

From Machine to Musical Instrument: The Life and Workings of the Metrostyle Pianola

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Side by side, two grand pianos sat on the stage of London's Aeolian Hall on June 16, 1913 (fig. 1)—not an uncommon setup, if it weren't for a kind of mechanical prosthesis interposed between one of the instruments and its performer. This cabinet attachment was in fact one of the stars that evening, as the caption of the illustration that commemorated the event in various British newspapers underscored: "Madame Chaminade and the Pianola at Aeolian Hall." Apparently oblivious to the other human on stage and juxtaposing the Pianola as an "Other" to the famous pianist, the seemingly innocuous description hints at the Pianola's troubled identity as agent, instrument, and machine—a slippery discursive slope that its inventors and producers had been navigating since its inception.

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FIGURE 1. "Madame Chaminade and the Pianola at Aeolian Hall,"
Illustrated London News, July 12, 1913, 75.



Building on the entertaining mechanics of barrel organs and musical clocks, the Pianola originated in late nineteenth-century North America.¹ It integrates elements of these musical automata with a technique introduced in an altogether different kind of technology, the Jacquard loom, which used perforated paper rolls to program textile patterns into a machine. For the Pianola, patterns perforated into paper rolls encode the musical work to be read by the instrument's pneumatic mechanism. A hole in the paper, as it passes over the tracker bar, generates suction in the corresponding tube. A series of valves translates the suction into mechanical action, causing the corresponding wooden finger of the Pianola to strike a key on the attached piano. But rather than enthralling

¹ Among the numerous genealogical histories of the Pianola and related instruments, the website of the Pianola Institute (www.pianola.org/history/history.cfm) offers a particularly incisive account. As it was an instrument engineered for musical amateurs, much of the work of preserving its material traces and legacy is still today accomplished outside academia. Often the sources provided by non-scholarly experts are considerably more reliable than the accounts propagated in academic discourse.

audiences through ghostly automation and pompous tunes (as had the orchestrion, for instance), the Pianola was meant, at least in its first decade, for a more edifying cause: to facilitate widespread music-making in the middle-class household.²

The Pianola calls for a human performer to render a musical interpretation. The player treads the pedals to power the pneumatic system and thereby regulates some dynamic qualities and accentuations (more air produces a more energetic triggering of the piano key and hence a louder tone). Hand levers provide further control over fluctuations in tempo and dynamics. By inviting musical performance, the Pianola claims the rank of “musical instrument,” while at the same time falling into a lineage of inventions that integrate mechanistic control into musical activities. In engineering, and to some extent in ideology, the Pianola’s forebears include Marie-Dominique-Joseph Engramelle and Claude Balbastre’s experiments with capturing interpretation through a form of notation (1775), the mechanization of pianism in android automata such as “la musicienne” (1774), and even combinatorial devices for generating new music, from Athanasius Kircher and Salomon de Caus’s efforts (1615) to Dietrich Nikolaus Winkel’s Componium (1821).³

At the same time, the Pianola presents its own idiosyncratic functionality, being conceived as an essentially expressive instrument: with the seemingly challenging part of piano-playing—the execution of the right tones in the right temporal succession—relegated to a mechanism, the player’s attention could focus on interpreting the musical material more freely than ever before. And yet the human player pictured in figure 1 is not even acknowledged. He becomes a mere operator of a machine, and an anonymous one at that. It is no surprise, then, that reactions toward this new mode of music-making oscillated between wonderment and disapprobation. After all, witnessing the supplementation, let alone displacement, of the creative human body by a machine reasonably conjured fears related to the onset of industrialization, fears stirred up

² The uncanny magic of musical automata has variously been described through the metaphor of “ghosts”; see, for example, Carolyn Abbate, “Outside Ravel’s Tomb,” *Journal of the American Musicological Society* 52 (1999): 465–530; and Allison Wente, “Magical Mechanics: The Player Piano in the Age of Digital Reproduction” (PhD diss., University of Texas at Austin, 2016). The contributions to the conference “Ghosts in the Machine,” hosted at Cornell University in 2017, are documented in *Keyboard Perspectives* 11 (2018).

³ On the innovations during the French Enlightenment, see especially Rebecca Cypess, “‘It Would Be without Error’: Automated Technology and the Pursuit of Correct Performance in the French Enlightenment,” *Journal of the Royal Musical Association* 142 (2017): 1–29; and Adelheid Voskuhl, *Androids in the Enlightenment: Mechanics, Artisans, and Cultures of the Self* (Chicago: University of Chicago Press, 2013). Roger Moseley attends to traditions related to what Patrick Feather has classified as “melographic” notation in *Keys to Play: Music as a Ludic Medium from Apollo to Nintendo* (Oakland: University of California Press, 2016), esp. 50–55, 159–63.

equally in literary genres, such as H.G. Wells's science fiction novels, and in scientific-political pamphlets, such as Thomas Carlyle's emphatic "Signs of the Times." Reflecting in 1829 on the "mechanical age" of his day, Carlyle identified a daunting vanishing point to technological advancements that replaced humans with machines: "Not the external and physical alone is now managed by machinery, but the internal and spiritual also."⁴ Did the Pianola implement such a dystopian scenario by allowing a machine to emulate artistic expression, that inherently human capacity? We shall come back to this ominous prophecy.

Associations with an apparent dehumanization of musical play have accompanied the Pianola throughout the past century and continue to haunt it today.⁵ All too often, however, the image of the Pianola propagated in such accounts is tinged by a specific historiographical lens on technological innovation in music in the early twentieth century, one that foregrounds a teleological trajectory toward devices for automated musical playback. In such narratives, the Pianola is easily dismissed as a preliminary spinoff, an unsuccessful would-be imitation of human performance rather than an independent product with a decisively different agenda. It might even be mistaken for a quasi-automatic machine that simply prefigured the reproducing piano and eventually the phonograph, commonly understood as the apogee of musical reproduction. From a technological vantage point, the Pianola undeniably constituted an essential step in these developments. It introduced the possibility of reproducing specified musical interpretations from a form of inscription. With the Pianola, however, the enactment of these inscriptions in performance is contingent on human engagement. Conceiving of the Pianola as a musical instrument rather than an automatic machine, manufacturing firms like the Aeolian Company pursued a sociocultural agenda that emphatically counteracted tendencies of passive listening. As such, zooming in on the technological and musical ambitions behind the Pianola can significantly enrich our understanding of the era by giving prominence to an instrument that did, in fact, dominate the markets and public interest for at least the first decade of the twentieth century.

⁴ Thomas Carlyle, "Signs of the Times," in *The Oxford Book of Essays*, ed. John Gross (Oxford: Oxford University Press, 2008), 137. For another discussion on the musical implications of Carlyle's essay, see David Trippett, "Exercising Musical Minds: Phrenology and Music Pedagogy in London circa 1830," *19th-Century Music* 39 (2015): 99–124, esp. 122. Steven Kemper and Rebecca Cypess, meanwhile, engage in a cross-historical purview of the question in "Can Musical Machines Be Expressive? Views from the Enlightenment and Today," *Leonardo* 52 (2019): 448–54.

⁵ Sergio Ospina Romero, for instance, proposes a Marxist reading of the commodification of musical labor through the player piano. Ospina Romero, "On Pianolas and Pianolists: Human-Machine Interactions, Dialectic Soundings, and the Musicality of Mechanical Reproduction," *Keyboard Perspectives* 11 (2018): 207–26.

While the Pianola has in recent years attracted some attention from media, music, and cultural scholars alike, the complex and nuanced interplay between the instrument and its human player requires more interrogation. This article seeks to rectify some prevailing misconceptions by examining more closely the particularities of the Pianola's musical capabilities and the mode of interaction that it forges with its users. I approach these questions via the two main tasks of music-making that the Pianola promises to replace through its mechanism; the skills needed, in turn, to complement these functions in shaping a musical interpretation; and ultimately the expressive freedom—and the limitations—that the Pianola bestows upon its players. Investigating these constellations of “pianolistic” music-making complicates ontologies of musical performance in the age of mechanical reproduction and at once offers various parallels with our interactions with the digital devices dwelling in our living rooms today.

Engineering an Instrument for Widespread Music-Making

The Aeolian Company was one of the foremost producers of mechanical musical instruments around 1900 and pioneered the invention and enhancement of the Pianola. The firm, founded in the United States and expanding to Europe with the London-based “Orchestrelle” Company as its subsidiary, embodied the transatlantic axis of a globally growing market.⁶ Both sites produced instruments and music rolls, and hosted concerts (such as the one with Cécile Chaminade) in their own concert halls.⁷ At the heart of Aeolian's venture was the Pianola, coined by Edwin Votey's patent in 1895. Through their share in the patent, the company acquired the rights to the designation. Even though other manufacturers soon joined a competitive market with similar instruments that bore such names as the Angelus, Cecilian, Simplex, Pleyela, and Phonola, they were oftentimes synonymously subsumed under the designation Pianola.⁸ Since technological innovation and business strategies specific to the Aeolian Company will serve as my central case study,

⁶ For a detailed history of the firm, see Rex Lawson, “Towards a History of the Aeolian Company,” *Pianola Journal* 11 (1998): 4–72. On the South American distribution and manufacturing of player pianos, see Sergio Ospina Romero, “Ghosts in the Machine and Other Tales around a ‘Marvelous Invention’: Player Pianos, in Latin America in the Early Twentieth Century,” *Journal of the American Musicological Society* 72 (2019): 1–42.

⁷ In Manhattan the monumental multi-story factory and showroom building, “Aeolian Hall,” on 42nd Street marked the business's success.

⁸ Pianola has also been commonly used in other languages, although preference might be given to brand names of national manufacturing firms that predominated within their respective markets, such as Hupfeld's Phonola in Germany or the Pleyela in France.

I follow this common linguistic imprecision and refer to the Pianola as a generic classification of similar instruments.

These instruments come in one of two general mechanical formats, the first being a so-called push-up or piano player as depicted in figure 1: a contraption that operates a piano externally. In distinction, a player piano has the pneumatic system built directly into the sound-producing instrument. While the push-up blocks the attached piano's keyboard, the integrated models expose the keys and thereby allow the instrument to be played also like a regular piano.

