

Sonic Affinity and Aesthetic Metamorphosis: The Nineteenth Century as a Turning Point in the History of Musical Thought

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Abstract

The theory of *sonic affinity* posits that the action of soundscapes perceived since the formation of the ear in the prenatal period models the human musical brain, generating aesthetic profiles in mimetic processes integrated within evolutionary logic. Applied to the field of historical musicology, this allows the interpretation of the nineteenth century as a key stage of musical mutations following the Industrial Revolution, which shattered the stillness of the ancien régime with the commotion of steam engines, mechanical spinners, and the railroad. Technological innovations had a decisive impact on the creation, performance, and perception of music. The orchestra grew unstoppable, the piano doubled in power and possibilities compared to its predecessors, metronome and pianola became universal, and cultured compositions developed previously unthinkable features and complexity. Every formal parameter of music was affected: accents, tempo, melody, harmony, timbre, and intensity. Importantly, the human voice, which had dominated the history of music since the Middle Ages, was temporarily drowned out by the instrumental avalanche—just as at factories people could not hear each other due to the din—reflecting both a physical and metaphorical surrender before the machine. Thus, the notorious differences between, for example, the cantabile progressions by Vivaldi and Handel on the one hand and the gigantism and steadiness of Bruckner and Mahler on the other were not restricted to natural evolution and personal temperament but largely obeyed the uneven sensory-auditory environment of the respective lifetimes of these composers. The response of the audience was broadly consistent with the new musical universe, reinforcing the notion of an underlying umbilical cord between what is heard and what is preferred. In addition, the notion of absolute music as the pinnacle of all arts turned its listening into an inward experience, tightly linked to the “othering of the senses” and correlative silencing of the listener.


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Introduction

“It is fearful! It is maddening! I am quite giddy and confused. London is the grandest and most complicated monster on the face of the earth,” claimed Felix Mendelssohn Bartholdy in a letter to his family about the noise and bustle in London when he visited the city in 1819.^[1] Many other contemporary testimonials about emerging industrial cities point towards an extraordinary sound shock in the nineteenth century. This article aims to propose a unifying perspective that can help bridge the gap between historical musicology and history of sound studies for phenomena such as sound worlds of the past and their interaction with musical thought.^[2] Music is not an essence out of time and place. It is closely intertwined with the context of its makers and receivers, which requires certain combined approaches for in-depth knowledge. Consequently, sound studies and their applications have become a “transdiscipline”^[3] today. Stated in positive terms: “it is precisely the interdisciplinary status of the history of sound that constitutes its greatest strength.”^[4]

The starting point for sonic affinity was that animals that adapt their skin color and body temperature to the surrounding environment survive better.^[5] This general principle has been successfully incorporated into disciplines such as biology and evolutionary development studies but barely applied to sound studies. In the present article, the first question in addressing this approach was whether humans need to adapt to the soundscapes they live in. Our response is yes; in fact, adaptation to soundscapes may have been crucial for life in prehistory (when our genome was formed) for three causal reasons: defensive-offensive functions, communication, and orientation.^[6] The second question was whether this adaptation has a direct repercussion on human musical preferences, and the answer is equally affirmative. The present study aims to substantiate both claims and apply them to such a dynamic and fascinating period in the history of music and sound as the nineteenth century.^[7] The analytical framework for this purpose is the theory of *sonic affinity*.^[8] It comes mostly from the field of neuroscience and posits that the human musical brain is modeled by the action of soundscapes perceived since the formation of the ear in the prenatal period,^[9] generating aesthetic profiles in mimetic processes integrated within evolutionary logic. In other words, humans tend to assimilate and reproduce the sounds of the aural environments that surround them from their inception and throughout their lifetime. With regard to specific parameters of music, for example, the steadiness of machinery sounds (overwhelming in the period considered) surely had a musical echo, because sound repetition induces a musical perception by itself: “across repetitions, environmental sounds can come to seem more music-like than they did on initial presentation ... regardless of whether the stimuli are repeated exactly or in jumbled form.”^[10] This natural reaction shows the predisposition of our brain to transform non-musical sounds into music, just by repetition.

Applied to historical musicology, sonic affinity allows the interpretation of the nineteenth century as a determining stage of musical mutations following the Industrial Revolution which shattered the stillness of the *ancien régime* with the commotion of steam engines, mechanical spinners, and the railroad. In the audience, the new acoustic culture triggered a corresponding “new art of listening”.^[11] within the aesthetic hegemony of *absolute music*, modern and attentive listening (“inward listening”) involved the “othering of the senses”^[12] and a progressive silencing of the listener. The ear emerged as the supreme sense, relegating the others to a secondary position, thus developing a perception based on “monosensoriality.”^[13] At that stage, Western culture became to a large extent a *sonocentric* culture, challenging the historical hegemony of the sense of sight.

A first look reveals that in the period considered, fundamental technological innovations took place, with a strong impact on the creation, performance, and perception of music. It was the era of “the conquering engines”^[14] or “the machine age,”^[15] which affected all orders of life. The “extraordinary acceleration of musical activity and scientific innovation” led to a sea of new sonorities, with an “enormous expansion of the sense for sound” by the mid-nineteenth century.^[16] Unique devices—due to their size and sound power—were constructed, like the “monstrous” Daboll trumpet, built around 1890 in Boston as an acoustic beacon for ships on foggy days.^[17] Within the realm of music, the orchestra grew unstoppable, the piano doubled in power and possibilities in comparison to its predecessors, the metronome and pianola became universal,^[18] and cultured compositions developed previously unthinkable features and complexity. The revolution was not limited to material innovations but included aesthetics and the whole conception of music as a quasi-sacred art. Each formal parameter was affected: accents, tempo, melody, harmony, timbre, and intensity. Thus, the notorious aesthetic differences between, for example, the melodious progressions by Antonio Vivaldi and George Frideric Handel on the one hand and the gigantism and steadiness of Anton Bruckner and Gustav Mahler on the other were not restricted to a matter of natural evolution and personal temperament but largely obeyed the uneven sensory-auditory environment of the respective lifetimes of these composers. The example provided by Julian Horton is illustrative:

Deployment of the pastoral style in, for example, the “Pifa” from Part I of Handel’s *Messiah* and Liszt’s *Les préludes* might indicate superficial stylistic affinities (compound meter, major modality, drone bass), but these qualities have to be understood against the backdrop of sharply contrasted social contexts: the “other” of Liszt’s pastoral music is an industrialized urban landscape that Handel could scarcely have imagined.^[19]

Romantic composers articulated the amplitude and continuity of the new soundscapes, and the correlation is obvious at times. The response of the audience was broadly consistent with the new musical universe, reinforcing the notion of an underlying link between what is heard and what is preferred.

One of the most relevant findings of this research is that the human voice, which had dominated the history of Western music since the Middle Ages, was temporarily drowned out by the instrumental avalanche—just as at factories people could not hear each other due to the din—reflecting both a physical and metaphorical surrender before the potency and regularity of the machine (see the epigraph “The Death of Isolde” below). Instrumental music had been largely considered inferior to vocal music. Immanuel Kant and Jean-Jacques Rousseau culminated the enlightened philosophy of art that conceived wordless music as, in the words of the former, “more pleasure than culture” (“mehr Genuß als Kultur”),^[20] while Rousseau, in his *Dictionnaire de Musique* (1768), dismissed it as unable to convey concepts. But according to Mark Evan Bonds, a dramatic shift took place at the beginning of the nineteenth century, inverting the hierarchy. Now purely instrumental music was hailed precisely because it could express that which lay beyond the grasp of conventional language, thus driving the listener to a higher, ideal world—to the “wondrous realm of the infinite” (“das wundervolle Geisterreich des Unendlichen”) in E. T. A. Hoffmann’s celebrated phrase.^[21] Instrumental music became the highest synthesis of the ineffable and knowledge, the language of reason and the sublime, and entailed the act of listening as thinking.^[22] Only in the twentieth century—with its microphones, thousand-watt amplifiers, and speakers—was the human voice restored to its secular primacy among all forms of music-making, allowing the singer to roar wildly or whisper in a confidential trance before a crowd in a stadium.

The symphony was the great genre of the nineteenth century, corroborating the hypothesis of a sonic revolution that boosted the realm of instrumental music. Ludwig van Beethoven elevated the trend to the highest extent and became the main composer and beacon of music of the century, a true human paradigm, but—and this is very important from our perspective—he was not its creator:

This perception of instrumental music as a vehicle of ideas did not originate in responses to Beethoven or his symphonies ... The perception of the symphony as a means of thought was already in place by the late 1790s, before Beethoven had even begun to write symphonies at all.^[23]

Rather, the shift was driven by “a radically new conception of all the arts—including music—that emerged in German-speaking lands toward the end of the eighteenth century.” The change in listening to music “opened up new perceptions toward music itself, particularly instrumental music.”^[24] Moreover, the success of the symphony by the late eighteenth century was “an unlikely development”^[25] against adverse circumstances: “in light of external factors alone—poor economic incentives for composers and publishers, declining patronage, and limited public venues of performance,” Bonds states, “it is all the more remarkable that the symphony should rise to such prominence during Beethoven’s lifetime.”^[26] Bonds puts the accent on the emerging German nationalism, but the aural revolution that shook European cities must have exerted an important influence. Sounds suddenly were a colossal force, and the symphony was the most suitable genre in the transition to musical art. The symphony, in addition, probably represented the *people* in the context of the bourgeois revolutions, with no soloists but a powerful ensemble of families of instruments that metaphorically evoked the communal identity of a nascent *nation*.

