"The Expressive Organ within Us": Ether, Ethereality, and Early Romantic Ideas about Music and the Nerves

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In Honoré de Balzac's novel *Le Lys dans la Vallée* (1835), Felix de Vandenesse courts Henriette de Mortsauf by implying that their souls have a sympathetic connection.

> We belong to the small number of human beings born to the highest joys and the deepest sorrows; whose feeling qualities vibrate in unison and echo each other inwardly; whose sensitive natures are in harmony with the principle of things. Put such beings among surroundings where all is discord and they suffer horribly. . . . The organ within us endowed with expression and motion is exercised in a void, expends its passion without an object, utters sounds without melody, and cries that are lost in solitude.[1]

Katherine Prescott Wormeley's translation renders "un orgue expressif doué de mouvement" as "the organ within us endowed with expression and motion." This word choice omits the author's pun on the expressive organ, here serving as both a metaphor for the brain and a reference to the recently invented harmonium instrument of the same name, the *orgue expressif*.[2] Balzac's wordplay on the expressive organ represents an unexpected convergence of music, organology, natural science, and spiritualism. A variety of other harmoniums popu-

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[1]Honoré de Balzac, *The Lily of the Valley*, trans. Katharine P. Wormeley (Boston: Hardy, Pratt & Co., 1900), 69.

[2]I use "harmonium," a name patented in 1840 by the instrument manufacturer Alexandre Debain, to refer to the vastly popular family of free-reed instruments both pre- and postdating Debain's patent.

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late his stories and novels, including the physharmonica ("Le Dôme des Invalides," 1832), the panharmonicon ("Gambara," 1837) and the *accordéon* (*L'Envers de l'Histoire contemporaine,* 1848). In all these cases, the sounds of the instrument are used to illustrate unusual mental states ranging from hallucination to hysteria, with an emphasis on interpersonal sympathetic vibration. Indeed, Balzac's musical fantasies were rooted in contemporaneous medical practice: between 1820 and 1850, the harmonium was regularly used in the treatment of nervous disorders.

The harmonium is a keyboard instrument with a rank or ranks of free reeds, which produces sound as air generated by manually operated bellows flowing past a reed enclosed in a pipe, causing the reed to vibrate. This allows the performer exceptional control over crescendo and diminuendo. As wind-operated instruments featuring the new technology of vibrating free reeds, harmoniums were specifically designed to simulate the ethereal sounds and expressive properties of the Aeolian harp. These intentions can be discerned in the names of early harmonium models; as George Dodd would later swoon, "Aeolophon, Aeolodicon, Aeolharmonica, Melodium, Melodion, Aeolomusicon; what liquid sweetness of names!"[3] The nineteenth-century instrument builder Johann Andreas Gleichmann explicitly traces the origin of the harmonium to the dream of disciplining the Aeolian harp by bringing it "under the sway of the tempered scale and the power of the fingers."[4]

Although the association of the harmonium with nervous effects evokes ancient tropes linking music and the body, the presumption of a specific neurophysiological response to the instrument's qualities of timbre and expression has a more recent history. The reception of the harmonium in the early nineteenth century is a continuation of an auditory culture that formed over half a century earlier around the ethereal timbres and swelling sounds of a number of newly popular musical instruments, including the glass harmonica, the Aeolian harp, and the Jew's harp. Relatively recent additions to the soundscape of the eighteenth century, all three instruments were described by Athanasius Kircher in *Musurgia Universalis* (1650) but only came into widespread use around 1750.[5]

Heather Hadlock and James Kennaway have shown how the glass harmonica became indelibly linked to morbid effects on the nerves, particularly those of young women.[6] The Aeolian harp had a very different reception, evoking distinct neurophysiological theories of interpersonal sympathy while simultaneously serving as a central symbol of Romantic subjectivity in poetry, literature, and philosophy.[7] The Jew's harp had a more limited sphere of influence; the only reported medical use of the instrument I have found involved staging an

[3]George Dodd, "The Harmonious Blacksmith," *Household Words* 8, no. 196 (24 Dec. 1853): 402.

[4]Johann Andreas Gleichmann, "Ueber die Erfindung der Aeoline oder des Aeolodikon," *Allgemeine musikalische Zeitung* 22, no. 30 (July 1820): 508.

[5]Thus Benjamin Franklin's invention of the treadle-operated armonica in 1761 enabled the glass harmonica to become an instrument upon which one might play music with artistic aspirations. See Stanley Finger, *Doctor Franklin's Medicine* (Philadelphia: University of Pennsylvania Press, 2006). Likewise, it was only with the publication of James Thomson's poems "The Castle of Indolence" and "Ode to an Aeolian Harp," the footnote of which referenced an Aeolian harp builder in London, that the instrument began to appear regularly in musical practice.

[6]Heather Hadlock, "Sonorous Bodies: Women and the Glass Harmonica," *Journal of the American Musicological Society* 53:3 (2000): 507–42; James G. Kennaway, *Bad Vibrations: The History of the Idea of Music as Cause of Disease* (Burlington, VT: Ashgate, 2012).

