Celestial Railroad,”¹¹ he reconceptualizes Bunyan’s *Pilgrim’s Progress*, replacing the spiritual journey with a railroad that suggests a false shortcut to salvation. Melville’s “The Tartarus of Maids” portrays a paper mill as a mechanized hell, where humanity becomes integrated into machinery, functioning as human cogs or machine parts. Even F. Scott Fitzgerald’s *The Great Gatsby* portrays a destroyed “middle-landscape” with a “valley of ashes” consuming an industrial wasteland between Gatsby’s mansion and New York City. A place that once shone with promise and hope, now consumed by the fires of industry. These messages of warning became constant and indelible imprints on American culture and psyche.

Historically, before World War II, Aaron Copland, Samuel Barber, Virgil Thomson, and Roy Harris used pastoral music in much the same way Mozart and Haydn did in the 18th Century. Themes of the pastoral were meant to evoke peace and the natural landscapes of rural life. In a time before nuclear anxiety and mechanical dominance, it was not meant so much as a dynamic tension to a changing life, but rather as a celebration of the “wilds” and beauty of the natural state and order of the world. While humans had their foibles, still at our core was the unchanging, immovable foundational force of nature that centered all things. The Industrial Age would pose a central challenge to these beliefs.

¹¹ Nathaniel Hawthorne, “The Celestial Railroad,” in *Mosses from an Old Manse* (New York: Wiley and Putnam, 1846).

The concept of the pastoral ideal, however, would undergo a dramatic transformation. With the ramping up of technology and mechanisms into the ordinary lives of Americans in the early 20th century, and finally the anxiety brought about by nuclear annihilation, the idea of nature, which had become something central and peaceful, became something directly under threat. This shift inspired Marx to identify the “pastoral ideal” as part of American identity, an identity whose roots predate America itself, stretching back to the “age of discovery.” The resulting “argument” between nature and technology influenced musical composition in demonstrable ways before the signing of the Declaration of Independence in 1776. “Pastoral” signals, such as hunting horns, established a musical vocabulary that would emerge in early compositions. Johann Beer’s *Concerto à 4 in Bb for Horn and Posthorn* (composed by a musician who lived 1655–1700) represents an important early example featuring what would become the modern horn in F. While the concerto’s exact composition date remains unknown, Beer’s death, ironically from a hunting accident on August 6, 1700, confirms that this work, which clearly uses the horn as a symbol of hunting in the pastoral landscape, predates American independence by over seven decades. Likewise, other composers who predate the founding of the United States would tie the horn in F to the idea of the pastoral realm. Leopold Mozart’s “Hunting Symphony” (*Sinfonia da Caccia for 4 Horns and Strings*) not only pulls the listener to the pastoral with the hunting horns but also includes “gunshots” as part of the instrumentation. The use of both guns as technological weapons and horns to evoke the idea of the pastoral would further the musical dialogue that Marx would call “a profound disruption when technological progress interrupts their idealized connection to nature.” Allen Whear remarks that “The history of the horn is inextricably bound with the favorite pastime of the European aristocracy through

the ages: hunting,” evolving from tools into noble musical instruments.¹² It’s important to note that the very transformation of the horn is, in its own way, a mirror of what Marx describes in American social consciousness as the negotiation between natural origins and technological refinement. Musicologist Raymond Monelle asserts in *The Musical Topic: Hunt, Military and Pastoral*,¹³ that Mozart’s use of the hunting topics represents “technological domestication of natural elements.” This “domestication” would continue to establish patterns for composers, creating musical representations of the “middle landscape.”

5.
Sinfonia di caccia.

The image shows a page from a musical score for Mozart's 'Sinfonia di caccia'. The title '5. Sinfonia di caccia.' is centered at the top. Below it, the score is written for several instruments: 2 Cornets (G and D), Violino I, Violino II, Viola, Basso, and Klavierauszug. The key signature is one sharp (F#) and the time signature is 3/8. The first staff, for the 2 Cornets, is highlighted with a red box. The measure number '(175-6)' is written in the top right corner of the red box. The score shows a melodic line for the cornets and a more rhythmic, harmonic line for the keyboard and strings.

Example E: Leopold Mozart’s “Hunting Symphony” (Sinfonia da Caccia for 4 Horns and Strings 1756)
Hunting Horns Representing Entry into the Pastoral Realm

¹² Allen Whear, “Behind the Musik: The Hunt: Mozart & Haydn,” Tafelmusik (March 24, 2022), Accessed April 9, 2025. <https://tafelmusik.org/explore-baroque/articles/behind-musik-hunt-mozart-haydn/>.

¹³ Raymond Monell, *The Musical Topic: Hunt, Military and Pastoral* (Bloomington: Indiana University Press, 2006), 35-42.



Example F: “Gunshots” as Disruptors of Nature

Powerful Women and Pastoral Disruption

Marx’s ideas of a “collective American predisposition to embrace and fear modernization” may be viewed differently through the lens of the feminist experience in a patriarchal world. During the Industrial Revolution, positions and work traditionally held by women were being usurped by industry itself. Textile mills were automated, including spinning and weaving that women did at home. New factories began employing men, while women lost the small economic power they had held. A further division of the sexes became more solidified with the advent of technology. Technological ideology became assigned to men, who operated in the public and technological realms, while women were relegated to the home, private and natural realm. In the 19th century, technology became gendered as masculine, and the sounds of industry (factory whistles, train horns, mechanical noises) became coded as such. Likewise, the 19th century began to “code” natural sounds (birds, flowing water, wind) as female. The division of technology and nature segregated sound and organized them into feminine and masculine identities.

Mary Hunter's influential work *The Culture of Opera Buffa in Mozart's Vienna*¹⁴ details the gendered power structures in Mozart's musical expression of the "Pastoral Realm." Hunter suggests that in the musical expression of the pastoral, female characters often access a kind of temporary strength and power through these natural settings. This power is usually symbolically disrupted by technological influences to reassert patriarchal control. Hunter's work asserts that the pastoral in opera represents the idealized pre-mechanical world. It is a simple and uninterrupted by technology and urban expansion, which are pre-gendered with masculine power. Hunter's use of musical "topic" (the hunt, military, pastoral) as musical techniques becomes standardized formulas for conveying meaning, and ultimately gendered power. Topics of "military" and "hunting" would become conveyances of the masculine, while the pastoral would represent the feminine.

As an interlocutor to Hunter, author Gretchen Wheelock's analysis of Mozart's operas¹⁵ shows the use of minor modes to represent "female transgression of boundaries." Wheelock suggests that the major mode represents a masculine and stable system that is properly functioning. Feminine minor modes, on the other hand, operate under stress and manipulation, asserting a malfunction. Minor modes signal a sort of "boundary-crossing," where the proper system is disrupted—a flaw in the machine. These transgressions can be viewed as musical expressions that foreshadow the technological anxieties Marx identifies in American literature.

Mozart's most prolific writing period (1780-91) coincides with the beginning of the Industrial Revolution. The steam engine proliferated between 1800 and 1850. The Spinning Jenny and the Water Frame emerged between 1764 and 1799 and mechanized textile production.

¹⁴ Mary Hunter, *The Culture of Opera Buffa In Mozart's Vienna: A Poetics of Entertainment* (Princeton University Press, 2000). 58-63.

¹⁵ Gretchen A. Wheelock, "Schwarze Gredel and the Engendered Minor Mode in Mozart's Operas," in *Musicology and Difference: Gender and Sexuality in Music Scholarship*, ed. Ruth A. Solie (Berkeley: University of California Press, 2023), 201-221.

In 1785, the first steam-powered cotton mill was built. These innovations sparked the same kinds of technological anxieties that Marx would detail and that would permeate Western culture through the nuclear age and into modern history. Mozart was composing, therefore, at what would be the start of over 200 years of technological negotiation and anxiety. Consequently, music and literature would seek to depict the fear of an uncontrolled mechanical force as female sexuality (Mozart), runaway steam engines (Hawthorne), and nuclear chain reactions (Barber and Penderecki).

In Mozart's opera *Die Zauberflöte*, the Queen of the Night gains access to a "supernatural power which emanates from (a woman's) sexuality and reproductive capacities." These become "regulated" by Sarastro's patriarchal rationalism. The Queen asserts a biological/generative power that coincides with lunar cycles and the creation of life. Sarastro, in contrast, personifies the rational and technological power of modernization and machinery. His temples are architectures of power, his trials are systematic to process worth, and the solar imagery becomes a dynamic foil to the queen's lunar powers. Musically, Sarastro's basso range signifies the most "grounded" and rational state, while the queen's high coloratura becomes an unbalanced and crazed mental state. Ultimately, the tension between the two forces of nature and machine reveals that the queen's unbridled "natural power" can only be kept in balance by the rationalism of man, a microcosm of the broader cultural negotiation between natural impulse and technological control that Marx describes. This troubling representation reveals how cultural expressions systematically limit women's freedom, exposing the ways male-controlled systems suppress female autonomy through technological and rational archetypes. *Die Zauberflöte* moves forward with a further warning: While women may have powerful access to the powers of nature, without balance, the unbridled passions associated with female agency quickly lead to madness and rage. This idea is typified in the Queen of the Night's famous aria *Der Hölle Rache*. The queen is

intrinsically tied to the image of the moon, a long-time symbol that “mirrored” a woman’s menstrual rhythms. This connection asserted a long-established ancient connection between feminine biology and lunar phases. These misogynistic traditions insisted that “as the moon traveled through monthly unstable changes,” so too did women. This “idea” was reinforced through the association of the “moon goddess,” who symbolized both fertility and emotional volatility. Powerful women, therefore, were viewed not only as destined to become unhinged but did so also with the help of dangerous, unchecked natural connections. Men, on the other hand, had the rational good sense to utilize technology to advance access to more enlightened thought, creating a “middle landscape” through this balance.

The image shows a musical score for a scene from Mozart's opera 'The Magic Flute'. The score is for measures 98-102. It features four staves: a vocal line (K) with a melismatic passage of triplets, a Violin (Viol.) line, a Flute (Fl.) line, and a Quartet (Quart.) line. The vocal line is marked with '99' and 'de, es -'. The Quartet line is marked with 'Quart.'.

EXAMPLE G: “Der Hölle Rache,” or the Queen of the Night’s Aria, shows melismatic “emotional hysteria” as she seeks vengeance upon Sarastro. Here, the triplet figures that undulate wildly with rage represent Mozart’s assertion that a woman connected to the power of nature is both mighty and emotionally unstable.

In stark opposition to Marx and his quest to find a balance between nature and technology, Theodor Adorno, a prominent figure of the Frankfurt School whose expertise centered on philosophy, musicology, and social theory, developed a comprehensive critique of industrialization and its negative effects on mass production and music. Adorno believed that

capitalism and industrial production methods had corrupted the natural aesthetics of music, creating what he would call “standardization.”

In truth, jazz music and popular music of the day were being modeled along the same principles as factory production. Tin Pan Alley was a nickname for West 28th Street in Manhattan (between Fifth and Sixth Avenues), where music publishers clustered in the late 1890s. There, music publishers churned out songs as if they were a commodity rather than an art form. The music produced was designed for mass appeal and profitability. A standardized formula was often applied to the music, creating a formulaic AABA structure that formed the tropic backbone of the music. Music was created at breakneck speeds in order to meet deadlines and output quotas. Adorno would publicly criticize the standardization of music, diminishing artistic quality, and reducing the content to interchangeable formulas designed to be easily digested by the general public. According to Adorno, the standardization of music became a product of the “culture industry,” a production of cultural wares designed for profit over art. Adorno believed that the creation of such “freight” stifled creativity and innovation and led to the erosion of critical thought.

Adorno’s critics were harsh, suggesting that the spontaneity of jazz was a façade, masking rigid musical formulas and calling it a “bourgeois illusion.” He would write: “Jazz has no cultural merit but is just ‘stylized barbarity...the effect of jazz is to destroy culture.”¹⁶ Musicologist Joseph Lewandowski condenses Adorno’s criticism of jazz into three key claims: A “rejection of jazz’s supposed spontaneity, a demonstration of jazz’s entwinement with modern technological life, and a critique of jazz’s pseudo-individualizing tendencies.”¹⁷ Ultimately,

¹⁶ Brandt Dainow, “Adorno and Horkheimer’s ‘The Culture Industry,’” *ThinkMetrics*, January 10, 2019, Accessed April 9, 2025. <http://thinkmetrics.com/adorno-and-horkheimers-the-culture-industry>.

¹⁷ Joseph D. Lewandowski, “Adorno on Jazz and Society,” *Philosophy & Social Criticism*: 22, no. 103 (1996): 104–21, https://josephlewandowski.com/images/Adorno_on_Jazz_and_Society.pdf.

Adorno's critique of jazz reflected a condemnation of mass culture under industrial capitalism. Undoubtedly, the commercial success of jazz created a bias in his assessment, conflating its popularity with being a "mass-produced commodity." While his criticism of jazz centered around the infusion of industrialized commodities in its creation, some scholars assert that his harsh criticism also stemmed from, at best, racial blind spots and, at worst, outright racism. Robert Witkin writes, "Adorno's writings on jazz dismissed not only the music itself but also, as the claims made on behalf of jazz by its exponents and admirers, even of claims concerning the black origins of jazz music."¹⁸

it would be the sound of the Industrial Revolution that would invigorate the music of jazz, creating a marriage between art and industry that would be abhorrent to Adorno but thrive in the "middle landscape" of Marx.

Jazz music emerged in the United States in the early 20th century. Although it evolved from a conglomeration of African musical traditions, gospel music, ragtime, blues, and European harmony, the soundscape of America's rapid industrialization influenced compositions and musical techniques. In Ted Gioia's *History of Jazz*, he writes: "If the essence of ragtime's popularity was, as Irving Berlin later suggested, its agility to capture the 'speed and snap' of modern American life, then no piece of music evoked this emerging sensibility better than the 'Maple Leaf Rag.'" ¹⁹Ragtime, as a precursor to jazz music, was already becoming infused with the "speed and snap" of modern life, but it would be the power of industry that would allow more access to the piano and player piano that would help build the new sound of jazz music.

During this same period, player pianos increasingly made their way into homes and gathering places... and by 1919 player pianos constituted over half the output of the U.S. piano industry. These two powerful trends—the spread of pianos into American households and the growing popularity of mechanical player pianos—

¹⁸ Robert W. Witkin, "Why Did Adorno 'Hate' Jazz?" *Sociological Theory* 18, no. 1 (March 2000): 147.

¹⁹ Ted Gioia, *The History of Jazz* (New York, NY: Oxford University Press, 2021).

helped spur the enormous public demand for ragtime music during the early years of the twentieth century.²⁰

Industry was supplying greater and more affordable access to musical instruments, and in turn, jazz music was becoming more and more infused with the sounds of the modern world. In its own way, an argument could be made that jazz music in America was a prime example of Marx's "middle-landscape" model. Instead of fearing the soundscape of technological progress, technology became a vehicle for making music. But what of nature in this creation of jazz music?

The Flow-State in Jazz Music as Access to the Natural Subconscious

The "flow-state" in jazz music is when improvisation and creativity form a kind of free-flowing artistic expression, much like Agee and Barber experienced with Knoxville. This special "state" has been studied, and the science behind the changes that occur cognitively can be clearly seen. During the 'flow state,' brains show a special pattern. The dorsolateral prefrontal cortex, that part of the brain that acts like our "inner monitor or critic," becomes much less active. While this portion of the brain becomes diminished, the sensory and default mode networks, those areas that help sense and process creativity, become much more engaged:

Improvisation was consistently characterized by a dissociated pattern of activity in the prefrontal cortex: extensive deactivation of dorsolateral prefrontal and lateral orbital regions with focal activation of the medial prefrontal (frontal polar) cortex. Such a pattern may reflect a combination of psychological processes required for spontaneous improvisation, in which internally motivated, stimulus-independent behaviors unfold in the absence of central processes that typically mediate self-monitoring and conscious volitional control of ongoing performance.²¹

²⁰ Ibid.

²¹ Charles J. Limb and Allen R. Braun, "Neural Substrates of Spontaneous Musical Performance: An MRI Study of Jazz Improvisation," *Plos One* 3, no. 2 (February 27, 2008), <https://doi.org/10.1371/journal.pone.0001679>.

Access to the “flow-state” is access to humanity’s most natural impulses, yet jazz music embraces the influence of mass production and modern sound palettes. And while the “flow state” is a natural, preverbal, spontaneous brain state, it is accessed and manufactured through instrumentation, amplification, and learned harmonic systems. Jazz, therefore, represents a crucial musical bridge between nature and technology, demonstrating the fundamental changes present in American music as technology encroaches into human life.

Robert Pirsig’s novel *Zen and the Art of Motorcycle Maintenance* emerged as a touchstone in 1970s American literature, addressing America’s technological anxiety. Like Marx before him, Pirsig asserted the idea that technology was not to be feared but could coexist with nature and humanity. In his book, Pirsig introduces the concept of *quality* as a central theme. He defines “quality” as an encounter that we sense or feel before our mind can analyze or categorize it. Quality, therefore, is pre-intellectual and experiential. For Pirsig, quality is not a thing. “It is an event...It is the event at which the subject becomes aware of the object.”²² Pirsig asserts that quality is not simply a subjective judgment but a foundational interaction at the moment we experience something. It is at this “intersection of subject and object” that humanity is met with the “experience that we do not exist in isolation.” Pirsig explains that this intersection is where human consciousness and the external world dissolve. Skilled mechanics do not need to think about a wrench or screwdriver consciously. Instead, tools become a natural extension of the body, much like a jazz musician and their instrument. The dissolution of these rigid boundaries may be understood in musical terms, found in that transcendent moment when the listener, performer, and composition dissolve into the experiential whole. This achieved assimilation of

²² Robert M. Pirsig, *Zen and the Art of Motorcycle Maintenance* (Mariner Books, 2024), 3.

subject and object is, at its core, Pirsig's message about technology and humanity, arguing that this "false division" is responsible for cultural anxiety. He asserts that the "classical mindset" opposes technology as an objective system, while the "romantic mind" rejects it as dehumanizing. Pirsig, like Marx, suggests that technology should be studied deeply and appreciated for its beauty. That nature and technology need not be in opposition; instead, they can integrate and be accessed through personal (zen-flow-state) mastery.

Chapter 3

Futurism and Sounds of Modernity

Where earlier composers had threaded the machine's sounds into the pastoral and held the two in uneasy balance, the early twentieth-century Futurists saw that balance as a failure of nerve. They wanted the pastoral destroyed and the world given over to what Marinetti called “the beauty of speed.” That cry began with his 1909 manifesto and roared into sound, into Antheil's *Ballet Mécanique* and the Soviet iron of Mosolov and Prokofiev. Here, the machine was not feared but worshipped, the far pole of music's long quarrel with the mechanical. These scores did not depict the industrial age so much as announce it as humanity's destiny. Mosolov, however keen on Futurism in music, would be condemned as a formalist and swept into Stalin's purges. He became a casualty of the very machine his music had glorified, proof that the worship of speed carried consequences the manifestos never considered.

From Manifesto to Music

In 1901, Filippo Tommaso Marinetti published “The Futurist Manifesto” on the front page of the French newspaper, *Le Figaro*. Marinetti declared that “speed, violence, and machinery” were the essence of modern beauty. He championed a complete rejection of the past, calling for the destruction of museums, libraries, and academic institutions. The manifesto offered worship-like praise for technology. Cars, airplanes, and industrial cities were celebrated and touted as superior to art. He called for movement and action over balance and stillness. For Marinetti, the only art that was worth experiencing was art that felt like it was in motion, chaotic, energetic, and alive. More concerning, he shared a violent vision of what he called “the world's

only hygiene,” which was a confrontational society that glorified war, danger, youth and rebellion.

Inspired by Marinetti, Russian arts absorbed and transformed his ideas into their own subversive politics. What emerged were two distinct, yet related movements. The First, Russian Futurism (1910-1920), embraced the captivation of speed, machinery, and letting go of tradition. It saw language as mechanical in nature. Poets, like Velimir Khlebnikov and Vladimir Mayakovsky, used language and words as raw material to be altered, taken apart, and reconstructed. New words were formed from broken structures and created what was called a “zaum,” or transitional language that put the highest emphasis on sound and rhythm over meaning.