An Aural Affair

Throughout the nineteenth century, the Industrial Revolution spread over the foremost countries, and it was understood very much as an “aural affair”^[27] wherein cities and factories produced a “perpetual din.”^[28] The hypercritical Max Nordau described in 1892 how industrialization involved an earthquake, a dramatic transformation.^[29] In England, Victorian culture became a period “of unprecedented amplification, unheard-of loudness.”^[30] Many US journalists complained about the “warlike din” of urban everyday life,^[31] and New York residents suffered a “continual rattle, roar ... nearly all hours of the day and night [in a] ceaseless assault of confused and discordant noises.”^[32] Working conditions could be awful. For instance, in 1887 an inquiry by the Dutch parliament revealed that young boys employed in the boiler-making industry often had to stand inside the boilers holding back rivets as they were hammered in, with risk of deafness.^[33] Something like a spontaneous replica could take place, through increasing loudness and aggressiveness, as seemingly happened in a public market in Amsterdam in 1878, where children echoed the deafening noise of the city:

Each and every corner of the building was chokingly filled with toddlers. Hundreds and hundreds screamed and yelled as loud as their Dutch voices could, drumming and blowing on ugly trumpets, ran like small devils, and clattered their little rattles behind the back of those incautious persons who dared to join them.^[34]

In the realistic picture *Das Eisenwalzwerk* (The iron mill, see figure 1), Adolph von Menzel

resorted to the allegory of the old miller's trade for the crowded and noisy factory, with many workers in chain production, uncontrolled pollution, and permanent din. The scene, inspired during a visit of Menzel to the factories in Upper Silesia, suggests infernal chaos, with fiery tones in *chiaroscuro*, maximum physical tension, and a sound atmosphere predictably extreme, a faithful reflection of the strenuous work in primitive industry, aggravated by the social misery it entailed.

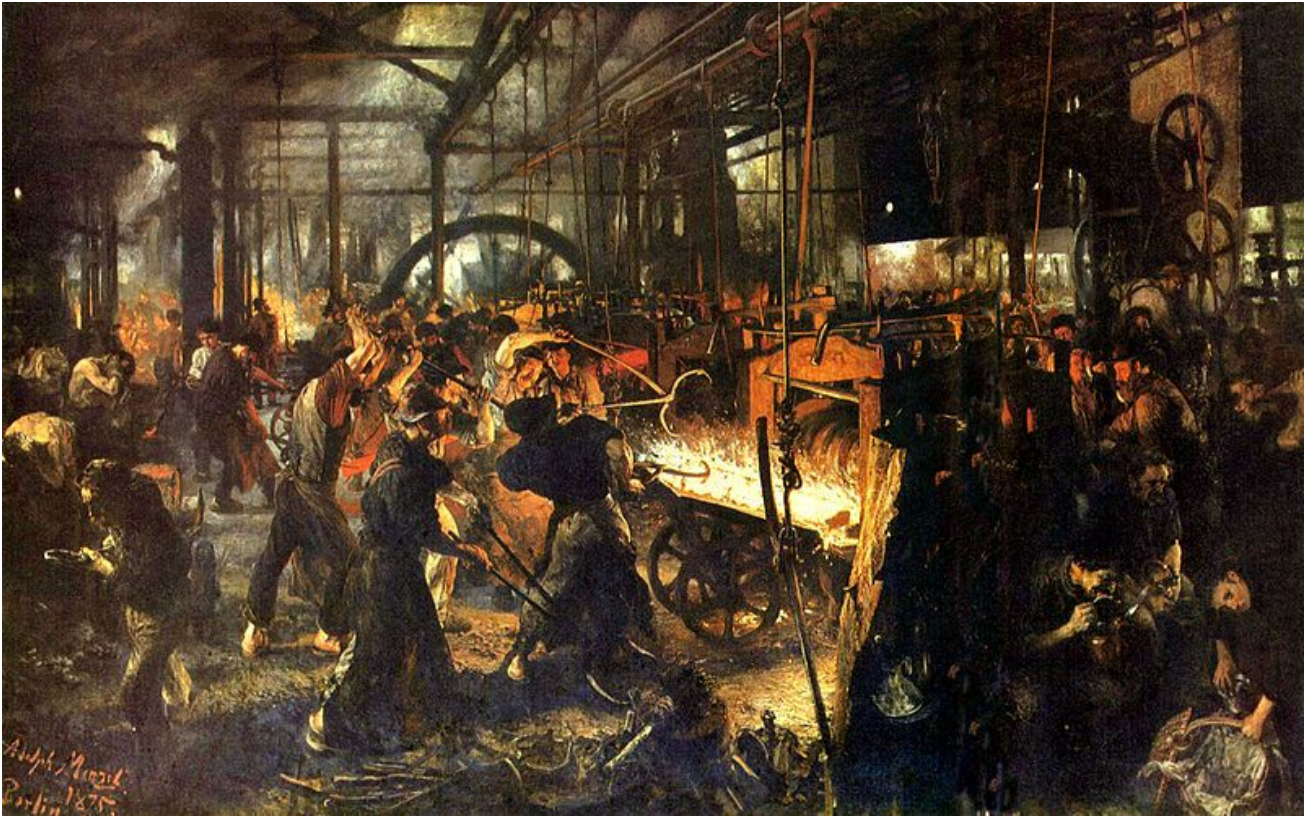


Figure 1: Adolph von Menzel, *Das Eisenwalzwerk* (1875), oil on canvas; by courtesy of Staatliche Museen zu Berlin, Nationalgalerie, photography by Andres Kilger

Industrial countries suffered especially from exposure to excess noise, probably England ahead of the rest. As the Scottish scientist Hugh Miller wrote in 1845 about Birmingham:

In no town in the world are the mechanical arts more noisy; hammer rings incessantly on anvil; there is an unending clang of metal, an unceasing clank of engines; flame rustles, water hisses, steam roars, and from time to time, hoarse and hollow over all, rises the thunder of the proofing-house.^[35]

Interestingly, Miller wondered if Birmingham's rich musical culture was a byproduct of this industrial soundscape. Its citizens, he reckoned, having lived "in an atmosphere continually vibrating with clamour," had absorbed a love of noise into their very souls. The fact is that in industrial areas, since the early nineteenth century, "hundreds of thousands, perhaps millions of people were now trapped into experiencing near-continuous noise." Consequently, "for many people it was no longer noise but silence that was unnatural; as if people had now submitted themselves completely to the machine."^[36] In many cases the problem was just noise as nuisance, but in factories and streets it could be deafening, an unbearable urban drone, as Glaswegian doctor Dan McKenzie protested in his 1916 allegorical essay *The City of Din: A Tirade against Noise*.^[37] Street music could form an integral part of it: British mathematician Charles Babbage complained of buskers and their "instruments of torture" in London.^[38] In the country, the roar of engines destroyed natural peace. Novelist Franklin Norris, in *The Octopus: A Story of*

California (1901), described the mechanical harvester as a demonic invention:

The steam hissed and rasped; the ground reverberated a hollow note [and the] wheat stalks ... rattled like dry rushes in a hurricane ... His ears were shocked and assaulted by a myriad-tongued clamor, clashing steel, straining belts, jarring woodwork.^[39]

Among the heavy machinery that suddenly invaded life, the railroad was a fearsome monster if only because of the din it gave off. In his seminal book *The Machine in the Garden*, Leo Marx described how in America locomotives signified the symbolic break with the pastoral ideal, ruthlessly penetrating and disrupting the countryside. In the city, they were equally problematic. Charles Dickens published an outraged letter in 1854 against the train invasion of his neighborhood, Stagg's Gardens, London:

What changed our neighbourhood altogether and for ever? ... what put the neighbourhood off its head, and wrought it to that feverish pitch that it has ever since been unable to settle down to any one thing, and will never settle down again? THE RAILROAD has done it all.^[40]

William Wordsworth, Friedrich Schiller, Thomas Jefferson, Arthur Schopenhauer, and William Blake also abhorred the noisy sequels of progress. Blake, for example, condemned "these dark Satanic Mills."^[41] Schiller considered that man himself had "nothing in his ears but the monotonous sound of the perpetually revolving wheel," and therefore he would never develop "the harmony of his being."^[42] Writers were not alone: "by the early 1900s, antinoise leagues had been formed all over Western Europe and North America, organizing antinoise campaigns, antinoise conferences, antinoise exhibitions, and 'silence weeks.'"^[43]

In summary, a sonic revolution took place in modern societies, where soundscapes and technological innovations impacted on every dimension of life, with special emphasis on the realm of music.