[7]Shelley Trower has traced the remarkable specificity accompanying the deployment of the Aeolian harp within early Romantic poetry and literature, concentrating in particular on Samuel Taylor Coleridge's reception of David Hartley's associationist psychology and vibratory neurophysiology. See Trower's analysis of Coleridge's Aeolian harps in "The Eolian Harp" (1795) and "Dejection: an Ode" (1802) in Shelley Trower, *Senses of Vibration: A History of the Pleasure and Pain of Sound* (New York: Continuum, 2012), 13–36. See also Mark Asquith, "Philosophy, Metaphysics and Music in Hardy's Cosmic Vision," in *The Ashgate Research Companion to Thomas Hardy,* ed. Rosemarie Morgan (Farnham: Ashgate, 2010), 181–98; Caroline Welsh, "Nerven, Saiten, Stimmung: Zum Wandel einer Denkfigur zwischen Musik und Wissenschaft 1750–1850," *Berichte zur Wissenschaftsgeschichte* 31, no. 2 (2008): 113–29. M. H. Abrams, *The Mirror and the Lamp* (Oxford: Oxford University Press, 1953) remains relevant to any discussion of the Aeolian harp in literature.

imitation of an Aeolian harp at a patient's hospital bed.[8]

The nearly exclusive association of musically generated nervous effects with Franz Anton Mesmer's employment of the glass harmonica has overshadowed the importance of other instruments, most notably the Aeolian harp, in shaping the specific sonic aesthetics of early Romantic ethereal music. Rather than continuing the glass harmonica tradition, medical uses of the harmonium appear to align more closely with the qualities and reception of the Aeolian harp, not least in the instrument's generally positive therapeutic associations. This article aims to recover the importance of both the Aeolian harp and the harmonium within nineteenth-century musical discourse by linking their acoustic properties to specific ideas about physiology and nervous transmission.

The Aeolian harp has long been familiar as a recurring trope within art song texts,[9] but the musical ramifications of the instrument's close ties to contemporaneous ideas about neuroscience have not yet received much consideration. These ties would literally have been audible, because the instrument's sonic qualities were readily available to eighteenth- and early-nineteenth-century ears. Contemporaneous descriptions of the sounds of the Aeolian harp by poets, philosophers, and scholars suggest new interpretations of programmatic depictions of the instrument by Ludwig van Beethoven, Justin Heinrich Knecht, Anton Reicha, and Hector Berlioz.

Aside from some organological accounts, investigation of the harmonium has been relatively limited.[10] In what follows, I first trace the history of the harmonium and then examine the specific neurophysiological discourse around the instrument in a number of works by Balzac, as well as in medical case studies reported from America, England, Germany, France, and Italy. Extending Emily Dolan's theory of ethereal sounds back to Newton and forward to the mid-nineteenth-century harmonium, I propose that studying the discourse around ethereal mediums can help illuminate the emergence of the attitude that certain types of sounds had privileged access to the nerves.[11]

The Invention of Free Reeds

The German physiologist Christian Gottlieb Kratzenstein (1723–95) is remembered today as an innovator in the fields of electricity and its medical applications. A lesser-known aspect of his work was his pioneering research in speech synthesis. In a monograph submitted for a scientific competition held by the St. Petersburg Academy of Sciences in 1780, Kratzenstein hypothesized that the vibration of the epiglottis, rather than that of the vocal chords, affected the tone of voice.[12] His accompanying evidence

[8]Justinius Kerner, a prolific Romantic poet and physician, discussed the medical use of the Jew's harp in 1829, proposing it as an important complement to Mesmer's glass harmonica. Justinius Kerner, *Die Seherin von Prevorst: Eröffnungen über das innere Leben des Menschen und über das Hereinragen einer Geisterwelt in die unsere* (Stuttgart: J. G. Cotta, 1829), 138–39. Kerner's son Theobald discusses his father's treatment of a mentally ill patient with a free-reed mouth harmonica evoking the swell and ethereal sounds of the Aeolian harp. At the window, Kerner plays his "ghostly tunes, at first barely audible as if from afar, then louder, fuller and again dying away." Theobald Kerner, *Das Kernerhaus und seine Gäste* (Stuttgart: Deutsche Verlag-Anstalt, 1894), 244.

[9]See Stephen Bonner, *The History and Organology of the Aeolian Harp* (Cambridge: Bois de Boulogne, 1969); Walter Windisch-Laube, *Einer luftgebornen Muse geheimnisvolles Saitenspiel,* vols. 1–3 (Mainz: Are-Editions, 2004); Mins Minssen, "Zur Phänomenologie des Windes und der Windmusik," in *Phänomenologie der Natur,* ed. Gernot Böhme and Gregor Schiemann (Frankfurt am Main: Suhrkamp, 1997), 232–55.

[10]See Myles Jackson, *Harmonious Triads: Physicists, Musicians, and Instrument Makers in Nineteenth-Century Germany* (Cambridge, MA: MIT Press, 2006). Earlier organological accounts of the harmonium include Arthur Orde-Hume, *Harmonium: The History of the Reed Organ and Its Makers* (London: David & Charles, 1986); Robert Gellerman, *The American Reed Organ and the Harmonium* (Vestal, NY: Vestal Press, 1996); *Das Harmonium in Deutschland: Bau, wirtschaftliche Bedeutung und musikalische Nutzung eines 'historischen' Musikinstrumente,* ed. Christian Ahrens and Gregor Klinke (Frankfurt am Main: Edwin Bochinsky, 1996). More recently, Matt Rahaim has investigated the complex reception of the harmonium within Indian culture. Rahaim, "That Ban(e) of Indian Music: Hearing Politics in the Harmonium," *Journal of Asian Studies* 70, no. 3 (2011): 657–82.