The built-in models became ever more popular and were also the standard format of an altogether different instrument: the reproducing piano. Although similar in appearance, the reproducing piano, an instrument for automated playback of predefined renditions, differs fundamentally from the hand-played Pianola in both conception and use.⁹ And yet these two instruments have often been conflated at the expense of the Pianola, which was eventually superseded by the reproducing piano on the market and in historical consciousness. Even accounts that acknowledge the Pianola as an independent step in the development of new musical instruments—such as Thomas Patteson's and David Suisman's most recent contributions—are not entirely immune to this teleological prejudice of historiography, which inadvertently classifies the Pianola as a cursory step on a one-way street toward fully automated musical reproduction.¹⁰

Recuperating the Pianola from such narratives and promoting it instead as an autonomous invention promises to enrich our understanding of musical mechanization in the early twentieth century. To start, this approach diffuses the elitist desire to circumscribe standards of musical performance through prerecorded interpretations.¹¹ Instead, the Pianola embraced a more democratic approach of diversifying its players and explicitly addressing amateurs—at least in its promotional

⁹ In German the terms “Kunstspielklavier” and “Reproduktionsklavier” capture this distinction quite well.

¹⁰ Thomas Patteson, *Instruments for New Music: Sound, Technology, and Modernism* (Oakland: University of California Press, 2016), esp. chap. 2, “‘The Joy of Precision’: Mechanical Instruments and the Aesthetics of Automation”; and David Suisman, “Sound, Knowledge, and the ‘Immanence of Human Failure’: Rethinking Musical Mechanization through the Phonograph, the Player-Piano, and the Piano,” *Social Text* 28 (2010): 13–34. While Suisman claims to write toward resuscitating the “player piano” from scholarly oblivion, he, too, neglects the Pianola as an independent instrument and cultural-historical phenomenon. Karin Bijsterveld and Trevor Pinch also conflate the two instruments within the overarching designation “player piano” in “‘Should One Applaud?’ Breaches and Boundaries in the Reception of New Technology in Music,” *Technology and Culture* 44 (2003): 536–59.

¹¹ Notably, this desire traces back to debates over proper musical interpretation in the Enlightenment, as discussed in Cypess, “‘It Would Be without Error.’”

representation; as we shall see, the reality still perpetuated a hierarchical relation between users, producers, and professional musicians.

The difference between the reproducing piano on the one hand and the Pianola on the other materialized already in their respective music rolls. For the reproducing piano, the rolls (colloquially known as “artist rolls”) record one specific performance as played by a pianist. This single interpretation is captured in the perforations in as much detail as the technology allowed. The music rolls for the Pianola, by contrast, contain a purely metronomic transcription of the score. They encode the sequence and duration of pitches without any interpretative deviation in their temporal or dynamic relation.¹² In this “neutral” form of representation, these rolls highlight the essentially mechanical qualities of music, both as visual artifacts in which the two central parameters of pitch and duration are rendered in binary code (hole or no hole)¹³ and, when played without further intervention, as a mechanized stream of sounds. These metronomic rolls, however, offer the possibility of being interpreted anew on every occasion. In other words, these rolls granted the players agency to make music themselves.

Precisely this idea shaped the business strategy of the Aeolian Company until 1915. As Rex Lawson chronicles, Aeolian had a device for hand-recording rolls (i.e., for fully automated playback).¹⁴ But the managing officials deemed this technology a restriction that “depriv[ed] the enthusiastic performer . . . of voicing his own individuality in playing,” as an account in the *Music Trade Review* from 1912 explains:

The scheme of hand recorded music is not new by any means. . . . As long as fifteen years ago the Aeolian Co. built and operated a hand recording machine which faithfully reproduced hand playing. But the obvious artistic disadvantages of a roll thus manufactured was that it presented so arbitrary an interpretation that the Pianola performer was *denied the pleasure of varying this interpretation*.¹⁵

¹² Other parameters, meanwhile, might well be engraved in the rolls (usually in rows of holes alongside the left and right borders of the paper roll), such as moments of accentuation or the use of the sustaining pedal.

¹³ Based on the binary form of representing music through the perforations, media scholar Lisa Gitelman has read piano rolls as pioneering digital coding. Gitelman, “Media, Materiality, and the Measure of the Digital; Or, The Case of Sheet Music and the Problem of Piano Rolls,” in *Memory Bytes: History, Technology, and Digital Culture*, ed. Lauren Rabinovitz and Abraham Geil (Durham, NC: Duke University Press, 2004), 199–217, esp. 204.

¹⁴ Rex Lawson, “On the Right Track: The Recording of Dynamics for the Reproducing Piano (Part Five),” *Pianola Journal* 26 (2019): 2–47, at 26–29.

¹⁵ “The Aeolian Co.’s Latest Product,” *Music Trade Review* 54, no. 10 (1912): 27–28, emphasis added. As a preliminary step, the quoted article promoted so-called “Metroart” rolls, which promised a synthesis of the best of both worlds, combining rolls that were hand-played by “eminent and temperamental musicians” with the possibility of further interpreting these rolls as a pianolist. The invention was meant to overcome an acknowledged

Only in 1915—about a decade after Welte in Freiburg had started the commercial distribution of their reproducing Welte-Mignon—did Aeolian follow suit and bring their reproducing Duo-Art onto the market. As its name indicates, the Duo-Art comprises multiple (effectively three rather than just two) modes of operation: the automated playback of reproduction rolls, the interpretation of metronomic rolls as on a Pianola, and—being a built-in mechanism that leaves the piano keyboard exposed—traditional performance in the manner of a regular piano. Even in their gradual advances toward automated playback, the Aeolian Company thus retained the possibility of expressive music-making in different forms.

Other companies, as well, positioned their piano players and player pianos within such an agenda. Around 1920 a manual on *Artistic Piano Playing with the Angelus* still declared: “No one can listen daily to the production of the great masterpieces without feeling an increased and intensified love for music, and it is impossible to understand the full charm of music unless you play it yourself.”¹⁶ As we shall see, this participatory model of music-making inspired various pedagogical adaptations that derived from an observed need for guidance. For while playing was promoted as an easy task, accessible to “anyone,” it must have been evident to the production firms that operating a novel instrument was not entirely intuitive.

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Between Public and Domestic, Instrument and Machine

The reception of the Pianola’s public appearances, beyond the domestic realm, illuminates the expectations and puzzlement that the instrument elicited among its contemporaries. For manufacturing firms, regular showcase concerts served as a marketing opportunity well beyond the event itself.¹⁷ Duetting with Chaminade, for instance, not only impressively demonstrated the musical capacities of the instrument to the audience at Aeolian Hall that day in 1913 (fig. 1) but also featured in the company’s commercials for years to come, effectively paired with written endorsements of the composer-pianist.¹⁸ But these promotional efforts

“rigid accuracy of the regular music roll” and allow for greater “rhythmic elasticity,” although the fact that it remained a niche product positions it more as a lip service than a serious endeavor.

¹⁶ [Wilcox & White], *Artistic Piano Playing with the Angelus* (London: Sir Herbert Marshall & Sons, n.d. [ca. 1920]), i.

¹⁷ On the history of Aeolian’s showroom concerts, see www.pianola.org/concerts/concerts_historic.cfm.

¹⁸ Advertisements generally circulated in multiple English-language journals and magazines around the globe, spreading as widely as Salt Lake City and St. Louis to

also raised their own set of questions, especially when it came to the relation between the Pianola and its player. This manifests itself already on a linguistic level in the written documentation of the concerts. The Aeolian Company, for instance, commonly omitted mention of a player, perhaps to cast the spotlight on the Pianola instead as the real agent in the event.¹⁹ Even when the Pianola was featured on center stage in Queen's Hall, London, about a year earlier, on June 14, 1912, surrounded by musicians of the London Symphony Orchestra under the direction of Arthur Nikisch, announcements assigned the role of rendering the solo part in Grieg's Piano Concerto to "the pianola" and thereby suggested that the instrument plays essentially by itself.²⁰

Critics tended to mirror the language of instrumental autonomy in their accounts. "On this, the first occasion [in the UK] that the pianola has been used in conjunction with a fine orchestra, the instrument made a very favourable impression" one reviewer wrote,²¹ and another reported that "it played Grieg's Pianoforte concerto."²² Despite identifying the Pianola as the (grammatical) subject ("it"), the latter critic, writing for the *Musical Times*, acknowledged the importance of its "highly skilled manipulator" and even referred to him by name: "[the pianola] played under Mr. Easthope Martin's guidance."²³ Martin was also the no-name on stage with Chaminade the following year (fig. 1). But although he was acknowledged in the review from 1912, the identification of Martin as "manipulator" and his performance as "guidance" still undermines his autonomy in shaping the musical rendition. Indeed, it contradicted the idea of the Pianola as a means for artistic expression.

Other accounts, meanwhile, articulated trepidations over "the fearful new thing" on stage, worrying that the machine might take on a life of its own and make it impossible for even the most skilled conductor and orchestra to play alongside: "One expected accidents, half-bar differences, lost rhythm. . . . One felt that the conductor, the orchestra, the Pianola-player, were all suffering from this apprehensiveness as to possible disasters."²⁴ Against these ominous anticipations, the extent of control that the player assumed over the performance became a matter of

Bournemouth and Manchester. The variety of ads produced by the Aeolian Company alone over the years is impressive; many are now hosted in the archives of Stanford University.

¹⁹ Lawson notes "Aeolian's determined practice of crediting the Pianola, to the exclusion of its performers." See Lawson, "On the Right Track," 11. Other companies handled this differently, and private concerts often named the performers of all instruments involved.

²⁰ The Aeolian Company also invoked passivity in such expressions as "the solo part played throughout by means of a Pianola." *Indianapolis News*, August 19, 1912, 3.

²¹ *Observer*, June 16, 1912, 6.

²² *Musical Times*, July 1, 1912, 468, emphasis added.

²³ *Musical Times*, July 1, 1912, 468.