Music, Musicians, and the Audience

What were the consequences of the new acoustic environment? As stated above, each parameter of music was affected: accents, tempo, melody (pitch in general), harmony, timbre, and intensity. The orchestra became a mighty army (particularly the powerful sections of brass and percussion), with extended scale and multiple timbre options:

After mid-[nineteenth] century the orchestra came to include additional wind timbres such as cor anglais and bass clarinet ... Instruments were invented in large numbers ... Improvements were often focused towards achieving greater power and (in the case of woodwinds) acquiring greater flexibility in remote keys.^[44]

The piano triumphed over its predecessors. The use of the metronome, tuning fork, and pianola became universal, entering an era characterized by the "mechanical tyranny of precision."^[45] Already in 1854, Robert Schumann complained about the "Tyrannei des Tactes" (tyranny of meter) in music, advocating for liberation.^[46] The musician was becoming "an automatic metronome," in the "metronomic turn" of the century.^[47]

Soloists competed to display machine-like technical perfection with their instruments. Beethoven lamented that “today’s pianists ... just run up and down with memorized passages: bang, bang, bang! What does that mean? Nothing!”^[48] Instead, Beethoven “didn’t like to play his own works. All he wanted was to improvise,” as stated by his friend Julie Guicciardi.^[49] This fundamental practice—so appreciated in the past—almost disappeared with the mechanization of music performance since the nineteenth century. In her study on Carl Czerny, Grete Wehmeyer associates keyboard drilling in musical education with the machines of the industrial era, drifting into the “abdication of creativity,” that is, killing off the pupil’s natural interest and desire to create.^[50] Instrumental obsession combined with automata fever may have been behind Schumann’s attempt to “mechanize” his fingers, which instead ruined them.^[51] In military music, the martial canon made the soldier a “human machine.”^[52] For example, in the British military academy at Woolwich, a pendulum was used to mark the pace, demanding total precision and an exact number of steps per minute. Simon Werrett concludes that “the body had to defer to the machine.”^[53]

Another trait derived from the sounds of the industrial era was *gigantism*: the massive and loud use of many performers on stage as an attractive and meaningful fact in itself, combined with architectural designs of musical immensity. From the mid-nineteenth century onward, gigantism became an aesthetic imperative as well as a social paradigm. Hector Berlioz, in his *Grand traité d’instrumentation et d’orchestration modernes* (1844), put forward the ideal orchestra and choir as formed by 467 instruments and 360 singers. His *Te Deum* (1849, op. 22, H118) was written for more than 1,000 performers.^[54] Previously, in the *Requiem* (1837, op. 5, H75), Berlioz included:

a giant chorus and twice the standard number of wind instruments. He also increased the strings, added ten tympanists, and set four groups of brass instruments in the corners of the performance space ..., thereby “spatializing” the sound, so that “the fanfare seems to radiate out from the center of the orchestra.”^[55]

Berlioz’s effect of dividing brass instruments into four groups is interesting. This section was increasingly dominating the orchestra. He was not an exception: for instance, Giacomo Meyerbeer used to deploy on stage “blaring saxophones, pounding tympani, or haunting masses of sound,” which the Parisian public received with thunderous applause.^[56] If we compare two referential works like the *Magnificat* by Vivaldi (RV610/611), composed in 1719 or before, and the so-called “Symphony of a Thousand”—Mahler’s Eight Symphony of 1906, in E-flat major—Vivaldi’s work transmits a majestic grandeur by very modest means: just the voices, two oboes, and strings. Mahler instead fills the stage with a monumental set-up. Two centuries after Vivaldi, both the composers and the audience demanded a different format for solemn works. Mahler’s symphony was very much applauded at its premiere in Munich, and probably the impressive mass of musicians was a reason.

Several caricatures of the epoch portrayed instruments as scandalous artefacts, like the lithograph by Paul Delaroche *Il Signor Tambourossini, ou la nouvelle mélodie* (1821), parodying Gioachino Rossini (see figure 2). Violins and scores by Wolfgang Amadé Mozart and Domenico Cimarosa are trampled by Rossini himself (characterized as a rowdy Turkish-like musician—*Il Turco in Italia*) and King Midas (with his ass’s ears), while Apollo, god of music, flees covering his ears to Mount Helicon, with the lyre slung around his back. The raucous magpie perched on the trumpet clearly points at *La gazza ladra*.^[57]



Figure 2: *Il Signor Tambourossini, ou la nouvelle mélodie* (1821), lithograph by Paul Delaroche; Bibliothèque National de France, by courtesy of Gallica

Berlioz, conducting an orchestra-as-army, is depicted in a comparable caricature by Andreas Geiger in 1846, equally reflecting the controversy around the new musical generation.^[58]

The response of the audience to gigantism and musical immensity was active and proportional, as music rose unstoppably to the throne of arts: “the power of loud sound was appealing for many reasons, be it narcotic, communicative, or musical.”^[59] This aural fascination provoked massive events of performers and public, because the mimetic process took place also in the listeners. Hence, the social adaptation to the new soundscapes entailed compositional gigantism, ample formations, and music theatres for thousands of spectators. The Exeter Hall (1831) in London, for example, could host about 3,000 people. In his autobiography (1865), Louis Spohr depicted it:

Imagine a gigantic hall with places for 3,000 persons, crammed full, head above head [with a] magnificent and stupendous organ, and on all sides around it, an orchestra and choir of singers number 500 persons.^[60]

The Musikverein in Vienna (1870) reflected the magnificence of the Austro-Hungarian Empire, with a capacity to host more than 2,000 people in the main hall and over 3,000 on the whole. It was pioneering architecture in offering excellent acoustic conditions for music performance. In

Paris, the Trocadéro Palace (1878) had 5,000 seats. Bayreuth, Chicago, Havana, Madrid, Milan, Moscow, New York, and many other cities worldwide joined the trend with monumental theatres. Concerning high numbers, even in the remote Galicia (Spain), the 1882 anthem “Gloria a Galicia,” by Silvares and Calé, required 500 musicians on stage.^[61] There were extreme cases, like the National Peace Jubilee, consisting of a musical celebration in Boston, Massachusetts, in June 1869, which gathered “some 11,000 singers from some 100 choral groups with over a thousand-piece orchestra section.” It was then proclaimed to be the “greatest musical enterprise of modern times.”^[62]

Formal Parameters

Table 1 displays schematically the main cause-effect (sound-to-music) sequential processes that took place in emerging industrial areas of Europe and America during the nineteenth century.

Generative matrix (soundscape as root)	Musical affinity
Sonic revolution	Creation, performance, and perception of music
The era of machines	Triumph of instrumental music Voice decline Timbre variety Abdication of creativity
<i>High intensity (din)</i>	<i>Loudness, extreme contrasts</i>
<i>Strong beats</i>	<i>Lively rhythm, accelerated tempi</i>
<i>Regular pulse</i>	<i>Repetitive motifs, regularity</i>
New architecture / The cut effect	Varied harmony, multiple modulations
Multi-frequencies	Extended scale
New sound culture	Audience response: gigantism Massive events / monumental theatres

Table 1: Sonic affinity cause-effect processes in the nineteenth century

Regularity was one of the most clearly perceivable innovations of many musical pieces. Vivaldi and Mozart lived in a world where sounds were generally fleeting, but in the industrial age, heavy machinery produced multiple regular (uninterrupted) sounds, which music mirrored. For example, in the Prelude to *Das Rheingold* (1854, WWV86A) Richard Wagner develops an immense drone in E-flat major (163 bars), unthinkable a century before. Wagner was suggesting with sounds the image of the river as a powerful mass of water growing in front of the spectator. In the sequence, low-pitched sounds of double basses stand out, followed by bassoons and the arpeggio of horns and the rest of the orchestra, on a single triad harmony for 5 minutes. Time seems to stand still,

there is no melody, meter and tempo are virtually unrecognizable, and all the attention focuses on timbre and progressive expansion. The motive of such a natural element as a river may seem to be at the opposite extreme of machine sounds, but the causal root can be perfectly present. Wagner crossed a compositional threshold in this prelude. He anticipated the language of soundtracks, monochord variations, and continuity aesthetics that would become the basic principle of minimalism and other modern genres. His was not an isolated case; for instance, Mahler's tendency towards "temporal suspension" is relevant in this context.^[63]

By contrast, rhythm and tempo were also modified in the nineteenth century towards sustained beats, heavy sounds remarking the time signature, and an accelerated speed. The Romantic opera expert Roger Alier considers that some fragments of Rossini's overtures were conceived under the effect of the industrial spinning machines that spread during the life of the Italian composer.^[64] The Overture to *Guglielmo Tell* (1829), bars 226–30 and onward, is an excellent example of this approach (see figure 3). If Rossini wanted to reflect in a single fragment on the transition from the *ancien régime* sound order to the industrial one through music, he did it outstandingly at the beginning of this celebrated opera, by these means: pastoral 3/8 beat in G major, a bucolic Andante ($\text{♩} = 76$), with woodwinds evoking a bagpipe via a peaceful *pp* dialogue between flute and English horn, with clear bass drones played by the strings. Suddenly, to the call of the trumpet (brass, bar 226), the music rushes into a mechanical 2/4 time, Allegro Vivace ($\text{♩} = 152$), in E major with no modulation (a distant tonality from G major), *ff* indication, and the whole orchestra runs unbridled like a locomotive after the trumpet. In this splendid passage, the Italian composer spared no effort to underline the effect of a radical contrast.

219

Allegro vivace. (♩ = 152)

224 Fl.

Cor. ingl.

Clar.

Fag.

Cor.

Tr.