[11]Emily I. Dolan, "E. T. A. Hoffmann and the Ethereal Technologies of 'Nature Music,'" *Eighteenth-Century Music* 5, no. 1 (2008): 7–26.

[12]John Ohala, "Christian Gottlieb Kratzenstein: Pioneer in Speech Synthesis," *Online Proceedings, The 17th International Congress of Phonetic Sciences* (2011): 157.

was an organ-like machine that imitated the five cardinal vowels by means of differently shaped pipes with vibrating tongues, or free reeds. Kratzenstein conceived of this technique after examining a Chinese sheng, a mouth organ, which had been brought to Copenhagen. A by-product of his project was the first free-reed instrument in the West.[13]

After Kratzenstein's vowel-producing instrument won the St. Petersburg competition in 1780, free reeds appeared in an organ hybrid built by Kirsnick, a local Danish expatriate. In 1788 the music theorist and organ reformer Abbé Vogler visited St. Petersburg, where he learned about Kirsnick's invention. Vogler was highly impressed by this instrument, to the extent that he commissioned Rackwitz, Kirsnick's assistant, to add free reeds to new organs he was designing in Rotterdam and Frankfurt. The instrument builder Johann Nepomuk Mälzel learned about free reeds directly from Vogler and used them extensively in his *panharmonicon,* a keyboard instrument that automated the playing of wind, string, and percussion instruments. His colleague Johann Friedrich Kaufmann notes that free reeds were prominent in Mälzel's oboe, clarinet, and trumpet sounds, and claims that Mälzel inadvertently revealed the "secret" of free reeds to the Paris audiences upon exhibiting his instrument there between 1805 and 1807.

However, the transmission of free reeds into France had begun long before Mälzel. Marin Mersenne included an illustration of a Laotian sheng, a free-reed mouth organ, in *Harmonie Universelle* (1636). A Chinese sheng was also described at length in the sixth volume of Joseph Marie Amiot's *Mémoires concernant l'histoire, les sciences et les arts des Chinois* (1779).[14] Three years later, a translation of Kratzenstein's prize-winning essay entitled "Sur la naissance et sur la formation des voyelles" was published in the journal *Observations sur la physique* (1782). The French organ builder Gabriel-Joseph Grenié began to experiment with free reeds around 1798, culminating in his invention of the *orgue expressif* (1810), which employed a foot pedal to create dynamic swells by varying air pressure into a free-reed register. Due to its foot-pedal mechanism, Grenié's instrument is generally regarded as the earliest modern harmonium.

The free-reed technique spread rapidly through scientific reports, international expositions, and traveling exhibits, captivating instrument builders and audiences alike. Writing in 1830, a contributor to the *Gentlemen's Magazine* describes a lecture on sound given by the renowned physicist Michael Faraday, which featured performances on Dietz's *Aerophone,* Dowbis's *Glossophone,* Day's *Æolian Organ,* and Wheatstone's *Symphonia*. The writer marvels "that four persons, in different places, should set about the construction of an instrument, exactly upon the selfsame principle, and all at one time, without the least knowledge of each other, is extraordinary; yet such is the fact."[15] As Myles Jackson has shown in his history of the emergence of the free reed in German instrument building practices, very similar designs were produced independently across Europe.[16] The ensuing variety of newly invented harmoniums include Eschenbach's *eoline* and *eolodicon* (ca. 1810), Kaufmann's *choraulodion* (1811), Häckel's *physharmonica* (1818), Dlugosz's *aeolopantalon* (1830), Cavaille-Coll's *poikilorgue* (1832), Myers and Storer's *seraphine* (1839); Debain's *harmonium* (1842), the *orgue mélodium,* built by Alexandre *père e fils* (1844), and many others.

If the birth of the harmonium can be traced to Kratzenstein's scientific experiments, the Abbé Vogler served as its midwife. Touring Europe with his "Simplification System" for organ reform, Vogler famously promoted increased expressivity and efficiency through the improvement of traditional organ design. The

[13]See Friedrich Gottlieb Wilke, "Ueber der Erfindung der Rohrwerke mit durschlagenden Zungen," *Allgemeine musikalische Zeitung* 25, no. 10 (1823): 150–56.

[14]However, Mersenne does not appear to have understood the function of the reeds. See Christian Ahrens, "Zur Frühgeschichte der Instrumente mit Durchschlagzungen in Europa," in *Harmonium und Handharmonika: 20. Musikinstrumentenbau-Symposium, Kloster Michaelstein,* ed. Monika Lustig (Michaelstein: Stiftung Kloster Michaelstein, 2002), 32.

[15]J. W., "The Æolina," *Gentleman's Magazine* 148 (1830): 504.