²⁴ "Piano-Player and Orchestra: Unique Concert at Queen's Hall," *Piano-Player Review* 1, no. 1 (September 1912): 23–24.

surprise: “But a change soon came. The perfect technique of the Pianola, the gradual building up of the crescendos, and the terrific tonal climaxes drove out all but the enjoyment of it. Mr. Martin became the pianist—that fearsome thing didn’t exist—and a great noise of applause crowned (and, of course, spoiled) the end of the first movement.”²⁵

This most comprehensive account of the 1912 performance, appearing in the first edition of the newly founded *Piano-Player Review*, evidently attempts to frame the new “thing” within familiar taxonomies. The classification implies a network of interrelations among the player, instrument, listener, and sonic result: when the performance convinces on a musical level, the “thing” ceases to perturb the spectator and Martin climbs the ranks from “manipulator” to “pianist.”²⁶ In the face of novelty, this evaluation is still inevitably informed by the familiar. Indeed, many other aspects in the performance’s sociocultural setup would have similarly suggested as much and conformed to expectations: a skilled soloist, the professionalism of the other musicians involved, the venue, and the repertoire. The division by gender, too, between the men featured (if anonymously) on stage and the women who were the main addressees of advertising portfolios—depicted in the privacy of their homes where they entertain their husbands and a couple of house guests—perpetuated well-established social norms of nineteenth-century pianism.²⁷

Early skeptics and admirers alike lacked the vocabulary to describe the new kind of performances that the Pianola afforded. When a committee of representatives of various firms addressed this linguistic haziness in 1911, it was already too late to eradicate such designations as “operator” or “manipulator” from common parlance.²⁸ The proposed alternative, to speak of the player as the “pianolist,” promoted the Pianola as a musical instrument like any other (with the neologism modeled after familiar instrumentalists such as violinists or, indeed, pianists). In this context, the above reviewer’s attempt at hearing Martin as “the

²⁵ “Piano-Player and Orchestra: Unique Concert at Queen’s Hall,” 24.

²⁶ Other listeners, meanwhile, continued to perceive Pianola performances as showcasing primarily dehumanized technological achievements, for example in the London-based *Observer*: “The same mechanical means were used to accompany Miss Elena Gerhardt in some songs.” *Observer*, June 16, 1912, 6.

²⁷ While many advertisements still forcefully reinscribed traditional gender norms in domestic music-making and their layered social and power-political connotations, some scholars have proposed that player pianos and piano players also undermined such dynamics through the novelty and technological appeal of the instruments, which also attracted men as possible users. See Cecilia Björkén-Nyberg, *The Player Piano and the Edwardian Novel* (Farnham: Ashgate, 2015); and Catherine Hennessy Wolter, “Sound Conversations: Print Media, Player Pianos, and Early Radio in the United States” (PhD diss., University of Illinois at Urbana-Champaign, 2016), esp. chap. 3.

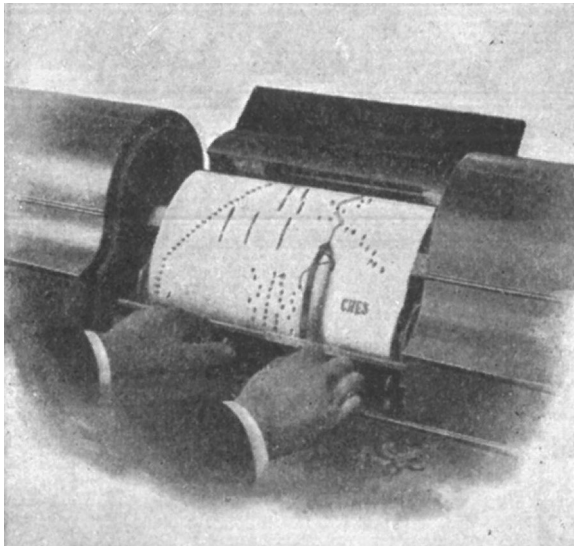
²⁸ See Gitelman, “Media, Materiality, and the Measure of the Digital,” 207–8; citing “Player-Piano Nomenclature: Words to Use and Avoid,” *Player Piano* 1, no. 5 (September 1911): 5–6.

pianist” overshot the goal and failed to register the different skill sets and modes of interaction required on the two instruments. This, after all, was the motivation behind engineering the Pianola.

The Metrostyle

In the evolution of the Pianola, technological innovation also bespeaks the instrument’s intended functionality. An early and pivotal mechanical refinement, submitted to the US Patent Office in November 1901 by Francis L. Young (assignor to the Aeolian Company), addressed the technological novelty of the Pianola’s interface and need for additional guidance to assist its players. The two patents (692,968 and 692,969, respectively) for “Controller for mechanical musical instruments” and “Device for marking perforated music-sheets with a line indicating an effect to be produced” were granted in February 1902. About a year later, in 1903, the first Metrostyle

FIGURE 2. Illustration of the Metrostyle. Advertising leaflet, “The Metrostyle Pianola,” *McLure’s Magazine*, 1903. The lever for affecting fluctuations in tempo is operated by the player’s right hand. It has a pointer attached that extends over the music roll to allow the player to follow the annotated Metrostyle-line.



Pianolas entered the marketplace.²⁹ Like its patents, the Metrostyle comprises two components. The first is a “controller,” or hand lever, on the instrument, which allows for continuously modifying the tempo at which the roll unwinds. It slides along a scale of metronomic measurements and has an attached moveable pointer that extends over the music roll (fig. 2).³⁰

The second part of the invention was delivered on the music rolls themselves in the form of a red line that runs across and alongside the perforations (fig. 3). This “Metrostyle-line” provides performance instructions to the player, suggesting one way of varying the tempo. A deflection to the right indicates an *accelerando*, one to the left a slowing down. To recreate the suggested rendition in performance, the player would simply follow the line with the hand lever.

In the patent’s justification, Young identifies tempo fluctuations as the primary “effect to be produced” and mentions variations in dynamics (referred to as “expression”) and the operation of the sustaining pedal as two other possible applications of the proposed technology. A related mechanical appliance for altering dynamic levels—the Themodist—was introduced in 1906, when Aeolian started to split the wind chest to allow for dynamic differentiation between the treble and bass registers. This modification was similarly accompanied by annotations on music rolls, which again took the shape of a continuous line (this time as a zigzagging, dotted blue trace, as in fig. 3). With respect to the sustaining pedal, different mechanical solutions were invented, from knobs to be depressed by the player’s palm on Hupfeld’s Phonola to the automatic operation via additional perforations on the sides of the music rolls, common with Aeolian’s instruments.

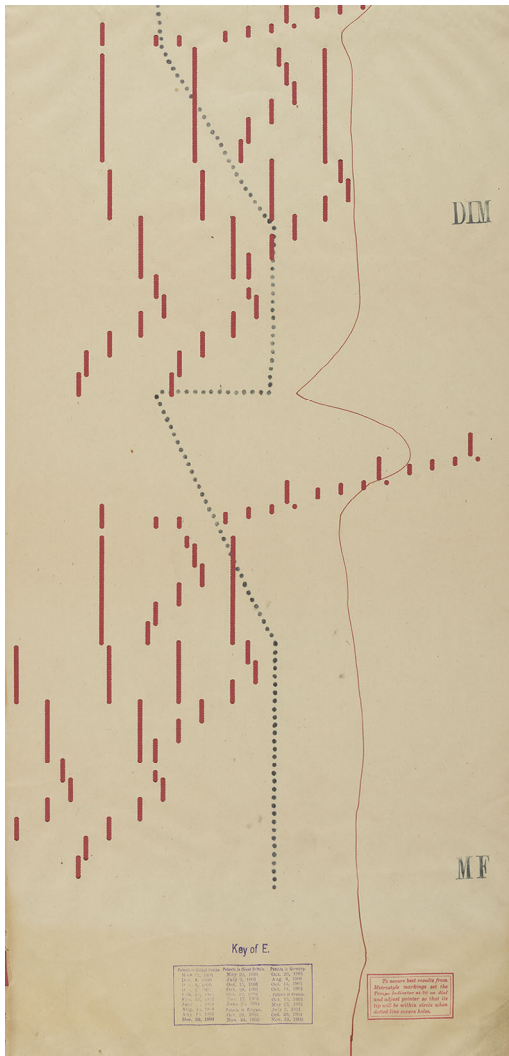
These technological advancements define the performative possibilities of the Pianola through the musical parameters that can be varied by the player. Tempo and dynamics arise as the central expressive qualities of pianolistic music-making.³¹ They complement pitch and rhythm,

²⁹ See also Lawson, “On the Right Track,” for a history of the invention and Francis Young’s career at the Aeolian Company. Young was one of the earliest demonstrators of the Pianola in New York but was soon sent off to the London subsidiary.

³⁰ While the main manufacturing companies agreed to various standards to allow for playing rolls on instruments of any brand, the numerical span of available metronome marks varies across different instruments. On a Phonola by Hupfeld it might range from 10 to 110, for instance, while on instruments of the Aeolian Company it typically spans from 10 to 150.

³¹ On the idea of the Pianola as an instrument for fostering expressivity, see also Christine Fena, “‘Soulless Machines’: The Question of Human Expression in Player Piano Discourse 1900–1930,” *Keyboard Perspectives* 11 (2018): 187–205. Related conceptions of musical interpretation as defined through variance in “mouvement” trace back to Enlightenment thought and Engramelle and Balbestre’s attempts at capturing an authoritative interpretation by recording temporal deviations in keyboard playing. See

FIGURE 3. Aeolian Company, Pianola music roll, Moritz Moszkowski, Waltz op. 34/1. The Metrostyle-line, suggesting fluctuations in tempo, is drawn as a solid (red) line; the dotted (blue) line indicates dynamic variations suggested for the “Themodist” lever. Deutsches Museum, Munich (DM 1988–481/96), catalogue edited by Silke Berdux and Rebecca Wolf, <https://digital.deutsches-museum.de/projekte/notenrollen/1988-481T96/> (accessed November 19, 2020) © Deutsches Museum / Konrad Rainer.



which are determined through the perforation of the rolls. Indeed, this differentiation of musical parameters is manifest in the material artifact of the piano rolls and their distinct encodings: the mechanistic, binary perforations on the one hand, and the hand-drawn, linear surface annotations on the other.³² By disintegrating the complex phenomenon of musical play into its component parameters, each captured through separate notational processes, the rolls thus epitomize the conception of musical interpretation that stands behind the Pianola.

From an engineering point of view, the Metrostyle was vital in securing the Pianola's musicality. Fittingly, the Aeolian Company celebrated the invention in an early advertisement from 1903; it elevated the Pianola from a "musical machine" to an "instrument of music."³³ In relation to the strictly metronomic rendering of the music encoded by the perforations, the possibility of varying the tempo went a long way toward creating a musically pleasing performance. After all, the sonic aesthetics of the Pianola were modeled after the piano. Skilled pianolists, such as Lawson today, master this musical simulation most convincingly.³⁴ Such performances demonstrate the striking subtleties that can be achieved on the Pianola, despite its ostensibly different material affordances. While rubato in regular pianistic technique commonly occurs within individual voices (e.g., an unevenness in an accompanying figure) or in the relation between voices (e.g., an asynchronicity between accompaniment and melody), the mechanical possibilities of the Pianola do not allow for such localized variance. Instead, moving the tempo lever affects the full musical texture at once as the internal temporal ordering of tones is fixed by the holes on the roll. Such differences aside, listeners are likely inclined to hear Pianola performances through ears attuned to human pianism.³⁵ After all, the repertoire featured on piano rolls celebrated the familiar lineage of Romantic piano literature. As Marion Saxer has suggested, this mimetic relation secured a continuity in sociomusical practices and contributed to the instrument's economic success.³⁶ At the

Cypess, "It Would Be without Error." Voskuhl, *Androids in the Enlightenment*, discusses the close relation between musical automata and the history of emotions.