Triang.

a 2.

ff

Allegro vivace.

Figure 3: Gioacchino Rossini, *William Tell and Other Great Overtures in Full Score* (Mineola: Dover Publications, 1994), 27, bars 219-30

Resources like chromatism, rubato, and theme transformations also flourished as a part of the new musical universe.^[65] Intensity indications proliferated as never before in the Romantic era, reaching extreme nuances (of either several *f* or *p*). This “nervous” notation is well visible at a

glance on many pages by Frédéric Chopin, Schumann, Johannes Brahms, and Franz Liszt. The causal reason may have been the disquieting soundscapes of the century, as in the restless and disturbing effect of Mahler's Ninth Symphony (1909) in D major, whose third movement (*Rondo. Burleske. Allegro assai. Sehr trotzig*) would evoke the "urban din" ("estrépito urbano") and frenzied flow of modernity.^[66] Wallis D. Braman affirmed that "what seems to be new in the nineteenth century is the increase in the use of startling or violent effect."^[67] On the contrary, in the music by Johann Sebastian Bach there are only three indications around *forte*: one is simply *forte*, and the other two are of lesser potency (*poco forte* and *mezzo forte*), while for weak sounds—*piano*—Bach uses up to five varied degrees, two of them even weaker.^[68] The special attention given by Bach to faint sounds, and barely to loud ones, reflects how he translated into music the soundscapes of his life, which were close to that category of nuances.

In addition to intensity and regularity, another outstanding feature of the transition to nineteenth-century music aesthetics was the expansion of the musical scale in the lower frequencies. If in Vivaldi and Mozart high-pitched instruments and singers prevailed—in consonance with an aural environment mostly formed by natural and fleeting sounds—a century later preferences turned into the opposite. In this facet the influence of sonic affinity is palpable. However, the musical scale expanded in both directions, and in conjunction with a timeless conception of the musical discourse, Wagner coined the concept of endless melody: an uninterrupted melodic narrative that seems, indeed, to have no end, drastically breaking with the hitherto hegemonic *belcanto* and its delimited phrases.

Among the technical changes stemming from urban architecture, the "cut out" effect, or acoustic cut, which consists of sudden changes in intensities and/or predominant tones and timbres, can be experienced in noisy environments when passing, for example, from one street to another, or from inside a building to the exterior.^[69] The Romantic tendency of modulation, together with the flood of intensity indications, may be related to this effect. Olivier Balaÿ considers three more psychoacoustic effects typical of the nineteenth century: masking effect, reverberation, and mixing effect.^[70] In a study on a factory in Lyon, France, he demonstrates how recent developments "changed the conditions under which sounds were produced and propagated," leading to "average intensities, lower frequencies and continuous noises."^[71] Figures evince how the new soundscapes became dominant in Paris:

The oldest study [n.d.] observed average variations ranging from 46.5 to 56.5 decibels in the streets of Paris at night and a value of 60 decibels for daytime noise on Place Saint-Augustin. A comparable study, carried out at the end of the first third of the twentieth century shows that car horns and police whistles reach a level of 84.5 decibels, the noise at certain times and places becoming continuous.^[72]

Finally, of all the formal parameters of music, timbre was perhaps the most altered, entailing the triumph of instrumental music.^[73] During the nineteenth century "the emergence of pure instrumental music as an autonomous and compelling art form ... is one of the most extraordinary events in the history of Western culture."^[74] New instruments were invented, like the accordion, saxophone, and Wagnerian tuba. Ensembles like the string quartet became a rite of passage for composers. Program music also acquired a relevant reputation. And in general, it was a period with an overabundance of instrumental forms, like the symphony, concert, sonata, string quartet, variations, and symphonic poem, together with an avalanche of minor categories, like ballades, nocturns, musical moments, waltzes, mazurkas, and impromptus.

The orchestra evinced gigantism in music more than anything else, and the brass section

somehow brought the voice of the factories to the concert hall. However, the king of cultured music was the modern piano, a prodigy of engineering with more than eighty keys, the double repetition action (by Sébastien Erard in 1824), and an impressive appearance. As Eduard Hanslick observed:

In Mozart's and Haydn's day the piano was a weak, thin box with a soft tone, scarcely audible as far as the front room. ... The full tone and carrying power of the modern piano arise from its great size, its colossal weight and the tensions of its metal-strengthened frame ... The instrument has gained this offensive power and offensive character for the first time in our day.^[75]

This piano was capable of displaying acoustic power and polyphonic variety, executing all the dynamic nuances, and captivating the audience with the vertiginous virtuosity of the performer. It was also a “percussion” instrument, suitable for the passages full of energy and heroism by Beethoven, Chopin, and Schumann, in which dynamic contrasts, interspersed with phrases of extreme lyricism, accentuated the reappearance of the resounding *fortissimo*. Soft and sentimental pieces became equally popular in the Romantic salon, spurring the nostalgic yearning of many fans who longed for the past before the rumble of the machine and destruction of nature. The piano surpassed the violinist and the castrato that had dominated the previous century, becoming a universal symbol of Western high culture and a self-referential icon (that is, that needs not to be explained): “Not only did the [piano] generate a new repertory ... It also transformed the social history of music; the instrument itself became a social agent.”^[76]

It is meaningful how this instrument perfectly reflected the differential contexts of two renowned composers. Beethoven—the intuitive pioneer of so many musical advances—demanded from the time of his youth a heavy and powerful piano:

From 1796 onward, Beethoven campaigned for Viennese piano reform, specifically for “a heavier action, a sturdier instrument and a bigger tone” ... his impact on piano technology coincided with a growing international trend toward louder and sturdier instruments.^[77]

On the contrary, half a century before, the German harpsichord maker Gottfried Silberman had developed “an early piano but abandoned it after J. S. Bach refused to endorse it on the grounds that it was too heavy.”^[78]

The Death of Isolde

Although the notion of death of the voice could be exaggerated, the decline of human singing during this period was real, especially after the 1840s. This conclusion is an important result of the research carried out for the present article, addressing a topic that seems to have gone unnoticed in the field of nineteenth-century music studies. Regarding this period, there are notions like “death of the voice”^[79] and “silenced voice,”^[80] but these mainly refer to the arrival of massive printing and the phonograph. This article outlines a related but different approach: the stifling of the voice as a music performer, confronted with the machinery of the epoch and its powerful soundscapes. Despite the splendor of opera and the importance of lieder, the human voice succumbed both physically and metaphorically to the instrumental avalanche, especially the cantabile style, as stated above. The underlying logic is obvious: there can hardly exist a

musical style more incompatible with industrial sounds than cantabile.

The remarkable increase in instrumental genres in the nineteenth century correlates with the dominant sounds of the machines, which imposed their power (thunderous), register (deep), and regularity (cyclical), thus subjecting the singers, whose acoustic parameters could not compete with them. Among other significant chronicles, Herman Melville, in *The Paradise of Bachelors and the Tartarus of Maids* (1855), described a paper mill in New England in which the noise of the machines was devastating. When the visitor (in first person) enters the factory, he is struck by the scene:

Not a syllable was breathed. Nothing was heard but the low, steady, overruling hum of the iron animals. The human voice was banished from the spot. Machinery ... here stood menially served by human beings ... as the slave serves the Sultan.^[81]

Many primitive machines were rudimentary and had great losses in heat and abrasion, producing loud noise. In the personal testimony of Lucy Larcom, a worker at the Lowell textile factory in London, around 1840: “in the sweet June weather I would lean far out of the window, and try not to hear the unceasing clash of sound inside.”^[82] The loudness level must have been really intense at the Lowell factory: “workers often stuffed cotton in their ears. It was so difficult to hear over the noise that workers talked with their hands.”^[83]

In 1913 Josephine Goldmark, chair of the Committee on the Legal Defense of Labor Laws of the US National Consumers' League, stated about sewing machines in a factory: “the roar of the machines is so great that one can hardly make oneself heard by shouting to the person who stands beside one.”^[84] In the streets the voice had been subdued:

In 1550 there were only three carriages in Paris, and most nobles mounted horses or mules. By the mid-eighteenth century ... there were some 20,000 carriages in the city, and after 1750 increasing numbers of cheaper vehicles ... And as traffic noise grew, it potentially drowned out other sounds, particularly street conversation.^[85]

With reference to nineteenth-century urban auditory perception, Balaý concludes that “in a more open spatial morphology, human voices are diluted, [and] the presence of local social life is almost inaudible.”^[86]

These testimonies may help us understand that human voices were waging an unequal battle against superior forces. The regression of vocal genres is a reliable indicator of the *instrumental turn*, as it may be called. Oratorios and cantatas declined; opera remained active but with notable stylistic changes and a decreasing tendency at the turn of the century. Lieder became an intimist refuge in the Romantic salon, but in orchestral songs the soloist was in constant danger of perishing behind the instruments, having to endeavor to counter them. This struggle can be observed in the Mahlerian cycle *Das Lied von der Erde* (1909), where the voice usually sings *f* and *ff* and, on the contrary, the instruments perform lower. In this sense, the precision of dynamic indications by the Austrian composer to maintain the balance between the different parts is remarkable. On a scene from the first act of *Götterdämmerung* (Wagner, 1876), Bernard Shaw wrote in 1898:

With tremendous exordium of brass, the tenor and baritone go at it with a will, showing off the power of their voices ... finishing with a lurid unison ... They are vocal athletes.^[87]

Additionally, Wagner's operas have been described as vocal symphonies, and *Das Lied von der Erde* is a cycle of six songs in the form of a symphony,^[88] which reinforces the notion of an *instrumentalization of the voice* in this period. The involution with respect to the eighteenth century was complete:

The classical symphonic style Haydn used in 1771 was based on Italian opera overture, or *sinfonia* ... This shows how prevalent vocal music still was over instrumental music by the late eighteenth century.^[89]

The fact is that "in the early nineteenth century, instrumental music became divorced from function and context in Germanic society."^[90] Two influential theorists, Schopenhauer and Hanslick, addressed the instrumental-vocal dichotomy, in favor of the former, as "the quintessence of an autonomous art for its lack of concrete signification."^[91] The musical compositions by Hoffmann suggest how "as instrumental music developed, song was neglected."^[92] In Austria and Germany, during the turnover from the eighteenth to the nineteenth century there was a "sudden shift of instrumental music from the lowest to the highest of all musical forms, and indeed of all the arts in general."^[93] With Beethoven, symphonic language and the piano triumphed as the apotheosis of Romanticism, compendium of all music and supreme expression of art.

