

E. T. A. HOFFMANN AND THE ETHEREAL TECHNOLOGIES OF ‘NATURE MUSIC’

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ABSTRACT

In 1814, E. T. A. Hoffmann published his short story, *Die Automate*. The story concerns the dealings of two friends and a fortune-telling automaton, the Turk, whose prophetic utterances seem to reveal a supernatural and psychic ability. Although the story first appeared in the *Allgemeine musikalische Zeitung*, it has been mostly overlooked by music scholars. In addition to the lengthy passages dealing with artificial intelligence, the story includes an extensive discussion of music performance and music instruments. The instruments they discuss – machines capable of bringing forth the voice of nature – perhaps appear as fantastical creations of Hoffmann’s imagination. However, he refers to real instruments that played an established role in late eighteenth- and early nineteenth-century musical culture. This period saw the frenzied production of many novel and bizarre instruments such as the euphon, aiuton, aenomochord, xänorphica and the harmonichord. Though these instruments are all but forgotten today, they testify to a widespread preoccupation with timbre and instrumental sonority. The consolidation of the orchestra as a concept, musical body and institution in the eighteenth century went hand in hand with the notion that individual instrumental sonorities had distinct expressive characters. By the early nineteenth century, this idea manifested itself in two distinct traditions: an orchestral one, in which composers increasingly took advantage of the ever-growing palette of instruments, giving rise to the modern concept of orchestration and the romantic symphony, and an instrument-oriented one, in which musicians, scientists and inventors attempted to capture ‘ideal sonorities’ (usually timbres resembling the human voice) in specially designed instruments. These creations offer a missing link between idealist aesthetics of the period and musical practice. Though ultimately ephemeral, they represent a kind of ‘absolute’ music that was founded purely in ethereal sonorities rather than in musical formalism.

On 16 January 1814, E. T. A. Hoffmann wrote to Rochlitz, editor of the *Allgemeine musikalische Zeitung*, with a submission for the journal:

Übersende ich in der Anlage eine Erzählung die ich unter dem Titel: die Automate für die M. Z. geschrieben mit der gehorsamsten Bitte für die Einrückung gütigst zu sorgen . . . und so wenig auch Anfangs die Automate der Tendenz der M. Z. zu entsprechen scheinen, so glaube ich doch, daß sie für diese Zeitschrift passen, weil ich Gelegenheit gefunden mich über alles was Automat heißt auszusprechen, und also auch musikalische Kunstwerke der Art ganz vorzüglich beachte, nebenher auch den musikalischen Ludwig manches über die neuesten Bemühungen der Mechaniker – über die NaturMusik – über den vollkommensten Ton – Harmonika – Harmonichord ppp sagen lasse keinen schicklicheren Platz finden kan als eben in der M. Z.

Enclosed herewith is a story I wrote for the *Allgemeine musikalische Zeitung*, entitled *Die Automate*, with the request to have it published . . . and little as the automatons at first appear suited to the tone of the *AmZ*, I still believe that they fit into this journal, because I took the opportunity to express myself on everything that is called an automaton, and to pay special attention to musical artefacts of this kind; also, I have the musical Ludwig say a lot about the latest efforts of



the technicians, about nature music, about the perfect sound, about the harmonica, the harmonichord and so forth, which could not find a more appropriate place than the *Allgemeine musikalische Zeitung*.¹

'Automata' appeared in the *AmZ* on 9 February. Later in 1814, Hoffmann published an expanded version of the story in *Die Zeitung für die elegante Welt*; he eventually incorporated it into his *Serapions Brüder*.² The tale concerns two friends, Ludwig and Ferdinand, and an automaton, 'The Turk', which an enterprising exhibitor was displaying in town. The Turk was a splendidly dressed figure, seated on a tripod. Spectators could whisper questions into the Turk's right ear, which he would answer with a gentle breath of air and a dramatic hand gesture. No one had discovered the trick of the automaton, even after close scrutiny. The mystery of the mechanism, however, attracted less attention than the actual answers given by the Turk: they were alternately cold, witty, astute, painful and occasionally prophetic. Though Ludwig is extremely sceptical of the Turk – and all such mechanical 'travesties' of humanity, as he refers to automata – he accompanies Ferdinand to see the automaton. In the longer versions of the story, Ferdinand whispers a question to the Turk, and the reply leaves him in melancholy shock. He later tells Ludwig that the Turk had made reference to his secret lost love. This beloved had come to him in a dream, a singer with a bell-like voice. Shortly after the dream, he caught sight of this mysterious girl, but not since. Having closely guarded the secret of this encounter, he is dumbfounded and dismayed when the Turk unexpectedly prophesizes a most unhappy fate for him and his beloved.

In an attempt to find a rational explanation for the Turk's answer – which Ludwig is convinced exists – the two pay a visit to the Turk's inventor, Professor X, a philosopher and chemist with a special interest in mechanics. During their visit, they are subjected to a musical concert: eager to show off his artworks, the professor leads the two friends to a hall containing four automaton musicians: the friends see a flute-playing man, a woman at a keyboard instrument, and two boys, with drum and triangle; in addition, the room is lined with musical clocks, and in the back is a large orchestrion.³ Taking his place at the piano, the professor performs a march together with his automata that climaxes to a horrendous *fortissimo*, with all the instruments clanging together. The two friends are so horrified by the performance that they leave immediately without questioning the professor further, lest he and his machines begin another performance. Afterwards, the two friends discuss the true nature of music and musical instruments at length. The story ends hurriedly: Ferdinand leaves town when summoned by his father. On the journey, he sees his beloved again – after her marriage ceremony to a Russian officer. She recognizes Ferdinand, and faints into the arms of the very same professor who invented the Turk. The narrative ends at this point, heightening the many ambiguities and interruptions in the story: we never learn the secret of the Turk, the true identity of Ferdinand's beloved, or her relationship to the professor.

The story touches on many fascinating themes – artificial intelligence, science, ideal love, performance, 'nature' music, and mechanics. In typical Hoffmannesque fashion, 'Automata' creates an uncanny world characterized by an uneasy relationship between the supernatural and the rational, magic and forgery: the entire narrative explicitly focuses on the continual attempts to find explanations for all mysterious phenomena – Ludwig is ever determined to unmask the professor as a fraud and to find a rational reason for the Turk's prophetic replies. Much of the friction between the otherworldly and the rational stems from how closely 'Automata' echoed contemporary society. Though no fortune-telling Turk existed, a chess-playing

1 Hans von Müller and Friedrich Schnapp, eds., *E. T. A. Hoffmanns Briefwechsel*, volume 1 (Munich: Winkler-Verlag, 1967), 436, translated in Johanna C. Stahlin, ed., *Selected Letters of E. T. A. Hoffmann* (Chicago: University of Chicago Press, 1977), 217.

2 *Die Zeitung für die elegante Welt* 14/68–75 (7–16 April 1814); E. T. A. Hoffmann, 'Die Automate', in *Die Serapions Brüder*, ed. Wulf Segebrecht (Frankfurt am Main: Bibliothek Deutscher Klassiker Verlag, 2001), 410.

3 The term 'orchestrion' denoted a range of instruments in this period. Here, however, it is clear that Hoffmann refers to mechanical instruments designed to imitate the sounds of an orchestra. I discuss instruments of this type in 'The Origin of the Orchestra Machine', *Current Musicology* 76 (Fall 2003), 7–23.



Turk did, which, when sceptics were not trying to figure out the secret to the automaton, excited audiences about the possibilities of machine intelligence.⁴ The descriptions of grotesque automata and Ludwig's spirited rants against artificial intelligence are so striking that it is easy to overlook the extended and detailed discussions of music; indeed, 'Automata' has a greater presence in histories of science and technology than in musicology. The story is not included in David Charlton's collection of Hoffmann's musical writings, nor is it discussed in Abigail Chantler's recent study of Hoffmann's aesthetics.⁵ But just as the Turk drew upon a public fascination with artificial intelligence, Hoffmann's discussion of music also reflected abiding concerns of contemporary musical culture: the earliest published version of 'Automata' focused primarily on Ludwig's and Ferdinand's discussion of music; Ludwig's extended tirades against other kinds of automata and the tale of Ferdinand's lost love were not central themes and only appear in the longer versions. The purpose of this essay is two-fold; I will explore the instruments and musical ideas that are woven into the narrative; second, I would like to turn around, as it were, and use Hoffmann's story, once contextualized, to gain access to a special aesthetic world of the late eighteenth and early nineteenth centuries that has been ignored or marginalized in musicological scholarship.