³² This differentiation between layers of notation and annotation will merit further consideration elsewhere.

³³ "[The Metrostyle] makes the Pianola an instrument of music, and not a musical machine." Aeolian Company, "The Metrostyle Pianola," advertising leaflet in *McClure's Magazine*, 1903, i.

³⁴ A convincing example of Lawson's playing is available at www.youtube.com/watch?v=G8n-s5IohT4/, esp. ca. 6:15.

³⁵ The polarity between a rational and phenomenological evaluation of these effects could supply an intriguing case study for testing the cognitive capacity of "corrective listening" (*zurechthören*) in empirical aesthetics.

³⁶ Marion Saxer, "Die Ökonomisierung der Wahrnehmung. Anmerkungen zur Wirtschaftsgeschichte der Medien oder: vom Aufstieg und Niedergang des Selbst-

same time, the attendant sonic aspirations also posed challenges to the players of the new instrument.

Into Practice

As the story goes, many of those audience members of the showcase concerts who were incentivized to procure their own Pianola felt deluded by its apparent ease of use once they tried to emulate the performances they had heard. Advertisements for the Pianola and similar instruments had repeatedly emphasized that “anybody, regardless of their skill” could now make music. Among the innumerable expressions of this idea, a particularly memorable and often-cited image is an ad for the Gulbrandsen, titled “Easy to Play,” that shows a baby crawling over and thereby “operating” the pneumatic pedals. In other cases, such as the “Simplex,” the idea was ingrained in the name. But as critics have noted, then and now, without some skill and musical knowledge, a rendition on these instruments sounds just as mechanical as their metronomic raw material. Artistic expressivity, in other words, has to be learned.

The Metrostyle offered a welcome opportunity to address this problem. Representatives of the Aeolian Company recognized early on that the annotated line could function as a pedagogical device, guiding players to musically convincing performances. If players followed the line with the lever on their instrument and thus enacted the represented interpretation, through repeated use and practice they would internalize these performances and learn to recognize the principles of “intelligent, musicianly interpretation.”³⁷ Ultimately, this guided practice would make even a previously inexperienced player capable of producing their own interpretation, of expressing themselves freely while also fulfilling standards of artistic music-making. Or, as Joseph Slivinski put it: “The Metrostyle . . . makes it possible for those who have not studied music to learn to interpret artistically the great masterpieces.”³⁸

spielklaviers,” in *Spiel (mit) der Maschine: Musikalische Medienpraxis in der Frühzeit von Phonographie, Selbstspielklavier, Film und Radio*, ed. Marion Saxer (Bielefeld: transcript, 2016), 75–100, at 95. Thomas Patteson (*Instruments for New Music*, 39) delineates how the technology, especially through its adaptation in the reproducing piano, also stimulated radical changes in compositional aesthetics, leading to the paradigm of “mechanical music” by the 1920s. Original works written specifically for the Pianola, such as Igor Stravinsky’s *Étude pour pianola*, commissioned by the Aeolian Company in 1917, anticipated the “joy of precision” that Patteson traces.

³⁷ The Aeolian Company’s 1903 advertisement leaflet praises the Metrostyle as “an authoritative, easily followed but not obligatory guide to intelligent, musicianly interpretation.” “The Metrostyle Pianola.”

³⁸ Joseph Slivinski (probably Polish pianist Józef Śliwiński), quoted in the advertising leaflet “The Metrostyle Pianola.”

As I discuss in more detail elsewhere, the pedagogical appeal of the Metrostyle was heightened by the ingenious idea of commissioning renowned musicians to provide their interpretations as the basis for the Metrostyle annotation.³⁹ On such “Autograph Metrostyle” rolls (as they were marketed) the red line reflects tempo fluctuations suggested by the featured pianists, sometimes the composers themselves. The results could rightfully be advertised as capturing authoritative interpretations, in a manner that makes them reproducible by anyone sitting at the Pianola. More than simply a technological supplement to an invention that was aimed first and foremost at refining the Pianola’s musical possibilities, the annotation of the music rolls was a crucial component in the participatory model of music-making that the Pianola commonly promoted.

Production firms located this aspiration for simplified musicianship also in the overall design of their instruments. A handbook for the Angelus Piano, for instance, proclaimed: “Should you imagine the mastery of the player piano a difficult matter, contrast a few days used in familiarizing yourself with the Angelus as compared with years of study and expense incurred before being able to play the simplest composition by hand.”⁴⁰ The notion of “mastery” thus becomes redirected from the bodily control of the performer’s fingers to a much more cerebral understanding of the new instrument. The comment, moreover, refers to the “years of study” that the instrument bypassed: the tedious scales, monotonous études, and years, if not decades, of dedicated practice required for a satisfactory command of the piano—another trope that manufacturing firms did not tire of highlighting repeatedly in various disguises. The promise was that such labor was no longer necessary. As the Aeolian Company summarized in an advertisement from 1912: “The Pianola Piano provides both the Piano and the ability to play it.”⁴¹

This commodification of “mastery” and “ability” relied in the first place on deconstructing the activities of pianistic music-making relegated to the Pianola. The same ad identified the two main hurdles that the Pianola could overcome: “The Pianola Piano removes the barrier which has stood so long between you and the enjoyment of music—the lack of ability to read the written notes and to finger the keys.”⁴² Both of

³⁹ I explore the complexities of transferring a musical interpretation into the annotation of the Metrostyle-line—likely a collaborative effort between the musician and a representative of the Aeolian Company—and claims of authority and authenticity in “Reproducing Authenticity and Teaching Musical Interpretation with the Metrostyle Pianola,” in *Player Pianos in Early 20th-Century Life*, ed. Catherine Hennessy Wolter (forthcoming).

⁴⁰ [Wilcox & White], *Artistic Piano Playing with the Angelus*, 3.

⁴¹ Aeolian Company, advertisement in the *Times*, November 1, 1912, 14.

⁴² Aeolian Company, advertisement in the *Times*, November 1, 1912, 14.

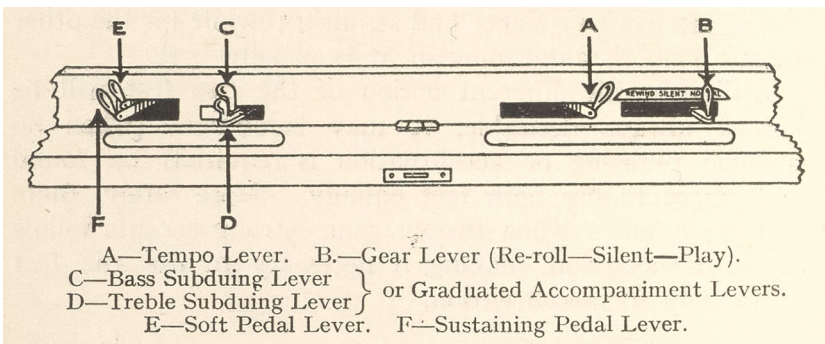
these skills merit further attention. The latter—physical control over one’s own fingers and the ability to move them with the speed and accuracy required to perform music at will—is perhaps the most common way in which the challenge of regular piano-playing is contrasted against the operation of levers on the Pianola.

The Skills of Pianola-Playing: Operating Levers

The notion that the Pianola radically simplified music-making has been fueled in large part through comparison with its progenitorial instrument, the piano. What springs to the eye first in such a juxtaposition is the difference between their manual interfaces: eighty-eight keys on the latter and merely four to six levers on the former (see fig. 4).

This obvious disparity in contact points rightfully raises questions about the nature of the supplementary forces required to create a musical performance on the Pianola. An obvious response is to locate this activity in the mechanism of the Pianola, the confluence of the quasi-automatic action and the information coded on the music rolls. Sergio Ospina Romero, who analyzes this bipartition of agency through the lens of Marxism, has stretched the analogy to suggest that “the interaction (between instrument and player) and co-production for the sake of musicality almost resembled, at times, Fordist principles of labor

FIGURE 4. Illustration of the levers on a Pianola of the Aeolian Company. Reginald Reynolds, “On Playing the ‘Pianola’ in Its Various Forms,” in Percy A. Scholes, *The Appreciation of Music by Means of the ‘Pianola’ and ‘Duo-Art’: A Course of Lectures Delivered at Aeolian Hall, London* (London: H. Milford, Oxford University Press, 1925), 140. Reproduced by kind permission of the Syndics of Cambridge University Library.



division.”⁴³ But Ospina Romero also astutely observes that the invisibility of the mechanics inside the Pianola has repeatedly attached an “acousmatic spell” to the instrument that allowed theories of the mysterious inner workings to oscillate between the accurate and the fictional.⁴⁴

Various handbooks that were published on the art of Pianola-playing sought to counter this black-boxing. They introduce novice players to the instrument and provide instructions on its use and on how to achieve different musical effects. These texts perform an admirable balancing act between upholding the notion that “a child can play it” and still conveying the complexity of movements and technical details needed to successfully play the instrument, as Reginald Reynolds, one of the main British pianolists of the Aeolian Company, self-consciously frames the challenge in his manual.⁴⁵ His handbook deconstructs the allegedly simple act of playing into recommendations for the right posture, technical drawings, specialist terms, and the gentle reminder that “some practice will be necessary before it is possible to judge the exact manipulation of the levers for producing the effects required.”⁴⁶ How easy was it, then, to operate the various levers of the Pianola? Reynolds writes:

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The Tempo Lever should be held *lightly* and freely between the thumb and forefinger of the right hand.

The Subduing Levers can, in most cases, be used by the thumb of the left hand, enabling the middle finger to be used for the sustaining pedal, with the forefinger available for the soft pedal. But when the isolation of individual notes (not already “themodised”) may be desired, it will be found necessary to use the thumb upon the lever for subduing the treble, and the forefinger upon the lever for subduing the bass, in which case the sustaining pedal must be controlled by the little finger. When this form of manipulation is required it will be best to turn the left wrist and elbow outwards; the forefinger can then be released while the thumb is held back.⁴⁷

To summarize, the pianolist manipulates effects of tempo with their right hand and dynamic shadings with their left. This general rule applies across most models of instruments and different brands. On the Aeolian

⁴³ Ospina Romero, “On Pianolas and Pianolists.”