Particularly vulnerable to the machine revolution was the figure of the soprano, the great diva of the past. In general, sopranos and remaining voices (including the castrati, so popular in the eighteenth century) declined because the machine outperformed the human being. But in addition to the problems for any voice singing with the new ensembles, sopranos had to face the challenge of powerful bass sounds that threatened to smother them.^[94] An objection to this argument could be that, in theory, those prevailing bass frequencies would provoke by contrast an automatic enhancement of high-pitched sounds (like female voices); but the truth is that sopranos simply clashed with the orchestral ensemble, progressively becoming figures outside the new musical order, as happens with Isolde in *Tristan und Isolde*.^[95] In addition, possibly the romantic conception of women as ethereal beings, as beautiful as they are vulnerable, had an influence on their being imagined (more than men) as crushed by the machines. Sean M. Parr observes how in mid-century Paris, the coloratura soprano reached a peak, and "its apparent disappearance is one of the most striking shifts in operatic style ... By the end of the century, coloratura was all but gone from the composer's musical palette."^[96] If literature is a metaphor for reality, the fact is that in Giacomo Puccini's *Tosca* she commits suicide, and *La Bohème* ends with the death of Mimì. Giuseppe Verdi's *La traviata* and Wagner's *Tristan und Isolde* have a similar (tragic) end for the female protagonist, Violetta and Isolde respectively. Carmen is violently killed at the end of Georges Bizet's eponymous opera. Arnold Whittall sees in Amina, from *La sonnambula* by Vincenzo Bellini, "the vulnerable romantic heroine" ("la vulnerable heroína romántica").^[97] Concerning *Norma*, he considers her final death "the most forward-looking and influential feature" of this opera ("el rasgo más progresista e influyente").^[98] Instead, Mozart's *prime donne* were more fortunate, that is, those in *Così fan tutte*, *Le Nozze di Figaro*, and *Die Zauberflöte*. In *Don Giovanni*, Donna Elvira retires to a convent after the bitter end of her love with Don Giovanni, but she does not die. Certainly, the tragic feeling inherent to Romanticism permeated everything, including fatality in the outcomes and gender bias. But as modern manifestations of the eternal principle of myth in literature, operas also reveal—sometimes with resounding clarity—the thinking and sensitivity that underlie the society that creates them.

In Wagner's most celebrated opera, Isolde dies over Tristan's body, singing sweet words to her

beloved (scene 3, final). There are neither knives nor poisons. It constitutes an act of sublimation, a love death (*Liebestod*). For the soprano it is an extremely difficult passage, in itself and because of the previous hours of singing. Isolde's last words are: "in the resonating sound, in the wafting universe of the world-breath ... drowning, sinking, unconscious, supreme delight!" ("in dem tönenden Schall, in des Welt-Atems wehendem All ... ertrinken, versinken, unbewusst, höchste Lust")—which can be interpreted as a lyrical recreation of the twilight of the voice, engulfed by the surrounding sound mass (see figure 4).

The image shows a page of a musical score for Richard Wagner's opera *Tristan und Isolde*, specifically the "Liebestod" (Love Death) scene from Act III, Scene 3. The score is for orchestra and voice. The instruments listed on the left include: Kl. Fl. (Clarinet), Br. Fl. (Bassoon), III. (Violins), Cl. (Clarinet), E.H. (English Horn), Hr. (Horn), Tr. (Trumpet), Pos. (Posaune/Trombone), Btb. (Tuba), Pk. (Percussion), Harfe (Harp), VI. (Viola), Br. (Bassoon), Isolde (Voice), Ve. (Violoncello), and Ch. (Cello). The score is written in G major and 3/4 time. The vocal line for Isolde is in German, with the lyrics: "Welt - A - theus we - hen - dem All, -". The score is marked with "K 1014" and "441".

K 1014

441

Figure 4: Richard Wagner "Liebestod," from *Tristan und Isolde*, WWV90, act III, scene 3, final (Leipzig: Breitkopf und Härtel, n.d. [1895]), 441

The accompaniment builds up in a long growing tension, ending in the final resolution of the Tristan chord (F-B-D#-G#, after four hours, since it opens the opera). When Isolde is pronouncing the last words, the instrumental score indicates *crescendo* and *molto crescendo*,

and the climax is reached with the whole orchestra performing *f* and the harp *ff*—to fade gently in the last verses in the triad chord of B major. In this scene Isolde sings alone; hers is the only surviving voice. The effort Wagner requires from the soprano is tremendous; the composer forces her to belt out so that she can be heard amidst the instrumental storm. The orchestral virtuosity in dynamic nuances and resources is remarkable, such as tremolo and vertiginous scales on the strings, as opposed to long notes—almost pedals—of brass, a section that witnesses unmoved the agony of the frail maiden.

In other countries, and far from luxury stages, something similar was taking place. In their study on Bohemian folk music, Markl Jaroslav and Vladimír Karbusický found out that brass bands became very popular there in the nineteenth century, to the detriment of strings and (especially) voice: “the penetrating sound quality of wind instruments seriously discouraged singing.”^[99] Interestingly, not only singers were silenced, but, in a complementary reaction to the gigantism indicated above, the whole audience. In the course of the century, a motionless reception pervaded the habitus of the listeners, enabling them to perceive in a trance-like state the divine gift of music. Just as skyscrapers dwarfed the citizens, industrial sounds silenced them, in a complex process that involved the psychological construction of self-identity.^[100] This mixture of intimacy and social fracture of music can be appreciated in Fernand Khnopff’s *Listening to Music by Schumann* (see figure 5), where metaphysical meditation prevails over simple pleasure.