[16]Jackson, *Harmonious Triads,* 75–111.

introduction of new technologies such as free-reed registers and swell shutters augmented the former, while the latter were improved by the implementation of scientific methods, such as the replacement of certain bass pipes with different tones produced by the combinations of other registers. Vogler regarded his organ reforms as a vast improvement: "On an organ refurbished according to my Simplification System, the performer has all possible nuances at his disposal. Perhaps one day, just as today we compare the old, stringed clavichord to the *Hammerklavier* with its *forte* and *piano* possibilities, one will regard my new organ as the 'Forte-Piano-Organ.'"[17]

Thanks in no small part to Vogler's advocacy, the inclusion of free-reed registers in Romantic organs became widely accepted.[18] Moreover, the inclusion of these new free-reed registers enabled an amplification of the organ's expressive potential.[19] Vogler associated expression almost exclusively with dynamic gradation; his reformed organs featured a number of swell mechanisms enabling the generation of crescendo and decrescendo. These included the *Windschweller,* a foot-operated pedal mechanism that allowed for the control of the air flowing through free-reed registers, and the *Jalousieschweller* (or Venetian swell), in which an organ register or registers were enclosed inside a box consisting of wooden blinds that opened and shut, thereby changing the dynamics of the sound.[20] Vogler designed the former specifically for free reeds, which, unlike standard pipes, were not affected in pitch by fluctuations in the wind supply.[21] Although Vogler did not invent the latter swell mechanism, his advocacy for amplifying the organ's power of dynamic expression contributed greatly to its dissemination throughout Europe.

With their compact design, multiple stop capabilities, and self-sufficient pedaling mechanisms, harmoniums proved ideal for Vogler's developments. Indeed, the pedal mechanism of the earliest harmoniums necessitated the use of a *Windschweller* to generate sound, resulting in the welcome advantage of control over nuance of dynamic expression. Plate 1, taken from Carl Georg Lickl's *Phys-harmonica Schule* (1834), shows three methods of creating dynamic expression using the foot pedals.

The musical community placed high value on the harmonium's affordance of dynamic expression. An early report on the first harmonium, Grenié's *orgue expressif,* states that the church organ had "hitherto wanted the great faculty of expression, that of enforcing or diminishing the sounds. . . . M. Grenié, by a mechanism at once the most simple and most ingenious, has enabled [his] organ to obey all the influences of the soul."[22] An appraisal in the *Glasgow Mechanics' Magazine* remarked on the physharmonica's ability to "admit of every modification of expression."[23] An advertisement for a seraphine emphasizes its "varied qualities of tone . . . being delicate and soft, or powerful, at the pleasure of the performer";[24] an essay on the same instrument emphasizes

[17]Abbé Georg Joseph Vogler, *Zwei und dreisig Präludien für die Orgel und für das Fortepiano* (Munich: Falter, 1806), 11 (my trans.).

[18]Free reeds prominently featured in Vogler's *orchestrion* (1791), a portable organ intended to showcase the advantages of his "Simplification System." Vogler created an illusion of orchestral sections by physically separating the registers, a development that economized the organ's design and enabled the emergence of a distinctly spatial approach to instrumental timbre. With its new spatial arrangement of pipes according to timbre rather than size or visual aesthetics, the *orchestrion* was supposed to represent "the complete imitation of a full orchestra." Abbé Georg Joseph Vogler, *Handbuch zur Harmonielehre und für den Generalbaß* (Prague: K. Barth, 1802), vii (my trans.).

[19]By the mid-nineteenth century, commonly used free-reed stops included the clarinet, oboe, cor Anglais, musette, basset horn, bassoon, ophicleide, and saxophone. Later developments in harmonium design also led to the inclusion of free-reed instrument timbres within organ ranks: thus we see the emergence of the aeoline, harp eolone, claveoline, and physharmonica stops.

[20]The *jalousie* swell was common in eighteenth-century England, but little known in Germany prior to Vogler's reforms. Floyd K. Grave and Margaret G. Grave, *In Praise of Harmony: The Teachings of Abbé Georg Joseph Vogler* (Lincoln: University of Nebraska Press, 1987), 248.

[21]Friedrich Kaufmann, "Ueber die Crescendo und Diminuendo Züge an Orgeln," *Allgemeine musikalische Zeitung* 25, no. 8 (Feb. 1823): 117 (my trans.).

[22]Anonymous, "Improvement on the Organ?" *Gentleman's Magazine* (11 Dec. 1815): 484.

[23]Anonymous, "Miscellanies," *Glasgow Mechanics' Magazine* 4 (1827): 304.

[24]Joseph Hart, advertisement in *Spectator* 10:472 (15 July 1837): 672.