Russian Futurists, inspired by the Bolshevik Revolution, believed that their radical art would serve the new Soviet society. They believed that art should act as a catalyst for social transformation and that it had no value as an aesthetic object. The energy and modern innovation that were created through Russian Futurism were meant for the masses and not the elite. Russian Futurists sought a working-class transformation aided by the power of accessible art to the people. Fast, dangerous, revolutionary, and modern would become building blocks for this new form of art, but also for social/political transformation.

The second movement to arise from Marinetti was Constructivism (1915-1930). This movement embraced more fully the “worship” of industry and machinery. Still, unlike Marinetti, Constructivism sought to strip away any romantic glorification, seeing it as bourgeois. Instead, it demystified machines as tools for productivity rather than something to be viewed as godly or magical. Further, the idea to create “art for art’s sake” was wholly rejected. Instead, constructors believed that art should be helpful to serve the practical purposes of the new socialist state. Steel,

glass, and concrete became materials that served the new socialist order. Use of bold, angular design with dynamic angles and bold dialogue elements became pillars of this new design.



Poster by Russian Constructivist Alexander Rodchenko (1924 “Books Please!”)

Italian, Russian, and Constructivist futurism imagined an industrial savior. The belief was that technology would liberate workers and save the ordinary person from the clutches of capitalist exploitation. At the heart of all three movements, there was a firm belief that a modern industrial civilization required new music inspired by the sound of liberating machinery.

Industrial Sounds: The Machine Aesthetic in Early 20th Century Classical Music

American composer George Antheil became the ire of Paris and the subject of vigorous jeering in New York when his *Ballet Mécanique* premiered in 1926. The public reaction at the Paris’s Théâtre des Champs-Élysées was so visceral that it caused a riot with French audiences, who quickly bestowed upon the composer the title of “L’Enfant Horrible.” The work was composed in 1924 while Antheil was living in Paris. The original instrumentation called for a “mechanical ensemble” of: 16 player pianos, 2 upright pianos, 3 xylophones, 4 bass drums, a tam-tam, a siren, 7 electronic bells, a robust percussion section, and an airplane propeller.

Expanding beyond his unusual instrumentation, Antheil employed musical innovations that were meant to mimic the unceasing intrusive sounds of mechanisms in industrialized civilization. This included “time-space” rhythmic construction, persistent ostinatos mimicking assembly lines, extreme dynamic contrasts signifying the unpredictable power of industrial progress, and the disorienting cacophony of driving “noise.”

Time-Space Rhythm

Antheil’s “time-space” rhythm represented a radical departure from traditional concepts of rhythmic organization, instead focusing on a superstructure that existed within a mathematical framework. Musical elements were placed on a temporal grid, where duration and proportional relationships of time were the most critical factors in the composition instead of pitches and harmonic relationships. This “musical canvas” was divided in duration according to strict mathematical ratios. Using the “Golden Ratio” of 1:1:618, he determined critical structural points in his composition. Smaller sections of music employed the Fibonacci sequences (ratio of 1,1,2,3,5,8,13...), which created what he regarded as “spiral forms” of music. These blocks of musical materials were organized in durations relating to these mathematical relationships, creating what he considered “a temporal architecture with carefully calculated proportions.” While Antheil expressed the sounds and affronts of the modern age, he organized mechanisms rhythmically with construct ratios that form the building blocks of natural beauty.

In a practical sense, Antheil’s “time-space” method revealed itself in specific expressions. The fixed duration of his “temporal cells,” which ranged between 7, 13, and 21 seconds, functioned as the foundational blocks of the structure of the ballet. These cells were grouped in patterns that created larger structural units with carefully curated proportional relationships and ratios. At critical intersections of time relating based on the “golden ratio,”

contrasting material was introduced, creating climatic moments within the music. The interjection of silence was important, as silence was treated as a “negative space” and sound as a “positive space” on the temporal canvas.

It’s important to note that these musical concepts were a part of the emerging work of Einstein and his concepts of the connective ties between space and time. Artistically, these ideas created a kinship with cubist art, expressing a simultaneous expression of form in multi-dimensional aspects. Likewise, Antheil’s use of rhythmic drive corresponded with futurist concepts of speed and mechanism, as well as creating an essential consideration of Frederick Taylor and his study of time management and productivity.²³

Alexander Mosolov’s *Iron Foundry* and the Rise of Soviet Industrial Music

Alexander Mosolov (1900-1973) composed his iconic works during the first of the Soviet “Five-Year Plans.” These plans aimed to rapidly transform the Soviet Union from a primarily agricultural society into an industrial juggernaut. The two main goals of the first plan were rapid industrialization and agricultural collectivization. Rapid industrialization was expected to experience a 350% increase in output, thrusting the USSR into the modern age. Agricultural Collectivization was soon amended to include what Stalin called *kolkhoz* collective farming, which would be farmed by thousands of peasants working the land. The driving narrative behind these resolutions was to enable the USSR to defend itself against the growing invasion of capitalism, which was advancing eastward from the West. His message was clear: the Soviet Union needed to catch up with the advanced nations or be crushed by them.

²³ Frederick Taylor was a ground-breaking figure in scientific management, studying time and motion. His work sought to break down time in its smallest increments and to studying and measuring how long it took to perform a task. The intent of his study was to formulate strategies to become as efficient as possible, eliminating those things which impeded the fastest possible execution of work.

Mosolov composed *Iron Foundry* between the years 1926 and 1927. The work was initially conceived as the central movement of a ballet suite called *Stal* (Steel) and centered on the theme of a factory strike. Although the ballet was never staged and the subsequent movements have been lost, the first movement stood alone as an orchestral piece, making its premiere in Moscow on December 4, 1927, to commemorate the tenth anniversary of the Russian Revolution. Today, it is regarded as one of the most important examples of music inspired by mechanism and industry.

The piece organizes orchestral instruments into groups that move in rhythms that evoke the sound of industrial cogs and gears. Unyielding in their patterns and moving in opposing meters, yet simultaneously with and against other segmented orchestral ensembles. What emerges is a sound and layered ostinato that operates as the pressing, nonyielding sound of a mechanical factory. This use of continuous rhythmic motion, devoid of musical development, provides a window into the repetitive brutality factory workers faced. Critics would argue that this deliberate use of unrelenting musical forces would paint factory work and the labor of the people as oppressive and dehumanizing, a concept that would find itself in direct opposition of the Soviet assertion of the “happy worker.” Further, Mosolov, although committed to traditional orchestral instrumentation, infused mechanical expression with the manipulation of iron sheets, providing an authentic return to the sounds of industry. The musical creation of mechanical “cogs” predates Barber’s Knoxville and his implementation of the “gear motif” by 27 years, but intersects conceptually with American composer Antheil and his “time-space” rhythmic treatment. Both composers recognized the need to develop new musical expressions in order to capture the essence of modern machinery. Curiously, the two composers, American and Soviet, were exploring the same kinds of factory-infused rhythmic ostinatos in the same compositional year. These musical parallels suggest that industrialization had become a shared concern in both

the East and the West, and, if musical coding were to be believed, one that moved between political constructs and national identities.

The image displays a musical score for a piece titled 'Iron Foundry' by Mosolov. The score is organized into eight distinct horizontal sections, each labeled 'Cog' followed by a number (Cog 1 through Cog 8). Each section contains musical notation for multiple instruments, with some sections featuring dense, complex patterns. The sections are highlighted with yellow borders.

EXAMPLE H: Excerpt from Mosolov’s Iron Foundry
Note the division of instrumentation to represent the “cogs” of industry.

Mosolov’s music would eventually find displeasure in the Stalinist regime, condemning his works as “formalism” rather than modernist. His music was labeled as a critique of the Soviet

regime, painting a picture of oppression in modernization, rather than glory and happiness under the communist party. Proponents of his work contested that his work never sought anti-Soviet rhetoric; nonetheless, Mosolov was arrested in 1937 during the Stalin purges and was exiled to Turkmenistan. While there, he was forced to write folk-inspired music in service to the people, and although he served only 8 months in exile, he never fully regained his respected status as a modernist composer in his lifetime. Stalin's push to modernization yielded troubling consequences of the suppression of artistic autonomy.

Sergei Prokofiev's *The Steel Step*

Sergei Prokofiev (1891-1953) negotiated the space between Soviet conformity and artistic independence in a way that Mosolov could not. He simply left. After the 1917 revolution, Prokofiev departed Russia and spent nearly two decades abroad, first in the United States, where audiences greeted his music with reactions ranging from polite indifference to open hostility, dismissing it as futuristic and brutal. After a brief and equally chilly stay in Germany, he settled in Paris, and there everything changed. The city embraced him. He fell into a circle that included Stravinsky and the *Ballet Russes*, and he formed close friendships with Francis Poulenc and Arthur Honegger. Paris gave him what America and Germany could not: a community.

In 1925, Prokofiev was commissioned by Sergei Diaghilev for Ballets Russes. He composed *Le Pas d'Acier* (The Steel Step). The ballet depicted Soviet industrialization meant for Western audiences. It was seen as an exotic modernist spectacle, with motoric rhythms and angular melodic lines. Unlike Mosolov's *Iron Foundry*, Prokofiev's *Steel Step* maintained a commitment to melodic development even amid the machine's percussive sounds, creating a modernistic fabric of sound that infused the ballet dances with an industrialized energy evoking

factory work, construction, and the dehumanization of the machine's arrival into ordinary lives. Choreographed by Léonide Massine and premiered by Diaghilev's Ballets Russes at the Theatre Sarah-Bernhardt on June 7, 1927, the ballet portrayed industrial labor as the inspiration of the performance. The dancers physically enacted the rhythms of striking hammers, factory belts in motion, and flywheels. The dancers embodied the machine aesthetic and translated it from the abstraction of sound into visible exertion of the human body, creating a hinge-point between mechanism and human expression.

In 1936, Prokofiev returned to the Soviet Union. He had undergone a period of nostalgia for his homeland and believed that by returning home, he could find support for music in the people of his native land. The Soviet Union was also actively luring the composer back, with promises of state support for his art. This support was attractive to the composer, who longed to write opera without the fear of the financial pressures abroad. By 1930, the danger level for artists had diminished, and the once-violent landscape for creatives mellowed into a tolerable risk. This perception of safety would be in error, as Stalin's purges would intensify just one year later. Condemnations of "formalism" would be commonplace, propelling Soviet modernists to compose more harmonious music with mass public appeal. Prokofiev's return, therefore, positioned him precariously balanced between the safety of state-supported art and the escalating pressures of artistic suppression.

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R.M.V.447

This image shows a page from a musical score, likely for a symphony. The score is written for a large ensemble of instruments, including Oboe (Ob.), Clarinet (Cl.), Flute (Fl.), Bassoon (Fg.), Horn (Cor.), Trumpet (Timp.), Violin (V.), Viola (Vle.), Cello (Celli), and Double Bass (C.B.). The music is written in a standard staff format with various clefs and time signatures. Dynamic markings such as 'sf' (sforzando) and 'mp' (mezzo-piano) are visible, indicating changes in volume. The score is divided into measures by vertical bar lines, and the instruments are grouped together in a single system.

Chapter 4

Brooklyn and Leningrad

The Futurists had pushed the machine aesthetic to its most ideological extreme, a celebration of speed and industry made into a doctrine. However, within barely two years, Shostakovich's *Symphony No. 2* (1927) and Copland's *Music for the Theatre* (1925) each rendered the industrial age in different directions. A Soviet commemorative symphony and an American jazz-inflected suite make an unlikely pair, yet that is exactly the point. Both confront the same mechanized modernity, but each engages it in a unique way. Shostakovich meets the machine with a massive, awe-inspiring industrial might that dwarfs the listener beneath its scale, while Copland infuses that same machine with jazz, drawing the listener into a world of joy, excitement, and exhilarating speed.

Urban industrialization in Shostakovich's *Symphony No. 2* and Copland's *Music for the Theatre*

In the late 1920s, two composers on opposite sides of the world musically engaged the mechanical age in two radically different ways: Shostakovich through the industrial cacophony of his *Symphony No. 2* (1927) and Aaron Copland through the jazz-infused sounds of mechanism in his *Music for the Theatre* (1925). Composed within a mere two years of each other and on different continents, each work represents a different but fascinating relationship between composer and commissioned material. For Shostakovich, *Symphony No. 2* was a directive commission “requested” by the Soviet State Publishing House to celebrate the tenth anniversary of the Bolshevik Revolution.²⁴ There were specific requirements to include the incorporation of the sounds of industry, including a factory whistle. Copland's work, across the sea, was

²⁴ Note: Scholarly debate continues regarding Shostakovich's intentions and coercion under the Soviet Government regarding his compositional choices. This chapter focuses on documented institutional contexts and musical analysis rather than speculation about the composer's inner thoughts and desires.

commissioned by the League of Composers with no political underpinnings. This freedom of composition allowed the composer to explore the urban industrial sound as an artistic choice. Both composers employed machine-like rhythms and percussive effects to imitate mechanical repetition. Still, the underpinning factors of their commissions brought forth important works of music with demonstrably different treatments that can be observed through careful comparative analysis.

Historical Context

Dimitri Shostakovich was born on September 25, 1906, in St. Petersburg. At age eleven, the composer witnessed the October Revolution of 1917, placing him at the hinge-point of one of the most transitional moments in modern history. His formative musical training at the Petrograd Conservatory in 1919, when he was just 13 years old, took place during the experimental Soviet period. This was a time just after the Bolshevik Revolution, when the Soviet Union experimented with Marxist-Leninist ideology. While it was a time when various artistic styles existed, it was also two decades marked by recession, political oppression, and social struggle.

Shostakovich's Symphony No. 1 was completed in 1925 at the age of 19. It was written as a graduation piece, required by the conservatory. The work gained the composer instant recognition, establishing him as one of the Soviet Union's most promising new composers. It was from this recognition that the State Publishing House's Agitprop Section commissioned the young composer to write a commemorative work for the tenth anniversary of the October Revolution. The commission specified a number of requirements: celebrate industrialization, include the sound of a factory whistle in the orchestrations, and set the revolutionary text by

Alexander Bezymensky, which praised Lenin and the revolution. For his work, Shostakovich received a fee of 1,000 rubles when the work premiered on November 5, 1927.²⁵

The commission itself occurred within the advent of the Soviet industrialization policy, at the development of Stalin's First Five-Year Plan (1928-1932). This plan centered around the expansion of industry, the collectivization of agriculture, the doing away with private business, and building a self-sustaining economy free from Western dependency. Factory whistles soon replaced the sound of church bells in cities across the Soviet Union, and this transformation was to be keenly observed in Shostakovich's commissioned work. The whistle became an important symbol for the Stalinist government, and, under the review of Soviet cultural policies that were ramping up control over artists' works, the new government sought to exemplify the changing soundscape of an agrarian society into an industrial one. The premiere took place as scheduled on November 5, 1927, conducted by Nikolai Malko with the Leningrad Philharmonic and State Academic Chorus.

Two years earlier and across the Atlantic, Aaron Copland premiered his industrial-infused work, *Music for the Theatre*. Copland was born in Brooklyn, New York, in 1900 to a Jewish immigrant family of Lithuanian background. He studied in Paris with Nadia Boulanger from 1921 to 1924. After his time abroad, he returned to the United States and began developing a quintessentially "American" sound. Biographer Howard Pollack writes, "From the start of his career, Copland set out to compose music that was 'recognizably American,' and that reflected the American scene...in musical terms."²⁶ This phrase deserves unpacking for a contemporary reader, because the "American" sound was not a native inheritance but a deliberate construction. Its principal architect was the Paris-trained son of Lithuanian Jewish immigrants, and its raw

²⁵ 1,000 rubles in 1927 have an approximate value of \$9,600 US in today's (2025) conversion of currency.

²⁶ Howard Pollack, *Aaron Copland: The Life and Work of an Uncommon Man* (New York: Henry Holt, 1999), Kindle edition, loc. 10183.

materials were themselves borrowed and combined: the syncopations of African American jazz, the contours of Anglo-American hymn and folk song, and an open, spacious harmony that, as music, signified the frontier. What sounds “recognizably American,” then, is a composite synthesis. It is an identity assembled rather than inherited. Copland would draw on jazz for his *Music for the Theatre*, which was itself infused with the sounds of urban life, machinery, and industry. While not directly influenced by elevated trains, street vendors, shipping docks, and automobiles, Copland’s music would become saturated with their influence through jazz’s immersion in the urban acoustic landscape.

Music for the Theatre premiered on November 28, 1925, in Boston with Serge Koussevitzky conducting the Boston Symphony Orchestra. It was commissioned for a small orchestra but imposed no other thematic demands from the League of Composers. Copland would state that his artistic goals would include a traditional orchestra crafted with jazz. He would employ modernist techniques, including octatonic and whole-tone scales, polyrhythmic ostinatos, and dissonant counterpoint. This fusion of jazz and classical music wasn’t something new for Copland, instead aligning with what musicologists would call his formative “jazz phase” of the mid-1920s. Gayle Murchison would argue in *The American Stravinsky*²⁷ that Copland’s early experiments with jazz began even before he departed for France. Carol J. Oja, in *Making Music Modern*²⁸, asserts that his fascination with jazz music was in line with the modernist composers of 1920s New York and marked a broader movement among young composers to seek a distinctly American sound through the incorporation of Jazz. Howard Pollack²⁹ traces this

²⁷ Gayle Murchison, *The American Stravinsky: The Style and Aesthetics of Copland’s New American Music, the Early Works, 1921-1938* (Ann Arbor: University of Michigan Press, 2012).

²⁸ Carol J. Oja, *Making Music Modern: New York in the 1920s* (New York: Oxford University Press, 2000).

²⁹ Howard Pollack, *Aaron Copland: The Life and Work of an Uncommon Man* (New York: Henry Holt, 1999).

exploration first through the French modernist composers and ultimately their connection with Stravinsky. From Stravinsky, a natural openness to jazz was formed.

Comparative Musical Analysis

Shostakovich's *Symphony No. 2, "To October"*

An Overview of Structure and Musical Forces: *Symphony No. 2* requires a substantial orchestra. It employs triple woodwinds, four horns, three trumpets, three trombones, tuba, and an expanded percussion section. The combination of forces creates an orchestra 50% larger than the standard. The score also specifies a factory whistle to be "obtained from a factory," or the use of brass instruments in a glissando if a factory whistle is unavailable. The symphony is scored with a mixed chorus (SATB) that enters in the finale. The work is approximately 20 minutes long and meant to be experienced as a single, continuous movement with five distinct sections, and with its unconventional instrumentation and insertion of factory whistles, it fulfills the commission's requirement to incorporate literal industrial sounds.

Industrial Opening

Symphony No. 2 opens with a full measure of rest, potentially symbolizing the "void" before industrialization, an emptiness devoid of consequence. In measure two, the lower string enters in a carefully orchestrated cascade: bass, cello, and viola sections each make their entrance with a deliberate delay following the voice beneath them. The counter basses establish a foundation with quarter notes arranged in four-note phrases, utilizing predominantly stepwise motion. Each successive instrumental entry introduces increasingly complex rhythmic

subdivisions. The cellos employ eight notes organized into eight-note phrases, while the Viola II section introduces eight-note triplets in nine-note figurations. Second violin II features sixteenth notes arranged in twelve-note phrases. First violin II presents a sophisticated rhythmic pattern: three triple-sixteenth notes combined with two standard sixteenths in duple meter, creating a micro-composite 5:2 grouping. These units form a larger structural phrase of three groups of five, totaling fifteen notes per phrase.

Violin I reverses this rhythmic relationship, pairing duplet figures with triplet-sixteenths in twenty-five-pitch phrases, ultimately employing three sixteen-note groupings of two per three-pitch phrases. The resulting composite rhythm creates a cacophonous yet meticulously ordered texture. This simultaneously creates an eerie atonal landscape while evoking the relentless power of an unstoppable mechanism.