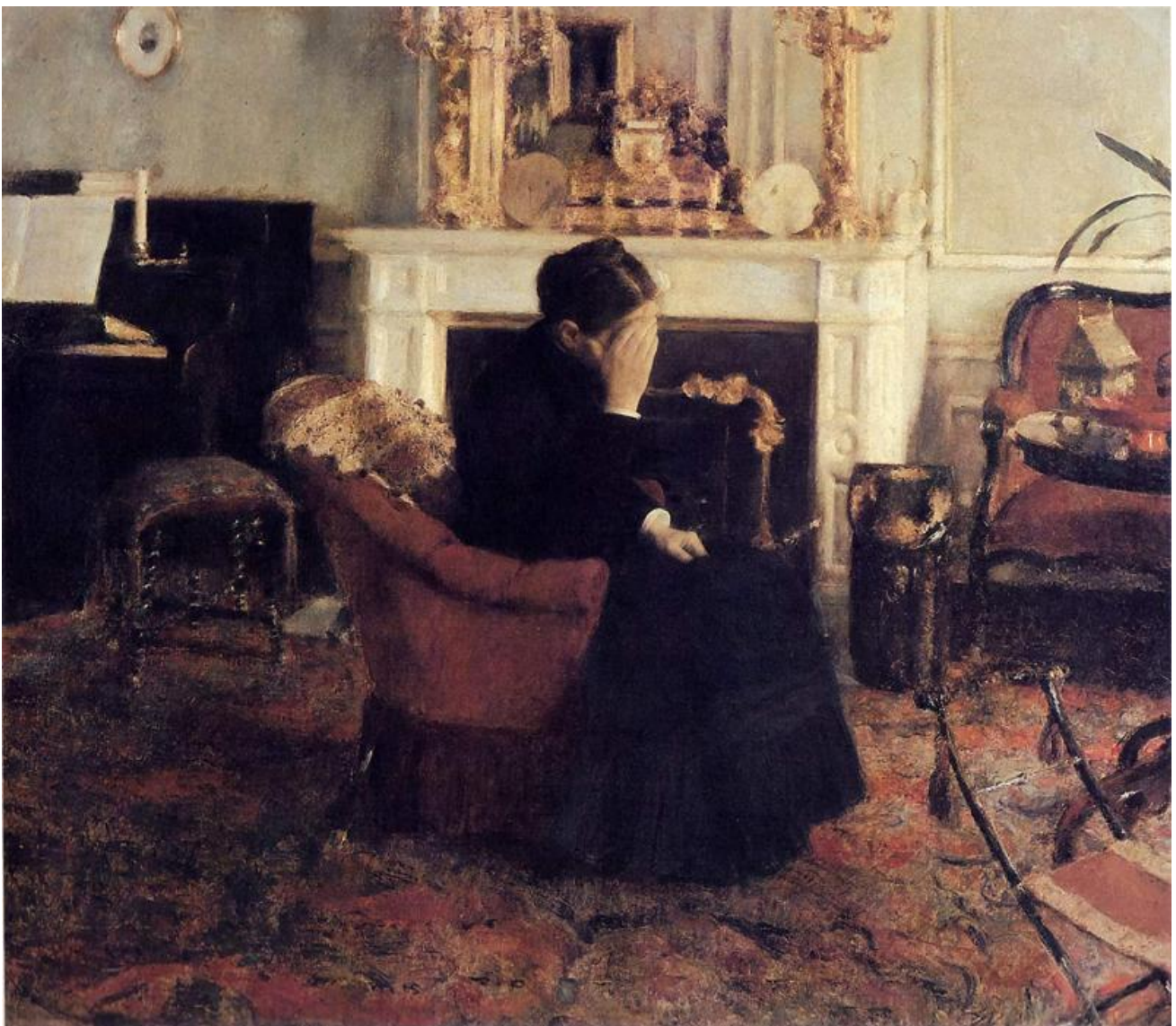


Figure 5: Fernand Khnopff, *Listening to Music by Schumann* (1883), oil on canvas;

Royal Museums of Fine Arts of Belgium (Brussels), inv. 6366, photography by J. Geleyns

The painting shows a sole listener who turns her back to the pianist and covers her face with one hand so that sight does not distract her from a single detail of the sound. The black color of the instrument and her dress reinforces the inner communion; she may be a widow, associating the female figure with death, but black is the negation of color and light, so that sound triumphs symbolically over sight in the scene. The inclination of the woman is significant: she does not simply listen to Schumann reclined, but concentrates to appreciate every note, as it was in music where the modern dilettante could find the ultimate sense of the self (*Bildung*, according to David Hendy).^[101] Another psychological detail by Khnopff is that we see neither her face nor the pianist's, thus underlining the universality of the session. Finally, the female hand tight on the legs could suggest sexual tension, as pointed out by Alain Corbin for the intimate relationship between women and the piano in the Romantic era.^[102] Lionello Balestrieri's *Beethoven* (1900)^[103] shows a similar subjugation to music in the audience. Listening had become a sacred task, and "worshipful silence" was necessary to reach a "state of ecstasy."^[104] Following Hendy's analysis:

Silence wasn't the same as passivity. It had an intensity to it. It was *work*. The listener was engaged in a monumental lifelong task of self-realization and cultural improvement.^[105]

Therefore, the audience evolved from a loud and open participation in the musical event (as in the early days of opera) to a deep introspection, which in the concert hall was only broken in the ritual and prolonged final applause.^[106]

There were additional reasons for the withdrawal of singing. Drawing on the aforementioned instrumental superiority, Wagner revealingly called *tonal speech* the language of the orchestra: "this pure tonal speech has secured in the individuality of the instruments."^[107] The orchestra, Wagner continued, has "a capacity for 'speech'—namely, a capacity for disclosing what is unutterable in words."^[108] In this sense, a subtle motive for the vocal decline came from the materiality of words, as opposed to absolute music within Romantic philosophy. Mendelssohn's *Lieder ohne Worte* (Songs without words, 8 volumes, 1829–45) are indeed "Lieder," but voiceless: the music sings in the piano as if the instrument were a human voice, but "without words," that is, only with abstract notes. In a letter to Marc-André Souchay in 1842, Mendelssohn explained this deep conception:

People often complain that music is too ambiguous, that what they should think when they hear it is so unclear, whereas everyone understands words. With me, it is exactly the opposite, and not only with regard to an entire speech but also with individual words. These, too, seem to me so ambiguous, so vague, so easily misunderstood in comparison to genuine music, which fills the soul with a thousand things better than words. The thoughts which are expressed to me by music that I love are not too *indefinite* to be put into words, but on the contrary, too *definite*.^[109]

Instrumental music was thus elevated to the category of the sublime that cannot be expressed with verbal language, detached from all material ties, such as words:

In instrumental music, suspected in the eighteenth century of being an empty but pleasant noise, Romanticism discovered a language in shades of the sublime, whose obscure codes were not poorer but richer than the unequivocal concepts of language through words.^[110]

In a suggestive contribution, John Neubauer describes how the process of liberating music from language during the Enlightenment was a forerunner of nonrepresentational art. He mentions explicitly “the triumph of instrumental music in the second half of the eighteenth century” and “the liberation of music from its linguistic confinement.”^[111] Therefore, on the one hand music emancipated itself from language (by becoming instrumental); and on the other hand it pioneered abstract art due to its detachment from both classical mimesis (imitation of nature and vehicle of emotions) and formal thought expressed in words (in vocal music). Other arts imitated instrumental music, as can be inferred from statements by Paul Gauguin and Stéphane Mallarmé.^[112] For Vincent van Gogh, the highest achievement possible for a painter was to be “a musician, with colors.”^[113] It was a radical shift in the field of poetry, because music had gone from being the servant of the world to the ideal model.

Nationalism probably was another motive for the instrumental turn. According to nineteenth-century music expert Matthew Gelbart:

German nationalist romantic justifications for instrumental music ... were used to assert the superiority of new German genres, such as the symphony and string quartet, over Italian opera and other previously more prestigious genres.^[114]

Germans were proud of it, or at least Wagner was, who stated that instrumental music as a whole was “the exclusive property of the German.”^[115] The Franco-Prussian War (1870–71) sealed their leadership in Europe, including philosophy and art paradigms. However, it would be a mistake to oversimplify by saying that the dense musical dialectic was resolved in a victory of the German symphony over French and Italian opera, and in that case, the notion of a universal sonic affinity should cast doubts since it would be limited to certain geo-cultural areas.

On the contrary, and specifically with regard to Paris as the great capital of nineteenth-century opera, the instrumental turn arrived quite before the war. As seen above, coloratura sopranos disappeared in France by the second half of the century, after having dominated the musical scenario, in a striking change in operatic style. Jeffrey Cooper has analyzed the rise of instrumental music in Paris between 1828 and 1871, which in theory were years just of opera and ballet apogee.^[116] He mentions the US composer Edward Burlingame Hill, who studied there and observed that in the years following mid-century, there was “a revolution in public taste due to the establishment of orchestras and chamber music societies,” with César Franck, Édouard Lalo, and Camille Saint-Saëns, as forerunners of that revolution.^[117] According to Cooper, the rise of instrumental concerts in Paris was impressive: in the period 1847–53, “chamber music achieved unprecedented public success and significant orchestral societies appeared.”^[118] The tendency towards instrumental music continued growing: “the repertory for the final subperiod before the Franco-Prussian War is characterized ... by continued expansion of performances of instrumental works,” developing into a “devotion to instrumental music in Paris.”^[119]

It must be underlined that, over and above the vocal/instrumental controversy, it was music as a whole that flourished unstoppable in those cities: in Paris “the period of 1854 to 1860 appears to have been the liveliest era for music yet described.”^[120]

Other extra-musical facts around this topic were present, like the outstanding rise of reading culture since the Enlightenment. Reading may have exerted an indirect but crucial influence in the decline of voice: The printed word ceased to be a luxury for elites and became a common language in newspapers, advertisements, magazines, and books, with literacy rates rising fast.

Traditionally “vocal” trades such as the town crier, the street vendor, and the storyteller started to decay.^[121] But so did acoustic objects such as the bell, whose toll was for centuries the voice of the community and an essential element of social cohesion.^[122]

It is noteworthy how literature reflected the involution of the voice. The automata Olimpia, in *Der Sandmann* (The sandman, 1817) by Hoffmann speaks few words but can play the piano and sing with virtuosic skill. *Nattergalen* (The nightingale, 1843) is a celebrated tale by Hans Christian Andersen about an emperor who prefers the tinkling of a mechanical bird to the song of the real nightingale he used to admire:

Andersen’s tale ... demonstrates the preference for instruments over human performers, although the real nightingale eventually triumphs over the mechanical bird. ... In Andersen’s story, the perfect tone, even in vocal music comes from the automated musical instrument rather than the singer’s body.^[123]

Ultimately Andersen makes the “authentic” voice of the living nightingale prevail over the mechanic, which can sing just one melody. The tale is a nostalgic allegory of nature and the old ways of life, which were fading and being replaced by machines and progress. Near the end, the emperor was dying, visited by death, and only the song of the true nightingale heroically saved him. In Andersen, the voice of the bird represents the wind, the rivers, and the trees, which the human being needs in order not to perish.

Conclusion

This article has applied the general theory of sonic affinity to the analysis of the nineteenth century. Many contemporary testimonials and scholarly references have been included to substantiate the guiding hypothesis. The results plausibly demonstrate the main axes of a generative interaction between the overwhelming soundscapes of the nascent industry and correlative musical creation, performance, and listening, as the mimetic response is detectable in every parameter of the repertoires considered. In light of this research, it seems feasible to apply the same formula of analysis to other periods of music history, as an approach to complement (never replace) the discipline of historical musicology.