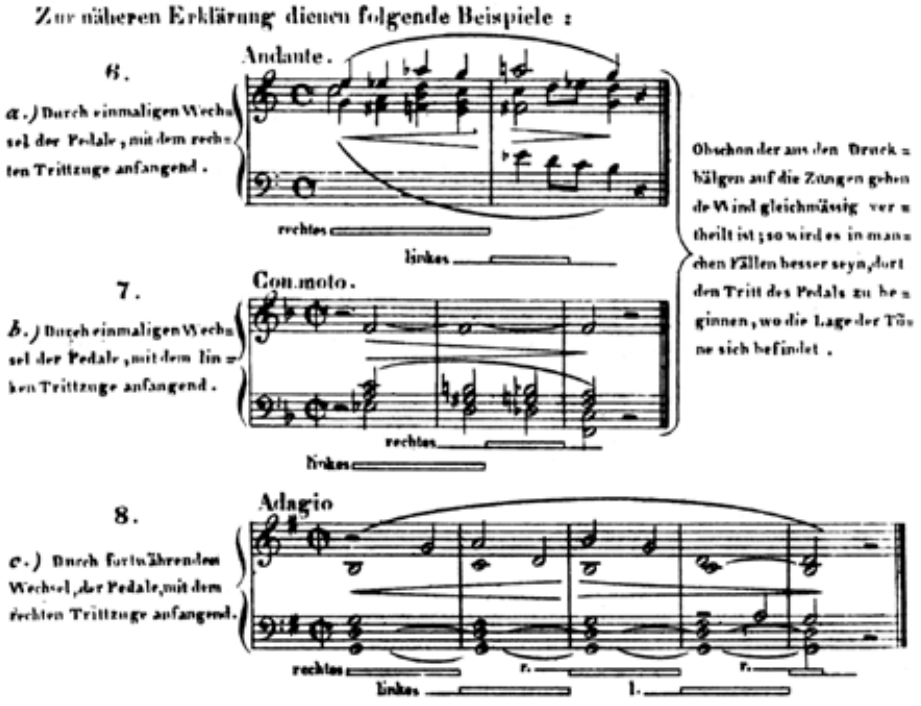

Plate 1: Expression techniques from Lickl, *Phys-harmonica Schule* (1834). Carl Georg Lickl, *Phys-harmonica Schule* (Vienna: Diabelli & Co., 1834), 9. Image courtesy of Staatsbibliothek zu Berlin, PK, http://digital.staatsbibliothek-berlin.de/werkansicht/?PPN=PPN642191840.

its "utmost possible delicacy of diminuendo and crescendo."[25]

In addition to their variety of expression, harmoniums were highly prized for their ability to evoke new and multiple timbres. The initial responses to free-reed instruments suggest that their malleable sound represented an unknown quantity, which was consistently described in terms of other instruments. Writing in 1820, the *Allgemeine musikalische Zeitung* compares the aeolodicon's tone to "a sweet mix of clarinets, bassoons, and other instruments."[26] A contemporaneous review of Schortmann's aeoline remarks that the instrument's *pianissimo* "exactly imitates the sounds of the harmonica, clarinet, horn, oboe, and violin."[27] A report on the seraphine from 1831 suggests that it can replace the flute, oboe, clarinet, bassoon, and cello.[28]

In 1841 the Parisian instrument builder Alexandre Debain capitalized on this imitative potential by introducing instrumental stops in his harmoniums; by 1843 his individual stops could imitate over ten different instruments.[29] A review in the *Musical World* (1847) suggests that the harmonium possesses "a power of tone equal to a large organ" and describes how, on the instrument, "the mellifluous softness of the flute, the silvery tone of the violoncello, and the depth and power of the double bass . . . added to,

[25]Anonymous, "The Seraphine," *Ladies Museum* 1 (January-June 1831): 319.
[26]Anonymous, "Nachrichten," *Allgemeine musikalische Zeitung* 22, no. 16 (April 1820): 267 (my trans.).
[27]Anonymous, "Découvertes nouvelles," *Journal général de la littérature étrangère, ou Indicateur bibliographique* (1820): 159 (my trans.).
[28]Anonymous, "The Seraphine," *Ladies Museum* 1 (January-June 1831): 319.
[29]Alexandre Debain, "Advertisement," *Revue et gazette musicale de Paris* 18 (April 1843): 153 (my trans.).

and blended with the brilliant tones of the piano."[30] Another review compares the harmonium, in "volume and richness of sound, to the organ, while in purity and delicacy, it rivals the strains of the Cremona."[31]

Plate 2, an advertisement for an instrument by Alexandre Debain from 1843, claims that the harmonium can imitate the bassoon, clarinet, bourdon, English horn, flute, clarinet, fife, oboe, trumpet, violin, cello, piano, and the human voice. The text is organized within a cruciform shape outlined by harmonium stops, emphasizing the instrument's religious associations. The advertisement explains the workings of the free reeds in general terms and notes that the instrument is easy to play and never falls out of tune. At the bottom is a musical passage featuring multiple stops as well as a prominent crescendo and decrescendo, while expressive nuance is represented by the dynamic indications.

The most innovative and influential harmonium manufacturing houses in the first half of the century were led by Alexandre Debain and the father-and-son team of Jacob and Édouard Alexandre of Paris. The French harmonium industry was considered the gold standard, as can be seen in its complete domination of the free-reed category in the *Exposition universelle* of 1855. Alexandre *père et fils* received the highest award, a medal of honor, while both Debain and Mustel received medals of the first class, with second-class medals going to the firms Forneaux, Dusus, and Müller, all of Paris. Out of the seven honorable mentions, five awardees were French, and the two other distinctions went to English and Austrian makers.[32] The distinguished piano builder Johann Lorenz Schiedmayer of Stuttgart sent his sons Julius and Paul to train at Debain and Alexandre's factories; the prolific German harmonium manufacturers Philipp and Georg Trayser were likewise trained by Alexandre.[33]

Instrument manufacturers cultivated relationships with prominent performers and composers in order to develop the market for their high-end models. The keyboard virtuosi Sigismond Thalberg, Louis-James-Alfred Lefébure-Wély, and Franz Liszt had exclusive contracts with harmonium firms. Composers including Adam, Berlioz, Bizet, Czerny, Franck, Dvořák, Gounod, Rossini, and Saint-Saëns likewise maintained close ties with harmonium manufacturers, who often commissioned works for their instruments. A vibrant industry of anthology and instruction books sprang up, consisting largely of simplified arrangements of popular tunes, opera arias, and excerpts from well-known piano or orchestral pieces.[34] The Alexandre advertisement in plate 3 dates from 1858. It emphasizes the instrument's prize-winning pedigree and features an array of endorsements from members of the Institut de France, professors at the conservatory, organists, and performers. Note the testimonial by the piano virtuoso Sigismond Thalberg (bottom right).