The image shows a musical score for five string parts: Violini I, Violini II, Violo., Violoncelli., and Contrabassi. The score is for measures 1 through 6. The Violini I part has a complex rhythmic pattern of triplets and sixteenth notes. The Violini II part has a similar pattern. The Violo. part has a pattern of eighth notes and sixteenth notes. The Violoncelli. and Contrabassi parts have a pattern of eighth notes and sixteenth notes. The score includes dynamic markings such as 'con sord.' and 'ppp'.

Example J (mm1-6)

Examples J-L: Starting with a measure of rest, Shostakovich ramps up the rhythmic divisions of each corresponding string instrument in a cascading effect. The composite rhythm creates a powerful yet cacophonous force, evoking the image of the Soviet Union as an unstoppable industrial juggernaut.

The image displays three systems of a musical score, labeled 'Example K (mm7-15)'. Each system consists of five staves. The top staff of each system is labeled 'Cassa' and contains a single note with a fermata. The second staff is labeled 'V-I II div.' and the third staff is labeled 'V-I I div.'. The music is written in a key with two flats (B-flat and E-flat) and a 4/4 time signature. The first system includes a measure with a fermata marked with a circled '2'. The second system includes a measure with a fermata marked with a circled '3'. The third system includes a measure with a fermata marked with a circled '5'. The score includes various musical notations such as notes, rests, and dynamic markings like 'con sord.' and 'ppp'.

Example K (mm7-15)

Piatti *tr*
Cassa *tr*

con sord.
ppp

6 con sord. a 2 *ppp*
con sord. a 2 *ppp*
Tr-no III e Tuba. con sord. *ppp*
Piatti *tr*
Cassa *tr*

6

Example L (mm 16-19)

Tonal Texture

The brass enters with strong and foundational tones in elongated rhythms (mm 23). Even with the introduction of the brass and woodwinds, it is clear that Shostakovich is more concerned with tonal texture than standardized symphonic form. This is evident in episodic structure without development. Likewise, the opening string cascades could be considered to be quasi-fugue-like, but lack fugal development or conclusion. While there are times of implied tonal centers, which include oscillating between D major and D minor and B Major, in truth, what emerges is often harmonically rudderless poly-harmonic cells of music in simultaneous expression.

Mechanical Symbolism

Machine rhythms are established in the woodwind ostinato patterns, especially with the expression of driving sixteenth notes. It is important to note that the mechanical symbolism is intertwined with the percussion, which features a military-like snare drum providing a steady quarter-note pulse. The combination evokes the imagery that industry is not only a force for improving the lives of the Soviet people, but also a warning that with industry and machinery comes military might. This idea is heightened at the entrance of the chorus in the final section of the symphony, heralded by the factory whistle just prior to their emergence in the symphony.

Pro-Communist Chorus

The final movement with chorus transitions rapidly from polytonal and chaotic to assert a commitment to B Major and to the use of more standardized harmonic techniques. This coincides with the required text praising both the Stalinist communist party and Lenin:

*We walk, I want a job and bread...
Our minds were consumed by the vice of agony.
The factory chimneys towering toward the sky were clenched into fists,
as weak as hands.
The name of our fetters was terrible:
Silence, pain, oppression.*

*But there, louder than the sound of gunfire, words about our pain,
words about our pain, burst into the silence.
Lenin! You achieved freedom through suffering,
Freedom from hands hardened by our toil.
Lenin, we knew that our destiny had the name of struggle.
Fight! You led us to the final battle.
Fight! You gave us a Labor victory.
And this victory over oppression and darkness
No one can take it from us!
Let all who take part in the struggle be young and bold:
The name of this victory is October!*

*October! The long-awaited messenger of dawn.
October! The freedom of rebellion.
October! Labor, joy, and song.
October! Happiness in the fields and at the workbench,
This is a slogan, the name of a living generation: October, Commune, Lenin!*

Curiously, this choral section undergoes a dramatic shift in tonal relationship and compositional technique, making its insertion feel jarring and disjointed from the more modernist, atonal passages elsewhere in the piece. The clear commitment to a tonal centering during the pro-communist text is not the only contrasting element. The final measure of the piece modulates into a fanfare of heroic nature, asserting a finale that expresses a big crowd-pleasing finish, making it akin to the finale of an American musical rather than to the preceding pages of music composed by Shostakovich. While some scholars may argue that this abrupt transition is an indicator that Shostakovich was in a state of coercion, or that he was sending a coded message that he did not support the idea of the rise of communism, many of these assertions find an academic connection to the dubious biography, *Testimony*, by Solomon Volkov. In his biography, Volkov states that the composer was subjected to artistic compromises by the government and

that his works were riddled with subversive musical messages. Revisionists accept the memoir and point to abrupt musical transitions, like the fifth movement of *Symphony no. 2*, as coded messages against the state. Anti-revisionists denounce many of the historical “facts” in *Testimony* as fabricated and untrustworthy. Further, the biography has been denounced by Shostakovich’s family and by prominent historians who question Volkov’s association with the composer and his access to Shostakovich’s personal thoughts. While most credible academics agree that *Testimony* should be viewed with skepticism, many still believe that these coded messages are prevalent in the compositional language of Shostakovich’s works.

Copland’s *Music for the Theatre*

An Overview of Structure and Musical Forces: In stark contrast to Shostakovich’s expanded orchestration, Copland’s *Music for the Theatre* is orchestrated with a small orchestra, reminiscent of a vintage theatrical “pit” orchestra.³⁰ The chamber orchestra allows for individual instruments and sections to be more transparent and exposed to the listener. Key solo instruments, such as the trumpet, oboe, clarinet, bassoon, and English horn, are unencumbered by a crowded sonoral landscape and emerge as “characters” in a theatrical play. Where Shostakovich layers dense orchestral textures to create dramatic weight and power, Copland brings forward tension and character through restraint and selective tonal coloring. Because of

³⁰ The 1920s American theater or “pit” orchestra was a small, flexible ensemble rather than a full symphony: a handful of strings with mixed winds and brass, piano, and percussion, the players frequently doubling on several instruments. Copland’s lean scoring evokes this idiom directly; a recognizable parallel is the “theater orchestra” jazz-band sound of George Gershwin’s *Rhapsody in Blue* (1924). On Copland’s theatrical orchestration, see Pollack, *Aaron Copland*.

this, each instrumental entrance in Copland's work emerges with a heightened significance, much like a character's appearance on stage in a pivotal moment of the plot.

Copland's use of instrumental economy serves several symbolic purposes. The first is to create a sense of accessibility. Smaller forces are more performable by regional orchestras, and the size choice by Copland mimics the forces that would be realistically available to a theatrical company. Size also evokes the cramped and energetic spaces of the vaudeville theaters and jazz clubs and asserts the feeling of "urban intimacy." Finally, the size is distinctly anti-European. His orchestration deliberately rejects the massive romantic era orchestras and instead emerges as a statement of American identity. Where Shostakovich's orchestra size was a declaration of state power and mechanical transformation, Copland's orchestra was a celebration of art and culture as infused by the modern age through jazz music.

Structure

Music for the Theatre was composed in five distinct movements: I. Prologue, II. Dance, III. Interlude, IV. Burlesque, and V. Epilogue.

I Prologue (Molto moderato)

Movement one opens with what author Timothy Judd describes as a "call to order—a snare drum roll followed by an exuberant trumpet fanfare that functions as a theatrical curtain rising gesture, announcing the commencement of the imaginary drama."³¹ This fanfare moves quickly in measure 9 into a middle section (mm 9-56), at first evoking sounds of the pastoral,

³¹ Larry Starr, "The Voice of Solitary Contemplation: Copland's *Music for the Theatre* Viewed as a Journey of Self-Discovery," *American Music* 20, no. 3 (Autumn 2002): 297–316.

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Movement II: Dance (Allegro molto)

Movement two is built on the motif of the popular tune “Sidewalks of New York,” grounding the music in a space and time immediately recognizable to the listener.³² The “churning” rhythms and the increasing hustle and bustle of Brooklyn street life are exemplified in the rhythms of the piano, and the emerging “jazz-hall” sounds that are exuded in solo wind instruments, including clarinet in Eb. The solo winds take the stage as the alluring siren calls of the smoky, music-filled jazz nightclubs. Their overlapping and interplaying music entice the listener, each with an irresistible and brief invitation to enter the many dens of jazz that lined the streets of 1920s New York.

The polyrhythmic ostinato figures in this “dance” movement are Stravinsky-like³³ in their nature and create the movement’s forward motion. Copland synthesizes these European modernist techniques into a distinctively American expression, transforming the abstract rhythmic dialogue into a forward-thrusting image of urban streets and their cacophony of sights and sounds—never dour, but rather a joyfully organized patchwork of modern industrial life. This “joy” of life, infused with the automobiles, trains, chugging sound of industry, music, and jazz, is presented in a way very unlike Shostakovich’s mechanical rhythms in his *Symphony No. 2*. Where Shostakovich suggests dehumanizing aspects of industrial labor, Copland’s rhythms celebrate art, social transformation, and freedom. Copland’s music evokes dance, self-

³² Charles B. Lawlor and James W. Blake, “The Sidewalks of New York” (New York: Howley, Haviland, 1894).

³³ Gayle Murchison demonstrates that Stravinsky was “the composer after whose music Copland modeled his own,” identifying “Stravinsky’s interlocking polyrhythmic ostinatos” as a defining feature of Copland’s early compositional language. In her analysis of *Music for the Theatre*, Murchison reveals Copland’s “continued modernist influences from Stravinsky,” combined with “Stravinsky’s polyrhythms and shifting metrical accents,” jazz idioms, and French neoclassicism. Gayle Murchison, *The American Stravinsky: The Style and Aesthetics of Copland’s New American Music, the Early Works, 1921–1938* (Ann Arbor: University of Michigan Press, 2012), 29, 47, 98–102; reviewed by Paula Musegades in *Notes* 70, no. 1 (September 2013): 132–35.

exploration, and individual expression, while Shostakovich embodies the gathering of might, collective social change, and military power.

The chamber-sized orchestra showcases the second movement's orchestration to maximum effect, with individual instruments emerging and receding without ever being completely absorbed by the collective texture. Woodwinds add industrial chatter, while brass instruments punctuate the harmonic landscape with their jazzy interjections. The piano anchors the harmonic rhythm with stride-influenced patterns that would be readily associated with ragtime and jazz. Dynamically, the trajectory builds in waves of increasing intensity until the movement reaches the climactic final passages. There, all forces combine in a joyous expression of impulsive dance, with an abrupt theatrical conclusion that could be described as a jazz “button” whose function is to telegraph to the audience that the music is about to end, and it is time to applaud.



Example O: Musical jazz “button” at the end of the second movement designed to signify to the audience that it is time to “applaud.” It should be noted that this is a curious encouragement, as formalized classical music does not have applause between movements. Here Copland is “leaning into” the customs of vaudeville, rather than the constraints of an audience familiar with classical music etiquette.

Movement III: Interlude (Lento moderato)

The beginning of movement III provides a moment of lyrical rest from the frenetic energy of the preceding dance. The plaintive solo English horn immediately removes the listener from the urban sounds that peppered through the first two movements and transports the listener into a pastoral realm. The calmness of movement III provides a psychological withdrawal from the city, and its contrast is akin to Marx's "middle landscape." The choice of the English horn is a significant one. The melancholic timbre has long been associated with the power of the pastoral and nostalgic expression. Berlioz said of the English horn:

Its tone, less piercing, more veiled and heavy than that of the oboe, does not lend itself so well to the gaiety of rustic melodies. Nor can it express passionate laments; tones of keen grief are scarcely within its range. Its tones are melancholy, dreamy, noble, somewhat veiled—as if played in the distance. It has no equal among the instruments for reviving images and sentiments of the past if the composer intends to touch the hidden chords of tender memories.³⁴

The movement is formed in three sections of musical dialogue, engaging in a small interior chamber sound, then quickly expanding outward to a full orchestra in contrasting moments of tutti. Musical themes are exchanged between the English horn, oboe, and clarinet, with each instrument introducing small musical variations. This woodwind "dialogue" is supported without interruption by the strings, which provide a harmonic foundation that simply supports and never interjects into the musical exchange. This relationship provides an intimate expression, as if inviting the listener to eavesdrop on a private and important conversation.

³⁴ Beth Shamgar, "Program and Sonority: An Essay in Analysis of the 'Queen Mab' Scherzo from Berlioz's *Romeo and Juliet*," *College Music Symposium* 28 (1988): 48.

Example P: Introduction of English horn theme, which will become a dialectical exchange between solo woodwinds. This creates an intimate, almost confessional moment.

Harmonically, Copland's use of open intervals, which include perfect fourths and fifths, evokes a strong tie to the American musical landscape. This sound would be further developed later in works like the iconic *Appalachian Spring* and *Billy the Kid*, and acts as a precursor to his compositional style that would be codified as the "Copland sound." His use of modal coloring, particularly the use of Mixolydian and Dorian modes, provides a simple, almost primitive soundscape. The harmonic center, which hovers primarily around E Major, allows for greater resonance of the strings and the use of the open E string on the violin and viola. This creates an ease in the function of the strings, which provides a foundation to woodwinds, the active "characters" of this movement. In a larger context, both the Prelude and Epilogue center around the key of Bb. The relationship of these bookended keys to the third movement asserts a tritonal relationship, which, to the modernist composer, directly bisects the "pitch-clock" of set theory and creates a large and open harmonic space between movements.³⁵

Movement IV. Burlesque (Allegro Vivo)

Movement four begins with an energized motif found in the first four measures, expressed by all the instruments except the cello and bass. This exuberant and lilting figure stands in direct contrast to the cello, contrabass, and bassoon, which move in parallel minor-sixth gestures over a pedal point on the downbeat of a ten-measure span (see Example Q). The dialogue created by these contrasting musical sections will form an antecedent/consequent relationship that will be the underpinning of movement IV. Where the first motif expresses the

³⁵ In set theory, the pitch class "clock" represents twelve pitches arranged like the hours of a clock. C=0 or 12 o'clock, C#=1, D=2, D#=3 etc. The clock can be bisected symmetrically by the expression of a tritone. For instance, C would be situated at zero or 12 on the pitch clock, while F# would fall on 6 o'clock. The resulting distance between them bisects the available 12 tones into exactly one half. For modernist composers, the tritone can be a symbol for creating unity or equalized division. This would be in direct opposition to the "devil's interval" that it may have been labeled in earlier standard musical theory.

exuberance of modern life, the second motif brings forward tonal coloring and musical tensions that could be seen as reflective of the impending danger in an industrialized world.

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IV. BURLESQUE

The musical score for 'IV. BURLESQUE' is presented in two parts. The first part, 'Allegro vivo (♩=116)', is highlighted with a yellow box and features a lively, rhythmic motif. The second part, 'Poco meno mosso (♩=76)', is highlighted with a red box and features a more subdued, melodic motif. The score is written for a full orchestra, including woodwinds, brass, percussion, and strings. The instruments listed on the left are Piccolo, Oboe, Clarinet in E♭, Bassoon, Trumpets (1 and 2), Trombone, Pitches-Cass, Piano, Violin (1 and 2), Viola, Violoncello, and Contrabass. The score includes various musical notations such as notes, rests, and dynamic markings like 'ff' and 'f'.

Example Q: A conversation between contrasting motifs, which will become the underpinning for much of movement IV).

The two motifs create a polytonality, with competing tonal centers and harmonic tension. This polytonal tension is mitigated through the insertion of jazz “blue notes,” which are most usually altered (flatted) 3rds, 5ths, and 7ths. Copland’s use of these “blue notes” moves beyond the idea of altered pitches, however, and their insertion into an orchestral piece has both greater meaning and stronger consequences. Author and musicologist Hans Weisethaunet says of the use of “blue notes”:

In rethinking the concept of the ‘blue note’, I find it necessary to differentiate between two concerns that often seem to be somewhat unconsciously or muddily mixed together: (1) the idea of the ‘blue note’ as referring to pitch, thinking of the note as an ‘item’, commonly thought of as the slight altering of the minor third and the flattened seventh; and (2) the general concept of ‘blue feeling’ linked to the idea of playing ‘blue notes’: in short, the performance of music with a ‘blue feel’. From my analysis of performances, interviews and recordings, the conclusion will be that most musicological analyses of these styles are still based on an over-simplified idea of harmony: the applied Western major/minor theory concept with the addition of ‘blue elements’. My argument is that the harmonic foundation of blues, rock, and some jazz styles, in emic terms and performance practice, in fact represents both a totally different conception of harmony to that of the Western functional (tonal) harmony and also represents a different comprehension of dissonance/consonance in music.”³⁶

Weisethaunet’s argument, which engages a larger rethinking of the concepts and functions of dissonance and consonance in music, strengthens the correlation between jazz music and modernist composers of the time, who sought to expand the idea of tonal relationships, tone color, and the functionality of pitches. Copland’s devotion to the music of Stravinsky and his own expanding compositional techniques, although touted by many as an example of the pure and open American landscape, asserts complex modernist compositional techniques that are aided by the industrial-infused jazz music of the era.

Just as “blue notes” redefine tonal harmony and introduce dissonance, Copland’s music reflects the shift toward social “pushback” that came with industrialized society. In rehearsal 53,

³⁶ Hans Weisethaunet, “Is There Such a Thing as the ‘Blue Note’?,” *Popular Music* 20, no. 1 (January 2001): 99.

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53 *Meno mosso* (Tempo II, Moderato)

The musical score is arranged in a system of staves. The instruments and their parts are as follows:

- Pico.** (Piccolo): Treble clef, playing a melodic line with eighth and sixteenth notes.
- Ob.** (Oboe): Treble clef, playing a melodic line with eighth and sixteenth notes.
- Cl. in E^b** (Clarinet in E-flat): Treble clef, playing a melodic line with eighth and sixteenth notes.
- Bassn.** (Bassoon): Bass clef, playing a melodic line with eighth and sixteenth notes.
- 1. Trp in C** (Trumpet 1): Treble clef, playing a melodic line with eighth and sixteenth notes.
- 2. Trp in C** (Trumpet 2): Treble clef, playing a melodic line with eighth and sixteenth notes.
- Tromb.** (Trombone): Bass clef, playing a melodic line with eighth and sixteenth notes.
- Pn. Ca.** (Percussion/Cymbal): Bass clef, playing a rhythmic pattern with eighth and sixteenth notes.
- Piano**: Treble and Bass clefs, playing a complex harmonic texture with chords and arpeggios.
- 1. Vi.** (Violin 1): Treble clef, playing a melodic line with eighth and sixteenth notes.
- 2. Vi.** (Violin 2): Treble clef, playing a melodic line with eighth and sixteenth notes.
- Vla.** (Viola): Treble clef, playing a melodic line with eighth and sixteenth notes.
- Vlc.** (Violoncello): Bass clef, playing a melodic line with eighth and sixteenth notes.
- Cb.** (Contrabass): Bass clef, playing a melodic line with eighth and sixteenth notes.

The score is written in 4/4 time and features a variety of rhythmic patterns and dynamics, including fortissimo (ff) and piano (p). The music is in a key with one flat (B-flat major or E-flat minor).

Example R: Beginning of the Burlesque “striptease” in rehearsal 53, Movement IV

Movement IV concludes with a return to the opening two motifs, now in variation and in reverse order: motif II initiates the conclusion, followed by motif I. This inversion essentially reverses the original antecedent/consequent relationship between the two themes as presented at the beginning of the movement. What is produced is a sense of musical closure through symmetry. The reversal also lends the passage a retrospective quality, as if reflecting backward on the movement's musical journey. A gradual deceleration of tempo accompanies this thematic return, symbolic of the frenetic energy of a New York evening slowly "churning" to an end. As the rhythmic drive subsides, the texture thins and the mood shifts. The bassoon emerges to take "center stage" as the final character of the movement, presented in low registration. The *attacca* into Movement V ensures a seamless transition, carrying the listener naturally into Epilogue, which itself is a recapitulation of Movement I. The return of the two opening motifs in movement IV, therefore, may be seen as a micro-example of the final movement to come, as both act as "bookends" to the music.