⁴⁴ Ospina Romero (“Ghosts in the Machine,” 5) builds on the notion of acousmatic effects in technology for the mechanical reproduction of sound as discussed, for example, in Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham, NC: Duke University Press, 2003), 20.

⁴⁵ Reginald Reynolds, “On Playing the ‘Pianola’ in Its Various Forms,” in *The Appreciation of Music by Means of the ‘Pianola’ and ‘Duo-Art,’* ed. Percy A. Scholes (London; New York: H. Milford, Oxford University Press, 1925), 137–55.

⁴⁶ Reynolds, “On Playing the ‘Pianola,’” 155.

⁴⁷ Reynolds, “On Playing the ‘Pianola,’” 140, emphasis in original.

Company's Pianola, the player's left hand has a total of four levers to operate, which variously subdue the dynamics of the bass or treble register and actuate the piano pedals. This already sounds like an intricate and delicate task, one that certainly requires practice for assimilating different hand movements, learning how they relate to the desired musical effects, and eventually combining them into reasonable interpretations of diverse musical works and styles.

This holds true also for regulating the tempo, even though the operation of a single lever appears a comparatively easy task, the more so when following a predefined *Metrostyle-line*. However, performing fluctuations in tempo by merely shifting a lever slightly to the left or the right is hardly an intuitive way of experiencing tempo, as it lacks the physical effort and lived excitement of an *accelerando* or the suspense of a *rubato*. The activity that most directly resembles these sensations in Pianola-playing is the treading of the pneumatic pedals. In fact, the task of continuously operating the pedals engages the player's legs and feet in a much more physically demanding way than the use of the *forte* and sustaining pedals on a regular piano. This activity, however, does not affect the tempo of the sounding music and thus must be decoupled from the assumption that treading faster might translate into a faster tempo. When approaching the Pianola, therefore, musicians trained on other instruments—and especially the piano—had to rewire their bodies and minds.⁴⁸

The Skills of Pianola-Playing: Singing with the Feet

Treading the pedals powers the pneumatic mechanism by providing the suction of air to activate the valves. In technological terms, the strength with which the bellows are operated varies the force with which the mechanical action is triggered. Like on a harmonium, this means that a controlled use of the pneumatic pedals shapes variance in dynamics and timbre. Moreover, a single stroke with one foot can produce an accentuation of the respective tone. The pianolist's two feet thus assume slightly different functions: one realizes momentary accents while the other assures a regular stream of air in the pneumatic system. To complicate matters, a passage with "a rapid succession of chords" or fast runs requires more air in the pneumatic system to operate all the separate

⁴⁸ To frame similar processes of unlearning and retraining embodied gestures and aural expectations in music, Daniel Walden has delineated relevant theories of defamiliarization in "The Politics of Tuning and Temperament: Transnational Exchange and the Production of Music Theory in 19th-Century Europe, Asia, and North America" (PhD diss., Harvard University, 2019), chap. 4.

valves.⁴⁹ Therefore, the player will have to treadle more forcefully to supply enough air pressure for rendering the required dynamics—all the more if the passage is to be performed with a crescendo.

Such immanently physical-mechanical concerns aside, Reynolds posits that “the ‘touch’ of the Pianola is controlled by the feet,” referring to the touch of depressing the keys on a regular keyboard.⁵⁰ The sense of touch, of striking the keys of the keyboard with a deliberate amount of weight and speed, is thus not eliminated on the Pianola. It is merely relegated to different limbs and to a mechanical appliance that is markedly absent from the regular piano and therefore easily misunderstood in comparison. While the Pianola’s pneumatic pedals and hand levers significantly reduce the player’s contact points with the instrument in comparison to the piano keyboard, equating the compactness of its haptic interface with a restriction of musical agency would be overly simplistic. To start, such an assessment commonly overlooks the impact of the pneumatic pedals on the Pianola’s musical capacities.

Crucially, the performer’s interaction with a pneumatic system fundamentally diverts the acoustic generation of sound from a depressing of keys to an air-powered process. Therefore, the feet of the pianolist not only control a sense of touch on the keys but are also more directly in touch themselves with the bellows, the lungs of the instrument as it were. In 1922 Sydney Grew expressed this dual analogy in his manual-qua-manifesto, *The Art of the Player-Piano*: “Pedalling is as breathing in singing or fingering in pianoforte playing.”⁵¹ Grew associates the action of pedaling with two different physical activities—moving the fingers on a piano keyboard and breathing in singing. Since pedaling shapes the sounds produced on the Pianola (their articulation, dynamics, and timbre), I would take the analogy further to suggest that skilled pianolists must learn to sing with their feet.⁵² This reading builds on further remarks by Grew, who also proposed to conceive of the Pianola—like any other musical instrument—as an “extension of the body”: “The essential in an art of musical performance is direct association, or touch: the instrument is an extension of the body, a part of the performer; and the closer the connection the more perfect is the touch.”⁵³

⁴⁹ Reynolds, “On Playing the ‘Pianola,’” 139.

⁵⁰ Reynolds, “On Playing the ‘Pianola,’” 138.

⁵¹ Sydney Grew, *The Art of the Player-Piano: A Text-Book for Student and Teacher* (London: Kegan, Paul, Trench, Trubner, 1922), v.

⁵² Although the mechanical assimilation of singing appears much more direct with the Pianola, the evocation of shaping cantabile qualities by means of pianistic pedals is reminiscent of nineteenth-century discourse around the sustaining pedal on the piano. See David Rowland, *A History of Pianoforte Pedalling* (Cambridge: Cambridge University Press, 1993), esp. chap. 8, including an account from 1833 on comparing the operation of pedals with lungs (114).

⁵³ Sydney Grew, “The Player-Piano,” *Music & Letters* 6 (1925): 236–47, at 241.

For Grew, this close connection between the performer and her instrument distinguishes the Pianola from the reproducing piano (or “street-piano,” as he calls it), which “is not a tool or instrument, but a machine.”⁵⁴ Following from this analysis, the pneumatic pedals are perhaps the most sensitive and direct “association” that the player perceives with the generation of sound. On reproducing pianos, indeed, this relation is suspended since the bellows are usually powered by electricity. The reproducing piano thus lands firmly in Grew’s category of a “machine.” The conception of instruments as “extensions of the body,” meanwhile, ties into common discourses on (musical) instruments as a form of prosthesis.⁵⁵ But beyond this close connection between player and instrument that Grew hints at, the metaphor of the prosthetic also applies to the Pianola’s construction on a yet more integral level. Since the Pianola was modeled to reflect the physical actions of a pianist, it figuratively transplanted human limbs into its mechanics.

Excursus: Body Metaphors—Mediating Human and Mechanism

On the early form of the Pianola, as a “piano player” or “push-up” cabinet (as operated by Easthope Martin in fig. 1), the transfer of action between the Pianola and the attached piano occurred through eighty-eight (originally sixty-five) wooden “fingers.” Cecilia Björkén-Nyberg has pointed out that this was not merely a descriptive metaphor taking reference from the human body. Rather, engineering the Pianola involved a detailed analysis of a pianist’s “functioning” that could be translated into elements of the mechanism.⁵⁶ This relation through mimicry at once predisposed the Pianola to comparative critique, to measuring how well this android apparatus could in fact imitate human playing. A 1913 essay in *Player-Piano Review* ponders a perceived mechanicity of the Pianola and ascribes this shortcoming to the “uniformity” of its “fingers.”⁵⁷ The invariable length of the mechanical fingers fixes the instrument’s

⁵⁴ Grew, “The Player-Piano,” 241.

⁵⁵ For a provocative reading on the prosthetic in musical play, see Peter Szendy, *Phantom Limbs: On Musical Bodies*, trans. Will Bishop (New York: Fordham University Press, 2015). Cecilia Björkén-Nyberg offers a pianistically focused review of infiltrations of the prosthetic into musical discourse, including their relationship to the player piano. Björkén-Nyberg, “From Carl Czerny’s Miss Cecilia to the Cecilian: Engineering, Aesthetics, and Gendered Piano Instruction,” *Journal of Historical Research in Music Education* 40 (2019): 125–42.

⁵⁶ Björkén-Nyberg, *The Player Piano and the Edwardian Novel*, 54.

⁵⁷ J. H. Morrison, “Strong and Weak Points of the Latest Pneumatic Piano-Players,” *Player-Piano Review* 2, no. 9 (1913): 62–71, at 62. The author describes this evenness as “perhaps, the most subtle and inevitable difference between the mechanical and the human player.”

“quality of touch” to a single position, inferior to the variance available to a pianist. A more nuanced reflection might consider the difficulty of varying the weight across different parts of the musical texture, such as accentuating an inner voice.

Through an inverse lens of comparison, meanwhile, the Pianola exposes limitations of a pianist’s hands.⁵⁸ An evenness in strength between all fingers seems precisely an achievement to which many pianists strive throughout their career; having ten—let alone more—equally strong fingers: a pianistic utopia. This realization indeed stirred imaginations of future music-making, from Ernest Newman, who celebrated the Pianola as the pinnacle of “modern piano music,” to humorist Alexander Moszkowski, who was eager to bypass “parasitic” pianists.⁵⁹ These visions stake out convoluted ontologies of musical performance and the tensions between expressive variance and total control, perfection and imperfection as the discursive field in which the Pianola was evaluated by its contemporaries.⁶⁰

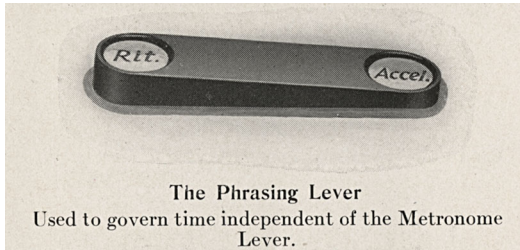
In addition to implementing principles of pianistic activity into the mechanics of the Pianola, production companies also sought ways to accommodate the instrument to human sensibilities. The sense of touch—so essential to the playing of any instrument—arose as a recurrent and particular concern that seemed eradicated from the interface of the Pianola with its two-dimensional levers. Even with the additional potentialities of controlling timbre through an air-powered mechanism, shifting this sense modality to the feet might not convince as a fully adequate substitute to feeling the piano’s keys under the fingertips.

⁵⁸ In his study of the craftsman, Richard Sennett has theorized a similar way in which both mimicking replicants and their superhuman counterparts, robots, reflect back on their model—the human. Richard Sennett, *The Craftsman* (New Haven, CT: Yale University Press, 2008), chap. 3, “Machines.”