One example of the close interaction between harmonium manufacturers and musicians is Berlioz's intimate association with Jacob and Édouard Alexandre, who were his close friends and occasional sponsors. Berlioz openly promoted their inventory, requiring an Alexandre instrument for his *L'enfance du Christ,* op. 25

[30]Anonymous, *Musical World* 22, no. 17 (1847): 269.
[31]Ibid., 256.
[32]Anonymous, *Exposition universelle de 1855: Rapport du jury mixte international: publiés sous la direction de S.A.I. le prince Napoléon, président de la commission impériale,* vol. 2 (Paris: Imprimerie impériale, 1857), 683–84.
[33]French harmoniums were popular in England and local firms found it difficult to compete. An example can be seen in the heated dispute between Chappell & Co. and Boosey & Son. The former sold imported Alexandre instruments, while the latter promoted the Evans's English Harmonium, "manufactured in that substantial and superior manner peculiar to English-made goods." Anonymous, "Evans English Harmonium," *Athenaeum* 1776 (9 Nov. 1861): 632. This transparent attempt to capitalize upon national sentiment proved a double-edged sword, as the very Englishness of Boosey's instrument swiftly came into question, culminating in a virulent exchange of full-page ads in London newspapers between December 1859 and January 1860. Boosey was ultimately forced to admit that Evans had in fact "added to the skeleton of an Alexandre Harmonium, which he had entirely reconstructed." Anonymous, "Evans English Harmonium," *Saturday Review* (7 Jan. 1860): 25. For the details of this dispute, see Chappell's ad in *Saturday Review* (31 Dec. 1859): 821, and Boosey's response in the same on 7 January 1860 (p. 25) and again on 14 January in *Athenaeum* (p. 26). See also Chappell's response in the *Saturday Review* on 21 January (p. 96).
[34]See Krzysztof Rottermund, "On a Number of Transcriptions of Works by Fryderyk Chopin with Regard to Domestic Music-Making in the 19th and 20th Century," *Chopin in Performance History, Theory, Practice,* ed. Artur Szklener (Warsaw: Narodowy Instytut Frederyka Chopina, 2005), 333–43.

Plate 2: An advertisement for a Debain *orgue-harmonium*, *Revue et gazette musicale de Paris* 10, no. 18 (30 April 1843): 453. Image courtesy of Yale University, Gilmore Music Library.

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HALEVY, Vice-President, Perpetual Secretary of the Institute.
FETIS, Author of the Report, Director of the Conservatory of Brussels.
BERLIOZ, Librarian of the Imperial Conservatory of Music.
MARLOYE, Member of the Jury of the Exhibition of 1849.
ROLLER, formerly Manufacturer of Pianos.

MESSRS. ALEXANDRE & SON

Have obtained the confirmation of the above by the Institute, the Conservatory and the leading Organists and Performers, viz:

MEMBERS OF THE INSTITUTE.

MM. Rossini, MM. Auber, MM. Adam, (Adolphe),
Clapisson, Thomas (Ambroise).

PROFESSORS AT THE CONSERVATORY.

MM. Bataille, MM. Cohen, (Jules), MM. Marmontel,
Massart, Panseron, Potier,
Mme. Damoreau-Cinti.

ORGANISTS.

MM. Batiste, Organist of St. Eustache, MM. Benoist, Imperial Chapel,
Durand, St. Genevieve, Vessy, St. Roch,
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PERFORMERS.

Thalberg, Liszt, Dussoigne Meholl Pere,
Basset, Brisson, Dans oigne Meholl Fils,
Cavaille-Coll, Dreyfus, (Mme.) De La Fage, (Adrien.)
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Plate 3: An advertisement for an *orgue Alexandre*, *Musical World,* 31 July 1858, 495. Image courtesy of Yale University, Gilmore Music Library.