In the period considered, the mechanical canon spread unstoppably from an increasing Germanic hegemony in Europe—either military, technological, or cultural—and crucially affecting musical education and performance. But the transition involved the whole society, as stated by Horton: “the radical transformation of music’s relationship to its social context after 1800 reflects seismic political, social, and cultural upheavals.”^[124] The instrumental turn was impressive, industrial soundscapes developed as a sonic imperative, vocal culture declined in front of the supremacy of machines, and listeners were silenced in a complex process that transformed musical perception into an “inward listening” as part of the process of identity search (another important psycho-sociological effect of the Industrial Revolution). As for the decline of the voice, the power of the new soundscapes must have drowned out the voices of women and men alike in streets, factories, and (mimetically) stages, but its effect on the former was more profound for acoustic reasons, although in the public imagination there were also gender connotations that probably influenced the “death of the soprano” (as re-enacted in Wagner’s *Isolde*). Aural gigantism was another relevant feature of the century, together with an opposite trend towards intimacy and pastoralism, which thrived as an alternative reaction in the Romantic salon.

In summary, a sonocentric culture was gradually consolidated upon the notion of *absolute* music as a sacred and ineffable essence, within a generative context of dominant industrial soundscapes. Thus, the nineteenth century emerges as a polymorphous mosaic of aesthetic and technological encounters, with their respective projection in the field of music and listening. It constitutes a turning point in the history of musical thought.



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2. The broad and complex notion of "musical thought" can hardly be theorized in a few lines. In this article it refers to the ways in which a society thinks about the concept of music, that is, the set of creative, performative, and perceptual practices and experiences that congeal into a specific philosophy, aesthetics, and social impact of music within its time and place, entailing general issues of meaning, subjectivity, identity, culture, history, functionality, and their respective paradigms. Therefore, "musical thought" touches aspects that merge epistemological and cognitive concerns with aesthetic/artistic ones, within the unavoidable frame of constrictions that stem from a specific sociocultural context. ↑
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7. This study considers the "long" nineteenth century: roughly from the French Revolution to the First World War. If we exclude the twentieth century (up to the present day)—with its radical avant-gardes, the introduction of electronic instruments, generalization of the recording and reproduction of sound, and the explosion of urban popular music—without a doubt the nineteenth century has been the most transformative in the total history of Western music. Its acoustic universe changed our cultural history, affecting all orders of art, but especially music. For these reasons, this article focuses on general repertoires and a unifying approach; it does not pretend to encompass the multiple dimensions, variety, and cultural richness of the period. ↑
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18. Instruments like the celestina, barrel organ, and lyrichord also evinced the aesthetic and technological shift towards automation. Deirdre Loughridge, “Celestial Mechanisms: Adam Walker’s Eidouranion, Celestina, and the Advancement of Knowledge,” in Davies and Lockhart, *Sound Knowledge*, 47–76. As kindly suggested by a reviewer of this article, the pendulum clock, invented by Huygens in 1661, was considered one of the main factors for “accelerating” the First Industrial Revolution. See David S. Landes, *Revolution in Time: Clocks and the Making of the Modern World* (Cambridge, Mass.: Harvard University Press, 1983). ↑
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25. *Ibid.*, 1. ↑
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36. Ibid., 218–20. ↑
37. Dan McKenzie, *The City of Din: A Tirade against Noise* (London: Adlard and Son, 1916). ↑
38. Cited in Simon Werrett, “Disciplinary Culture: Artillery, Sound, and Science in Woolwich, 1800–1850,” *19th-Century Music* 39, no. 2 (2015): 96. ↑
39. Cited in Christine Norquest, “‘The Endless Roar in Which We Live’: The Figure of Noise in Nineteenth-Century U.S. Literature” (PhD diss., University of Iowa, 2019), 143 and 154. The excess of decibels and pollution generated a strong rejection and desire for a pastoral revival. The list of novels that yearned for the lost Arcadia is impressive: “In *The Great Gatsby* [F. Scott Fitzgerald, 1925], as in *Walden* [H. D. Thoreau, 1854], *Moby-Dick* [H. Melville, 1851], and *Huckleberry Finn* [M. Twain, 1884], the machine represents the forces working against the dream of pastoral fulfillment.” Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (New York: Oxford University Press, 1964), 358. ↑
40. Cited in Shelley Trower, *Senses of Vibration: A History of the Pleasure and Pain of Sound* (New York: Continuum, 2012), 121. See also Paul Watt, “Street Music in London in the Nineteenth Century: ‘Evidence’ from Charles Dickens, Charles Babbage and Lucy Broadwood,” *Nineteenth-Century Music Review* 15, no. 1 (2018): 9–22. ↑
41. Cited in Marx, *Machine in the Garden*, 19. ↑
42. Cited in Ibid., 169. ↑
43. Karin Bijsterveld, *Mechanical Sound: Technology, Culture, and Public Problems of Noise in the Twentieth Century* (Cambridge, Mass.: MIT Press, 2008), 1–2. ↑
44. Colin Lawson and Robin Stowell, *The Historical Performance of Music: An Introduction*, Cambridge Handbooks to the Historical Performance of Music (Cambridge: Cambridge University Press, 2004), 98. ↑
45. Myles W. Jackson, “From Scientific Instruments to Musical Instruments: The Tuning Fork, the Metronome, and the Siren,” in Pinch and Bijsterveld, *Handbook of Sound Studies*, 210. ↑
46. Cited in Bernd Herzogenrath, “In/human Rhythms,” in *Sonic Thinking: A Media Philosophical Approach*, ed. Bernd Herzogenrath, thinking|media (New York: Bloomsbury, 2017), 111. ↑
47. Alexander Bonus, “Refashioning Rhythm: Hearing, Acting and Reacting to Metronomic Sound in Experimental Psychology and Beyond, c.1875–1920,” in Biddle and Gibson, *Cultural Histories of Noise*, 90 and 96. ↑
48. Original wording: “los pianistas de hoy en día ... sólo recorren el teclado arriba y abajo con pasajes que

se han aprendido de memoria: ¡pam, pam, pam! ¿Qué significa eso? ¡Nada!” Cited in Oscar Sonneck, *Beethoven contado a través de sus contemporáneos*, transl. Ana Pérez Galván (Madrid: Alianza Música, 2020), 135. In this article, all translations into English are mine unless indicated otherwise. ↑

49. Ibid., 59. ↑
50. Cited in Katherine Hirt, *When Machines Play Chopin: Musical Spirit and Automation in Nineteenth-Century German Literature*, *Interdisciplinary German Cultural Studies* 8 (Berlin: De Gruyter, 2010), 97. ↑
51. Dieter Hildebrandt, *Pianoforte: Social History of the Piano* (London: Hutchinson, 1988), 164. ↑
52. Werrett, “Disciplinary Culture,” 89. ↑
53. Ibid., 91. ↑
54. John Tresch, *The Romantic Machine: Utopian Science and Technology after Napoleon* (Chicago: University of Chicago Press, 2012), 143. ↑
55. Ibid., 142. The text between quotation marks is by Berlioz (1844). ↑
56. Ibid., 304. ↑
57. A detailed interpretation of this drawing can be found in Stephen Bann, *Paul Delaroche: History Painted* (London: Reaktion Books, 1997), 46–48. ↑
58. Andreas Geiger: *Un concert à la mitraille au Théâtre de Vienne* (1846), Bibliothèque-Musée de l’Opéra National de Paris. Remarks in Tresch, *The Romantic Machine*. ↑
59. Hecker, “The Era of Megaphonics,” 12. ↑
60. Cited in Davies and Lockhart, “Introduction,” 17. In this new dialogical sphere between music and audience, there were superimposed connotations: “Exeter Hall was conceived as the moral center of [British] empire, bringing together the voices of creation and gathering news.” Ibid. ↑
61. Aurea Rey Majado, *A Coruña y la Música: El Primer Orfeón Coruñés (1878–1882)* (Coruña: Ayuntamiento de Coruña, 2000), 119–20. ↑
62. Hecker, “The Era of Megaphonics,” 8. ↑
63. Laura Dolp, “Viennese *Moderne* and Its Spatial Planes, Sounded,” *19th-Century Music* 33, no. 3 (2010): 247–69. ↑
64. Personal communication in Spanish, 2021 (phone and email). Cited with permission. ↑
65. This is in apparent contradiction with the mechanical insensitivity of the machines. But as explained above, the reactions to the industrial soundscapes were varied, some of them leading to the opposite extreme, in compensation for an increasingly inhumane world, as happens with the very nature of “Romanticism.” On the evolution of harmony in the period, see James B. Kopp, *Chromatic Transformations in Nineteenth-Century Music*, *Cambridge Studies in Music Theory and Analysis* 17 (Cambridge: Cambridge University Press, 2002). ↑
66. Stephen Downes, “Lenguajes musicales de amor y muerte: el legado compositivo de Mahler,” *Quodlibet* 49 (2011): 102. ↑
67. Wallis D. Braman, “The Use of Silence in the Instrumental Works of Representative Composers: Baroque, Classic, Romantic” (PhD diss., University of Rochester, 1956), 331. ↑
68. Lawson and Stowell, *Historical Performance*, 108. ↑
69. *Sonic Experience: A Guide to Everyday Sounds*, ed. Jean-François Augoyard and Henry Torgue, trans. Andra McCartney and David Paquette (Montreal: McGill-Queen’s University Press, 2005). ↑
70. Olivier Balaÿ, “The Soundscape of the City in the Nineteenth Century,” in Biddle and Gibson, *Cultural*