⁵⁹ Ernest Newman, *The Piano-Player and Its Music* (London: Grant Richards, 1920), 9: “The whole technical evolution of modern piano music has been unconsciously towards the piano-player.” Newman’s claim suggests an aesthetic necessity to develop an instrument better suited to perform the repertoire of the past than what was available when it was composed. Alexander Moszkowski, *Das Pianola: Ein Beitrag zur Kunstphilosophie* (Berlin, 1911). For a more extensive discussion of Moszkowski’s provocative pamphlet and its implications for ontologies of musical performance, see Rebecca Wolf, “Spielen und bedienen: Das selbstspielende Klavier als virtuose Maschine,” in *Spiel (mit) der Maschine: Musikalische Medienpraxis in der Frühzeit von Phonographie, Selbstspielklavier, Film und Radio*, ed. Marion Saxer (Bielefeld: transcript, 2016), 137–56.

⁶⁰ Morrison, quoted above (see note 57), introduced his professed critique of the Pianola’s mechanical limitations with the observation that imperfection lends the machine human qualities: “The machine is human enough to have a mixed character of qualities and defects” (“Strong and Weak Points,” 62). David Suisman (“Sound, Knowledge”) investigates the concept of “human failure” in discourse on musical instruments and mechanisms, while Bijsterveld and Pinch (“Should One Applaud?,” 541–42) expand on the notion of imperfection as a qualifier of instrumental play.

FIGURE 5. The phrasing lever on an Angelus piano. [Wilcox & White], *Artistic Piano Playing with the Angelus* (Springfield, MA: John C. Otto, n.d. [ca. 1920]), 9. Reproduction kindly provided by Howe Collection of Musical Instrument Literature, ARS-0167, Box 129 folder 8. Stanford Archive of Recorded Sound, Stanford University Libraries, Stanford, CA.



As if to respond to this deficiency, the American manufacturing firm Wilcox & White adjusted the manual interface of their Angelus piano. Instead of the *Metrostyle* lever on an Aeolian Pianola, the Angelus featured a “phrasing lever” (fig. 5).⁶¹ Described as a “tilting tablet” in the manual, it was marked with “Rit.” (for *ritardando*) on the far-left and “Accel.” (for *accelerando*) on the far-right side. Rather than sliding a lever left to right, this shift switch allowed players to regulate expressive tempo by depressing the ends of the switch.

The switch is promised to be “sensitive, needing but a slight pressure to make changes in time.” Moreover, it allowed for immediate feedback in that “by merely resting the finger upon this tablet every pulsation of air can be felt as it passes through the instrument.”⁶² Through this intensified connection between player and instrument, the phrasing lever approximated further the quasi-prosthetic fusion that Grew envisioned for the interrelation between human and musical instruments.

This technological advancement provides another example of efforts by engineers and advising musicians to hone the Pianola and similar instruments to become ever more sensitive, responsive, and musical. These pursuits of humanizing the mechanical counter narratives of the gradual dehumanization of musical labor that scholars such as Ospina

⁶¹ [Wilcox & White], *Artistic Piano Playing with the Angelus*, 7–8. The phrasing lever is combined with a “Metronome lever” that is used to adjust an overarching starting tempo—similar to the lever for the *Metrostyle* on the Aeolian. But by decoupling this function from the continuous variations in tempo on the switch, the Angelus’s metronome lever does in fact—according to its name—regulate a steady overarching tempo (like a metronome would), since releasing the phrasing lever has the effect of resuming in “normal basic time” (8).

⁶² [Wilcox & White], *Artistic Piano Playing with the Angelus*, 7–8.

Romero, Suisman, and Timothy Taylor have observed.⁶³ Taylor, for instance, frames the mere availability of music on piano rolls as fostering a “consumerist ideology,” which overshadows the ideal of self-expression that the Pianola afforded.⁶⁴ Such a reading neglects the fact that the music rolls for the Pianola do not yet reify music as a ready-made object as they essentially rely on human input to be transmuted, or unmuted, into sounding music.⁶⁵ In short, the ideal of self-expression is indeed a vital component of the Pianola’s cultural identity.

With respect to the experience of playing the Pianola, the different elements of the instrument’s haptic interface—dynamic levers, tempo lever, the pneumatic pedals, and finally the phrasing lever—provide a variety of creative and expressive possibilities to the player. As with any other musical instrument, using them effectively requires the combination of some bodily skills, musical sensibility, and a good understanding of the instrument’s inner workings. In relation to playing the piano, certain conventions of shaping the music might have to be untrained and reconceived—again, just as switching between other kinds of musical instruments requires a process of adaptation. Indeed, it was not so much the haptic configuration of the Pianola that instituted a certain aura of the mechanical in music-making, I would argue, but rather a more intangible dimension in the interaction between instrument and player.

The Skills of Pianola-Playing: Reading and Letting the Pianola Read

As noted above, the Aeolian Company identified two main “barriers” that hindered many from expressing themselves musically on the piano. Besides the accuracy in “fingering the keys,” it was the “ability to read the written notes,” meaning the system of conventional music notation, that impeded accessibility for the untrained.⁶⁶ The Pianola, they promised, could help overcome both of these obstacles. Many advertisements, like the one shown in figure 6, illustrated this message plainly and assertively.

The two-bar excerpt from Beethoven’s Sonata Op. 106 is effectively eye-catching and visually dense with a key signature of five sharps,

⁶³ Timothy D. Taylor, “The Commodification of Music at the Dawn of the Era of ‘Mechanical Music,’” *Ethnomusicology* 51 (2007): 281–305, esp. 283–301. For a broader discussion on narratives of commodification with respect to the player piano, see Ospina Romero, “Ghosts in the Machine,” esp. 7–11; and Suisman, “Sound, Knowledge.”

⁶⁴ Taylor, “Commodification of Music.”

⁶⁵ In that way, they do not carry the same acousmatic potential as the reproducing piano and phonograph—a quality that Ospina Romero (“Ghosts in the Machine,” esp. 8–11) observes as underlying processes of musical commodification.

⁶⁶ Aeolian Company, Advertisement in the *Times*, November 1, 1912, 14: “The Pianola Piano removes the barrier which has stood so long between you and the enjoyment of music—the lack of ability to read the written notes and to finger the keys.”

FIGURE 6. Aeolian Company, “Can you play this?” Advertisement for the Pianola Piano in the *Observer*, February 25, 1912, 4. Reproduced by kind permission from <https://www.newspapers.com/newspage/258814532/>.

*Excerpt from
Beethoven's Sonata, Op. 106.*



Can you play this ?

What is it that prevents you from playing this simple passage just as Beethoven meant it to be played ?

It is not because you do not love music—it is not because your ear is not attuned to harmony. Isn't it only because you are unable to translate these signs into the sounds they represent ? You have never acquired the knowledge or the manual dexterity necessary to do so.

Why not get a Pianola and let the music roll play the notes for you ?

The Pianola Piano makes short work of the difficulties of music—reads the notes and plays them for you—but does not rob you of any of the pleasures of personal rendition. You interpret the music according to your mood and taste. You infuse the composition with your own personality.

The Pianola Piano responds to your emotions as no other piano-playing instrument in the world could do. This is no prejudiced statement—it is the testimony of the entire musical world.

The Pianola Piano

with

The Metrostyle and The Themodist

The Metrostyle is the feature of the Pianola Piano that has won for it the unstinted praise of the most famous musicians. The Metrostyle enables the novice to play the most complicated music with all the colour and feeling of a finished musician. It is the only practical expression guide ever invented.

The Themodist brings out the complete melody of the simplest ballad or the most complicated composition. It accents, note by note, the actual melody and subdues all other notes, whether above or below. The Themodist gives you an absolute, governable touch. It is an exclusive feature of the Pianola Piano.

The Pianola Piano—the Piano of to-day—is the magnificent Pianola combined with the world-famous Steinway, Weber, or Steck Piano. See, hear, and play it at Aeolian Hall, or write for Catalogue "R."

THE ORCHESTRELLÉ CO.,
AEOLIAN HALL,
135-6-7, NEW BOND STREET, LONDON, W.

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a contrapuntal texture with many sixteenth notes, additional accidentals, and lots of fingerings. The notation signals difficulty both to those who might be at a loss over the sheer clutter of symbols and to those who are in fact able to read them and correlate them with the technical intricacies of the passage and the work from which it is taken. Underneath, the ad asks provocatively, “Can you play this?” and probes further, “What is it that prevents you from playing this simple passage just as Beethoven

meant it to be played?” While many conceivable answers are possible, the advertisers assert that it is “only because you’re unable to translate these signs into the sounds they represent.” Luckily, the Pianola “reads the notes and plays them for you.”⁶⁷ Another ad from 1912 similarly brings home the message that, with the Pianola, reading no longer conditions playing. The ad is superimposed on a page of sheet music that features octave runs in the right hand and full chords in the left—in short, music that at first sight is not only difficult to read but also to play. The heading assures us, “You might not be able to read music—but you *can* play it.”⁶⁸ When the instrument takes care of the preliminary tasks, what it leaves for the player is the act of interpretation: “You interpret the music according to your mood and taste. You infuse the composition with your own personality.”⁶⁹

The Pianola thus detached the enjoyment of music-making from the need to read conventional notation, previously a prerequisite to playing. This alluring promise has been misinterpreted to suggest that the Pianola no longer required the ability to read music at all, in any form of notational representation. And that assumption, in turn, has been perpetuated in commentary and scholarship to the present day, impinging on the intriguing question as to whether piano rolls might not provide an alternative form of notation.

This intuition, indeed, has been litigated in numerous court cases in which sheet music distributors accused producers of other storage media for music, including piano rolls, of infringing on their publishing rights.⁷⁰ One of the strongest arguments offered by the defense drew on comparison with phonograph records to deny that the rolls were legible to human users, asserting instead that the rolls were exclusively machine readable. Even though this reasoning was anything but iron-clad—especially with respect to metronomic music-rolls for the Pianola that do not encode an interpretation—judges repeatedly corroborated the illegibility of piano rolls. Despite the immediate jurisdictional success, these debates straitened communication between piano-roll companies and their customers. Cultivating the (mis)conception of the rolls’ illegibility in the wider public at once unsettled the observation made by

⁶⁷ Aeolian Company, Advertisement for the Pianola Piano in the *Observer*, February 25, 1912, 4.

⁶⁸ Aeolian Company, Advertisement for the Pianola Piano in the *Observer*, November 17, 1912, 11: “The Pianola Piano reads the music—you interpret it.”