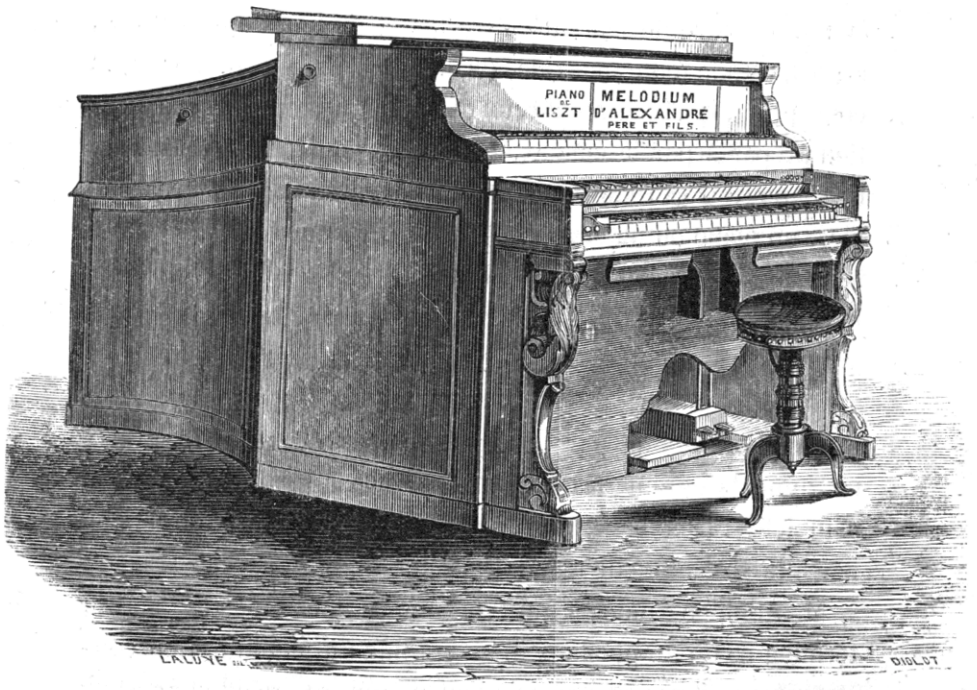


Plate 4: An Alexandre *Liszt-piano.* Charles Robin, *Histoire illustrée de l'exposition universelle,* vol. 1 (Paris: Furne, 1855), 125.

(1854) and including their instrument in the second edition of his *Grand Traité d'instrumentation et d'orchestration modernes* (1855).[35] In *Les Grotesques de la musique* (1858), Berlioz also included a short story entitled "Prudence and Sagacity of a Provincial—Alexandre's Melodium," detailing the misadventures of a country bumpkin who visits the grand Alexandre showroom and attempts to play the instrument without understanding the function of the pump pedals. Alexandre *père et fils* also collaborated with Liszt, who endorsed their massive *Liszt-piano,* an organlike hybrid with three keyboards, free reeds, hammers, and strings (see plate 4). Not to be outdone, Debain boasted endorsements by Adam, Auber, Halévy, Rossini, and Spontini.

According to Robert Gellerman, the harmonium industry peaked around 1890;[36] Richard Burnett and William Dow locate the turning point a decade later.[37] By all accounts, the instrument underwent a meteoric rise throughout the century, a remarkable trajectory for a new instrument. A comparison published in the *Musical Standard* of 1877 put the Paris harmonium industry at half the value of the piano industry and more than the wind, wood, metal, and bowed instrument industries combined.[38] Similar trends can be seen in a report on the British market in the catalogue of the *Exposition universelle* of 1867, where har-

[35]Hector Berlioz, *A Treatise upon Modern Instrumentation and Orchestration,* trans. Hugh Macdonald (Cambridge: Cambridge University Press, 2002), 311–14.

[36]Robert Gellerman, *The American Reed Organ and the Harmonium* (Vestal, NY: Vestal Press, 1996), 3.
[37]Richard Burnett and William Dow, *Company of Pianos* (Goudhurst, Kent: Finchcocks Press, 2004), 33.
[38]Anonymous, "Notes," *Musical Standard* (11 Aug. 1877): 90.

monium builders outnumbered any other instrument manufacturers except for those making pianos and organs.[39]

In the first half of the nineteenth century, however, the sounds of the harmonium were still relatively fresh, and as such constituted an unknown quantity. Early reports on the harmonium's diverse timbres and dynamic nuance consistently linked the instrument to supernatural sound or metaphysical subjectivity.[40] A variation on these properties emerges from the instrument's representation in fiction and medical discourse. To understand the full context of this reception, we need to take a detour through the ethereally vibrating universe of the long eighteenth century.

Neurophysiology and the Aeolian Harp

The late Enlightenment saw a proliferation of neurophysiological metaphors based on the material features of musical instruments.[41] Musical instruments constituted appealing subjects for natural philosophers; at once an integral part of daily life, they also represented some of the most complex technology available at the time.[42] Giving the Pythagorean notion of celestial harmony a material twist, comparisons with musical instruments recycled familiar tropes about music and the body in Classical and Christian traditions. The concept of sympathetic vibration as embodied by musical instruments thus provided a readily accessible model for the ethereally mediated interaction between the mind and various physical and spiritual forces.

A multivalent term since the Homeric age, the ether was famously overdetermined as a substance at once material and spiritual.[43] The scientific understanding of ether that held sway throughout the eighteenth and first half of the nineteenth century stemmed from Isaac Newton's work on gravitation, forces, and action at a distance.[44] In his 1713 revision of *Principia Mathematica,* Newton suggested that the mind communicated with the nerves through the vibrations of an electrical ethereal spirit. He thus provided an alluringly simple physical explanation for the invisible opera-

[39]A table entitled "the number of manufacturers of musical instruments in London" (exclusive of workmen), lists 286 pianoforte manufacturing companies, 43 organ builders, and 31 harmonium manufacturers (including 3 seraphine companies). In comparison, there are 14 flute and flageolet builders, 10 violin and cello luthiers, and 9 drum makers. Anonymous, "Notes," *Musical Standard* (11 Aug. 1877): 60.

[40]For example, Franciscus Carolos Hofgartner compared the physharmonica's powerful crescendo and decrescendo to "a ghostly voice, without the accents of any earthly substances," while Thomas Busby's account of the aeolodicon observes that it evokes "the imagined music of the spheres." Franciscus Carolos Hofgartner, "Effectus musicus in hominem sanum et aegrotum" (diss., University of Vienna, 1847), 14; Thomas Busby, *Concert Room and Orchestra Anecdotes of Music and Musicians: Ancient and Modern,* vol. 2 (London: Clementi, 1825), 70.