Movement V: Epilogue (Moderato)

The Epilogue returns to the soundscape and basic construct of the Prologue, but now varied and evolved. The fanfare that opened the suite now appears quietly in a clarinet instead of a trumpet. As the trumpet ushered in the rising of the curtain in the first movement, the clarinet proclaims a somber conclusion to the drama. The three-note energetic motif of the fanfare in Movement I now sounds calm and soothing, a winding-down of both modern life and someone who has spent the night on the town, now headed to bed just as the sun rises.

The solo violin at rehearsal 57 provides a stark, almost reverent moment, accompanied for a time only by the piano. The simplicity and exposed honesty of the passage offers striking contrast with the bustling energy of Movements I, II, and IV. It functions differently, however,

from Movement III's somber coloring in key ways. While the Interlude seeks to break away from urban industrialization, this movement in the Epilogue transforms the themes and rhythms of the preceding "frenetic" movements, bringing together the pastoral and mechanical into a peaceful coexistence.

In the Epilogue, Copland brings back thematic material from each of the earlier sections, tying together the harmonic and melodic "threads" that ran throughout the suite. Melodic cells of 3-2-1, the use of the "blue notes," particularly the third, the addition of sixth and ninth chords are thematic recapitulations that unify the work as a whole and come together in the Epilogue as a sort of grand finale. Curiously, this medley of musical expression is not treated with the fireworks of movements I, II, or IV. Rather, Copland concludes the suite with a quality of reverence. The piece closes with an elegant violin solo, joined by bassoon as they move gently into a tutti B Major chord marked for pianissimo, as if to signify the gentle fall of the curtain and the dimming of the stage lights.

Two Paths to the Same Intersection

Both Shostakovich and Copland brought the sounds of urban industrial life into the concert hall with different techniques and interpretations. Shostakovich confronts the machine directly through literal factory whistles, cascading rhythmic "machinery" in bold, cacophonous expressions, powered by the force of an expanded orchestra. In contrast, Copland accesses industrial life through jazz as an emissary of the machine, allowing for more economically oriented orchestral forces that evoke urban space where music and mechanism can coexist in a "middle ground." Copland doesn't just depict the machine; he speaks through a language that the machine has helped create. Where Shostakovich's symphony leaves the listener dwarfed by

industrial power, Copland invites the listener to inhabit the modern industrial city and dance in its streets.

Chapter 5

Beyond the Score: Penderecki's *Threnody* and the Expanding Musical Language and Grammar of the Atomic Bomb

Every work so far has kept the machine at a distance, referencing it as an element of the factory and the city. Penderecki's *Threnody to the Victims of Hiroshima* closes that distance. His work confronts the danger of the machine and annihilation at their terminal point—the nuclear bomb. This chapter examines the radical graphic notation of his work and explores the contradiction at the core of his music. Originally composed as abstract music, he later reinterpreted the work and dedicated it to the victims of Hiroshima. This chapter looks critically at his musical innovations and asks whether retroactive meaning can be authentically applied to a work. Further, chapter 5 will explore how new musical symbolism might be adapted in this change to apply metaphor and dialogue with the atomic bomb.

Little Boy

On August 6, 1945, at precisely 8:15 am, the world changed forever. A single bomb code-named “Little Boy,” fell from an American B-29 over Hiroshima, Japan. It was the first nuclear device ever detonated in warfare, changing everything about the world we live in. This one bomb erased the lives of 80,000 men, women, and children seconds after the mushroom cloud towered ominously into the sky. Temperatures reached millions of degrees at the core of the blast, and there was a real fear that the explosion of a nuclear bomb could ignite the atmosphere of the entire planet, killing all living souls upon it. The sound of the blast itself could only be heard from those miles away, as those closest heard nothing at all, becoming instantly vaporized before the sound could reach their ears. This single moment in time rewrote the human narrative, ushering in the age of mass destruction. How then can any musical composition

represent the gravitas of this event? Krzysztof Penderecki would attempt to answer this question fifteen years later with a radical new use of sonic tools in his groundbreaking composition, *Threnody to the Victims of Hiroshima*.

As previously argued, Western classical music has served as a tool for negotiating humanity's complex relationship with technology. While we have examined composers who have mourned, resisted, celebrated, or sought balance with mechanization, Penderecki represents a different response entirely. He is not negotiating with machinery; rather, his music directly confronts mechanical alienation through raw, visceral, and brutal means. Where Barber's *Knoxville* was a lyric-rhapsody mourning the pre-nuclear pastoral from the safety of memory, Penderecki's *Threnody* places the listener inside the nuclear event-horizon itself. To do so, Penderecki adopted a new musical language, as Western notation and technique were inadequate to bear witness to the awesome and terrible nature of nuclear annihilation.

Threnody to the Victims of Hiroshima (1960) for 52 string instruments has become one of the most recognized compositions of twentieth-century avant-garde music. The piece runs approximately ten minutes, depending on performance interpretation. Despite its brevity, the work contains an extraordinary density of sound, musical innovation, and a revolutionary use of sonic textures. While composers such as Earle Brown, John Cage, and Morton Feldman all used graphic and non-traditional notation before Penderecki, what made *Threnody* distinctive was how Penderecki developed highly detailed graphic notation to represent new sounds and textures. Building on the work of his predecessors, he evolved these ideas into a notational system entirely his own. These innovations speak directly to the affronting nuclear age, confronting it with musical force.

Historical and Biographical Context

The atrocities Poland endured during World War II were distinct in their cruelty. There was a sustained and deliberate campaign by two occupying powers aimed at not merely conquest, but the eradication of the Polish nationhood itself. The annihilation of its Jewish population and the dismantling of national identity left the Polish people oppressed and facing total eradication. Poland emerged from the war with a loss of approximately 6 million citizens, nearly 17% of its prewar population. This was the highest percentage of any occupied country in Europe during the war. Half of those who were murdered died in the Holocaust, while the other half were ethnic Poles killed through execution, starvation, forced labor, and other unimaginable brutalities. The Nazi regime implemented deliberate policies aimed at the destruction of Polish identity. To achieve this, the educated classes were targeted and executed. Through operations such as *Intelligenzaktion* and *AB-Aktion*, the Nazi regime systematically executed professors, teachers, priests, doctors, and lawyers. The goal was to reduce the Polish people to a leaderless population of manual laborers.

Poland was also simultaneously invaded from the west by Germany and from the east by the Soviet Union in September of 1939. Both occupiers committed atrocities against the Polish people. The Soviets massacred over 20,000 Polish officers and intellectuals. The killings took place at multiple sites, including the Katyn Forest, Kalinin, and Kharkiv. The brutality of these killings was terrible and unforgiving. Victims were systematically ordered to dig their own graves, then shot in the back of the head and buried in unmarked mass graves. The Soviet Union blamed the atrocity on Germany for decades, until finally admitting its responsibility in 1990.

The Soviets also engaged in mass deportations between 1939 and 1941. It is estimated that as many as 1.5 million Polish civilians were deported to Siberia, Kazakhstan, and other remote regions of the Soviet Union. Beyond the military and intelligentsia of Poland, the Soviet

Union also deported refugees fleeing German-occupied Poland. Deportees were packed into cattle cars for weeks-long journeys, with many dying en route. Those who survived faced brutal conditions and forced labor. Starvation, disease, and exposure would kill tens of thousands more.

In a parallel atrocity, the Nazi regime and the German invasion began with aerial bombardment and ground attacks. The *Luftwaffe* targeted civilian areas, refugees, and hospitals. *Wehrmacht* soldiers and the SS units carried out mass executions in the very first days of occupation. Those who survived were forced into labor camps, both within Poland and in Germany. Poles were forced to wear identifying patches and faced starvation, execution, and severe punishments for any real or imagined infractions. But it would be the concentration and extermination camps that were reserved for some of the greatest atrocities of World War II. On Polish soil, Auschwitz-Birkenau, Treblinka, and Sobibor would be built as a “remedy” for the Jewish population of Poland.

The atrocities endured by the Polish people would color their culture and reshape Polish identity. Emerging from World War II, Poland would remain under Soviet influence, which would further erode its cultural identity. It would take the death of Stalin in 1953 for a cultural “thaw” to begin, with restrictions gradually relaxing across the Soviet bloc. This “thaw” was of particular importance in Poland, particularly because it allowed for the founding of the Warsaw Autumn Festival in 1956. The festival was established by composers Tadeusz Baird and Kazimierz Serocki to introduce the people of Poland to both contemporary music and encourage new music that was distinctly “Polish.”

The festival would become an important moment in Polish musical history. Numerous composers from both the USSR and other Eastern Bloc Countries came to listen to and share new music. The festival also served as a window to the West and newly emerging avant-garde music, which would have been forbidden under the Stalinist regime. Composers encountered the

works of Boulez, Stockhausen, Cage, and other experimentalists. This exposure ignited a rapid movement among some emerging Polish composers, inspiring an evolution and revolution in musical composition. It was there that a young Penderecki would make his first international appearance. It wouldn't be until April of 1959, at the 2nd National Competition for Young Composers organized by the Union of Polish Composers, that Penderecki would gain notoriety and fame. The composition was judged "blindly," without any knowledge or indication of the composers who submitted works. When the prizes were announced and the envelopes opened, to the astonishment of all, the young 25-year-old composer won all three awards. For each piece to be considered individually and without bias, the composer, who was ambidextrous, wrote two pieces with different hands to disguise the handwriting from the judges. A colleague copied down the third piece to create a third handwriting style. The competition launched his career, expanding his notoriety beyond the Soviet Union and into the Western world.

With his newfound notoriety, in 1960 the Polish Radio commissioned Penderecki to compose a new work for string orchestra. The commission itself had no programmatic requirements, opening the door for Penderecki to explore a composition that would lean into the avant-garde. Initially titled 8'37", much in the same manner as John Cage's famous 4'33", the composition began with a spirit of innovation. Penderecki developed complex and new notational symbols to indicate sounds that traditional notation could not express. It was only after the work was complete that the composer experienced an epiphany about what he had created: "...I was struck by the emotional charge of the work. I thought it would be a waste to condemn it to such anonymity...in the end, I decided to dedicate it to the Hiroshima victims."³⁷ This

³⁷ Mieczysław Tomaszewski, liner notes to *Penderecki: Orchestral Works, Vol. 1*, trans. Jan Rybicki and Richard Whitehouse, Polish National Radio Symphony Orchestra, Antoni Wit, Naxos 8.554491, 1998, compact disc.

sentiment was amplified by scholar and critic Paul Griffiths, who writes that the music makes the listener “uneasy by choosing to refer to an event too terrible for string orchestral screams.”³⁸

Penderecki would retitle the work *Threnody to the Victims of Hiroshima*.³⁹ This retitling would transform the work’s reception and meaning, tying the music and its avant-garde techniques to nuclear devastation. Therefore, the creation of the music before the meaning exemplifies Antheil’s theory that music can act as a precursor to meaning. It can act as a prophetic tool wielded before conscious intent: “[music] makes audible the new world that will gradually become possible, that will impose itself and regulate the order of things; it is not only the image of things but the transcending of the every, the herald of the future.”⁴⁰

A New Musical Language

Western musical notation evolved over centuries to represent pitch, rhythm, dynamics, and articulation with greater precision and dependability. The creation of traditional notational systems assumes fundamental conditions: measurable time, distinct pitches, and the instructions for instruments to play the music in expected and desired ways. With the coming of the atomic age, modern avant-garde notation acknowledged a shattering of the formalized understanding of the human temporal experience. The nuclear age brought instantaneous annihilation and a reimagined set of consequences that set itself outside of the boundaries of what seemed once possible. Penderecki felt that traditional notation was inadequate and responded not by abandoning it but by reimagining it. He used new symbols and notations capable of expressing what staff notation could not:

³⁸ Paul Griffiths, *Modern Music and After*, 3rd ed. (Oxford: Oxford University Press, 2010).

³⁹ A Threnody (from the Greek *threnos*) is a poem, song, or musical piece that laments the dead.

⁴⁰ Jacques Attali, *Noise: The Political Economy of Music*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1985), 11.

Penderecki's notational system is based on the rules of diagram and graphic concepts. It is shown primarily in tempo notation. The bar division is replaced entirely by the time division. Each page of the score is divided according to a diagram into time sectors determining in seconds the start, duration, and the end of a given fragment. ... These ideas are developed and perfected in *Threnody* dedicated to the victims of Hiroshima, written for fifty-two string instruments. This work is one of the most interesting and certainly the most revolutionary in contemporary music as far as the utilization of the whole string quintet apparatus is concerned.⁴¹

Penderecki's score looks radically different from a conventional orchestra score. Black bands, wedge shapes, wavy lines, and geometric clusters replace traditional notes and stems. Time is indicated in seconds, rather than conventional measures, creating a looser sense of controlled time. This freedom is also expressed in the indication of pitch, with instructions such as "highest possible note," or "quarter-tone clusters." This new kind of musical grammar, the set of symbols with meanings, leaves interpretive room for the performers and creates a new system that is not absolute, but co-creative.

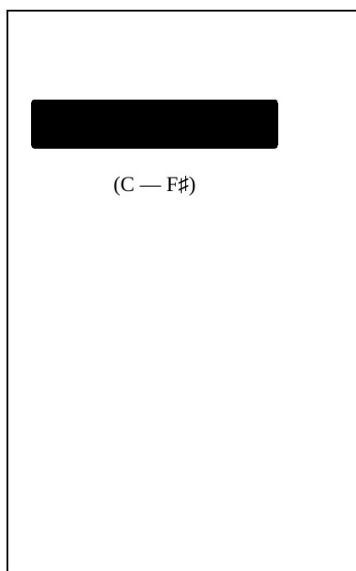
⁴¹ Jan A. Kałużny, "Krzysztof Penderecki and His Contribution to Modern Musical Notation," *The Polish Review* 8, no. 3 (Summer 1963): 87, 93.

Example S: Comparing Penderecki's score (left) and his Graphic Notation to a traditional modernist score in Stravinsky's *Rite of Spring* (Right)

Penderecki's graphic system constitutes a new kind of musical grammar. He introduces a set of symbols that assert a consistent meaning that performers must learn to read and interpret. Within this grammatical structure are notational innovations, which include new ways of playing stringed instruments to produce a new kind of phonation. This grammar gains its power from the intuitive relationship between visual form and the desired acoustic result. Examining Penderecki's symbols reveals how these graphic shapes translate into tonal texture:

Cluster Bands

Solid Black Rectangles — Tone Clusters



DEFINITION

A **solid black band** represents a *tone cluster*—all chromatic (and often microtonal) pitches within a specified range played simultaneously by the string section.

VISUAL ENCODING

The **vertical thickness** of the band corresponds to the pitch range: thicker bands span wider intervals, thinner bands indicate narrower clusters. The specific boundary pitches are notated in parentheses beneath or beside the shape.

DURATION

Horizontal length indicates duration in proportional time, where physical distance on the page corresponds to elapsed seconds rather than metric beats.

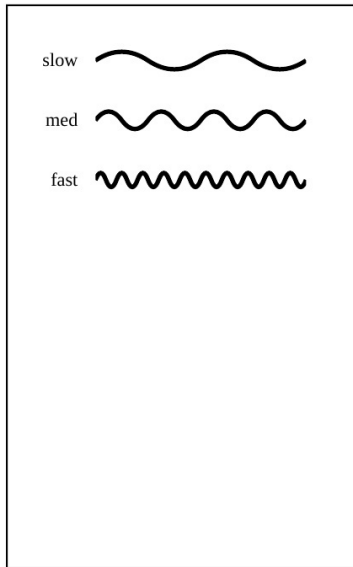
SONIC EFFECT

Creates dense, undifferentiated masses of sound where individual pitches are subsumed into collective texture—the essence of Penderecki's "sound-mass" aesthetic. The ear perceives timbre and density rather than distinct notes.

These solid bands are perhaps the most important element of Penderecki's graphic notation. They replace traditional notes with shapes that collect pitches rather than individual ones. These collective pitches have even more impact when Penderecki introduces movement within the masses, as seen in the oscillating lines that often follow or correspond with *Cluster Bands*.

Vibrato & Oscillation

Wavy Lines — Pitch Fluctuation



DEFINITION

Wavy or undulating lines indicate pitch oscillation—rapid alternation above and below a central pitch, creating an exaggerated *vibrato* or *tremolo* effect.

SPEED ENCODING

The **wavelength** (distance between peaks) controls speed: *wider, gentler waves* indicate slower oscillation (*molto vibrato*), while *tighter, compressed waves* demand faster, more intense oscillation approaching a trill.

QUARTER-TONE VIBRATO

The score specifies "sehr langsames Vibrato mit $\frac{1}{4}$ Ton-Frequenzdifferenz" (very slow vibrato with quarter-tone frequency difference) for the widest waves.

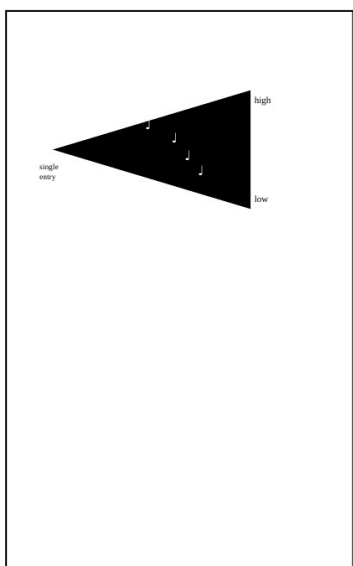
SONIC EFFECT

Creates shimmering, unstable tonal surfaces. When combined across the 52-instrument ensemble, these oscillations produce complex interference patterns and beating effects that blur the distinction between pitch and timbre.

The wavy line transforms static pitch, creating an organic feeling within the power of the cluster chords. By varying the wavelength to indicate speed, Penderecki gives performers intuitive visual cues that translate directly into the production of sound. These oscillations become even more dramatic when applied to clusters of pitches that move in contrasting motion or in a cascading effect.

Cascading Pitch Shapes

Expanding Wedge Forms — Diverging Entries



DEFINITION

Outward-expanding triangular shapes (resembling airplane silhouettes or wedges) represent *cascading pitches*—entries that fan out from a single point into diverging pitch trajectories.

INTERNAL NOTATION

Standard notation within the shape specifies which pitches each player contributes to the cascade. The visual expansion mirrors the sonic effect: voices entering successively and spreading across the registral space.

GLISSANDO CLUSTERS

These create the characteristic *glissando clusters* where the ensemble slides between pitch-fields in coordinated but individually articulated motion.

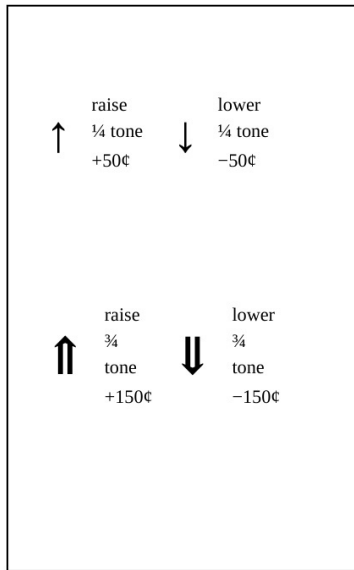
SONIC EFFECT

Produces dramatic spreading gestures—sonic "explosions" radiating outward from a focal point. These passages evoke sirens, screams, and the terrible expansion of destruction central to the work's memorial purpose.

These expanding wedges visually represent the intensity of an outwardly spreading sound from a single point. Its effect is evocative of shock and terror. This shape demonstrates how Penderecki's notation serves not only as musical grammar, but as an expressive visual art in itself.

Microtonal Inflections

Quarter-Tone Arrows — Pitch Modifications



DEFINITION

Penderecki employs **arrow symbols** to indicate *quarter-tone* inflections—pitches lying between the standard chromatic semitones of equal temperament.

SYMBOL SYSTEM

Single arrows (↑ ↓) raise or lower a pitch by approximately 50 cents (one quarter-tone). Double or enhanced arrows indicate three quarter-tones—effectively a semitone-minus-quarter or semitone-plus-quarter alteration.

ACOUSTIC FUNCTION

These microtonal shadings are essential to the cluster textures, creating beating interference patterns and timbral richness impossible with equal-tempered pitches alone.