Music in 'Automata'

Hoffmann's story is suffused with musical references; when the main characters are not explicitly discussing music, fantastic tones and subliminal songs still dominate the narrative. Hoffmann uses sonority to reveal the inner nature of the various characters encountered in the tale: Ferdinand's lost beloved is first encountered through her singing; her bell-like voice enchants him, and she tells him in his dreams that he recognizes her through her melody, which resonates with tones already present in Ferdinand's heart. By contrast, the dubious professor's voice is described as a 'screaming, discordant tenor' suited to someone hawking wares in the market. For most of the story, cacophonous sounds envelop the professor: his mechanical works produce an unbearable din, and even his keys clatter noisily when he opens the hall for Ludwig and Ferdinand. Earlier, Ludwig describes his experience seeing an elaborate exhibition, which included a mighty mechanical Mars surrounded by automaton warriors and courtiers:

So bald wir vor den Thron getreten, fingen ein Paar Trommelschläger an, auf ihren Trommeln zu wirbeln, und Pfeifer bliesen dazu ganz erschrecklich, daß man sich vor dem kakophonischen Getöse hätte die Ohren zuhalten mögen. Ich bemerkte, daß der Gott des Krieges eine durchaus schlechte, seiner Majestät unwürdige Kapelle habe, und man gab mir recht.

As soon as we had stepped before the throne, several drummers began to roll their drums, and fifers fided most horrendously, so that one had to hold one's ears to escape from the cacophonous racket. I remarked, and was agreed with, that the God of War had a rather poor band, unworthy of his majesty.⁶

Throughout the story, Hoffmann carefully aligns good characters and events with musicality and sublime tones, evil or soulless ones with grating, discordant and militaristic clattering. Ferdinand's feelings for his

4 Wolfgang von Kempelen created a famous hoax, The Turk, a chess-playing 'automaton'. Not only did the machine play chess, but it often beat its human opponents. For an eighteenth-century account of the machine, see Karl Gottlieb Windisch, *Briefe über den Schachspieler des Hrn. von Kempelen* (Basel, 1783), translated as *Inanimate Reason; or a circumstantial account of that astonishing piece of mechanism, M. de Kempelen's chess player* (London, 1784). For a marvellous modern account of the Turk, see Tom Standage, *The Turk: The Life and Times of the Famous Eighteenth-Century Chess-Playing Machine* (New York: Walker, 2002).

5 See David Charlton, *E. T. A. Hoffmann's Musical Writings: Kreisleriana, The Poet and the Composer, Music Criticism* (Cambridge: Cambridge University Press, 1989) and Abigail Chantler, *E. T. A. Hoffmann's Musical Aesthetics* (Aldershot: Ashgate, 2006).

6 Hoffmann, 'Die Automate', 410. The translations are my own, in collaboration with Thomas Schneller.



beloved, for example, transform into ethereal notes; by contrast, his blissful dream of his beloved is interrupted by the 'shrill sound of the post-horn', which signals her departure.

The professor's performance and the ensuing discussion constitute the heart of the story. The later versions of 'Automata' heighten the effect of the musical discussion by setting it up through the earlier musical events and references: the professor's ever-crescendoing march echoes the abysmal music performed by the automatic band of Mars; when Ludwig and Ferdinand begin their extended discussion of musical performance and instruments, they praise tones that Hoffmann has already woven into earlier parts of the narrative.

Their lively musical conversation begins when Ferdinand, the less fiery and opinionated of the two friends, remarks that the professor's performance was, at least, 'interesting'. Ludwig vehemently disagrees, and ruthlessly disparages the automata and the professor's own performance, which he deems equally mechanical. Mechanical music, he says, merely imitates the physical movement of the performer and ignores the true purpose of music.⁷ But when a feeling musician performs, the tones illuminate and reflect his soul's own inner music: music is not created by the air passing through wind instruments or the scrape of a bow across a violin, but rather through the spiritual connection the tones foster between human beings. This theme of spiritual connection runs throughout 'Automata': Ludwig theorizes that the Turk is controlled by a being capable of gaining access to people's inner souls through a kind of psychic rapport; Ferdinand is likewise bound to the mysterious singer through a spiritual connection that is activated by musical tones.

Ferdinand eventually agrees with Ludwig's estimation of mechanical music, and ponders the pitiable fact that inventors of automata do not put their time to better use by improving real musical instruments. Ludwig leaps on this notion, and tells Ferdinand that he believes the true goal of musical science should be the study of 'the class of sounds that belong . . . to Nature herself' and that inventors should 'lock this mysterious music into an instrument which then obeys the will of man and resounds at his touch'.⁸ Ludwig goes on to tell Ferdinand that he finds the recent inventions, which use unusual materials such as slips of glass and metal rods, most fascinating, and that what is truly needed to create a 'higher mechanics of music' is the discovery of the acoustical secrets hidden in nature. He believes in Arcadian times, when humans were in harmony with nature, the world was lush with a profound and ethereal music. After chancing upon the few remains of these tones of nature, Ludwig believes that all instruments should aim to reproduce the effect of this music:

In dem unvermerkten Entstehen, Anschwellen und Verschweben jener Naturlaute liegt etwas, das unser Gemüt unwiderstehlich ergreift, und das Instrument, dem dies zu Gebote steht, wird in eben dem Grade auf uns wirken müssen; mir scheint daher, daß die Harmonika rücksichtlich des Tons sich gewiß jener Vollkommenheit, die ihren Maßstab in der Wirkung auf unser Gemüt findet, am meisten nähert . . . Recht viel in dieser Hinsicht wird auch gewiß das neuerfundene sogenannte Harmonichord leisten. . .

In the imperceptible emergence, swelling and dissipation of these nature sounds is something that irresistibly touches our sensibilities, and the instrument capable of replicating this effect will exert a corresponding effect on us. For that reason it seems to me that, in regards to its tone, the Harmonica mostly closely approaches that perfection, which is measured by its effect on our

7 Eighteenth-century views of machine performance were not as negatively charged as Hoffmann's. See for example Adelheid Voskhul, 'Motions and Passions: Music-playing Women Automata and Cultural Commentary in Late 18th-Century Germany', in *Genesis Redux: Essays on the History and Philosophy of Artificial Life*, ed. Jessica Riskin (Chicago: Chicago University Press, 2007), 293–320; David Yearsley, 'Bach the Machine', in *Bach and Meanings of Counterpoint* (Cambridge: Cambridge University Press, 2002); and Annette Richards, 'Automatic Genius: Mozart and the Mechanical Sublime', *Music and Letters* 80 (1999), 366–389.

8 E. T. A. Hoffmann, 'Die Automate', 420.



sensibilities . . . In this respect, much will be accomplished by the newly invented so-called harmonichord. . . .⁹

There is something disarmingly didactic about Ludwig's extended lectures in the midst of the narrative; his vivid descriptions of instruments and their tones signal that the message is directed far beyond the immediate circumstances of the story. This effect is heightened when we consider that all of the instruments that the characters hear and discuss were not monsters of Hoffmann's imagination, but actual instruments that played an established role in contemporary musical practice. The glass harmonica had been part of musical culture since 1761 and Hoffmann mentions and alludes to many other more recent inventions. Father and son Gottfried and Friedrich Kauffmann completed their harmonichord just five years before 'Automata' and when Ludwig speaks of instruments that 'let strings vibrate in ways different from the customary ways', he surely refers to instruments such as Johann Jakob Schnell's anémochord, invented in 1798, which used compressed air to set strings in motion (Figure 1).¹⁰ The machines that make up the professor's grotesque orchestra were all real: flute- and clavier-playing automata were well known in the eighteenth century, as were musical clocks. The orchestrion – a large mechanical organ designed to imitate the sounds of the orchestra – was a more recent invention, which reflected a growing fascination with loud and grand music. It is in this discussion that Hoffmann's story most clearly hovers between fantastic literature and cunning musical criticism. The tones that permeate the narrative of 'Automata' were not only real, but were also closely tied to central aspects of late eighteenth- and early nineteenth-century culture. When Hoffmann wrote 'Automata', musicians, philosophers, scientists and inventors all searched for, in Ludwig's words, 'none other . . . than the discovery of the perfect tone'.¹¹

The allure of ethereal sonorities

The interest in new instruments and the perfect sound was part of a larger fascination with sonority that had been growing since the mid-eighteenth century, when thinkers about music first began to think about instrumental timbre, apart from performance, in increasingly precise and systematic ways. This move towards a more abstract notion of timbre manifested itself in various ways in musical practice, the most obvious of which involved the orchestral tradition: the increased importance of sonority gave rise to the modern notion of orchestration, the earliest orchestration treatises and the idea of instrumental 'character'; composers actively sought out new orchestral sounds, fuelling, in part, the taste for grand and bombastic effects that reached frenzied heights in the early nineteenth century.¹²

In addition, however, a distinct musical practice sprang up, an 'alternative' practice focused on ethereal sonorities reminiscent of the voice. The orchestral practice dominates our historical narratives, in part because many of the developments surrounding the orchestra helped forge our modern conception of the symphony and its capacity for expression; this other practice has faded from mainstream musical culture, and its influence on later music is more hidden.

9 E. T. A. Hoffmann, 'Die Automate', 422.

10 'Saiten auf ganz andere als die gewöhnliche Weise vibrieren und ertönen zu lassen. . .', E. T. A. Hoffmann, 'Die Automate', 420.

11 'Dies ist kein anderes . . . als die Auffindung des vollkommensten Tons', E. T. A. Hoffmann, 'Die Automate', 421.