⁶⁹ Aeolian Company, Advertisement for the Pianola Piano in the *Observer*, February 25, 1912, 4.

⁷⁰ Two pertinent cases from 1906 and 1846 are discussed in Gitelman, “Media, Materiality, and the Measure of the Digital,” esp. 204; and Peter Szendy, *Listen: A History of Our Ears*, trans. Charlotte Mandell (New York: Fordham University Press, 2008), 74–80.

many that the perforation of the rolls does in fact encode the essential parameters of the musical work as captured in the score: they map the tones in their two variables of pitch and duration, and they reflect the temporal distance between consecutive tones. All these elements are readily legible, and arguably more straightforwardly so than in conventional notation. Time and temporal relations are represented through the vertical spacing and extension of the roll's perforations; the placement of the holes on the roll's horizontal axis reflects the arrangement of the respective pitches on the piano keyboard.⁷¹

The inconsistencies and confusions arising from the court cases notwithstanding, various accounts attest that the legibility of the music rolls was in fact much more than mere "tacit knowledge."⁷² This, moreover, was not merely a convenient side effect but integral to playing the Pianola, as Reynolds explains in his handbook: "It will be found necessary, and is fortunately easy, to be able to read and understand the perforations in the music rolls sufficiently well to know what to expect before the notes are actually played."⁷³ From a musical perspective, then, reading music continued to play an essential part in Pianola performance. After all, as noted earlier, producers and musicians alike framed the Pianola within an educational agenda, in which the lay musicians should not only experience the short-lived pleasure of reproducing predefined interpretations but also "learn to interpret artistically the great masterpieces," as Slivinski had put it.⁷⁴ Especially in this field of free interpretation, a solid knowledge of the work to be performed remained a prerequisite. While the music could certainly be studied through the traditional format of a score or learned aurally through repeated playing, the music rolls effectively provided the necessary access on a visual level.

The fact that the surface of the rolls was annotated with visual cues for the performers to *read* while playing additionally speaks to considering them as a form of notation. This bifurcation of the notational representation between the perforations and surface annotations may invite the differentiation proposed by Lisa Gitelman between reading the "music rolls" as opposed to reading "the music."⁷⁵ Following the Metrostyle-line with the pointer on the instrument might qualify as a reading of the roll without necessarily engaging with the

⁷¹ Emily Dolan has analyzed the ubiquity of the piano keyboard as a powerful frame of reference for conceptualizing music across the centuries. Dolan, "Toward a Musicology of Interfaces," *Keyboard Perspectives* 5 (2012): 1–12.

⁷² Gitelman ("Media, Materiality, and the Measure of the Digital," 217n32) relates this to "tacit knowledge."

⁷³ Reynolds, "On Playing the 'Pianola,'" 137–8.

⁷⁴ Slivinski, quoted in the advertising leaflet "The Metrostyle Pianola."

⁷⁵ Gitelman, "Media, Materiality, and the Measure of the Digital," 209, emphasis in original.

representation of the music. But in practice, I posit, the two activities are closely intertwined. After all, playing a roll comes with an immediate auditive feedback that connects the sounds produced to the perforations as visual cues. In most cases, therefore, the experience of playing the Pianola will entail some form of reading not only the rolls but also the “music itself.”

At the same time, the instrument stands up to its promises: the player is no longer required to read conventional music notation, a codified system of signs and significations demanding specialist literacy.⁷⁶ Instead, the music rolls of the Pianola offer an accessible alternative that is both intuitively legible and tailored to the operational and performative contexts of the instrument. In practice, indeed, the instrument and the player share the task of reading. They meet in the same notational interface provided by the music rolls, which they both decode, each for their own purposes. In light of this collaborative effort, the apparent incompatibility between different classes of readership—humans and machines—that the above dispute construed seems to dissolve.

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Being Told How to Read

And yet, there is arguably a difference between the ways in which machines and humans read. As a mechanism, the Pianola’s mode of “reading” the perforations of the music rolls is strictly linear. Reading habits among humans, meanwhile, are never so rigidly defined.⁷⁷ The mechanical workings of the Pianola, however, constrain the available modality of reading and impose it also on the human player. This is primarily a matter of temporality: as it plays, the music roll unwinds continuously, revealing only a short segment of its entire length. The mechanism controls the pace not only of the music but also of the player’s cognitive engagement with it. Looking and listening back is only possible when stopping and rewinding the roll; looking and listening ahead is trickier still. When enacting the interpretation defined through the annotations, such a modality of reading seems practical. The linear annotations—denoting fluctuations in tempo and dynamics—neatly symbolize and prescribe this form of engagement. But for interpreting the music more freely, the notion of “following” the annotated lines

⁷⁶ The essential difference to conventional score notation lies in the nondiastematic indexicality of the perforations compared to note-heads in a diastematic notation system.

⁷⁷ In recent years, many studies have investigated reading habits in music and otherwise by means of eye-tracking technology. Some pertinent results are summarized in Marjaana Puurtinen, “Eye on Music Reading: A Methodological Review of Studies from 1994 to 2017,” *Journal of Eye Movement Research* 11, no. 2 (2018): 1–16.

contrasts with the cognitive modes through which musicians conventionally approach music: through listening ahead, often by reading ahead, as Reynold reminded us above.

In addition to the relentless linearity of the predetermined reading mode, the reader's cognitive freedom is restricted by the limited excerpt of the music roll visible at any given moment.⁷⁸ As soon as it has been played, the completed part of the roll is wound up on an auxiliary spool within the instrument and disappears from sight. And still more constraining than the disappearance of previously played and heard music is the limited snippet of the roll revealing the music yet to come. This significantly limits the player's ability to read ahead. As a consequence, pianolists need to know their repertoire more profoundly than pianists, as they have to anticipate musical events without relying on notational cues much ahead of time.⁷⁹

While the Pianola was constantly modified to take on more human features, as we saw above, we can witness here how at the same time the instrument transferred some of its mechanical qualities onto its human users. The mechanical effects were not entirely unwanted, however. The steady unfolding of the music in front of the player's eyes and ears indeed also engendered compelling possibilities, especially for pedagogical purposes. By default, the Pianola's mechanics focus the reader's eyes on the very excerpt of the roll's visual aspect that corresponds to music sounding at any given moment. Through this automated synchronization of auditive and visual stimuli, the Pianola's action forges relations between these sensory modalities and facilitates a subliminal understanding of the music and its mode of presentation. A novice user of the Pianola, for instance, would quickly learn to appreciate the internal logic of the perforations and their relation to the sounding music. This learning could be further shaped and enhanced through paratextual annotation of the rolls, beyond instructions for performance. The initiative *AudioGraphic Music*, which British music pedagogue Percy A. Scholes chaired from 1925 to 1930, explored this potential by providing contextual and analytical information to listeners.⁸⁰ These rolls visually animated the music simultaneously with its hearing and thereby inaugurated standards for music appreciation that are still valued today.

⁷⁸ Gitelman, moreover, notes that with the roll unwinding downwards, common reading habits are inverted, since the reader has to adopt a perspective of reading upwards. Gitelman, "Media, Materiality, and the Measure of the Digital," esp. 209–10.

⁷⁹ The difference here is one of degree, encapsulated in the material format of the notation.

⁸⁰ I discuss the motivations and media-specific strategies of this initiative in "Music Appreciation through Animation: Percy A. Scholes's 'AudioGraphic' Piano Rolls," *SMT-V7* (2021), <http://doi.org/10.30535/smtv.7.1>.

For all its pedagogical potential, however, when the Pianola forces its users to surrender to the reading experience that it affords, it invariably takes liberty and control away from the player. It is all too enticing to succumb to the gradual unfolding of the notation and to let the mechanism determine the pace of reading without anticipating how the music might develop beyond the visible. A pianolist who tries to enact the interpretation indicated through a Metrostyle-line will tend to focus on the deviations of the line at any given moment and thereby easily lose an encompassing perspective of larger formal structures and coherences. In fact, when observing a pianolist in action (as can be done on various YouTube channels), there is a striking similarity to console games such as virtual car races. In this analogy, which draws from an account by Lawson, following the Metrostyle-line with the lever translates into operating a steering wheel to navigate the street and oncoming traffic. In both scenarios, players react to constantly evolving visual and aural stimuli, keeping in sight only what appears imminently vital to a successful completion of the game.⁸¹

In this way, the instrument also mechanized its human partners, and not only in an exterior, physical way (whereby the pressing of keys on the piano became the moving of levers on the Pianola). Rather, the efforts of engineering a new instrument targeted more internal changes, affecting cognitive modalities and, by implication, aesthetic experiences. Carlyle's warning from almost two centuries ago rings uncannily true. But if we allow these concerns to tinge our view of the Pianola, we would do well to reflect critically also on the ways in which we surrender to technologies that shape our experiences of making music and listening to it today—from pedagogical software to animated scores and listening guides. Many of these applications bear a striking resemblance to the “software” of the Pianola through their notational logic, the coding of different parameters through separate forms of representation, and the effects of synchronized animation.⁸² Among the different points of contact between player and instrument outlined above, therefore, it has been precisely the audiovisual interface of the Pianola that not only interfered most distinctively with familiar modalities of music-making but also appears to have had the most lasting effect in technologies of musical play to the present day.

⁸¹ Rex Lawson in an interview with the author, February 26, 2019.

⁸² The conception of storage media for mechanical musical instruments as their “software” (such as, in this case, the piano rolls) is proposed by Gitelman, “Media, Materiality, and the Measure of the Digital,” 204. For the above analogy, the software *Synthesia* is particularly pertinent, not only because of its prevalence in a vast array of applications but also because of the thorough similarities with the visual logic of piano rolls. Further correlations between musical play (specifically on the Pianola) and virtual games will merit more extensive scrutiny elsewhere, integrating a growing body of ludomusicological scholarship, such as Moseley, *Keys to Play*; and Kiri Miller, *Playing Along: Digital Games, YouTube, and Virtual Performance* (New York: Oxford University Press, 2012).