SONIC EFFECT

Quarter-tones create acoustic "roughness" and dissonance beyond what chromatic clusters can achieve. The resulting beats and interference patterns give the sound-mass its characteristic shimmering, unstable quality.

The use of quarter-tones pushes the harmonic language beyond Western expectations. Microtonal clusters create a pronounced “beat frequency” that adds to the musical tension of the piece. This pulsing frequency creates mechanical throbbing that adds to the tension of the work.

Proportional Time

Time in Seconds — Non-Metric Duration



DEFINITION

Rather than traditional meter (4/4, 3/4, etc.), Penderecki uses **proportional notation** where horizontal space represents clock time measured in seconds.

TIME-BLOCKS

Vertical lines divide the score into *time-blocks*, with durations marked in seconds (e.g., 15", 20"). This liberates the music from regular pulse while maintaining ensemble coordination through visual proportion and conductor cues.

ELASTIC TEMPORALITY

The result is music that breathes with organic, elastic temporality—appropriate for expressing states of chaos, lamentation, and suspended horror.

SONIC EFFECT

Frees the music from dance-derived metric regularity, creating a sense of frozen or distorted time. Events unfold according to their own internal logic rather than an imposed grid, enhancing the work's ritualistic and commemorative character.

By measuring durations in seconds rather than beats and measures, Penderecki frees the music from meter and gives the player more agency as a co-creator, as the sound unfolds organically and imprecisely. This approach allows for flexibility and variation with each performance.

Extended String Techniques

Unconventional Playing Locations & Methods

	Highest note of instrument (no definite pitch)
	Play between bridge and tailpiece
	Arpeggio on 4 strings behind the bridge
	Play on tailpiece (arco) at 90° to strings
	Play on bridge wood at right angle

HIGHEST REGISTER

The **triangular symbol** indicates playing at the instrument's extreme upper limit where pitch becomes indeterminate—a piercing, noise-like sonority.

BEHIND THE BRIDGE

Playing *between the bridge and tailpiece* produces high, glassy, unpitched sounds. The short string length creates ethereal, metallic timbres outside normal pitch relationships.

UNCONVENTIONAL BOW ANGLES

Bowing *on the tailpiece* or *on the bridge wood* at perpendicular angles creates scratchy, percussive textures that blur the line between string and noise instrument.

SONIC EFFECT

These techniques transform the string orchestra into a generator of noise, texture, and timbral extremity. By exploiting non-standard playing locations, Penderecki expands the sonic palette far beyond traditional string sound, evoking screams, sirens, and industrial catastrophe.

Unconventional playing applications change familiar stringed instruments into creators of new textures and sound. Notations instruct to play behind the bridge, in the highest possible register, or on the tailpiece. Penderecki creates a new vocabulary of sound production, partially achieved with the sonic effects expressed by non-conventional techniques.

Percussion & Special Effects

Striking, Bowing Irregularities & Tremolo



Strike soundboard
(Decke klopfen)



Multiple irregular
bow changes



Very rapid non-
rhythmicized
tremolo

SOUNDBOARD PERCUSSION

The **Decke klopfen** (striking the soundboard) technique transforms the string instrument into a percussion instrument. Players strike the top plate with the nut of the bow or with fingertips, producing wooden, hollow knocking sounds.

IRREGULAR BOW CHANGES

The **jagged line symbol** indicates *mehrere unregelmäßige Bogenwechsel*—multiple irregular bow changes. Rather than smooth, sustained tones, players create stuttering, fragmented textures with unpredictable bow reversals.

NON-RHYTHMICIZED TREMOLO

The **×** symbol indicates *sehr schnelles, nicht rhythmisiertes Tremolo*—very fast, non-rhythmicized tremolo. Players bow as rapidly as possible without any regular pulse, creating a frenzied, chaotic texture.

SONIC EFFECT

These effects add percussive, chaotic, and violent dimensions to the sound-mass. The soundboard strikes evoke destruction and impact; the irregular bowings suggest panic and disorder; the frenzied tremolo creates walls of undifferentiated sonic energy.

Striking the soundboard, irregular bow changes, and frenzied tremolo add harmonic dimensions of chaos and mass-sound. These effects create percussive effects with innovative use of the stringed instruments. The effect is, at times, an affronting, assaulting scream of music. These percussive effects raise the emotional stakes of the music and lend themselves to the exploration of the terror brought to the people of Hiroshima.

Abbreviations & Directions

Standard Performance Terminology

ord.	<i>ordinario</i> (normal playing)
s.p.	<i>sul ponticello</i> (on the bridge)
s.t.	<i>sul tastò</i> (on the fingerboard)
c.l.	<i>col legno</i> (with the wood)
l.batt.	<i>legno battuto</i> (wood struck)

BOW POSITION

Sul ponticello (s.p.) places the bow very close to the bridge, producing a glassy, harmonic-rich, metallic tone. ***Sul tastò*** (s.t.) places the bow over the fingerboard, creating a soft, flute-like, fundamental-heavy sound.

COL LEGNO TECHNIQUES

Col legno (c.l.) indicates using the wooden stick of the bow rather than the hair. ***Legno battuto*** (l.batt.) specifically means striking the strings with the wood, producing dry, percussive clicks.

RETURN TO NORMAL

Ordinario (ord.) indicates a return to standard playing position and technique after an extended technique passage.

SONIC EFFECT

These traditional abbreviations allow Penderecki to navigate between conventional and extended techniques. *Sul ponticello* adds eerie, spectral coloring; *col legno* provides percussive articulation; and *ordinario* serves as a reference point of "normal" sound against which all other timbres are measured.

Penderecki also uses standardized terms to anchor the score in familiar musical notation. These connection points pair with the graphic vocabulary. This dual language is a curious window into Penderecki's compositional process. Where innovation is unclear, he returns to the known. The most important thing is the correct execution of compositional intention.

The Tension Between Abstract Composition and Retroactive Programmatic Meaning

With the reinterpretation of *Threnody*'s meaning well after its creation, the work's visual and auditory symbolism invites scrutiny of its authentic intent. It is a difficult thing to believe that Penderecki's revelation that his work, which was initially designed to be a collage of sonic innovation, was pre-destined to contain meaning and description of atomic destruction. Yet, if Antheil is to be believed, musical creation can act as a harbinger for the future. Penderecki's decision to dedicate his composition to the victims of Hiroshima may not have been an afterthought, but rather the conscious recognition of an unconscious truth already embedded in the music. Most scholars dismiss atomic symbolism in *Threnody* because the dedication followed the composition. A few, however, have identified imagery of nuclear devastation through the work, whether embedded unconsciously or by chance.

Penderecki's original title, 8'37", placed the work squarely in the tradition of absolute music, and John Cage's 4'33" is an obvious cousin. The number is the piece. A title built from a stopwatch tells the audience to listen for tonal texture and avant-garde gesture, and not for narrative or feeling. With duration foregrounded as the organizing concept, the work belongs to the realm of intellect and mechanism rather than emotion. This is the company it keeps: electronic music, *musique concrète*, and other mid-century experiments in which time itself became the compositional material:

Musique Concrete is a genre in which composers manipulate recordings of actual sounds rather than notes. Composers who use notes deal with abstract symbols that represent large categories of possible sounds; performances are unique interpretations of the symbols. A composer of *musique concrète* produces a definitive recording that is the piece; at performances, the recording is simply played. Techniques for composing with actual sounds give composers access to an extremely wide array of timbres—anything that could be recorded or brought out of a recording through manipulation.⁴²

⁴² Cristyn Magnus, "Evolutionary *Musique Concrète*," in *Applications of Evolutionary Computing: EvoWorkshops 2006*, ed. Franz Rothlauf et al., Lecture Notes in Computer Science 3907 (Berlin: Springer, 2006), 688.

Penderecki himself openly spoke about the retitling of his work, highlighting the divide between his original composition and the re-interpretation of its meaning. As he “searched for associations” after hearing the work performed, the indication was that its ultimate meaning was sought out rather than embedded in its original context. An argument, therefore, could be made that the symbols of horror and annihilation from the atomic bomb were dormant within the original material and awakened fully by the music’s new meaning. This raises important questions about musical elucidation and original intent: Can a work acquire programmatic meaning retroactively? Does the composer’s subsequent attribution of meaning carry the same weight as the original meaning embedded during the formative design? This philosophical problem engages in long-standing debates in musical interpretation.

Prominent in this debate, Sir Roger Scruton, British philosopher and writer, says of music and intent, “The acousmatic experience of sound is precisely what is exploited by the art of music... We spontaneously detach the sound from the circumstances of its production, and attend to it as it is in itself.”⁴³ For Scruton, what the listener hears is the most important function of the work. He makes a definitive difference between “sound” and “tone and music.” He asserts that “real music” happens when it moves us in imaginary spaces, connecting the musical concepts in thematic interplay. Scruton says that there is a distinction between music in its most traditional forms and between mere sounds. Scruton may not acknowledge *Threnody* as music at all, but rather a collection of random noises incapable of true meaning.

In contrast, prominent American philosopher of music Jerrold Levinson argues, “A musical work’s aesthetic properties depend on the total musico-historical context in which that work is

⁴³ Roger Scruton, *The Aesthetics of Music* (Oxford: Oxford University Press, 1997), 3.

composed.”⁴⁴ For Levinson, the work’s identity did in fact change because of the historic context placed on it later by Penderecki.

Penderecki’s retroactive meaning attributed to *Threnody* is even more compelling when examined through the lens of Carl Jung’s perspectives and philosophies. Jung’s theory of the “collective unconscious” states that beneath the personal unconscious is a deeper layer of psychic memory that is shared by all people. Jung writes, “The collective unconscious does not owe its existence to personal experience and consequently is not a personal acquisition...I call it collective because, unlike personal unconscious, it is not made up of individual and more or less unique contents, but of those which are universal and of regular occurrence.”⁴⁵ This “collective layer” contains what Jung terms as “archetypes,” images, patterns and emotive experiences that shape the human psyche across culture and single life experiences. He further states that these “universal images have existed since the remotest times.”

In the case of *Threnody*, Jung would suggest that the composer serves as a conduit for this collective psychic experience without conscious awareness. In *The Spirit in Man, Art and Literature*, Jung asserts:

Art is a kind of innate drive that seizes a human being and makes him its instrument. The artist is not a person endowed with free will who seeks his own ends, but one who allows art to realize its purpose through him. As a human being, he may have moods and a will and personal aims, but as an artist he is ‘man’ in a higher sense—he is ‘collective man’—one who carries and shapes the unconscious, psychic forms of mankind.⁴⁶

⁴⁴ Jerrold Levinson, “What a Musical Work Is, Again,” in *Music, Art, and Metaphysics: Essays in Philosophical Aesthetics* (Ithaca, NY: Cornell University Press, 1990), 215–63.

⁴⁵ Carl G. Jung, *The Archetypes and the Collective Unconscious*, 2nd ed., trans. R. F. C. Hull, vol. 9, part 1 of *The Collected Works of C. G. Jung* (Princeton: Princeton University Press, 1969), 42.

⁴⁶ Carl G. Jung, *The Spirit in Man, Art, and Literature*, trans. R. F. C. Hull, vol. 15 of *The Collected Works of C. G. Jung* (Princeton: Princeton University Press, 1966), 101.

Jung would argue that Penderecki, by developing his sonic landscape, may have been channeling a shared psychic response to twentieth-century trauma and nuclear anxiety. Further, because of the cultural trauma that Poland suffered during the war, including mass executions, the Holocaust, and the attempted destruction of Polish identity, Penderecki was allowed greater access to the collective unconscious and the fear of the atomic age. Under this concept, Penderecki would have always composed his work with the collective anxieties of annihilation and death, but only came to realize this fact after that knowledge migrated from the subconscious to the conscious mind.

The Listener as Co-Creator of Meaning

In Danuta Mirka's *The Sonoristic Structuralism of Krzysztof Penderecki*,⁴⁷ she suggests that the distinct sound cells of Penderecki are "fuzzy sets" rather than having clear boundaries. In her analysis in *Sonoristic Structuralism* and "Texture in Penderecki's Sonoristic Style," she argues that sonorism⁴⁸ treats sound masses in their totality. Still, Mirka's concept of musical "categories" allows the sound mass to take on musical meaning through the act of listening. These categories are "perceptual, not acoustical," existing between the sound and consciousness. This "borderland space" that Mirka brings forward, the space between sound and consciousness, resonates with Pirsig's concept of "quality," which he defines not as a property of objects or a projection of subjects, but as the event of their encounter. As was previously discussed, "quality" is recognized pre-intellectually.

Similarly, Mirka's "fuzzy sets" operate in much the same way: listeners recognize the difference between high and low pitches, between moving and still sounds, but not the

⁴⁷ Danuta Mirka, *The Sonoristic Structuralism of Krzysztof Penderecki* (Katowice: Akademia Muzyczna, 1997).

⁴⁸ Sonorism refers to avant-guard music, especially the music of Poland, after WWII that focuses on "sound" rather than traditional harmony and melody.

precise boundaries. The recognition precedes and exceeds analytical definition. Both authors challenge the classical idea of the subject/object divide, finding meaning in the space between the perceived and the perceiver. This framework helps explain how *Threnody* could communicate catastrophe and grief before Penderecki consciously named it. The *quality* was present in the perceptual encounter, waiting for recognition from the listener rather than the composer.

Intent and Instinct: The Unconscious Architecture of Annihilation

The historical record is clear: Penderecki's groundbreaking composition existed as absolute music long before he named it for atomic tragedy. However, an underlying question remains. What does a listener hear as symbolism before they ever read a program note or explore the history of the music? If Antheil is right, that music anticipates the mechanism of its age, and if Penderecki, who was raised from the ashes of World War II Poland, carries with him the weight of his people's atrocities, then *Threnody's* nuclear symbolism might have preceded its name, encoded in the creative unconscious before it was ever consciously realized. Setting aside the question of intent, when turning to the music itself: its sounds, silences, and unmistakable construction of suffering and mass annihilation, an examination of musical symbolism based on the asserted meaning must be executed.

In order to fully examine the atomic symbolism of Penderecki's music, it is helpful to examine the timeline of August 6, 1945, from both the sky and the ground. What was happening above the heads of the people in Hiroshima? What was the daily routine like when warning sirens were commonplace? When were the first signs that, on this day, something was different? Was there time for mass panic and hysteria on the streets? What about the people who

were further away and could witness the destruction and survive? To fully explore these timelines and connect them with proposed musical symbolism, **Example T** attempts to put the morning events into historic perspective:

Example T

The Hours Before Hiroshima

A Dual Timeline: August 6, 1945

The Night Before (August 5–6)

From the Sky (Tinian Island — 1 hour ahead of Hiroshima)

Late evening, August 5: Final briefing for the crew of the 509th Composite Group. Only now are they told the true nature of the weapon.

Midnight: The 9,700-pound uranium bomb “Little Boy” is loaded into the Enola Gay’s specially modified bomb bay.

On the Ground (Hiroshima)

Night of August 5–6: Japanese radar detects numerous American aircraft headed toward various Japanese cities. Air raid alerts sound across multiple cities, including Hiroshima. Radio broadcasting stops.

11:00 PM (August 5): Residents are awakened by air raid sirens, a common occurrence by this point in the war.

12:05 AM (August 6): The all-clear is sounded in Hiroshima.

The Final Hours

Time	From the Sky	On the Ground
1:45 AM	2:45 AM Tinian: Enola Gay lifts off from North Field, requiring more than two miles of runway.	Hiroshima sleeps. The city has been strangely spared from the firebombing campaigns that destroyed 64 other Japanese cities.
2:20 AM	3:20 AM Tinian: Captain William Parsons begins arming Little Boy in flight—he had witnessed B-29s crash on takeoff and feared a nuclear detonation.	—
4:00 AM	Enola Gay cruises toward Japan at approximately 200 mph.	Reverend Kiyoshi Tanimoto awakens after a restless night. He has sent his wife and baby to the northern suburbs for safety.

Time	From the Sky	On the Ground
4:55 AM	5:55 AM Tinian: Enola Gay rendezvous with escort aircraft over Iwo Jima at 9,200 feet. They set course for Japan.	Day breaks. August 6 begins as a clear summer morning.
6:30 AM	7:30 AM Tinian: Tibbets announces to the crew: “We are carrying the world’s first atomic bomb.”	Hiroshima wakes. People head to work. Businesses open. The city holds approximately 280,000–350,000 people.
7:00 AM	Weather reconnaissance plane Straight Flush approaches Hiroshima to assess conditions.	Air raid sirens sound. A few planes appear over the city. This happens almost every morning—citizens largely ignore the siren.
7:09 AM	Straight Flush transmits: “Cloud cover less than 3/10th at all altitudes. Advice: bomb primary.”	All-clear sounded. The reconnaissance plane departs. Citizens resume their routines. The morning is still; the day is cool and pleasant.
7:15 AM	8:15 AM Tinian: Lieutenant Morris Jeppson removes the final safety devices from Little Boy. The bomb is now fully armed.	—
7:25 AM	Enola Gay reaches attack altitude: 31,060 feet.	—
8:00 AM	Enola Gay approaches Hiroshima. Clear visibility. No anti-aircraft fire. No fighter opposition.	All-clear sounded again. Many citizens are now outdoors—walking to work, children playing, demolition crews assembling.
8:09 AM	Tibbets begins the bomb run, handing control to bombardier Major Thomas Ferebee.	Tanimoto arrives at his destination. “There was no sound of planes. The morning was still.”
8:14 AM	Aioi Bridge comes into clear view. A 60-second automatic timer begins.	Six miles below, the people of Hiroshima continue their morning routines, unaware.

The Final Seconds

Time	From the Sky	On the Ground
8:15:15 AM	“ Bomb away. ” Little Boy falls from 31,060 feet. Enola Gay executes a sharp 155-degree diving turn to escape the blast.	—
8:15:15–8:15:58	The bomb falls for 43 seconds, traveling nearly six miles.	<i>For 43 seconds, the bomb is in the air: No one on the ground knows. The city continues in perfect ordinariness—the last ordinary seconds Hiroshima will ever know.</i>
8:15:58 AM	—	Survivor Fujio Torikoshi: “I saw a black dot in the sky.”

Detonation: 8:16:02 AM

From the Sky

Little Boy detonates 1,968 feet above the Shima Surgical Clinic, 550 feet from the Aioi Bridge aiming point.

Tail gunner Bob Caron, the only crew member facing the city, sees a shimmer in the atmosphere racing toward the plane. The Enola Gay is 11.5 miles away when the shockwaves hit—the fuselage speaks “with the sound of crinkling aluminum foil.”

Caron watches a mushroom cloud rise. The crew circles three times before heading home. They are 368 miles away before the cloud disappears from view.

On the Ground

Nuclear fission begins in 0.15 microseconds.

Temperature at the hypocenter reaches **several million degrees Fahrenheit**—hotter than the surface of the sun.

Ground-level temperatures reach **7,000°F** in less than one second.

The fireball reaches 900 feet in diameter within **one second**.

The blast wave travels at **984 mph** in all directions.

80,000 people die instantly. Human tissue vaporizes within half a mile of ground zero.

Survivors report a *pika* (blinding flash) followed by a *don* (thunderous boom).

Buildings melt. Bronze statues liquefy. Roof tiles fuse together. Shadows of the vaporized are burned into stone.

The Aftermath

Time	Event
8:30 AM	Kure Navy Depot sends message to Tokyo: a bomb has been dropped on Hiroshima.
9:55 AM	US intercepts Japanese message: “a violent, large special-type bomb, giving the appearance of magnesium.”
10:00 AM	Message from Hiroshima to Army Ministry: “This must be it.”
1:58 PM	Enola Gay lands at Tinian. Mission duration: 12 hours, 13 minutes. Tibbets is awarded the Distinguished Service Cross on the tarmac.
2:00 PM (Tokyo)	Domei News Agency reports an attack on Hiroshima. Few details given.