12 The earliest treatises on composing for orchestral instruments are Valentin Roeser, *Essai d'instruction à l'usage de ceux composent pour la clarinette et le cor* (1764); Louis Joseph Francoeur, *Diapason général de tous les instruments à vent* (1772); and Othon Vandenbroeck, *Traité général de tous les instrument à vent* (1793). Other treatises occasionally contained sections devoted to composing for the different instruments, such as A. F. C. Kollmann, *An Essay on Practical Musical Composition* (1799, revised 1812). For discussions of these treatises, see Hans Bartenstein, 'Die frühen Instrumentationslehren bis zu Berlioz', *Archiv für Musikwissenschaft* 28 (1971), 97–118; John Spitzer and Neal Zaslaw, *The Birth of the Orchestra* (Oxford: Oxford University Press, 2004), 504–506; and Emily I. Dolan, 'The Idea of Timbre in the Age of Haydn' (PhD dissertation, Cornell University, 2006), Chapter 2, 'The Birth of Timbre'.

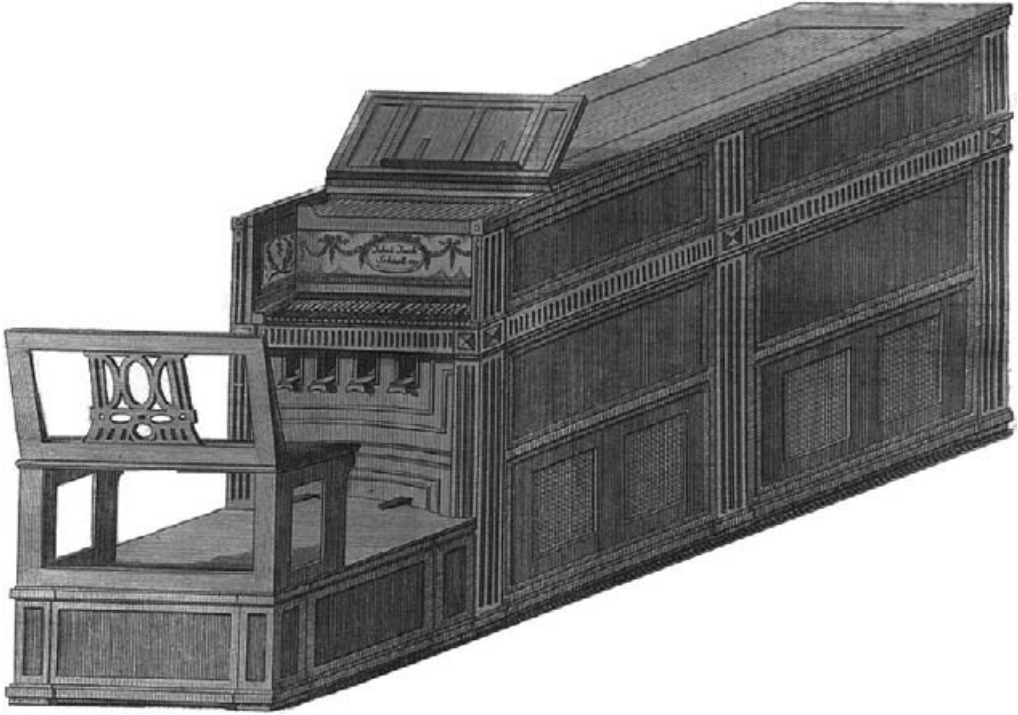


Figure 1 Johann Jakob Schnell's *anémocorde* or *Animo-corde*, invented in 1789 and reported in the *Allgemeine musikalische Zeitung* 1/3 (October 1798), 39–44; the image of the instrument was printed in the *Beylage zur Allgemeinen musikalischen Zeitung* 1/3. Exemplar in the Cox Music Library, Cornell University. Used by permission

The 'vocal-oriented' practice is more closely tied to the original sense of the word 'timbre' when it was first introduced into musical discourse in the mid-eighteenth century. Though we today consider timbre more or less equivalent to tone-colour, the association between note and hue did not solidify until later in the eighteenth century. The word 'timbre' was derived from the Latin noun 'tympanum', meaning drum or bell; rather than colour or character, 'timbre' in its original meaning focused on the quality of resonance.¹³ In the first explicitly musical definition of timbre, Jean-Jacques Rousseau discussed it purely in terms of the beauty of the instrument's resonance. He argued that the violin has the nicest timbre because it combines 'softness with brightness of sound'; by contrast, he noted that 'there are even instruments, such as the harpsichord, which are both dull and harsh at the same time; this is the worst timbre'.¹⁴

The later idea of timbre that was rendered as 'Klangfarbe' in German implies the presence of a strong orchestral tradition: the single colour of an instrument was one in a range of colours, and palette was produced by an array of instruments working together. The original significance of timbre involved only one resonating body. The initial attention paid to instrumental sonority did not consider instruments in a network of contrasting and complementary colours, but rather evaluated each sonority on its own, for its particular qualities. Put another way, both the orchestral and the 'individualistic' notions of timbre involved the notion of quality, but the former in the sense of character and the latter in the sense of value or grade. This second concept stemmed from the age-old belief that the most beautiful instruments were those that

¹³ Before the emergence of the modern musical notion of 'timbre', the word was used simply to mean 'resonance'.

¹⁴ 'Il y a même des instruments, tels que le clavecin, qui sont à-la-fois sourds & aigres, & c'est le plus mauvais *tymbre*.' Rousseau, 'Tymbre', in *Encyclopédie*, ed. Denis Diderot and Jean Rond D'Alembert (Paris, 1751–65)



imitated the human voice, an aesthetic that contributed to the privileged reception of the viola da gamba in the Renaissance; in the eighteenth century, Georg Sulzer praised the oboe for the same reasons:

Unter allen Instrumenten, worauf leidenschaftliche Töne können gebildet werden, ist die Kehle des Menschen ohne allen Zweifel das vornehmste. Darum kann man es als eine Grundmaxime ansehen, dass die Instrumente die vorzüglichsten sind, die am meisten fähig sind, den Gesang der Menschen Stimme, nach allen Modificationen der Töne nachzuahmen. Aus diesem Grund ist die Hoboe eines der vorzüglichsten.

Among all instruments that can produce expressive tones, the human voice is without doubt the one to be preferred. One can deduce from this the fundamental maxim, then, that the most excellent instrument is that which is most capable of imitating the human voice. By this reasoning, the oboe is one of the best.¹⁵

During the eighteenth century, two instruments in particular attracted widespread attention because of the quality of their sonority: the Aeolian harp and the glass harmonica. The Aeolian harp, or wind harp, had of course existed for centuries, and though it had been studied and theorized, it was only in the late eighteenth century that it became universally popular.¹⁶ Likewise, people had played the musical glasses since antiquity; the glass harmonica simply provided a new and more convenient means to do so. Both instruments reflect particular aspects of the new fascination with sound.

The Aeolian harp is deceptively simple: the instrument consists of a wooden box designed to funnel wind across varying numbers of tuned strings. Not only does it produce haunting sonorities, it does so mysteriously: single strings of the Aeolian harp are capable of giving forth multiple tones simultaneously. By coaxing such tones from wind, the Aeolian harp seemed to whisper nature's secrets to the enchanted listener. In the literature that surrounds the instrument, it appears by turns to hint at celestial and heavenly harmony, to reveal the art inherent in nature, and to serve as a powerful metaphor for the human mind.¹⁷ The harp was symbolic of music, or rather, the experience of music. Not only did the instrument suggest that music was an organic part of nature, it also resonated with contemporaneous notions of how humans interacted and were acted upon by the outside world. Johann Gottfried Herder, for example, frequently discusses the human mind as a divine 'string-play', surely a reference to the Aeolian harp. He writes:

Wie fern wir an dem, was uns umgibt, Teil nehmen, wie tiefe Leibe und Haß, Ekel und Abscheu, Verdruß und Wollust ihre Wurzeln in uns schlagen; das stimmt das Saitenspiel unsrer Gedanken, das macht uns zu denen Menschen, die wir sind.

The extent to which we participate in what surrounds us, how deeply love and hate, disgust and revulsion, vexation and pleasure, plant their roots in us – this tunes the string-play of our thoughts, this makes us into the human beings that we are.¹⁸

15 Sulzer, 'Instrumentalmusik', in *Allgemeine Theorie der schönen Künste*, translated in Thomas Christensen and Nancy Kovaleff Baker, eds., *Aesthetics and the Art of Musical Composition in the German Enlightenment: Selected Writings of Johann Georg Sulzer and Heinrich Christoph Koch* (Cambridge: Cambridge University Press, 1995), 97.

16 The growing fascination with the Aeolian harp is evident in publications such as Henry Thorowgood, *A Description of the Aeolian-harp, or Harp of Aeolus from the Earliest Account to the Present Time* (London, 1754?), which is a collection of earlier descriptions of, and poetry dedicated to, the instrument.