Cultural Negotiations

Concerns with mechanisms of guidance and control play out also in the cultural field more widely conceived. Representatives of production firms recognized that engaging pianolists through the audiovisual interface of the instrument provided the key to a broader dimension of literacy—that of cultural proficiency. “You know Dickens but do you know Beethoven?” is what an advertisement of the Aeolian Company provocatively asked in 1912.⁸³ Through playing, the coupled experience of grasping the music through its inscription on the roll in conjunction with perceiving it as sound, pianolists could “get right to the heart of the composer”—a way of “knowing” Beethoven to the extent of internalizing his spirit. With other, more contemporary composers, the performance instructions they provided for their own pieces forged an even closer “bond” between the player and the composer, as an advertisement titled “From Grieg to You” intimates.⁸⁴ Björkén-Nyberg has captured this socio-cultural function of bringing musical repertoires into the bourgeois household as “domesticating musical works,” comparable to piano transcriptions of symphonic scores as they circulated in the nineteenth century.⁸⁵

But the practices could also be more forcefully described as the establishment and reinscription of a selective canon of Western classical music. The assortment of works available on music rolls defined the legacy of an elitist culture that was now within everyone’s reach. As a notational artifact, the piano rolls not only provided the material trace of this cultural heritage but also brought it to life. While the featured repertoires were adapted to popular taste and especially after World War I overwhelmingly provided popular songs and dance music styles, in its heyday of the early 1900s the Pianola vigilantly tended the established masterpieces of “high culture,” specifically the pianistic repertoire from Bach to Grieg and Paderewski. In 1920 H. B. Tremaine, president of the Aeolian Company, proudly reflected back on this sociocultural impact: “The Pianola put the works of the great composers into the most distant towns and villages in every country of the world. It familiarized the people of these remote centers with the best music, teaching them to understand and appreciate the master pieces of the great composers.”⁸⁶

This colonialist mission was not always received with gratitude. While some fulminated against the sheer noise that the Pianola brought into

⁸³ The Orchestrelle Co., “You know Dickens but do you know Beethoven?” *Times*, October 4, 1912, 4.

⁸⁴ The Orchestrelle Co., “From Grieg to You,” *Times*, November 22, 1912, 11.

⁸⁵ Björkén-Nyberg, *The Player Piano and the Edwardian Novel*, 33.

⁸⁶ H. B. Tremaine, “The Development of the Player-Piano: Its Influence on Musical Appreciation,” *New York Herald*, February 1, 1920, 19.

neighborhoods, others were perturbed more specifically by the notion that the Pianola and its music suppressed other forms of music-making, including folk music traditions and their repertoires. In a letter to the editor of the *Manchester Guardian* from September 1912, for instance, Ananda K. Coomaraswamy, a historian and interpreter of Indian art and culture to Western audiences, denounced the ruthless business interests behind the pervasive distribution of piano-players and pithily observed, “one Beethoven may be the flower of a century’s growth; but one folk-singer is better evidence of national musical capacity than the most enormous sale of pianola records of sonatas could be.”⁸⁷ By such accounts, the participatory model of music-making envisioned by companies like Aeolian succeeded, although ironically at the expense of other, already active forms of musical expression.

Conclusion: Human-Mechanical Encounters

The power dynamics implicated in Coomaraswamy’s commentary also instantiate some of the many ways in which the aesthetic and sociocultural ideologies behind the Pianola were firmly ingrained in economic interests and strategies, as scholars such as Ospina Romero and Taylor have made clear.⁸⁸ Even if—or, perhaps, precisely because—the Pianola was conceived in relation to its human operators and depended on their active engagement, it participated in a trend of commodifying music and the labor and skill involved in making it. But the Pianola also opposed narratives of an increased automation in music-making and listening in the early twentieth century. Its producers defied the allure of engineering a device for reproducing predetermined—“canned”—performances.⁸⁹ While enticed by the reputation and authority that came with capturing the playing of renowned musicians, they continued to pursue an agenda of democratizing music-making among ever wider parts of society. Just as Ospina Romero has disentangled the “human-machine interaction” in Pianola-playing into modalities of labor and co-labor through a reading from the perspective of Marxist theories, my analysis asks what this means for the musicians and their experience.

⁸⁷ Ananda K. Coomaraswamy, D.Sc, “The Piano-Player: To the Editor of the *Manchester Guardian*,” *Manchester Guardian*, September 25, 1912, 3.

⁸⁸ See Ospina Romero, “On Pianolas and Pianolists”; and Taylor, “Commodification of Music.” Saxer, “Die Ökonomisierung der Wahrnehmung,” is equally relevant here.

⁸⁹ Gitelman (“Media, Materiality, and the Measure of the Digital,” 202) points out that composer John Philip Sousa coined the term “canned music” in his pamphlet “The Menace of Mechanical Music” (1906) in protest to the court ruling on the question of whether piano rolls violated the copyright on printed music.

When deconstructing the art of Pianola-playing from a musical point of view, two levels of action and interaction appear relevant. The first relates to physical actions involved in creating music, on the part of both the Pianola and its player. Since the player powers the mechanism by treading the pneumatic pedals, she is in command on that level. Any production of sound relies entirely on her physical input. Moreover, the deliberate use of the pedals shapes the quality of tone produced and thus allows the player to exert control also in an aesthetic dimension. Further musical nuance can be achieved by the moving of levers and depressing buttons or tilting tablets with her fingers and hands. With practice, the pianolist can learn the necessary skills and technique to effectively combine these different elements to express herself musically. In that respect, the Pianola functions like any other instrument but promises a faster success in performing diverse repertoires once the player has acquainted herself with the necessary technique.

In distinction to these corporeal contact points, the second level of Pianola-playing concerns the intangible realm of its audiovisual interface. It is here that the instrument determines the rules of the game. Just as the Pianola depends on the player to power the mechanic system, its mechanism in turn imposes a form of dependence on its human counterpart. The player is forced to adapt her reading habits to the relentlessly linear unfolding of the music roll. She must concede control in an activity that usually constitutes the precondition of music-making: the cognitive dimension of grasping and imagining the music as sounding phenomenon beyond its notational representation. At the same time, through the dynamic unfolding of its audiovisual interface, the Pianola opened entirely new possibilities for animating musical experiences beyond the overtly instructional. In combination, the two levels expose the reciprocal relations and mutual dependencies between Pianola and pianolist. They also illuminate the ways in which each exceeds the other's limitations, and how it might be possible to mediate between the human and the mechanical.

The Pianola occupies a liminal space on the spectrum between musical instrument and reifying machine. J. H. Morrison has elegantly framed these categories as related by a matter of degree: "The distinction between a machine and an instrument or implement turns upon a difference of degree—the directness or indirectness with which human action is brought to bear in the production of the effect."⁹⁰ This is already warranted by the relationality of the applied measures of comparison. When pitted against the piano, the Pianola might stir critics to

⁹⁰ Morrison, "Strong and Weak Points of the Latest Pneumatic Piano-Players," 71.

lament a loss of control over the generation of sound—a common impulse in evaluating adjustments in instrument design, as Karin Bijsterveld and Trevor Pinch remind us.⁹¹ Compared to the reproducing piano, meanwhile, even early twentieth-century audiences classified the Pianola as distinctly more instrument-like.⁹²

My analysis highlights the specific modalities by which player and mechanism exert control over the musical result on the Pianola in varying degrees of immediacy, while giving prominence to the aesthetic experiences they shape. Many of these aspects also come to the fore when tracing the Pianola's technological evolution. Innovation in engineering aimed at providing greater nuance in the sounds that the instrument could produce and at making it more sensitive to human input. Through these efforts, the Pianola assertively developed from a mere machine to a refined musical instrument. In an age and cultural climate that has been persistently characterized by its zeal for commodifying music in a paradigm of automatic reproduction, this alone should give us reason to pause.

Apart from offering a historiographical corrective, the Pianola invites us to embrace the nuance suggested by Morrison and to explore more thoroughly the spectrum between taxonomical categories. Most recently, Rolf Grossmann has applied such a lens in excavating elements of musical play in the handling of musical technologies from phonographs to turntables and electronic and digital interfaces.⁹³ In this somewhat nostalgic search for the “instrumentalization” of reproduction media, the Pianola occupies a central place. It exemplifies Grossmann's concluding resistance to the elusive vision of close control as a defining criterion in understanding musical instruments, media, and technologies. Rather, he proposes, it is crucial to ask about the relations they forge and the interactions they afford. Taking this call further, the Pianola offers a model for interrogating our quotidian human-machine interactions today. While it might allay Carlyle's premonition of machines ex-

⁹¹ Bijsterveld and Pinch, “Should One Applaud?,” 539.

⁹² On this point see also Andreas Ballstaedt, “Das Selbstspielklavier als Schnittpunkt von Mensch, Musik und Maschine: Szenarien der Jahrhundertwende,” in *Maschinen und Mechanismen in der Musik: XXXI. Wissenschaftliche Arbeitstagung, Michaelstein, 9. bis 11. Mai 2003*, ed. Boje Schmuhl and Ute Omonsky (Augsburg: Wissner, 2006), 95–106, at 102.

⁹³ Rolf Grossmann, “Distanzierte Verhältnisse? Zur Musikinstrumentalisierung der Reproduktionsmedien,” in *Klang (ohne Körper)*, ed. Michael Harenberg and Daniel Weissberg (Bielefeld: transcript, 2010), 183–99, esp. 196: “A critical perspective must be applied to a commonly misunderstood vision in discourse on technical musical instruments: the idea of maximal control of the instrument by the human ‘operator.’ The perceived distance or closeness to technical musical instruments is a question not of more or less complete controllability of parameters, but of the relation between the instrumental organization of complex structures and the aesthetic strategy of play.”

tinguishing human expressivity, it exposes the many ways in which interactions with instruments and machines might unfold, from the corporeal to the cognitive.

ABSTRACT

Media histories of music often frame technological innovation in the early twentieth century within a general zeal for automated musical reproduction. The engineering efforts of the Aeolian Company and its Pianola counter such narratives by fostering active music-making rather than passive listening. As a pneumatically powered attachment to a piano, the Pianola was initially limited to reproducing strictly mechanical renditions of music from perforated paper rolls. But the invention of the Metrostyle in 1903, a hand lever to achieve tempo-specific effects, significantly refined the musical capacities of the instrument. It allowed for inscribing onto the music rolls authoritative performance instructions that could be enacted by the player. Revisiting the various places that the Metrostyle Pianola inhabited, from the manufacturing site to the concert hall and the bourgeois living room, I illuminate the different sociocultural relationships and musical experiences that it mediates. By relegating certain tasks of conventional piano-playing to the mechanical workings inside the instrument, the Pianola was marketed as facilitating simplified music-making in ever wider parts of society. The Metrostyle annotations served as a pedagogical device for instructing novice players in principles of nuanced and tasteful interpretation. My analysis exposes the reciprocal relationships between the instrument and its human players, from attempts to adapt the physical interface to human physiologies, to the ways in which the instrument, in turn, imposes certain mechanistic affordances on its players.

Keywords: Aeolian Company, musical reproduction, music inscription, music reading, human-machine interactions, democratization of music-making