Histories of Noise, 221–34. ↑

71. Ibid., 221. ↑
72. Ibid., 230. ↑
73. See the chapter “The Death of Isolde” below for the impact of the instrumental turn on the decline of voice. ↑
74. Peter Kivy, “*The Emancipation of Music from Language: Departure from Mimesis in Eighteenth-Century Aesthetics*, by John Neubauer,” *College Music Symposium* 27 (1987): 192. ↑
75. Cited in Schafer, *The Soundscape*, 106. As stated by a reviewer of this article, there is an “obvious martial/military diction in this quote,” as well as in other ones cited. ↑
76. Jim Samson, “The Musical Work and Nineteenth-Century History,” in *The Cambridge History of Nineteenth-Century Music*, ed. Jim Samson, *The Cambridge History of Music* (Cambridge: Cambridge University Press, 2001), 6. ↑
77. Tia DeNora, *Beethoven and the Construction of Genius: Musical Politics in Vienna, 1792–1803* (Berkeley: University of California Press, 1995), 171. ↑
78. Ibid., 172. ↑
79. Ivan Kreilkamp, *Voice and the Victorian Storyteller*, *Cambridge Studies in Nineteenth-Century Literature and Culture* 49 (Cambridge: Cambridge University Press, 2005), 2. ↑
80. Norquest, “The Endless Roar,” 30. ↑
81. Herman Melville, “The Paradise of Bachelors and the Tartarus of Maids,” *New Monthly Magazine*, April 10, 1855, 675. ↑
82. Lucy Larcom, *A New England Girlhood: Outlined from Memory* (Boston: Riverside Press, 1889), 182. ↑
83. Alice Flanagan, *The Lowell Mill Girls* (Mankato: Capstone, 2005), 19. ↑
84. Cited in Bijsterveld, “Listening to Machines,” 154. ↑
85. David Garrioch, “Sounds of the City: The Soundscape of Early Modern European Towns,” *Urban History* 30, no. 1 (2003): 21. ↑
86. Balaÿ, “Soundscape of the City,” 232. ↑
87. George Bernard Shaw, *The Perfect Wagnerite* (New York: Dover, 1967), 131. ↑
88. Christian Utz, “Multivalent Form in Gustav Mahler’s *Lied von der Erde* from the Perspective of Its Performance History,” *Musilogica Austriaca: Journal for Austrian Music Studies* (February 27, 2018). ↑
89. Hirt, *When Machines Play Chopin*, 16. ↑
90. Mary Sue Morrow, *German Music Criticism in the Late Eighteenth Century: Aesthetic Issues in Instrumental Music* (Cambridge: Cambridge University Press, 1997), 1. ↑
91. Hirt, *When Machines Play Chopin*, 95. ↑
92. Edward Lippman, *A History of Western Musical Aesthetics* (Lincoln: University of Nebraska Press, 1992), 216. ↑
93. Mark Evan Bonds, “Idealism and the Aesthetics of Instrumental Music at the Turn of the Nineteenth Century,” *Journal of the American Musicological Society* 50, no. 2/3 (1997): 387. ↑
94. It is no coincidence that the choral societies movement that spread all over Europe in this period was based on men’s choirs. See, for instance, Rudolf Gusztin, “The Institutionalization of the Choral Movement in Nineteenth-Century Hungary,” in “Exploring Music Life in the Late Habsburg Monarchy and Successor States,” ed. Tatjana Marković and Fritz Trümpi, special issue, *Musilogica Austriaca: Journal*

[for Austrian Music Studies \(April 3, 2021\)](#). ↑

95. John Deathridge, "Post-Mortem on Isolde," *New German Critique* 69 (1996): 99-126. ↑
96. Sean M. Parr, "Dance and the Female Singer in Second Empire Opera," *19th-Century Music* 36, no. 2 (2012): 107. ↑
97. Arnold Whittall, *Música Romántica*, transl. by Silvia Alemany (Barcelona: Destino, 2001), 48. ↑
98. *Ibid.*, 49. The tragic fate of the romantic heroine was a sociocultural trope, which was manifested not only in opera but in almost any field of art. Examples in literature include Miss Julie and Madame Bovary. In painting, the theme of the woman destroyed by fatality pervaded the pre-Raphaelite school. ↑
99. Markl Jaroslav and Vladimír Karbusický, "Bohemian Folk Music: Traditional and Contemporary Aspects," *Journal of the International Folk Music Council* 15 (1963): 27. ↑
100. Thorau and Ziemer, *Oxford Handbook of Music Listening*. ↑
101. Hendy, *Noise*, 236. ↑
102. Alain Corbin, "Entre bastidores," in *Historia de la Vida Privada*, vol. 4, *De la revolución francesa a la primera guerra mundial*, ed. Georges Duby and Philippe Ariès (Barcelona: Taurus, 2017), 391-574. ↑
103. Conserved at the Museo Civico Revoltella, Trieste, Italy. ↑
104. Hendy, *Noise*, 236. About the core importance of silence in the new listening paradigm, see Julian Johnson, "The Breaking of the Voice," in "Mahler: Centenary Commentaries on Musical Meaning," ed. Jeremy Barham, special issue, *Nineteenth-Century Music Review* 8, no. 2 (2011): 179-95. ↑
105. Hendy, *Noise*, 236. ↑
106. James Deaville, "The Well-Mannered Auditor: Zones of Attention and the Imposition of Silence in the Salon of the Nineteenth Century," and Katharine Ellis, "Researching Audience Behaviors in Nineteenth-Century Paris: Who Cares if You Listen?," in Thorau and Ziemer, *The Oxford Handbook of Music*, 55-76 and 37-54. ↑
107. Cited in Lippman, *Western Musical Aesthetics*, 263. ↑
108. Cited in *Ibid.*, 265. ↑
109. Cited in Mark Evan Bonds, *Nineteenth-Century Piano Music*, 2nd ed. (New York: Routledge, 2004), 193. ↑
110. Carl Dahlhaus, *La Música del Siglo xix*, trans. Gabriel Menéndez Torrellas (Tres Cantos: Akal Música, 2014), 22. ↑
111. Original wording: "el triunfo de la música instrumental en la segunda mitad del siglo xviii," and "la liberación de la música de su confinamiento lingüístico." John Neubauer, *La emancipación de la música: El alejamiento de la mimesis en la estética del siglo xviii*, trans. Francisco Giménez (Madrid: Visor, 1992), 25 and 295. ↑
112. *Ibid.*, 16. ↑
113. Original wording: "me es tan querida la verdad ... que prefiero seguir siendo zapatero, a músico con los colores." In a letter to his brother Theo, February 12, 1890. Vincent van Gogh, *Cartas a Theo* (Barcelona: Barral - Labor, 1981), 356. ↑
114. Matthew Gelbart, "'The Language of Nature': Music as Historical Crucible for the Methodology of Folkloristics," *Ethnomusicology* 53, no. 3 (2009): 364. ↑
115. In his essay *Über deutsches Musikwesen* (On the essence of German music, 1840). Cited in Bonds, *Music as Thought*, 90. ↑
116. Jeffrey Cooper, *The Rise of Instrumental Music and Concert Series in Paris, 1828-1871* (Ann Arbor: UMI

Research Press, 1983). ↑

117. Cited in *Ibid.*, 1. ↑

118. *Ibid.*, 10. The problem is that Berlioz, Saint-Saëns, and Gounod left clear testimonies that only in opera would the French musician triumph, and twentieth-century musicology was nourished by this assessment. ↑

119. *Ibid.*, 120–21. The method used by Cooper is based on objective data stemming from Parisian concert series, like the following: “between 1828 and 1871 instrumental ‘art’ music was performed at thousands and thousands of events” (*Ibid.*, 20). Cooper locates 7,646 instrumental concerts in those years but estimates that there were many more, since not all of them were recorded. Interestingly, the favorite composers of the French audience were Beethoven (prominently), followed at quite a distance by Mozart, Mendelssohn, Haydn, Schubert, and Schumann (therefore, German-Austrian musicians). ↑

120. *Ibid.*, 154. ↑

121. Following Kreilkamp, *Victorian Storyteller*, Norquest, “[The Endless Roar](#),” 17, puts forward: “the Victorian novel is unique because it first presents the death of the storyteller, or the speaker, as resurrected through the written word.” ↑

122. Alain Corbin, *Village Bells: Sound and Meaning in the Nineteenth-Century French Countryside*, trans. Martin Thom (London: Papermac, 1999). ↑

123. Hirt, *When Machines Play Chopin*, 19–20. See also Anna Harwell, “Music History as Reflected in the Works of Hans Christian Andersen,” in *Music’s Intellectual History*, ed. Zdravko Blažeković and Barbara Dobbs Mackenzie (New York: RILM, 2009), 18–93. ↑

124. Horton, “Listening to Topics,” 643. ↑