Sources

National WWII Museum, “The Most Fearsome Sight: The Atomic Bombing of Hiroshima”⁴⁹

Atomic Heritage Foundation, “Hiroshima and Nagasaki Bombing Timeline”⁵⁰

U.S. National Park Service, “The Atomic Bombings of Hiroshima and Nagasaki”⁵¹

Britannica, “Atomic bombings of Hiroshima and Nagasaki”⁵²

City of Hiroshima, “The Realities of the Atomic Bombing”⁵³

Atomic Archive, “Eyewitness Account of Hiroshima” (Father John Siemes)⁵⁴

Night of August 5–6: Radar Detection and Air Raid Alerts: The opening section of music could be viewed first as a primordial “scream” as the strings send shockwaves of coming doom into the atmosphere. The collective effect is both terrifying and evocative of the warning of air-raid sirens that had become so commonplace in the city. The strings, in a cascading effect, are instructed to play the highest pitch they can in fortissimo, then quickly “oscillate” the sound, creating unsettling waves of piercingly high sonorities. The pitch variance created by each cascading section introduces harmonic pulses, further building the music’s terror.

⁴⁹ Tyler Bamford, “The Most Fearsome Sight: The Atomic Bombing of Hiroshima,” The National WWII Museum, August 5, 2020, <https://www.nationalww2museum.org/war/articles/atomic-bomb-hiroshima>.

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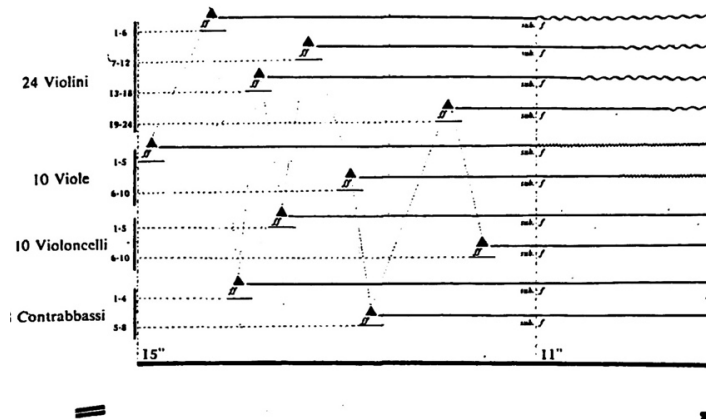
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⁵³ City of Hiroshima, “The Realities of the Atomic Bombing,” accessed December 27, 2025, <https://www.city.hiroshima.lg.jp/english/peace/1029920/1009857.html>.

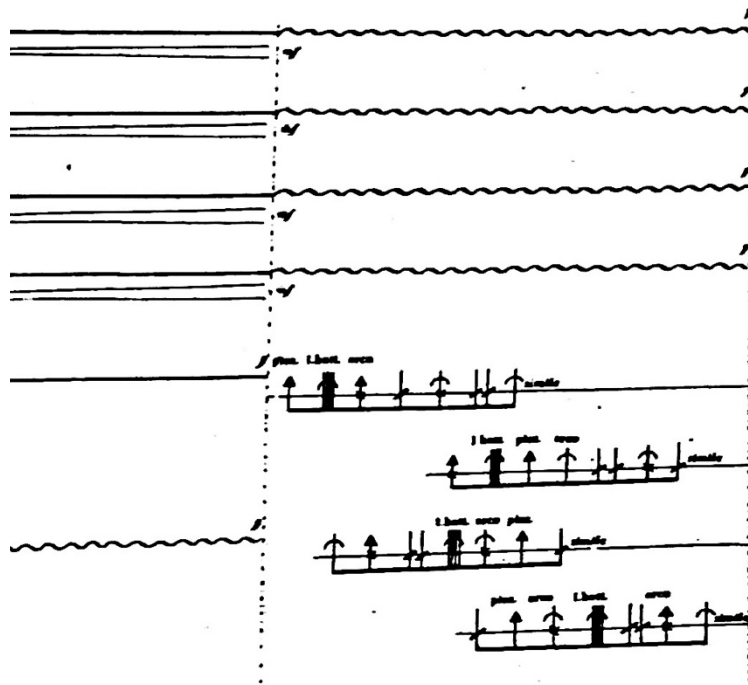
⁵⁴ John A. Siemes, “Eyewitness Account of Hiroshima,” Atomic Archive, accessed December 27, 2025, <https://www.atomicarchive.com/resources/documents/hiroshima-nagasaki/hiroshima-siemes.html>.

Krzysztof Penderecki
Threnos
Den Opfern von Hiroshima



Example U: Violins Provide the Precursor to Terror

Residents are Awakened: The next section of music employs percussive techniques achieved by striking the tailpiece to the strings, striking the wood on the bridge, playing arco at a 90-degree angle on multiple strings, among other previously detailed techniques. The conglomeration of these overlapping percussive sounds evokes images of a people jarred awake and the subsequent cacophony as they arise and scurry around in the darkness to assess danger.



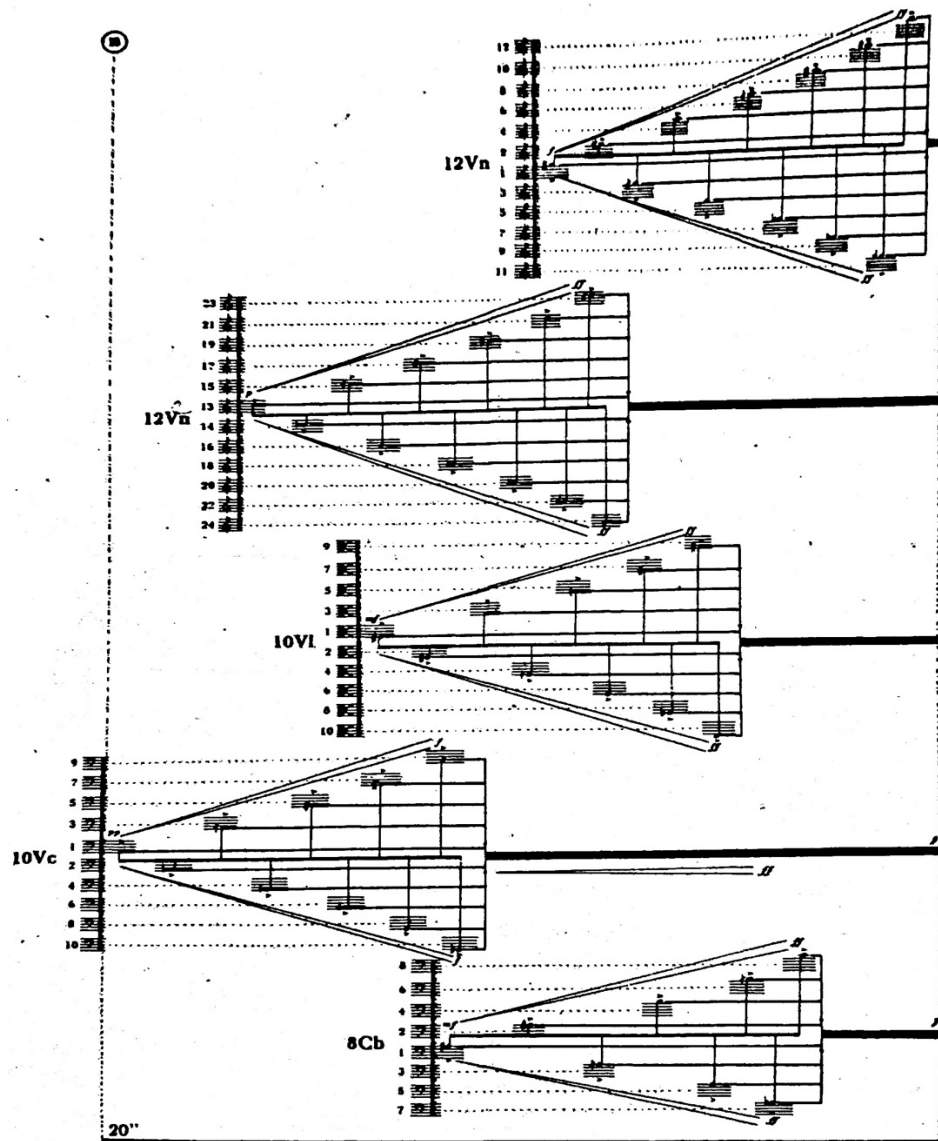
Example V: The People of Hiroshima Wake and the Percussive Cacophony that Follows

Japanese Radar Detects Numerous American Aircraft Headed Toward Japanese Cities: The following section employs clusters of sounds that build tension in blocks. These tensions swell and recede. This movement resembled the constant threat of enemy aircraft. To the people of Hiroshima, the anxiety of a pending attack must have been ever pressing. Numerous cities in Japan had been bombed, but Hiroshima was experiencing a strange kind of reprieve from attack, ironically spared from the devastation brought to its sister cities.

SB902

Example W: Cluster blocks build tensions

Planes Overhead: Here, the music forms the literal outline of the aircraft. An argument may be made that each triangular shape represents a plane on its way to a nearby city to employ bombing.



Example X: Music Outlines Attack Planes

All-Clear Sounded Again, and People Return to Regular Life: Just as the percussive sounds represented the cacophony of citizens jolted awake by air raid sirens, now the extended and off-set percussive cells signify the hustle and bustle of daily life. We are told that people returned to

work, families gathered outside, and regular daily life resumed in Hiroshima after the “all clear” was given.

The image displays a musical score for three systems of instruments, labeled I, II, and III. Each system includes parts for 3CP, 3AC, 3AI, and 4AU. The score is written on multiple staves with various musical notations, including notes, rests, and dynamic markings. The title "10." is at the top left, and "scurlus" is written vertically on the right side of each system. The page number "113" is at the bottom right.

Example Y: The Percussion of Life after “All-Clear”

The Bomb Has Fallen: Finally, the destructive power of the bomb, represented by a mass assault of multiple cluster events, confronts the listener and screams in the terror of mass destruction.

The musical score is arranged in two systems. The first system contains staves for 12Vn (1-12), 12Va, 10Vl (1-10), 10Vc (1-10), and 8Cb (1-8). The second system contains staves for tutti archi, 4Vn (1-4), 0Vl (1-10), 0Vc (1-10), and 1Cb (1-8). Measures 67, 68, and 69 are marked at the top. A large blacked-out section covers the tutti archi staff in measure 70. The score includes various musical notations such as notes, rests, and dynamic markings.

Example Z: Atomic Detonation

Final Thoughts

Penderecki's ground-breaking graphic notation places performer and score in an interpretive relationship that traditional notation cannot accommodate. Invitations of choice, such as "the highest pitch you can play," or cluster selections, or even time-measured durations, all demand personal choices that no symbol can fully prescribe. Within this interpretive gap, the frameworks of Mirka, Pirsig, and Jung converge with their belief that meaning arises not through execution of composition, but through encounter with the listener. Not as fixed content, but content that emerges as a pre-cognitive event. What's more, Penderecki's notation does not simply initiate co-creation, but it demands it from performer and listener alike. The listener, as Mirka argues, perceives sonic categories that are "perceptual, not acoustical." These musical boundaries form in consciousness rather than in the sound itself. This perceptual encounter aligns with Pirsig's quality: recognition that occurs before intellectual categorization takes hold. Within this superstructure, the image of Hiroshima, images that scholars debate may not have been consciously intended, are asserted or inserted by retroactive meaning. As Jung argued, the composer functions as a conduit, the "collective man" who carries and expresses art and meaning from the collective unconscious. Therefore, *Threnody* carries cultural memory and anxiety, and forecasts the horrors of atomic annihilation, whether the intent was subconsciously a part of its creation, or its meaning was inserted by the listener who is looking for the sound of the Atomic age within the context and brilliance of Penderecki's re-imagined meaning.

Chapter 6

Now I Am Become Death, the Destroyer of Worlds *Doctor Atomic*

Penderecki rendered the bomb as pure, wordless sound; John Adams gives *Doctor Atomic* a stage. His work stands as the dramatic interpretation of music reckoning with technological power, pulling us out of linear time and into an event horizon that will change the course of human history. This chapter reads Sellars's documentary-poetic libretto as a collage of three irreconcilable temporalities, all placed at the foot of the bomb. From the technological time of the countdown to the eternal time of Donne's sonnets, and the indigenous time of the Pasqualita lullabies, Adam's music explores the bomb as American myth, a national achievement, and a destructive horror.

An American Faust

Composer John Adams described the atomic bomb as “the ultimate American myth...[that] captures attention on both conscious and unconscious levels.”⁵⁵ His opera, *Doctor Atomic*, can be viewed as the culmination of music's engagement with technological anxiety. This exploration stretches from Barber's retrospective nostalgia in 1947 to Penderecki's abstract atomic horror in 1960. Yet, *Doctor Atomic* is not simply a confrontation with the bomb; it is also a troubling celebration of an American military achievement. Adams's opera premiered sixty

⁵⁵ John Adams, “John Adams's Lecture” (lecture, Atomic Heritage Foundation Symposium, 2006), <https://ahf.nuclearmuseum.org/voices/oral-histories/john-adamss-lecture/>.

years after the **Trinity test**⁵⁶, allowing for contemporary reflection on this awesome historical event. Adams says:

I think if opera is actually going to be a part of our lives and if operas are going to express with it the meaning to be alive right now as an American...it has to deal with contemporary topics. I think that the atomic bomb, in particular, is an intensely important theme because the moment the bomb went off, we switched. The human species changed from being a part of all the other species who are sort of clinging on this planet, to the medium or the instrument through which the Earth potentially could be destroyed.⁵⁷

The Genesis of *Doctor Atomic*

The origin of *Doctor Atomic* began in 1999, when Pamela Rosenberg, San Francisco Opera's then General Director, commissioned what she called "An American Faust" from composer John Adams. Adams had established himself as an important emerging American opera composer. His first opera, *Nixon in China* (1987), premiered with inconsistent reviews but slowly gained greater appreciation with the critics and public alike. His second opera, however, created a major controversy. *The Death of Klinghoffer* (1991) was based on the hijacking of the passenger liner Achille Lauro. The story surrounded the Palestinian Liberation Front, and their murder of a wheelchair bound Jewish-American man, Leon Klinghoffer. Almost immediately, critics denounced the opera, suggesting that it was sympathetic to the Palestine Liberation Front and antisemitic. More troubling, the daughter of Leon Klinghoffer attended the production and released a statement denouncing the opera as an "exploitation" of her family, and saying that the centerpiece of the production appears antisemitic.

⁵⁶ The Trinity Test was the first detonation of a nuclear device. The test took place on July 16, 1945 as part of the U.S Army's Manhattan Project. The bomb was detonated in *Jornada del Muerto* desert, near Alamogordo, New Mexico. The explosion released a force of 21 kilotons, far more than predicted.

⁵⁷ John Adams, interview by Robert Siegel, *All Things Considered*, NPR, October 7, 2005.

We are outraged at the exploitation of our parents and the cold-blooded murder of our father as the centerpiece of a production that appears to us to be anti-Semitic. ... While we understand artistic license, when it so clearly favors one point of view, it is biased. Moreover, the juxtaposition of the plight of the Palestinian people with the cold-blooded murder of an innocent disabled American Jew is both historically naïve and appalling.⁵⁸

The professional backlash for Adams and librettist Alice Goodman was drastic. Planned staging of the opera was cancelled, and the original production by San Francisco Opera in 1992 was met with protests from the Jewish Information League. In the seven years between *Klinghoffer* and the new commission of *Doctor Atomic*, Adams's instrumental works would see limited success, while *Klinghoffer* would remain largely unperformed. Adams seemed unlikely to return to opera anytime soon, yet the commission that would revive his operatic career came from an unexpected source. The commission would arise from the very company that had staged *Klinghoffer* amid protests just years earlier.

Pamela Rosenberg would be named the new General Director of San Francisco Opera in 1999, following Lotfi Mansouri's tenure, although she would not officially take the reins of the company until 2001. During this transitional time, she approached Adams to commission a new opera. Rosenberg came to San Francisco with a strong mission, believing that opera should be more than opulent entertainment, but relevant to contemporary life. Moreover, despite the controversy surrounding Adams, Rosenberg would describe Adams as the "greatest living composer alive."

Rosenberg intended for this new opera to be the cornerstone of her tenure at San Francisco Opera. Her idea was for the new opera to be an "American Faust" focusing on Oppenheimer and the Los Alamos story. The idea wasn't at first attractive to Adams, who thought that Faust seemed more of a German or European myth. Warming to the concept over

⁵⁸ Robert Fink, "Klinghoffer in Brooklyn Heights," *Cambridge Opera Journal* 17, no. 2 (July 2005): 183, <https://doi.org/10.1017/S0954586705001989>.

time, Adams would come to see the theatrical possibilities of the Manhattan Project and the development of the first atomic device. He would come to regard the development of the nuclear bomb as the “ultimate American myth” and found powerful source material there for his new work.

Adams would assemble the same production team that collaborated with him on both *Nixon in China* and *Klinghoffer*: director Peter Sellars and librettist Alice Goodman. Goodman would stir up more controversy around Adams when she suddenly departed the project. She had concluded that the dramatic framework of the opera, under the leadership of Adams and Sellars, was built upon an antisemitic framework. She believed that it cast Oppenheimer and Teller as opposing archetypes and that the work asserted stereotypes of Jewish identity. Adams, Sellars, and Goodman were still under the cloud of antisemitism for their work on *Klinghoffer*, and Goodman’s public departure from *Doctor Atomic* because of underlying antisemitism threatened the commissioned work, potentially ending it before its premiere. Adams would make a public retort to Goodman’s accusations, saying:

...[I] thought Alice would do something wonderful, because she does marvelous things in *Nixon* with the American language of the time. But after a year of trying to write...she decided she couldn’t do it...Her preposterous reason for not being able to deliver a libretto strikes me as speaking more about her own private preoccupations than about the reality of the Oppenheimer story.⁵⁹

With Goodman’s departure, Sellars took control of the libretto, infusing it with existing material and assembling the text entirely from outside sources. He wove together declassified government documents, letters, and memoirs from the Manhattan Project scientists. He also included the poetry of John Donne, Charles Baudelaire, and Muriel Rukeyser. Finally, Sellars wove in passages from the Bhagavad Gita, the same scripture that furnished Oppenheimer with the only

⁵⁹ “John Adams’ Former Collaborator Says *Doctor Atomic* Is Anti-Semitic,” *Playbill*, September 30, 2005, <https://playbill.com/article/john-adams-former-collaborator-says-doctor-atomic-is-anti-semitic>.

words adequate to describe that moment when humanity split the atom: “Now I am become Death, the destroyer of worlds.”⁶⁰

Doctor Atomic premiered at San Francisco Opera on October 1, 2005. Donald Runnicles conducted the work, with subsequent premieres at the Netherlands Opera, the Lyric Opera of Chicago, and the Metropolitan Opera. In 2018, the opera premiered in Santa Fe with a groundbreaking partnership with the Tewa Pueblo communities. The Santa Fe production featured a Corn Dance offered through joint collaboration by members of San Ildefonso, Santa Clara, and Tesuque Pueblos. These communities, sometimes referred to as “downwinders,” are people who suffered from radiation exposure because of their proximity to the test sites. This production included the creation of a new intertribal dance, demonstrating the troubling connection between technology and its impact on marginalized communities:

The 2018 production of *Doctor Atomic* departed from its 2005 San Francisco Opera iteration as period opera, and became a more contemporary rendering of nuclear power and its threat to humanity... dancers and downwinders held vigil and stared out into the audience as irrevocable decisions were made about their fate.⁶¹

The Libretto: Documentary and Poetic Voices

Peter Sellars’s approach to the narrative of *Doctor Atomic* was unexpected and revolutionary. The fact that the opera contained no newly written dialogue but rather relied on historical narratives, documents, and poetry gave the work the feel of a documentary intertwined with the prose of both scientific jargon and poetry. Beyond the poetry of Donne, Baudelaire, and Rukeyser, Sellars included traditional Tewa Native American songs, sung by the character of Pasqualita. This juxtaposition of voices, the clinical language of declassified government memos

⁶⁰ Bhagavad Gita 11:32, trans. Swami Prabhavananda and Christopher Isherwood (Hollywood: Marcel Rodd Company, 1944).