17 See Andrew Brown, *Aeolian Harp*, volume 3, *The Aeolian Harp in European Literature 1591–1892* (Cambridge: Bois de Boulogne, 1970); Thomas Hankins and Robert Silverman, 'The Aeolian Harp and the Romantic Quest for Nature', in *Instruments and the Imagination* (Princeton: Princeton University Press, 1995), 86–112; and Matthew Riley, 'Rustling Reeds and Lofty Pines: Elgar and the Music of Nature', *19th-Century Music* 26/2 (2002), 155–177.

18 Johann Gottfried Herder, 'Vom Erkennen und Empfinden der menschlichen Seele (1778)', in *Johann Gottfried Herder Werke*, volume 2 (Munich: Carl Hanser Verlag, 1987), 674, translated in *Herder: Philosophical Writings*, ed. Michael N. Forster (Cambridge: Cambridge University Press, 2002), 196.



As early as the 1740s the instrument began to infiltrate the poetic imagination, becoming a frequent subject for romantic musing. Coleridge's poem 'The Aeolian Harp', written in 1795, celebrates the raw experience of the instrument's ethereal sonorities:

. . . And that simplest Lute,
 Plac'd length-ways in the clasping casement, hark!
 How by the desultory breeze caress'd,
 Like some coy Maid half-yielding to her Lover,
 It pours such sweet upbraiding, as must needs
 Tempt to repeat the wrong! And now, its strings
 Boldlier swept, the long sequacious notes
 Over delicious surges sink and rise,
 Such a soft floating witchery of sound
 As twilight Elfin's make, when they at eve
 Voyage on gentle gales from Faery Land,
 Where *Melodies* round honey-dropping flowers,
 Footless and wild, like birds of Paradise,
 Nor pause, nor perch, hovering on untam'd wing.¹⁹

In 'Automata', Ludwig and Ferdinand discuss instruments that were designed to call forth nature's own voice. Ludwig confesses that he finds all attempts most fascinating, but that he also believes the Aeolian harp is a mere trifle or plaything. Ludwig was not alone in this regard: early nineteenth-century inventors attempted to produce wind-activated instruments of grander proportions, such as the storm harp, which used gigantic strings stretched in fields. Ludwig mentions this instrument, arguing that it is more worthy of nature. The anémochord, to which Ludwig alludes, was an attempt to transform the Aeolian harp into a practical instrument, controllable by man.

The glass harmonica, invented by Benjamin Franklin in 1761, had an even greater influence on musical culture of the late eighteenth and early nineteenth centuries. At the time of its invention, the instrument reflected both the dominant aesthetics that favoured vocal music and the burgeoning interest in instrumental sonorities that were immediately arresting. Indeed, the instrument was granted a kind of double life in the eighteenth century. It was its tone above all that separated it from other musical instruments, allowing it to escape the criticisms frequently lodged against instrumental music. There was no question of silly imitations of unworthy subjects, since the harmonica could imitate the one thing that was worth imitating: the human voice. Part of the success of this imitation stemmed from the instrument's capacity for dynamic nuance: the performer could crescendo or decrescendo while playing a single note, offering a kind of control impossible on pianos, harpsichords or most organs.

Part of the allure of the glass harmonica was that it was a partial solution to an age-old musical problem: the creation of an instrument that combined the dynamic nuance and sustaining power available to bowed-string instruments with the convenience of a keyboard instrument. This idea had fascinated inventors for centuries: Leonardo da Vinci drew up sketches for a keyboard instrument that used a rosined wheel to activate and sustain tones; the earliest actual instrument was Hans Haiden's Geigenwerk of 1575. Most subsequent sustaining pianos were built on the same basic principles as Haiden's instrument, that is, they used rosined wheels or bows to activate strings. The glass harmonica, though it lacked a keyboard, offered a radically new solution: rather than using strings and wheels, it used tuned glass bowls that were activated by the friction of the performer's moistened fingers.

The glass harmonica was not a perfect instrument. Its tone, when considered in isolation, enthralled many of its listeners, but the many faults of its mechanism – its muddy lower register, slow response and

19 Samuel Coleridge, 'Effusion XXV (composed August 20th, 1795) [The Eolian Harp]', in *Coleridge's Poetry and Prose*, ed. Nicholas Halmi, Paul Magnuson and Raimonda Modiano (New York: W. W. Norton and Company, 2004), 18.



inability to execute rapid passages, as well as its nasty habit of causing its performers to become ill – undermined the instrument's usefulness. Critics often doubted whether the glass harmonica was capable producing powerful music. After a concert by glass harmonica virtuoso Marianne Kircheggessner (for whom Mozart later wrote two works), a reviewer for *The Morning Chronicle* remarked that, 'the dulcet notes of the instrument would be delightful indeed, were they more powerful and articulate; but that we believe the most perfect execution of the instrument cannot make them. In a similar room, and an audience less numerous, the effect must be enchanting.'²⁰ What is striking about this review is the author's good will towards the instrument: though clearly disappointed by the concert, he nonetheless wanted to believe that the instrument was capable of enchanting its audience and only needed a different venue. This review highlights the strange fate of the instrument: rather than simply fading away into obscurity as most failed instruments did, the glass harmonica began to lead a liminal existence on the edge of eighteenth-century culture. It was both a failed experiment, causing increasing frustration and boredom in musical practice, and at the same time the ultimate romantic voice and the subject of many fantasies. Heather Hadlock's study of the glass harmonica illuminates this aspect of the harmonica's history, yet she sees these two worlds as separate; indeed, her argument about the harmonica is precisely that the instrument was lost between enlightenment and romantic aesthetics, and that the harmonica's image in each of these aesthetic worlds diverged increasingly with time.²¹ Her argument does not take into account a long tradition of instrument inventing that grew up in the wake of the harmonica. Fantasies about the harmonica inspired inventors to attempt, in very real ways, to create new and better instruments. Even if the harmonica was flawed, its ethereal sonority acted as a promise that a perfect instrument could exist, one with an unmatched timbre that produced a strong effect upon the listener. Far from simply becoming the subject of romantic fantasies about music, its sonority prompted a search in the early nineteenth century for an instrument characterized as pleasant, sweet and voice-like, capable of dynamic nuance, and 'natural'; in other words, an instrument that resembled the glass harmonica in all respects except its faults. Moreover, the fact that it was made of an unusual material inspired inventors to look beyond the traditional materials of instrumental building to create the ideal instrument.

Some inventors attempted to improve the glass harmonica directly by incorporating a keyboard to mediate between the performer and the glasses. They hoped that this addition would allow for more rapid execution and prevent the performer from suffering nerve damage from direct contact with the vibrations of the bowls. Starting in the 1780s, a string of inventors independently produced keyboard harmonicas, with names such as the *Tastensharmonika* and *Clavier-harmonica*. In spite of the efforts of these inventors, these experiments proved unsuccessful; not only were the tones still slow to speak, they were more difficult to control because the keyboard removed the nuance possible when a performer played directly on the glasses.²² The automatic lady in the professor's grotesque orchestra likely played an instrument of this type.

Other inventors turned to novel materials and mechanisms in their quest for the perfect instrument. In 1793, Irishman Charles Clagget unveiled his *Aiuton* or 'Ever-tuned Organ', which used tuning forks that were made to sound by a rosined band of seal-skin (Figures 2 and 3). Clagget claimed the instrument not only possessed a supremely sweet sonority, but also had the feature that it never went out of tune. He also claimed its sturdiness and small dimensions even allowed it to be used on the cabins of ships. Despite Clagget's confidence in the instrument's value, the *Aiuton* was beset by a variety of problems. Like the glass

20 Anon. 'Sixth Concert: 17th March 1794. Mr. Salomon's Concert. Hanover Square', *The Morning Chronicle* (18 March 1794), quoted in H. C. Robbins-Landon, *The Symphonies of Joseph Haydn* (London: Universal Edition, 1955), 515.

21 Heather Hadlock, 'Sorous Bodies: Women and the Glass Harmonica', *Journal of the American Musicological Society* 53/3 (2000), 507–540.

22 For a thorough discussion of the history of the *Tastensharmonika* and similar instruments, see Peter Sterki, *Klingende Gläser* (Bern: Peter Lang, 2000), 53ff. Sterki's study is an invaluable resource for the history of the harmonica and other glass instruments.



Figure 2 Charles Clagget's Aiuton or Ever-tuned Organ from *Musical phaenomena, founded on unanswerable facts; and a proof that musical instruments have hitherto fabricated on the most uncertain, therefore the most improper materials* (London, 1793), 10. Exemplar in the Albrecht Music Library, University of Pennsylvania. Used by permission

harmonica, its tones were slow to speak, and this was aggravated by the short time in which the rosin wore off the seal-skin belt, rendering it mute. After his death, a friend remarked that Clagget's fate was 'to have ideas theoretically sublime, but deficient in practical utility'.²³

Acoustician and inventor E. F. F. Chladni produced two musical inventions, and both betray the lingering influence of the glass harmonica. Chladni today is best known for his experiments with nodal

23 E. Lydiatt, Letter to the Editor, *Monthly Magazine*, number 206, volume 30/5 (Dec. 1810), 411–412. Clagget later tried to make an 'Ever-tuned Piano forte' that used hammers to strike the same style of tuning forks. This instrument never succeeded, because the force with which the hammers needed to strike the forks was so great that when 'the tone came out . . . it was preceded by one discordant and insufferably distinct, occasioned by the necessary momentum of the blow'. (E. Lydiatt, Letter to the Editor, *Monthly Magazine* number 209, volume 31 (Feb. 1811), 28.)