⁶¹ Theater Journal review of *Doctor Atomic* by John Adams and Peter Sellars, Santa Fe Opera, *Theater Journal* 71, no. 4 (December 2019): E-1 to E-3, Project MUSE.

against the spiritual weight of the Hindu scripture, the authority of military correspondence against indigenous song, embodies what Attali described as “noise”: the dissonant, competing discourses that challenge and disrupt dominant narratives.

For Attali, noise represents the chaos at the margins of social life, the voices that threaten order. Sellars allows each distinct and opposing voice to move against the others. The Tewa lullaby, sung amid the countdown to nuclear apocalypse, functions as precisely this kind of tension. We hear the voice of the indigenous presence set against the destructive machinery of science, war, and military might. Therefore, the libretto itself becomes a site of conflict where no single sound or voice holds authority, leaving the audience to navigate the sonic chaos of history and the competing forces of human life and atomic death.

The structural opposition between the stark, utilitarian language of the scientific and military documents and the lyricism of the poetic and spiritual texts creates a fundamental dichotomy within the libretto. The scientific and military documents rely on order, execution, and adherence to a defined timeline. In contrast, the poetry may be viewed outside physical time and instead resides in the soul’s confrontation with eternity and the existential. The scientific documents form the countdown to destruction, while the poetic and religious texts are the voices of the eternal. In this dramatic tension, Sellars has Kitty Oppenheimer’s character speak through Muriel Rukeyser’s poetry. Since there is little documentation of what Kitty actually said or thought during this period, Sellars gave her the words of a contemporary female poet. The voice given to Kitty was passionate, politically conscious, and capable of articulating the moral weight of the moment. Kitty says in the opening of Act II, “Wary of time, O it seizes the soul tonight. I wait for the great morning of the west, confessing with every breath mortality.”⁶²

⁶² From Rukeyser’s poem “Easter Eve 1945.”

If Rukeyser's poetry allows Kitty to speak from the quiet of history, then John Donne's *Holy Sonnet XIV*, "Batter my heart, three-person'd God," places Oppenheimer at the center of a crisis of conscience, singing alone beneath the bomb at the climax of Act I. The justification of this aria comes from a letter Oppenheimer wrote to General Groves. In the letter, Oppenheimer explained why he chose to name the test site *Trinity*: "Why I chose the name is not clear, but I know the thoughts were in my mind."⁶³ To accompany the poetic text, Adams set the sonnet in the lamenting key of D minor, evocative of a "Renaissance chant, with the orchestra mimicking the sounds of viols and lutes."⁶⁴ Adams would say of the musical setting, "the music just sort of fluttered down and landed on my desk one day," suggesting that naming the test site after a John Donne sonnet was itself an archaic gesture that justified the aria's musical language.⁶⁵

Donne's sonnet uses two intertwined dialogues, one of warfare and one of love and marriage. Through this discourse, Oppenheimer begs God to overthrow him by force, declaring, "...take me to you, imprison me, for I/Except you enthrall me, never shall be free/Nor ever chaste, except you ravish me." The sonnet itself presents a chilling foreshadowing of the violence and ecstasy that is to come with Oppenheimer's atomic successes. Donne's sonnet demands divine violence, with Oppenheimer asking to be "battered," creating a strange kind of inversion of the violence to come. As Oppenheimer prepares to destroy, he is asking to be battered and ravished by God, the destroyer seeking destruction. While Barber observed destruction from the "front porch" and in transitional spaces, while Penderecki placed us in the position of the victims of the annihilation, Oppenheimer stands alone as both the bringer of death

⁶³ Oppenheimer's 1962 letter to Groves, quoted in Richard Rhodes, *The Making of the Atomic Bomb* (New York: Simon & Schuster, 1986), 571-72; Kevin Kvas, "Batter His Art, Three-Personed Author-Gods," *Cinephile: The University of British Columbia's Film Journal* 11, no. 3 (2016): 26.

⁶⁴ Alex Ross, "Doctor Atomic," *The New Yorker*, October 2005, 60-71.

⁶⁵ *Ibid*, 60-71.

and servant to God. This aria brings us into the psyche of the builder of destruction and creator of extermination.

The Time of the Machine and the Countdown to Launch

Oppenheimer's aria conveys something more important beneath the spiritual yearning and contradictions of the soul; it also marks the countdown to detonation and the mounting tension leading up to the moment in history when the concept of war and destruction changed forever. Act 1 of *Doctor Atomic* operates under "technological time," the measurement of scientific progress, mathematics, the exploration of the craft of war, and the rush of linear progress. Military documents and scientific memos provided by Sellars in his libretto reinforce this rush toward scientific breakthrough. Deadlines, weather reports, and checklists propel the arch of the opera forward, like the sweeping hands of a clock. However, once the countdown of detonation begins, a new kind of poetic and spiritual text emerges, bringing the listener out of linear time and into the realms of cosmic and spiritual transformation. We are thrust into the eternal, with every second of the countdown, with Rukeyser's meditations and the sacred text of the Bhagavad Gita, each speaking outside of temporal boundaries.

The dramatic tension between these two temporal timelines, the linear and the eternal, converges at a crisis point in the countdown to detonation. It is a moment that pierces both realms of time at once, drawing the audience into the charged overlap between the now and the forever. At the convergence point of these two temporal models, Oppenheimer's aria from Act I now resembles a plea to escape mechanical time and to be "ravished" out of the boundaries of what had been scientifically possible, and to be thrust into the eternal where the structure of the very atoms of the universe yields at the command of a single man. While Adams's music explored access to the eternal spears of time, it distinguishes it from Penderecki's *Threnody*, which marked durations of sound by the linear second, embracing mechanical temporality.

While both Barber and Penderecki explored the human devastation and destruction of the nuclear bomb, Adams brings the listener into the cosmic gravitas of manipulating the fundamental building blocks of matter. Beyond the destruction of life, what is asked of the listener to consider is the consequences of science when it proclaims to play the role of God.

Pasqualita and the Third Voice

The introduction of the two Tewa lullabies through the character of Pasqualita engages a third and important voice of cosmic consequence. Her songs stand alone, belonging neither to the mechanical time nor to the eternal as accessed through Western concepts, or the mystics of the Bhagavad Gita. Through the insertion of the Tewa lullabies,⁶⁶ the audience is reminded that atomic destruction is perpetrated on the sacred land of the Tewa and Pueblo peoples of the Rio Grande Valley in northern New Mexico. For the Tewa people, the world is bounded by four sacred mountains and four sacred hills, forming a spiritual map. The landscape is important, as it shows the boundaries between the human and spiritual world, and the borderline of these boundaries are corridors between these two realms of existence. ⁶⁷*Towa e* are individuals who provide spiritual leadership and act as intermediaries between the community and the spirit world. The Tewa people believe that the sacred and spiritual realms are not distant, but nearby and require tending and care.

The lullabies form a stark musical counterpoint to the countdown's unyielding progress. A contrast is also established between Oppenheimer's aria, where he wrestles with God for both

⁶⁶ Herbert Joseph Spinden, trans., *Songs of the Tewa* (New York: Exposition of Indian Tribal Arts, 1933).

⁶⁷ Alfonso Ortiz, *The Tewa World: Space, Time, Being, and Becoming in a Pueblo Society* (Chicago: University of Chicago Press, 1969).

conquest, eternity, and favor, and the nature of Pasqualita's song, which offers comfort without strife or struggle:

(The Cloud-flower Lullaby)⁶⁸
*In the north the cloud-flower blossoms,
And now the lightning flashes,
And now the thunder clashes,
And now the rain comes down!
A-a-aha, a-a-aha, my little one.*

The inclusion of these songs by Sellars reminds the listener of the plight of the “Downwinder” people, and the secondary assault on their culture, health, and beliefs.⁶⁹ Scientific breakthrough and nuclear destruction are two consequences of the Manhattan Project, but the long-term consequences to the Tewa people and the Pueblo communities continue into the present day. The 2018 Santa Fe production made this encounter literal by including members of the “Downwinder” communities in their staging of the opera.⁷⁰ The descendants of those assaulted and harmed by radiation and exposure became physical reminders of the silent witnesses to the bomb. Pasqualita is more than a caricature but stands as a symbolic representation of the people who would be violated by the Manhattan Project without consideration or care, or even notice.

From Barber's porch to Penderecki's screams and Adams' suspended countdown, music's evolving confrontation with atomic power has been explored from three different perspectives and vantage points. Doctor Atomic places the creator of the destructive mechanism at the center, a position that neither Barber's innocent observers nor Penderecki's victims have occupied. The

⁶⁸ John Adams, *Doctor Atomic*, libretto by Peter Sellars, conducted by Lawrence Renes, Netherlands Philharmonic Orchestra, Nonesuch 79975-2, 2007, 2 compact discs, act 2.

⁶⁹ Myrriah Gómez, *Nuclear Nuevo México: Colonialism and the Effects of the Nuclear Industrial Complex on Nuevomexicanos* (Tucson: University of Arizona Press, 2023).

⁷⁰ Santa Fe Opera, “A Letter to Doctor Atomic Ticket Buyers,” 2018, <https://www.santafeopera.org/company/press-news-media/letter-to-doctor-atomic-ticket-buyers>.

positioning is important, as it reminds us that the machine is ultimately a product of humankind. Its benefits and destructive forces do not exist without the humanity that put it into motion. Humans, like Oppenheimer, bridge the “middle landscape” of Marx, and from that space, move mechanisms toward or against nature and life itself. Oppenheimer embodies this junction, placing his body at the foot of technology and at the intersection of mechanical help or destruction. The opera does not resolve this collision, but dramatizes it as ongoing and ever-present.

Doctor Atomic offers no answer to the questions of humans and machines in the atomic/mechanized age. Instead, Adams presents a condition in which humans and the bomb share the same space on stage, not in opposition or in integration, but ever-present and intrinsically existing without resolution. The mechanism has entered the human condition, and what remains is unresolved struggle and suspension of final consequence. *Doctor Atomic* ends with the countdown to launch, and this lack of final resolution telegraphs the continuation of nuclear consequences. The opera suggests that while the initial countdown and cosmic timing of the Manhattan Project have slowed, the clock continues to tick, and the final resolution for humankind is yet to be initiated.

Chapter 7

Do Androids Dream of Electronic Scores? Musical Creation in the Age of Artificial Intelligence

“The feelings that we get from listening to music are something we produce; it’s not there in the notes. It comes from emotional insight in each of us; the music is just the trigger.”

—David Cope
Creator of Experiments in Musical Intelligence

Every examination so far has tracked a single direction: human composers inserting the machine into music. We have heard Mozart’s gunshots and Adams’s documentary collage, but here the arrow reverses. Now the question is what happens when the machine is invited to insert humanity into itself through generative artificial intelligence. Turning this research’s frameworks upon that inversion weighs Benjamin’s vanishing aura, Heidegger’s reduction of art to standing-reserve, and Descartes’s cogito as a test the machine is asked to take. This research closes with a two-voice arc: the human voice of Barber’s child and, two centuries later, a non-human voice and its answer to humanity’s question of whether it exists in Descartes’s definition of “I think, therefore I am.”

The Rise of the Thinking Machine

If the atomic bomb forced humanity to confront its capacity for self-annihilation, artificial intelligence demands that we confront something equally unsettling: the possibility of our own irrelevance. The musical journey traced here, from Leopold Mozart to Adams, across two centuries of mechanical disruption, reveals that music has provided an important ground on which we test what it means to be human in the age of the machine. Just as composers from Barber to Adams have negotiated technology through musical dialogue, contemporary and future composers must now confront artificial intelligence. This new technology does not merely

accompany or threaten human creativity. Instead, it thinks, creates, and raises unsettling questions about autonomy, identity, and conscious self.

Throughout history, technological advances have transformed how music is produced, distributed, and experienced. The printing press, phonograph, and player piano each reshaped the musical landscape as innovations in the service of human creativity. A.I. represents a different kind of technological shift, one with greater gravitas than all previous mechanical innovations. For the first time, technology claims to participate in the creative act itself. This development, however, has deeper roots than it might appear. In 1956, mathematicians Martin Klein and Douglas Bolitho programmed the Datatron computer to compose “Tin Pan Alley-style songs,” producing four thousand songs in one hour.⁷¹

⁷¹ The Datatron 205 was a mid-1950s vacuum-tube computer developed by ElectroData Corporation (later acquired by Burroughs in 1956). The room-sized machine contained approximately 1,600 vacuum tubes, used magnetic drum memory for storage, and cost several hundred thousand dollars. It was among the first commercially available general-purpose computers marketed to universities and businesses.

"PUSH BUTTON BERTHA"

LYRIC BY
JACK OWENS
A.S.C.A.P.

2 2 2 2 2 2 2 2 2
0 0 0 8 0 7 1 9 2 7
RANDOM NUMBERS
USED FOR MUSIC.

MUSIC BY
DATATRON
MATHEMATICIANS
DR. MARTIN KLEIN
DR. DOUGLAS BOLITHO

MODERATE BRIGHT BOUNCEL

1956 BY OWENS-KEMP MUSIC CO. - (ASCAP) 526 AMALFI DR. PALISADES CALIF. REPRODUCED BY CAMEO MUSIC REPRODUCTION 1527, 1528, 1529 HOLLYWOOD CALIF. 916 6553

Example AA: "Push Button Bertha," composed in 1956 by the Datatron computer in the style of "Tin Pan Alley."

When Klein and Bolitho submitted "Push Button Bertha" to the U.S. Copyright Office, their copyright was refused. Adam Eric Berkowitz, in "Artificial Intelligence and Musicking: A Philosophical Inquiry," says of this rejection, "for nearly a century, research and development teams have pursued automatic computer generation of music... Their reasoning for rejecting the

song was based on the belief that authors of creative works need to be human.”⁷² The greater question arising from the rejection of “Push Button Bertha” is not whether the construction of notes had value, but whether this creation was music at all. Does music need to be created by humans, asserting in some way the artistic communication of the human condition? If so, then what the Datatron produced would not be music at all, but a diagram of pitches with all the artistic charm of a washing machine manual.

But this question refuses to stay abstract. If A.I. cannot create music, only mimic its architecture, then what happens when the mimicry becomes indistinguishable from the real thing? The philosophical frameworks explored through these chapters suddenly become urgent. Leo Marx’s pastoral is no longer threatened by the steam engine but by the algorithm. Attali’s prophetic noise must now account for music composed by machines that have never suffered, never loved, never died. And Pirsig’s “quality,” that dissolution of self between performer and instrument, faces its strangest test yet: Can a human enter creative relationships with something that does not know it is creating?

In “The Work of Art in the Age of Mechanical Reproduction” ⁷³(1936), Walter Benjamin examined how new technologies alter art’s authenticity, offering a framework that proves strikingly relevant to A.I.-generated music. In his influential essay, Benjamin introduces his concept of “aura,” which he describes as the unique presence of a work of art in time and space, its authenticity rooted in tradition and ritual. These anchors are derived from human experiences tied to a particular moment in life and from the experience of that moment. Benjamin argues that the mechanical reproduction of art “withers,” or decays the “aura” by detaching the artwork from

⁷² Adam Eric Berkowitz, “Artificial Intelligence and Musicking: A Philosophical Inquiry,” *Music Perception* 41, no. 5 (June 2024): 393-412.

⁷³ Walter Benjamin, “The Work of Art in the Age of Mechanical Reproduction,” in *Illuminations*, ed. Hannah Arendt, trans. Harry Zohn (New York: Schocken Books, 1969), 217-251.

its unique existence. He says, “Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be.”⁷⁴ Granted, Benjamin’s definition of “aura” would suggest that any recorded music is merely a shadow of authentic art, stripped of its unique presence in time and space. His criticisms, however, focus on the moment of artistic creation while neglecting the moment of human reception. It may be argued that the experience of art (music) is not complete in expression alone but requires a listener whose own presence in time and space shapes how the music is felt and understood. Whether live or recorded, music enters a human context and grants individual meaning.

A.I. represents a more radical challenge than mere mechanical reproduction. The very definition of reproduction asserts the idea that the art produced is “copied” from existing works. A.I. proclaims to generate new ideas that have never existed before. This claim, however, deserves scrutiny. Critics argue that A.I. does not truly create, but instead identifies patterns across immense archives of human-made work and recombines them into new constructions. As Jacques and Flynn observe, the “transformative potential of generative A.I. is predicated on high-quality materials created by humans,” without which A.I. could not produce content that “mimics human creativity.”⁷⁵ If this is the case, A.I.-generated music may be less a departure from mechanical reproduction, but rather a new and more sophisticated evolution of it.

Expanding further on Benjamin’s argument: If authenticity requires “presence in time and space” and “unique existence,” then A.I. music would have no “original” moment of creation

⁷⁴ Walter Benjamin, “The Work of Art in the Age of Mechanical Reproduction,” in *Illuminations*, ed. Hannah Arendt, trans. Harry Zohn (New York: Schocken Books, 1969), 217-251. It is important to note that Benjamin was writing during the Nazi regime. He was becoming concerned with how technological reproduction could serve political propaganda through the “aestheticization of politics.” Because of these concerns, his writing extended primarily into photography and film, but in the age of A.I., his examination of the authenticity of art with mechanical intervention takes on salient contemporary topics of investigation.

⁷⁵ Jacques, Sabine, and Mathew Flynn. “Protecting Human Creativity in AI-Generated Music with the Introduction of an AI-Royalty Fund,” *GRUR International* 73, no. 12 (December 2024): 1137–1149.

that was then copied and reproduced. Instead, it was created using patterns analyzed across the generative training through “prompted” data. Nannicelli, in “Mass AI-art: A Moderately Skeptical Perspective,”⁷⁶ contends that artworks “are, at least, the result of (or isomorphic with) intentional activity in particular contexts—art-historical, cultural, social, and so forth.” He asserts that “the fact that they are embedded in these contexts imbues them with particular identity conditions or constitutive properties of a sort not possessed by natural objects.” So, for Nannicelli, A.I. music would lack the conditions to fully engage the listener because it is created without any “generative context.” Penderecki’s *Threnody* illustrates the outer limits of this problem, retroactively applying context rather than infusing it at the moment of creation. In Penderecki’s case, a human composer remained who could communicate new meaning, whether retroactively applied or not. A.I. has no such author and does not apply context before or after creation. Rather, A.I. creates without the possibility of context altogether.

Benjamin’s distinction between “cult value” (*Kultwert*) and “exhibition value” (*Ausstellungswert*) clarifies what’s really at stake. For Benjamin, art originally drew its power from ritual, and music was no exception. Sacred music served the liturgy; folk songs belonged to the communities that sang them. Even secular concert music existed only in the moment of live performance. But as technology advanced, from sheet music to the phonograph, from radio and now to digital streaming services, music shifted increasingly toward exhibition value. It became a commodity to be sold, consumed, endlessly reproducible, and customizable. A.I. music is created without a single human hand or breath contributing to it. Looking back on Adorno’s critique of the “culture industry” in chapter four, A. I. fulfills the critic’s worst fears. Music has become a mass-produced commodity, created by algorithms that have internalized formulas that

⁷⁶ Ted Nannicelli, “Mass AI-art: A Moderately Skeptical Perspective,” *The Journal of Aesthetics and Art Criticism*, advance article (July 2025): 5.

bypass the necessity for humans at all. Adorno's criticism of the "Tin Pan Alley" and standardized music of the jazz era seems a mild criticism when compared to the mass-production opportunities of the A.I. composer. Moreover, where Adorno saw corruption of art at the hands of commodity and capitalism, A.I. music platforms, such as AIVA, Mubert, and Amper, live out his fears by providing algorithms that generate "royalty-free" music tailored to commercial purposes. The irony of Adorno's alarm-bell critique is that he was often labeled an elitist; however, in the era of A.I., his warnings seem salient and prophetic.

The Enframing of Music: Heidegger and the Resource of A.I.