Form of the Sounding Bars.

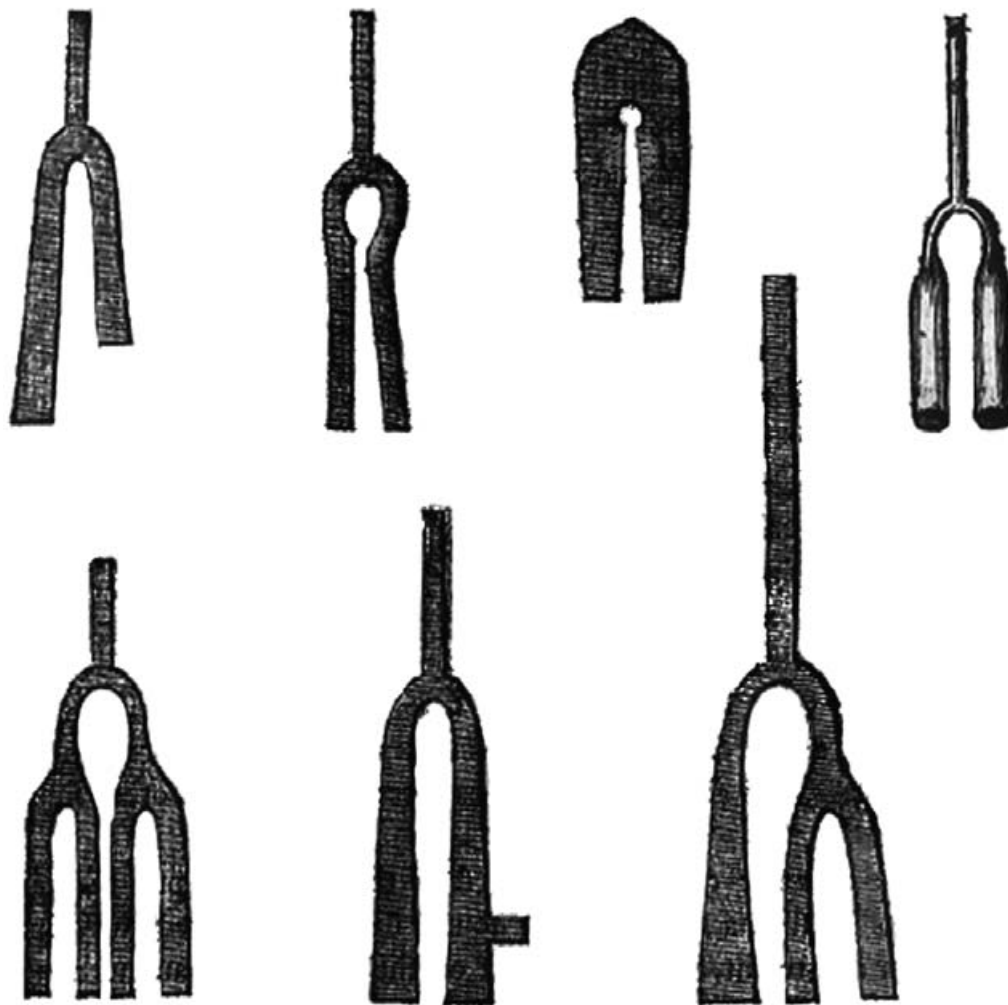


Figure 3 The Sounding Bars of Clagget's Aiuton, from *Musical phaenomena*, 9. Exemplar in the Albrecht Music Library, University of Pennsylvania. Used by permission

patterns, which formed part of his larger investigation into nature of sounding bodies; these studies reflect the marriage of aesthetics and science in this period: the nodal studies made visible the invisible secrets of sound, revealing beautiful patterns.²⁴ Chladni worked out the acoustical foundations for longitudinal

24 Myles Jackson, in his recent book *Harmonious Triads* (Cambridge, MA: MIT Press, 2006), explores Chladni and ethereal instrument building from the perspective of the history of science. See also Thomas L. Hankins and Robert J. Silverman, 'Science since Babel: Graphs, Automatic Recording Devices, and the Universal Language of Instruments', in *Science and Imagination*, 113–147.



vibrations of strings, rods and air columns, which, unlike transversal vibrations, had been little studied.²⁵ His first instrument, the Euphon, grew out of this work. It consisted of a series of tuned glass tubes that the performer rubbed lengthwise (rather than rubbing the rims, as in the case of the glass harmonica). Most reviews of the instruments obsessively compared it to the glass harmonica, either explaining how it was an improvement or else arguing that it was completely different.²⁶

Another family of instruments sprang up around Chladni's second invention, the clavicylinder. The clavicylinder had a keyboard and used a rotating glass cylinder, whose speed was controlled by the performer, to sound a series of iron rods.²⁷ This concept led to a series of imitations: in 1805, Christian Dietz invented the melodion, and in 1813 glass harmonica player Johann Buschmann created his terpodion. The difference between these instruments was in the material – while Chladni used glass and iron, Dietz used tin and brass, and Buschmann built the terpodion entirely of wood. In 1809, Franz Leppich unveiled his panmelodicon, which functioned similarly to the clavicylinder, and supposedly could produce a range of romantic sonorities, including the 'fortepiano, organ, glass harmonica, waldhorn, and bassoon' (Figure 4). Leppich travelled with the instrument, and performed a composition by Conrad Kreutzer entitled *Die Entstehung der Harmonie* (*The Emergence of Harmony*); though now lost, the name suggests a programmatic work concerned with music in its primordial state. The Kaufmanns' harmonichord was similar to these cylinder-type instruments: it used a glass cylinder to sound a series of strings, marrying the materials of the glass harmonica with those of traditional sustaining keyboards. It was one of the more successful inventions: Carl Maria von Weber composed an Adagio and Rondo for harmonichord and orchestra in 1811. The list of instruments goes on and on: in contemporary journals we can find reports of the melodika, xylharmonicon, xänorphica, triphon, uranion and lyrachord.

This seemingly disparate collection of instruments is joined by a common goal: each instrument sought novel, technological means by which to produce sound. Recent musical scholarship has become increasingly attuned to the aesthetic implications of instruments and musical technologies. Carolyn Abbate's exploration of music and machines traces a funereal theme through different musical technologies: 'While the human voice', she writes, 'conveys the strong sense that the speaker "speaks his own words", all instrumental versions of voice are by contrast suspect with regard to the origin of sound. They construe the medium as dead.'²⁸ Abbate's argument illuminates the source of Ludwig's horror at the professor's mechanical orchestra. The ethereal instruments that were invented during this period, however, functioned quite differently from orchestrions and automata; they suggest that not all instruments construe the medium as dead. Rather, these ethereal instruments offered an alternative kind of musical technology. Like scientific instruments, they were a means of discovery, liberating sounds from organic and man-made materials. An

25 His major work to discuss this is *Entdeckungen über die Theorie des Klanges* (Leipzig: Weidmanns Erben und Reich, 1787).

26 In a review in the London journal *The Philosophical Magazine*, for example, the author remarked: 'In the month of February last, Dr. Chladni of Wittenberg . . . performed on a new instrument he has invented, and to which he gives the name of *Euphon*. This instrument has nothing in common with the *Harmonica* but the glass. It consists of forty-one immovable parallel cylinders of glass, of equal length and thickness. Its construction, tone, and the method of playing it, are totally different from those of the *Harmonica*.' 'On a New Musical Instrument invented by Dr. Chladni; with some Experiments on the Vibrations of Sonorous Bodies', *The Philosophical Magazine* 2 (December 1798), 315.

27 E. F. F. Chladni, 'Nachricht von dem Clavicylinder, einem neuerfundenen Instrumente, von E. F. F. Chladni, enthaltend Bemerkungen über einige etwas damit verwandte Tastaturinstrumente', *Allgemeine musikalische Zeitung* 18 (January 1800), 305–313. Birgit Heise of the Museum für Musikinstrumente der Universität Leipzig recently published an organological discussion of the clavicylinder and like instruments: 'Chladni's Clavicylinder and Some Imitations', *The European Physical Journal – Special Topics* 145 (2007), 3–14. See also 'Zweyte Nachricht von dem Clavicylinder', *Allgemeine musikalische Zeitung* 3 (February 1801), 386–387, and 'Ueber einige wesentliche Vervollkommnungen des Clavicylinders', *Allgemeine musikalische Zeitung* 6 (December 1804), 221–223.

28 Carolyn Abbate, *In Search of Opera* (Princeton: Princeton University Press, 2001), 201.

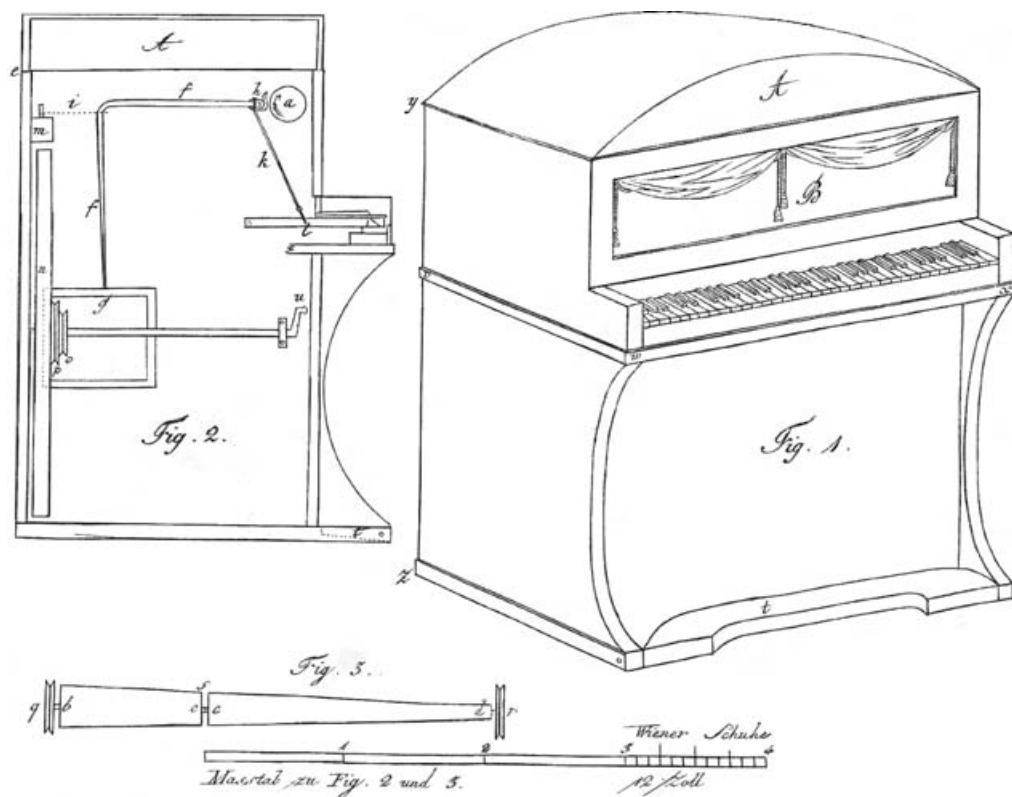


Figure 4 Franz Leppich's *Panmelodicon*, reported by J. F. Bleyer, *Allgemeine musikalische Zeitung* 13/8 (1811), 141–145; the image of the instrument was printed in the *Beylage zur Allgemeinen musikalischen Zeitung* 13/8. Exemplar in the Cox Music Library, Cornell University. Used by permission

orchestrion might entomb a musical work, but a clavicylinder releases the sounds inherent in iron and glass – just as Chladni's experiments with *Klangfiguren* reveal beautiful patterns hidden in acoustic vibrations (Figures 5, 6 and 7). 'Automata' plays with this precisely this distinction between the means and ends of technology: the professor's dubious machines separate sound and soul; the instruments for which Ludwig longs would, if successful, discover new sounds and novel conduits to connect humans with the sublime music engrained in nature.

Sound as gateway to the sublime

The new focus on timbre and sonority did not simply signify that musicians and composers were paying closer attention to the immediate qualities of instruments; it also heralded a new conception of musical sensation as a whole. During the first half of the eighteenth century, music was frequently criticized for its dependence on sensation: Cartesian dualism, which dominated Western culture, threatened to undermine music as an art form. Unlike the other arts such as painting and poetry, which could clearly imitate higher subjects and thus speak to the mind, music often appeared incapable of stimulating cognition, instead merely tickling the ears. Vocal music, because it was bolstered by a text that affirmed the music's meaning and intellectual content, fared better than instrumental music. The latter, however, was subject to a series of creative criticisms throughout the eighteenth century: French critic Batteux likened music to random paint

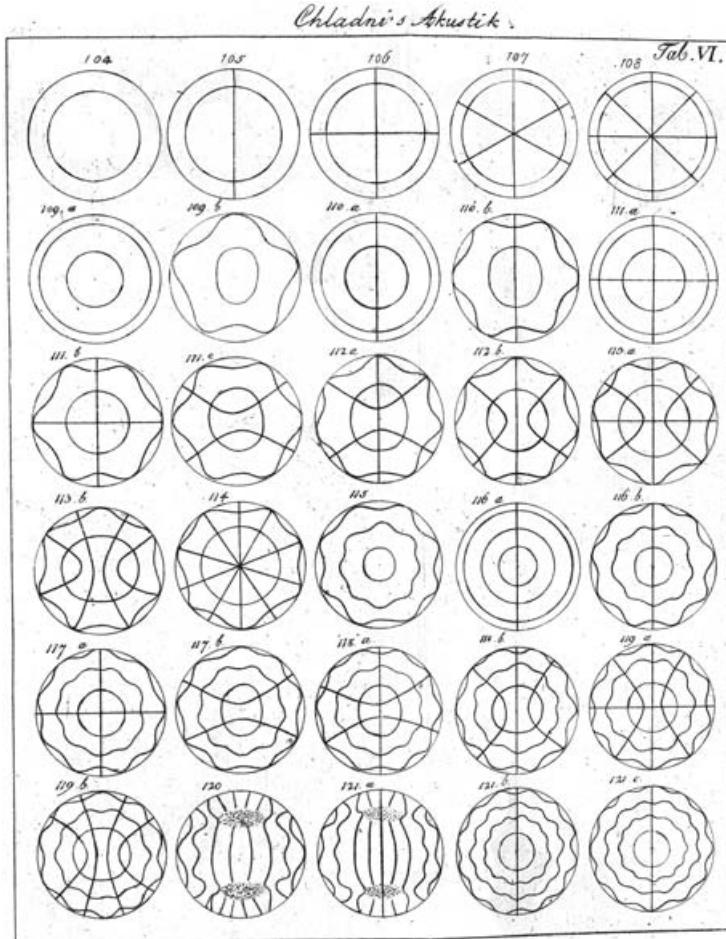


Figure 5

splatters thrown upon a canvas; some critics invoked random ink spots and abstract embroidery, while others likened music to prisms and plays of light.²⁹

As the century progressed, however, the basic conception of musical sensation began to change. This transformation was fuelled by developments in both musical practice and aesthetic philosophies. With the emergence of the modern conception of the orchestra and the idea of orchestration, composers were able to use instruments in increasingly precise and expressive ways, employing each for its particular qualities and

29 Charles Batteux: 'What would one say of a painter who was content to throw onto the canvas bold strokes and masses of the most vivid colors with no resemblance to a known object? The application to music speaks for itself.' (*Les Beaux-arts réduits à un même princip* (Paris: Durand, 1746), translated in Peter le Huray and James Day, eds., *Music and Aesthetics in the Eighteenth and Early Nineteenth Centuries* (Cambridge: Cambridge University Press, 1981), 49.) Similar criticisms were made specifically against the music in the so-called 'Italian' style. J. A. P. Schulz found such pieces to be 'a cacophony of arbitrarily connected tones without any further purpose than that of pleasing the ears of insensible amateurs, bizarre and sudden changes in character from joy to despair, from the pathetic to the trivial, without one knowing what the composer has in mind'. ('Sonate [Sonata]', in *Allgemeine Theorie der schönen Künste*, translated in Baker and Christensen, *Aesthetics and the Art of Musical Composition*, 102).