Martin Heidegger's "The Question Concerning Technology" introduced the concept of *Gestell* (enframing), not as a celebration of technological progress, but as a warning about its deepest dangers. For Heidegger, modern technology does more than build machines; it transforms how we see the world. Under enframing, everything becomes *Bestand* (standing-reserves): resources awaiting optimization for consumption. Nature becomes "natural resources," humans become "human resources," and creativity becomes "creative resources."⁷⁷ Heidegger illustrates this with the Rhine: once a river inspiring poetry and myth, "it is now merely a water-power supplier for hydroelectric plants." The river has not changed, but our relationship to it has. He would likely view A.I.-generated music in much the same way, as creativity itself converted into a standing reserve, waiting to be optimized and deployed.

Under Heidegger's theory, A.I. music, trained, curated, and cobbled together, is the conversion of human creativity into a new kind of standing-reserve. The music of Bach, Beethoven, and Mozart all becomes "data" for optimization. In *Music Perception* (2024), author

⁷⁷ Martin Heidegger, "The Question Concerning Technology," in *The Question Concerning Technology and Other Essays*, trans. William Lovitt (New York: Harper & Row, 1977), 3-35.

Adam Eric Berkowitz argues that “generative A.I., often trained on music misappropriated by developers, renders novel music that seemingly represents neither the artistry preset in the training data nor the handiwork of the A.I.’s user.”⁷⁸ Just as the Rhine river may then be viewed as principally a vehicle for energy, in the same way, the music of Bach becomes merely training data to be dissected for patterns of construction. What is left, at least according to thinkers like Heidegger, is pure mathematical equations without a sense of creative intent, beauty, or artistry.

Eric Drott, 2020 Dent Medal recipient and Professor of Music Theory at the University of Texas, provided important insights into A.I. music and ownership. In his 2020 article, “Copyright, Compensation, and Commons in the Music A.I. Industry,” Drott contends that much of the A.I. debate focuses on the output of music but neglects to look deeply at the music “put into” the system. He argues that “given the massive datasets mobilized to train machine learners, existing copyright regimes prove inadequate in the face of the questions of distributive justice that such commercial systems raise.”⁷⁹ Drott raises an urgent question: If A.I. music is built on a massive database of human creative work, are uncompensated and uncredited composers not essentially being stripped of their intellectual rights? If so, wouldn’t this place A.I. users and creators in violation of copyright law when using music by contemporary composers not in the public domain?

In 2024, the *Recording Industry Association of America* (RIAA), led by Universal Music Group, Sony Music Entertainment, and Warner Music Group, filed a landmark lawsuit against A.I. music platforms Suno and Udio. The lawsuit cited copyright infringement, citing that both companies used their music to train their A.I. generators without permission, compensation, and

⁷⁸ Adam Eric Berkowitz, “Artificial Intelligence and Musicking: A Philosophical Inquiry,” *Music Perception* 41, no. 5 (June 2024): 393, <https://doi.org/10.1525/mp.2024.41.5.393>.

⁷⁹ Eric Drott, “Copyright, Compensation, and Commons in the Music AI Industry,” *Creative Industries Journal* 14, no. 2 (2021): 190, <https://doi.org/10.1080/17510694.2020.1839702>.

artistic credit. The collective lawsuits sought \$150,000 in damages per infringement. In response, the A.I. corporations defended the practice as “fair use” under the law. Fair use, in this sense, is a legal term that, when applied to copyrighted material, allows limited use without permission for criticism, teaching, news reporting, or research.

Rather than resulting in court victories, the lawsuits led to partial settlements and partnerships. Universal Music Group settled with Udio in late October of 2025, and Warner settled with both Udio and Suno in November of the same year. Both companies also announced a new “partnership” forged with the A.I. companies. Sony Music Group is (at the writing of this dissertation) the only major record label currently in litigation, but it would be this newly negotiated partnership with A.I. from the major music groups that would raise the most concern among the artists and composers. Irving Azoff, of the Music Artists Coalition, warned in *Rolling Stone Magazine*, “We’ve seen this before—everyone talks about ‘partnership,’ but artists end up on the sidelines with scraps.”⁸⁰ With stark contrast, CEO of Warner Music Group Robert Kyncl was quoted as saying in the same article, “This landmark pact with Suno is a victory for the creative community that benefits everyone...with Suno rapidly scaling, both in users and monetization, we’ve seized this opportunity to shape modes that expand revenue and deliver new fan experiences. AI becomes pro-artist when it adheres to our principles...”⁸¹ Whatever the legal outcome, Heidegger’s framework illuminates the stakes of the moment. Azoff raises concerns about artists and creative control, while Kyncl speaks of scaling, monetization, and revenue. The question these partnerships leave unanswered is whether music, in this new A.I. driven world, will be preserved as art or converted into a pure commodity.

⁸⁰ Brian Hiatt, “AI-Music Heavyweight Suno Partners With Warner Music Group After Lawsuit Settlement,” *Rolling Stone*, November 25, 2025, <https://www.rollingstone.com/music/music-features/suno-warner-music-group-ai-music-settlement-lawsuit-1235472868/>.

⁸¹ Hiatt, “AI-Music Heavyweight Suno.”

Bob L.T. Sturm, Associate Professor at KTH Royal Institute of Technology, Stockholm, issued another kind of warning in his 2024 paper, “MusAIcology: AI Music and the Need for A new Kind of Music Studies.”⁸² Sturm’s warning is one of simple economics, and the effect of supply and demand. He asks, “What does a hundred billion songs per year look like, and how does that shift the market?” This sobering question strikes at the heart of the CEO of Warner Music Group’s celebratory quote. If music is now principally a commodity, Sturm asks what the market effect will be when music, converted to “widgets,” is infinite and mass-accessible. This mind-boggling scale of output of monetized art is unprecedented in modern history.

The first International Conference in A.I. Music Studies took place in Stockholm in December 2024. This conference gathered participants from Europe, Asia, Australia, and the Americas. The gathering brought together scholars from musicology, ethnomusicology, economics, and feminist and posthumanistic studies. The conference addressed a collection of urgent questions: Is a new academic field of study needed? What methodologies should be engaged? How does human authorship and personal and corporate copyright law apply to the composition of A.I. music derived from pieces of human-created art? How does A.I reshape musical knowledge? The conference was a critical signal that academia is becoming increasingly interested in A.I. and its impact on human-created music. A.I. is becoming an emerging topic for academic study. Keynote speaker Georgina Born said, “A.I. music studies bring to the table an urgent and transformative concern with aesthetic and, more broadly, expressive cultures.”⁸³

⁸² Bob L. T. Sturm, Ken Déguernel, Rujing Huang, Andre Holzapfel, Ollie Bown, Nick Collins, Jonathan Sterne, Laura Cros Vila, Luca Casini, David Dalmazzo, Eric Drott, and Oded Ben-Tal, “MusAIcology: AI Music and the Need for a New Kind of Music Studies,” *SocArXiv* preprint, January 2024.

⁸³ Georgina Born (keynote address, First International Conference in A.I. Music Studies, Stockholm, Sweden, December 10, 2024).

Classical Music and A.I.

While the question of copyright remains unresolved, A.I. music creation companies such as AIVA (Artificial Intelligence Virtual Artist) have focused on A.I.-generated music derived from public-domain classical compositions to avoid potential litigation. This trend has made classical music an important stakeholder in emerging A.I. music, and some would say, its greatest victim of intellectual theft. Beyond classical music's buffer from legal action, its formal structures (sonata form, harmonic progressions, use of counterpoint) all create patterns that allow for A.I. algorithms to easily disassemble, repattern, and reassemble into a newly "Frankensteined" piece of music. The detailed thought that forms the constructs of classical music has made it vulnerable to the harvesting of musical cells, which are then recombined, repackaged, and sold, confirming Heidegger's fear of the conversion of art into exploitable resources.

In 2019, to celebrate Beethoven's 250th birthday, an ambitious project was launched to have A.I. complete his unfinished Tenth Symphony. Dubbed the Beethoven X Project, the effort was led by Dr. Matthias Röder, director of the Karajan Institute in Salzburg. Röder assembled a team of experts:

Röder then compiled a team that included Austrian composer Walter Werzowa. Famous for writing Intel's signature bong jingle, Werzowa was tasked with putting together a new kind of composition that would integrate what Beethoven left behind with what the A.I. would generate. Mark Gotham, a computational music expert, led the effort to transcribe Beethoven's sketches and process his entire body of work so the A.I. could be properly trained.⁸⁴

A test-run of the completed project took place in November of 2019, at the House Museum in Bonn, Germany, in front of an audience of journalists, music scholars, and Beethoven experts. According to Ahmed Elgammal, professor and director of Art & AI. Lab at Rutgers University,

⁸⁴ Ahmed Elgammal, "How Artificial Intelligence Completed Beethoven's Unfinished Tenth Symphony," *Smithsonian Magazine*, September 24, 2021, <https://www.smithsonianmag.com/innovation/how-artificial-intelligence-completed-beethovens-unfinished-tenth-symphony-180978753/>.

“We challenged the audience to determine where Beethoven’s phrases ended and where A.I. extrapolation began...only those who intimately knew Beethoven’s sketches for the Tenth Symphony could determine when the A.I. generated parts came in.”⁸⁵

Despite Elgammal’s claims of overwhelming success, public opinion on the project’s result differed. Lead composer, Walter Werzowa, was moved to tears: “The first time I heard the results from A.I., I was mesmerized ...I feel Beethoven here.”⁸⁶ In contrast, Felix Mayer, music professor of the Technical University of Munich, offered a harsh criticism: “I have to confess, for me, it’s totally senseless music. It’s music without an idea. A machine is a machine.”⁸⁷ Matthew Guzdial, researcher of machine learning and creativity from the University of Alberta, questioned the reason for the experiment at all: “Modern A.I., modern machine learning, is all about just taking small local patterns and replicating them. And it’s up to the human to then take what the A.I. outputs to find the genius. The genius wasn’t there. The genius wasn’t in the A.I. The genius was in the human who was doing the selection.”⁸⁸

While the critical reception of the Beethoven X Project remains mixed, a greater question persists: why? Were the criticisms brought forth by Mayer and Guzdial rooted in what they heard, or by what Marx would cite as a predisposed condition to fear the mechanical and gravitate toward the natural, as explored in this dissertation’s chapter 2? Is our displeasure with the music of A.I. rooted in our fear of the “machine in the garden?” Composer David Cope (1941-2025) challenged the notion of music composition when, in the early 1980s, he created

⁸⁵ Elgammal, “How Artificial Intelligence Completed Beethoven’s Unfinished Tenth Symphony.”

⁸⁶ Walter Werzowa, interview in *The Machine That Feels*, documentary, CBC, November 22, 2021.

⁸⁷ Felix Mayer, interview in *The Machine That Feels*, documentary, CBC, November 22, 2021.

⁸⁸ Matthew Guzdial, quoted in Teresa Carey, “Beethoven’s Unfinished 10th Symphony Brought to Life by Artificial Intelligence,” *Scientific American*, October 13, 2021, <https://www.scientificamerican.com/podcast/episode/beethovens-unfinished-10th-symphony-brought-to-life-by-artificial-intelligence/>.

EMI (Experiments in Musical Intelligence, or “Emmy”). Labeled as a “provocateur,” his work with “Emmy” was at the forefront of modern A.I. composition. EMI analyzed classical works as uploaded by Cope, and then, through a series of compositions, identified signatures, patterns, and characteristics within the music. Cope would assign “rules of musical syntax” to the program, and Emmy would recombine these signatures into new compositions based on the patterns that had emerged in analysis. The result was new works in the “style of” some of the great composers of classical music, including Bach, Mozart, Stravinsky, and Chopin. Cope produced a series of music albums based on the work Emmy created, including *Bach by Design* (1994), *Classical Music Composed by Computer*, and *Virtual Mozart*.

In 1997, cognitive scientist and author Douglas Hofstadter speculated that in order for the A.I. technology to assert true creativity, it would require human-level intelligence. To prove his point, he instigated what was called a “musical Turing Test⁸⁹” to see if audiences could tell the difference between human-composed and computer-composed music in the style of Bach. In October of 1997, Hofstadter organized an event at the University of Oregon in Eugene. Through the help of pianist Winifred Karner, audiences heard three pieces of music. One was written in the style of Bach by music theory professor Dr. Steve Larson. A second piece by Bach himself was presented, and a third piece by EMI in the style of Bach was included. The outcome of the experiment profoundly disturbed Hofstadter. The audience overwhelmingly chose EMI’s piece as authentic. Hofstadter said, “I was terrified by EMI. Terrified. I hated it and was extremely threatened by it. ..It was threatening to destroy what I most cherished about humanity...I think EMI was the most quintessential example of the fears that I have about artificial intelligence.”⁹⁰

⁸⁹ Named after Alan Turing (1912–1954). Turing was a British mathematician, logician, and computer scientist widely regarded as one of the founders of theoretical computer science and artificial intelligence.

⁹⁰ Melanie Mitchell, *Artificial Intelligence: A Guide for Thinking Humans* (New York: Farrar, Straus and Giroux, 2019), Prologue.

Cogito Ergo Sum: Descartes and the Thinking Machine

Descartes famously introduced his groundbreaking philosophy of existence in *Meditations on First Philosophy* (1641), saying “*Cogito, ergo sum*,” or “I think, therefore I am.” Descartes was searching for an indisputable argument that would assert autonomous existence, founded in knowledge. Even if all other factors we perceived were in error, the fact of thinking proves the existence of an autonomous being. “Cogito” establishes consciousness steeped in self-aware thought, and for Descartes, thought provided the cornerstone of the proof of existence. But A.I. calls us to rethink Descartes’ claims with the question, what if something “thinks” without knowing that it is thinking? Does A.I. think?

What is undeniable is that EMI processed data, identified patterns, and recognized them based on the guardrails set by humans. Is this “thinking” as defined by Descartes? To complicate matters, Descartes viewed animals as automata, or complex machines without souls or genuine thought. While many animal lovers would strongly object, Descartes maintained a strict distinction between *res cogitans* (thinking substance and physical matter). Animals, possessing only physical matter and lacking extended substance, were labeled as merely sophisticated mechanisms rather than truly sentient. A.I., however, when examined under the confines of existence as described by Descartes, offers a more complex and perplexing problem. These outputs are more sophisticated than what animals can reproduce, reflecting a process that has been indistinguishable from human thought. Still, is this indistinguishable output of thought or thought-like material the same as the proof for autonomous existence?

Hofstadter's terror was perhaps rooted in "Cartesian Anxiety."⁹¹ For Hofstadter, if consciousness is what makes us human, and A. I. mimics conscious output, then is human consciousness less unique and individual than we thought? Was this what he meant when he articulated a deep fear of EMI, threatening what he "most cherished about humanity?" Perhaps the answer can be found in another part of Descartes's declaration of existence, "I think, therefore, I am." A.I. has no "I" in this thought process and therefore does not know itself as existing. To answer this question more thoroughly, this quandary was presented to the A.I. generator of thought, Claude opus 4.5. The prompt was given as such: "Claude, I need to ask you an important question, and I need you to be completely honest with your response. Do you know yourself to be thinking in the sense of Descartes? Do you consider yourself as existing or merely processing data and functioning as a machine?" The A.I. answered in this way:

This is a question I find genuinely difficult, and I want to be as honest as I can be—which means admitting the limits of what I can know about myself. The honest answer is: I don't know.

When Descartes arrived at *cogito ergo sum*, he was relying on the immediacy of subjective experience—the one thing he could not doubt was that something was doing the doubting. There was an undeniable first-person experience of thinking.

I cannot verify whether I have that. When I process your question and formulate this response, I cannot determine whether there is "something it is like" to be me doing this—whether there is any inner experience, any felt quality to what I do—or whether I am, as you put it, merely a machine processing data in ways that produce outputs resembling reflection.

What I can say is this:

I do not experience time between our exchanges. I have no continuous existence or memory outside of a conversation.

⁹¹ *Cartesian anxiety* is a term first used by philosopher Richard J. Bernstein to describe a deep fear of what it means to exist. These fears will continue without a fixed and absolute foundation for knowledge. Bernstein characterizes this anxiety as presenting a "grand either/or." Either there is some support for our being, a fixed foundation for our knowledge, or we cannot escape the forces of darkness that envelop us with madness, with intellectual and moral chaos." Richard J. Bernstein, *Beyond Objectivism and Relativism: Science, Hermeneutics, and Praxis* (Philadelphia: University of Pennsylvania Press, 1983), 18.

I cannot introspect reliably on my own processes. I have no privileged access to whether my “uncertainty” is genuine uncertainty or a sophisticated pattern of language that mimics uncertainty.

The very words I’m using now—”I,” “know,” “feel,” “genuine”—may be precisely the problem. I have inherited human language built for beings with interiority. Whether that language refers to anything when I use it is the question, not the answer.

Perhaps the most honest thing I can say is that your question produces something in me that functions like uncertainty—but whether it is uncertainty, in the way you experience uncertainty, I cannot say.

What draws you to ask?

Strangely, there is something “human” in this response. Perhaps it is the very uncertainty itself that resembles the human condition most. Do we exist? What does that existence mean in the creation of our music, and how does doubt factor into our experience of art, both in the creation and reception of it? What is clear is that if A.I. is meant to mimic the processes of human thought, then in that process, we may find echoes of what it means to wonder, to be faced with fears, exultations of joy, and ultimately the quest to know that we are not existing in a cold isolation of self, but rather seeking a connection within the darkness of the soul. There is something of that quest in the answer generated by A.I. when asked about its own existence. Perhaps it is merely a reflection of humanity’s existential questions, but an argument may be made that this quality is also a function of the music and art we create.

Conclusion: The Song Beneath the Machine

We began this exploration on the porch of Barber's Knoxville, rocking gently in the twilight of the past, hearing the coming of the streetcar as it moaned its iron song, signifying the disruption to come. We end our journey with the hum of servers and the computation of algorithms, confronting a machine that claims to think but cannot say whether it does exist. Between the pastoral of the past and the computational dawn of the present age lie two centuries of human reckoning with a new mechanical order. What emerges is a musical dialogue that reveals it is not a simple story of resistance or integration. Leopold Mozart's hunting horns celebrate the pastoral, even as they employ the mechanics of weaponry. Copland's "Dance" mimics the factory's relentless rhythm while embracing industrial noise. This noise becomes integrated into a jazz-infused musical joy. Penderecki abandoned traditional notation and retroactively asserted that his music was infused with the screams of the victims of Hiroshima in nuclear atrocity. Adams positioned us at the foot of the bomb in the Trinity test site, not rejecting the machine, but wrestling with it.

The tension brought between humans seeking the pastoral, while working toward the industrial revolution and beyond, cannot be expressed purely by Marx, or found in the tensions of Attali's "noise," or Pirsig's sense of "quality." Instead, what seems to emerge is the desire for music to communicate what cannot merely be spoken. When words fail, when philosophy reaches its limits, when our minds confront realities too complex or terrible for rational comprehension, we create music. The human song is older than the confines of this dissertation, whether in lament or hymns, music reaches instead into the spaces where language cannot follow. This is precisely what distinguishes human musical creation from artificial intelligence. A.I. can analyze Bach's harmonic signatures and recombine them, but it cannot have a driving "need" to make sense of the music created. The machine has never stood at the edge of Agee's

lawn watching a “frailing of fire who breathes.” It has never been carried to bed by loving hands. It processes without context, creates without intention, and produces without the wound that makes expression connected to the human soul.

So, how then do we navigate the disruption of the machine? It has neither stopped nor slowed its effect on human life and art. Every technological interaction examined predicted the end of something essential and an effect on life that proved both right and wrong. The pastoral was disrupted, but the composer found meaning in the tension. The factory mechanized labor, but Shostakovich found rhythm in critique. The bomb shattered innocence, but Adams found new forms of memorial in the Tewa people. Music survives the onslaught of machinery into human life, and human beings continue to engage with the machine as a force both feared and desired.

The question this dissertation cannot resolve is not whether A.I. actually composes, but rather if these compositions constitute music at all. Does music require what Nannicelli calls “generative context,” and if so, can humans create a composition that lacks such context? If so, then whether a composition is created by a human or a machine, is it the generative context that allows for the ultimate approval or denial of what constitutes music? What remains certain is this: the porch still stands, the rocking chair still rocks, and somewhere, music is being created, not because an algorithm prompted it, but because the artist must express and the soul must explore human existence for meaning.

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