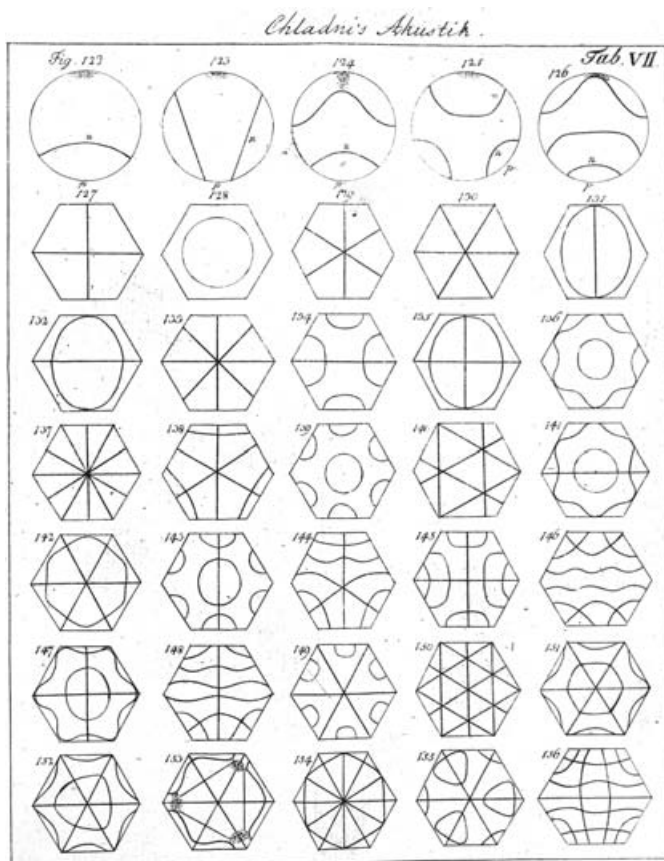


Figure 6

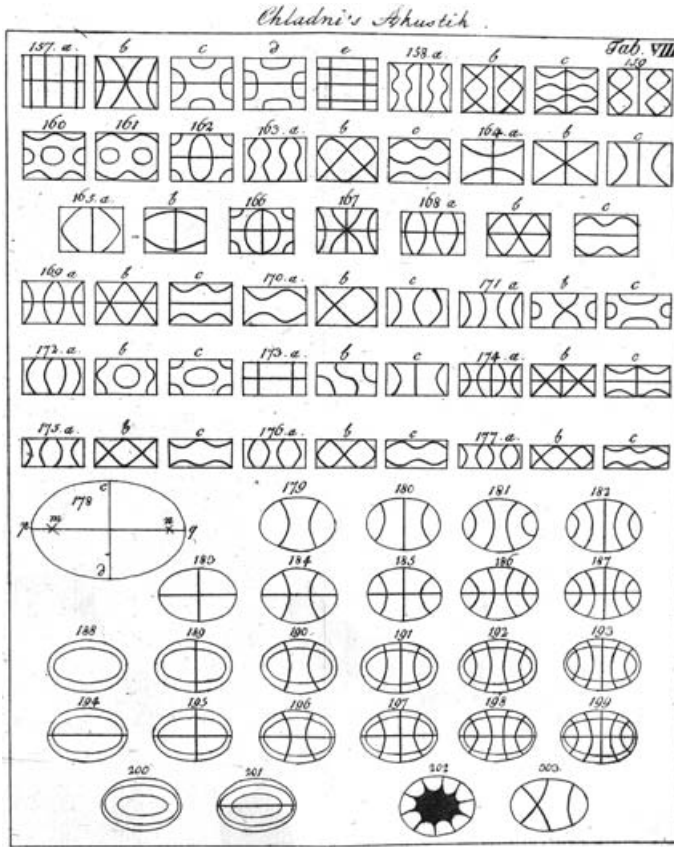
characteristics.³⁰ This helped fuel the notion that instruments were inherently expressive. At the same time, philosophers such as Herder began to explore the notion that musical sensations were, so to speak, always already aesthetic and that humans were predisposed to respond emotionally to sound. He advocated turning away from the physical study of tone and instead exploring the ways in which tones affect the listener, believing that tones had a kind of spiritual property that was completely independent from the tone's acoustical properties:

Du, der du von Nichts als von Stärke und Schwäche, von Höhe und Tiefer der Töne einem Begriff hast; gib Acht, ob der Schall einer Flöte und einer Schallmei, einer Laute und Geige, einer Trompete und eines Nachthorns . . . noch Einerlei Art und gleichsam Eine spezifische Masse des Klangs habe? ob jeder dieser ganzen Schälle gleiche Wirkung auf Deine Empfindbarkeit habe?

You, you who have no concept of the strength and weakness . . . of a tone, pay attention to whether the sound of a flute and a shawm, a lute and violin, a trumpet and a *Nachthorn* . . . still have the *same nature* and, as it were, *specific substance of sound*, whether each of these sounds has the same effect on your feelings?³¹

30 On the terms 'orchestration' and 'instrumentation', see Spitzer and Zaslaw, *The Birth of the Orchestra*, 501–506.

31 Johann Gottfried Herder, *Werke*, ed. Wolfgang Pross, volume 2: *Herder und die Anthropologie der Aufklärung* (Munich: Carl Hanser Verlag, 1987), 147.



Figures 5, 6 and 7 Ernst Chladni's *Klangfiguren* from *Die Akustik* (1802), tables VI, VII and VIII. Exemplar in the Annenberg Rare Book & Manuscript Library, University of Pennsylvania. Used by permission

Herder was fascinated by the idea that humans were naturally responsive to music, and that musical sensations resonated with the fibres of our souls. In *Kalligone*, his meta-critique of Kant's *Critique of Judgment*, he took this concept even further, arguing that humans were actually music instruments. Every listener responded emotionally to every tone, because, in Herder's words, 'music performs on the clavichord within us which is our own inmost being'.³² The clavichord and the Aeolian harp both appear as useful metaphors for the human soul in Herder's writing.

Similar ecstatic praise of the musical medium can be found in the writings of other early romantic writers, who often praised music by showing how its medium was superior to that of the other arts. Nikolaus Bacht has explored the special status accorded musical tone in the writings of Jean Paul, who rejected visual models of the mind in favour of an explicitly musical conception of the imagination. 'No colour', Jean Paul declared, 'can ever be as romantic as a tone'.³³ Wilhelm Wackenroder and Ludwig Tieck routinely lauded music's fundamental ability to transport the listener. The latter, for example, gushed:

³² 'Die Musik spielt in uns ein Clavichord, das unsre eigne innigste Natur ist', Herder, *Kalligone* (1800), *Werke*, volume 8 (Frankfurt: Deutscher Klassiker Verlag, 1998), 703.

³³ 'Keine Farbe ist so romantisch als ein Ton': Jean Paul, *Vorschule der Ästhetik (Sämtliche Werke)*, sixth edition, ed. Norbert Miller (Munich: Hanser, 1995), section 1, volume 5), 466, quoted and translated in Nikolaus Bacht, 'Jean Paul's Listeners', *Eighteenth-Century Music* 3/2 (2006), 204.



Wie schnell, gleich zauberhaften Samenkörnern, schlagen die Töne on uns Wurzeln, und nun treibt's und drängt's mit unsichtbaren Feuerkräften, und im Augenblick rauscht ein Hain mit tausend wunderbaren Blumen, mit unbegreiflich seltsamen Farben empor, unsre Kindheit und eine noch frühere Vergangenheit spielen und scherzen auf den Blättern und in den Wipfeln. Da werden die Blumen erregt und schreiten durcheinander, Farbe funkelt an Farbe, Glanz erglänzt auf Glanz, und all das Licht, der Funkelschein, der Strahlenregen lockt neuen Glanz und neue Strahlen hervor.

Like magical seeds, how rapidly the sounds take root within us, and now there's a rushing of invisible, fiery forces, and in an instant a grove is rustling with a thousand wonderful flowers, with incomprehensibly rare colors, and our childhood and an even more distant past are playing and jesting in the leaves and among one another, color gleams upon color, luster shines upon luster, and all the light, the sparkling, the rain of beams, coaxes out new luster and new beams of light.³⁴

One might dismiss this as mere romantic rhetoric, but Tieck's enthusiasm rested on the basic assumption that musical sound itself is powerful and affects our emotional state in profound ways.

This new conception of the aesthetic and spiritual properties of tone radically changed the perception of music as a whole. No longer was music's dependence on immediate sensations a drawback or a shortcoming, but rather the source of its strength and expressive power. Music was nothing less than a conduit between the worlds of the sensible and supersensible. These instruments were not simply devices designed to harness the most perfect tone, but rather attempts to create portals through which humans could experience nature's sublime and ethereal voice. Just as Ludwig argued that music at its purest functioned through a spiritual connection between the performing musician and the sounding body, so too these instruments drew their power from their connection to a distant spirit realm. To begin to understand the aesthetics of the early nineteenth century, we perhaps need to take Hoffmann more literally when he tells us that the 'Orpheus's lyre opened the gates of Orcus'.³⁵ Early nineteenth-century culture explored the idea that the perfect instrument could have the power of Orpheus's lyre: the panmelodicon, clavicylinder, melodion and the harmonichord – these were the would-be lyres of the nineteenth century, created with hopes of connecting the real and ideal worlds.

When we understand the importance of these instruments to musical culture, we can begin to understand 'Automata' as a work of musical criticism. Hoffmann prized the echoes of nature's sounds, and, like other early romantics, saw in tones the power to reach the infinite. At same time, Hoffmann recognized that most of the attempts by contemporary inventors were unlikely to succeed. Indeed, most suffered similar problems: their tones were weak, the mechanisms were flawed, they had sluggish responses, or were incapable of performing anything in a tempo faster than adagio; most disappeared shortly after their invention. Inventors, rather than aiming at the creation of an instrument that offered new possibilities for composers, were more concerned with novelty. Thus Ludwig complains that inventors never refined their creations, and that

... jeder mangelhafte Versuch [wird] ... als eine neue schon zur Vollkommenheit gediehene Erfindung angepriesen und vorgezeigt [...] Hierin liegt es, daß in kurzer Zeit so viele neue Instrumente zum Teil unter seltsamen oder prunkenden Namen entstanden und eben so schnell wider verschwunden und in Vergessenheit geraten sind.

34 Wihlem Wackenroder [with Ludwig Tieck], *Werke und Briefe* (Heidelberg: L. Schneider, 1967), 236, quoted and translated in Carl Dahlhaus, *The Idea of Absolute Music*, trans. Roger Lustig (Chicago: University of Chicago Press, 1989), 68–69. Dahlhaus dismisses Tieck's prose here as mere romantic rhetoric. Though expressed in undeniably florid prose, Tieck's position assumes the musical medium has an elevated aesthetic status.

35 'Orpheus Lyra öffnete die Thore des Orcus', E. T. A. Hoffmann, review of Beethoven's Fifth Symphony, *Allgemeine musikalische Zeitung* 12 (July 1810), 630–42, 652–59, 631.



every flawed attempt is instantly proclaimed a perfect and new invention. It is for this reason that for a brief time so many instruments with strange or extravagant names were developed and just as quickly vanished into oblivion.³⁶

But Hoffmann's critique was not limited to contemporary musical instruments. The opposition he creates in the story between sublime tones and grating sounds reflected Hoffmann's fears about contemporary musical practice. The burgeoning orchestral tradition, with its emphasis on grand effects, threatened to obliterate all gentle and refined sonority. Again and again, Hoffmann complained about bombastic orchestration. He was suspicious of the current fondness for 'Turkish' music, and found Spontini's treatment of the orchestra in *Fernand Cortez* particularly coarse:

. . . nur auf den starken Ton scheint es Spontini abzusehen; denn beynahe immerwährend ertönen sämtliche gewöhnliche Blasinstrumente und noch überdem Posaunen, kleine Flöten, Trommel, Triangel und Becken, bis zur Betäubung des Ohrs. Überall, wo nur irgend ein erhöhter Ausdruck des Moments denkbar, strömen alle äussere Mittel zusammen, und so wird jeder Klimax unmöglich.

Spontini . . . seems to aim merely at loudness; almost continuously we hear not only the standard complement of wind instruments, but also trombones, piccolos, drum, triangle, and cymbals, until the ears are deafened. Whenever any heightened dramatic expression is possible, every external resource is brought to bear, with the result that any climax becomes impossible.³⁷

The new orchestral style partially fuelled the need for ethereal instruments: they appeared as an antidote to the blaring trumpets and crashing cymbals. Hoffmann believed the orchestra to be a powerful expressive force, but he, like many other critics of the late eighteenth and early nineteenth centuries, also saw in it a negative potential. In an 1815 review of a performance by the Royal Orchestra of Berlin, he mused:

Mich hat manche Production des hiesigen Orchesters schon recht hoch erhoben, in ganze tönende Himmel, voll leuchtender, funkelnder Sterne. Aber bewährt sich nicht auch hier ein besondere Zeichen der Zeit, nämlich, dass die Instrumentalmusik, immer kecker, immer kühner beschwingt, mit starken, gewaltigen Fittigen den Gesang zu Boden schlägt? Die Ton bricht, wie in erster, riesiger Urkraft, die Fessel des Worts: aber soll denn die vox humana ganz verstummen vor dem gewaltigen Geist, der, wie ein mächtiger Magus, alle Töne, die in der ganzen Natur, wie ein tiefes Geheimnis, verborgen, hervorruft – diese vox humana, die, wie ein treuer Nachhall der ersten Naturlaute, noch eingehaucht von der schaffenden Mutter, das Höchste, ahnend im Innern, widerklinget?

Many performances by this orchestra have swept me up into whole heavens of sound, full of luminous, glittering stars. But does this not also confirm a peculiar sign of the time, namely that instrumental music, taking ever bolder, ever braver flight, dashes singing to the ground with its powerful wings? Musical sound, with its immense primeval strength, is bursting the fetters of the word; but should the *vox humana* be quite silenced by this powerful force which, like a mighty sorcerer, summons forth all the resonances that nature holds concealed like a profound secret? This *vox humana* which, like a faithful echo of the first nature music, still floating on their mother's breath, reawakens the sublimest inner presentiments.³⁸

The full force of 'Automata' as a work of musical criticism becomes apparent only when we realize the dialectical relationship between the nature instruments and orchestral music. Hoffmann not only used the

³⁶ Hoffmann, 'Die Automate', 421.

³⁷ Hoffmann, 'Briefe über Tonkunst un Berlin. Erster Brief', *Allgemeine musikalische Zeitung* 17 (January 1815), 17–27, translated in David Charlton, ed., *E. T. A. Hoffmann's Musical Writings*, 394.

³⁸ Hoffmann, 'Briefe über Tonkunst in Berlin', 18–19, translated in Charlton, *E. T. A. Hoffmann's Musical Writings*, 389.



story as a way to discuss the issues at stake in the invention of new instruments, but also to critique noisy orchestral sounds; the mechanical performance by the professor and his automata represented the dark side of orchestral music: it stood in for the many Turkish and battle symphonies that were so popular during the early nineteenth century. 'Automata' is about tone and its powers, both good and evil; to understand the kind of musical criticism Hoffmann engages in is to comprehend the importance of sonority to early nineteenth-century musical culture.

Practical idealism

It is here that the influence of these 'ethereal' instruments on musical culture as a whole becomes more apparent. Though today they appear as trifling novelty items, in the nineteenth century they played a crucial role in the formation of romantic aesthetics.

Mark Evan Bonds has shown the importance of idealist philosophies in early romantic musical culture, and the ways in which these philosophies were a necessary precondition for the birth of the idea of absolute music. He argues the idealist philosophical movement was separate from and unrelated to musical practice; but I believe this separation between philosophy and practice appears only because instruments like the euphon and the panmelodicon have been absent from narratives of music history. One can locate the rhetoric of idealism not only in the luminous prose of Wackenroder and Tieck, but also in discussions of ethereal instruments. After all, the notion that the universe was thoroughly musical was hardly novel; celestial harmony had played an important role in history since antiquity. What was new about Hoffmann, Wackenroder and Tieck's invocation a divine musical spirit realm was the idea this heavenly music could be accessed, in a practical and immediate way. Mankind could actually *hear* the ethereal music of nature.

In this way, these instruments offered an alternative 'absolute' music: this was not the music that partook of the emerging formal discourse espoused by later nineteenth-century thinkers, but a music that created its profundity both through the immediacy of its medium and its connection to prelapsarian nature sounds. The auditory impact resulted less from the intricacies of any composition performed on the instrument, and more from the inherent qualities of the instrument's immediate sonority. The harmonichord and panmelodicon are distinguished by the existence of actual compositions for the instruments; yet it is striking that the panmelodicon's most famous composition – *Die Entstehung der Harmonie* – was about the idea of music itself. The music of these instruments was the counterpart to the most bombastic forms of orchestral music. Noisy battle symphonies and other works that were packed with instrumental effects also drew their power from sound, but these works relished the materiality of sonority; they spoke to the body, the ethereal instruments attempted to connect to the spirit. This binary opposition is manifest in 'Automata' in the two kinds of sounds that dominate the aural landscape of the story.

The Hoffmann who wrote 'Automata' stands in contrast to the familiar Hoffmann in whom we have become accustomed to seeing the first inklings of formal approaches to music and the seeds of the traditional notion of absolute music. His belief that Beethoven's music 'sets in motion the machinery of awe, of fear, of terror, of pain, and awakens that infinite yearning which is the essence of romanticism' seems more at home in the spirit world of 'Automata' than in the introduction to his analysis of Beethoven's Fifth Symphony.³⁹ Yet each Hoffmann stands dialectically in need of the other: formalism required the notion that musical tones are a worthy aesthetic medium and that they function as conduits to distant spirit realms. Indeed, it is precisely because Kant had misgivings about the value of the musical medium that he deemed music an ephemeral art that left behind no food for reflection. Unless musical tones were always already aesthetic – as they were for philosophers such as Herder and Wackenroder – music could not be truly a fine art.

39 'Beethovens Musik bewegt die Hebel des Schauers, der Furcht, des Entsetzens, des Schmerzes, und erweckt jene unendliche Sehnsucht, die das Wesen der Romantik ist', E. T. A. Hoffmann, review of Beethoven's Fifth Symphony, *Allgemeine musikalische Zeitung*, 633, translated in Charlton, ed., *E. T. A. Hoffmann's Musical Writings*, 238.



There is a final point to be made: idealist aesthetics of the early nineteenth century were not only reflected in actual practice, but also, in part, forged by musical practice. These ethereal instruments did not simply provide a conduit through which early romantics could catch aural glimpses of ‘nature music’: these instruments actually help create the very idea of such music – Aeolian harps and glass harmonicas transformed a music that was theoretical into something tangible; ‘nature music’ was inescapably technological. Furthermore, though Hoffmann may have bemoaned the flaccid attempts by contemporary inventors to produce truly functional instruments, their continued failures also had a powerful effect on music. The inability to harness an ideal voice surely proved the otherworldly nature of that voice; in Benjaminian terms, the difficulty of mechanically reproducing the sounds of nature imparted the aura of authenticity to the idea of those sounds: it confirmed that they were indeed ideal, untameable by man, and that music was not wholly of this world.