[41]See Frank Stahnisch, "The Human Nervous System—A Clavichord? On the Use of Metaphors in the History of Modern Neurology," *The Neurology of Music,* ed. Clifford F. Rose (London: Imperial College Press, 2010), 73–101.

[42]For example, Charles Bonnet suggests one "imagine this admirable instrument of the operations of our soul as a clavichord, an organ, a clock, or some other, much more complicated machine." Tobias Cheung, "Omis Fibra Ex Fibra: Fibre Economies in Bonnet's and Diderot's Models of Organic Order," in *Transitions and Borders between Animals, Humans and Machines 1600–1800,* ed. Tobias Cheung (Leiden: Koninklijke Brill, 2010), 88–89. See also Christopher U. M. Smith, "Musical Instruments as Metaphors in Brain Science: From René Descartes to John Hughlings Jackson," *Neurology of the Arts,* ed. Clifford F. Rose (London: Imperial College Press, 2004), 191–206; Benjamin Wardhaugh, "Formal Causes and Immediate Causes: The Analogy of the Musical Instrument in Late Seventeenth-Century Natural Philosophy," in *Philosophies of Technology: Francis Bacon and His Contemporaries,* ed. Claus Zittel (Leiden: Koninklijke Brill, 2008), 411–28.

[43]See Joe Milutis, *Ether: The Nothing that Connects Everything* (Minneapolis: University of Minnesota Press, 2006); *Conceptions of the Ether: Studies in the History of Ether Theories 1740–1900,* ed. Geoffrey N. Cantor and Michael J. S. Hodge (Cambridge: Cambridge University Press, 1981).

[44]Using Newton's gravitational and optical ethers as their baseline, Geoffrey N. Cantor and Michael J. S. Hodge offer a definition of the ether general enough to encompass the ebb and flow of the changing concept throughout the eighteenth and mid-nineteenth centuries: "An ether was a spatially and temporally extended entity . . . present in spaces empty of ordinary solids, fluids, and gases; it is not perceivable as such ordinary materials are; it transmits actions or effects including or like those of magnetism, electricity, heat, and nervous impulses; it can penetrate and pass through ordinary solid, fluid, and gaseous materials; changes in its distribution or its state can cause observable changes in ordinary bodies." See the introduction in their *Conceptions of the Ether,* 2.

tions of various forces, both internal and external, on the body:

> All sensation is excited, and the members of animal bodies move at the command of the will, namely, by the vibrations of this spirit, mutually propagated along the solid filaments of the nerves, from the outward organs of sense to the brain, and from the brain into the muscles. But these are things that cannot be explained in few words, nor are we furnished with that sufficiency of experiments which is required to an accurate determination and demonstration of the laws by which this electric and elastic spirit operates.[45]

Newton's claim about the impossibility of proving the existence of the ether highlighted its role as a mystical placeholder for some unknowable force within an otherwise fully rational universe.[46] Different phenomena swiftly came to be understood in terms of various kinds of ethers; there was no agreement as to their nature or number. Prior to the mathematical physicist James Clerk Maxwell's work in the 1860s, scientists posited a multitude of ethers, known as "imponderables," including lumeniferous, electric, magnetic, and caloric fluids.

A number of natural scientists adapted Newton's hypothesis of "vibrating motions of the Aetherial medium" into systems of neurophysiology that regarded ethereal vibration as the mechanism of nervous transmission.[47] Perhaps the most influential theory was David Hartley's vibratory associationism. Hartley's *Observations on Man, his Frame, his Duty, and his Expectations* (1748) drew on the acoustic properties of musical strings to model nervous response and psychological function as the sympathetic reactivation of miniature vibrations (*vibruncles*) within the brain. Charles Bonnet, Johann Gottlob Krüger, and Johann Georg Sulzer also proposed vibrating nerve theories,[48] and philosophers from Edmund Burke to Denis Diderot to Johann Gottfried Herder explicitly likened sympathetic resonance to mental function. Robert Miles compares the eighteenth-century role of the metaphor of the nervous system as vibrating strings to the latter-day role of certain Freudian concepts, noting that the metaphor's "assumptions were so deep-rooted as to become second nature."[49]

While philosophers of an empirical bent adopted Newton's pragmatic ethereal framework, the mystical overtones of his vibrating ether attracted a range of spiritualist and occult figures. The line between these two camps was often blurred. For example, well before his mystical turn at age fifty-three, Emanuel Swedenborg (1688–1772) published a thesis on the vibratory function of the nervous system entitled *Om Darrningar* (On Tremulation, 1720). Based on Newton's *Opticks,* this prescient work suggested that all sensation and experience consists of vibration.[50] Ethereal vibration appears as a form of spiritual communication with celestial worlds in Swedenborg's mature theology, notably in *Arcana Cœlestia* (1756), which represents angelic communication as internal sensory vibration.[51]

Another offshoot of Newton's vibrating nerve theories is the universal subtle fluid postulated by the self-declared "Newton-ian," Franz Mesmer (1734–1815).[52] Mesmer's "animal mag-

[45]Isaac Newton, *The Mathematical Principles of Natural Philosophy,* vol. 2, trans. Andrew Motte (London: Sherwood and Neely, 1819), 314.

[46]As Joe Milutis asserts, Newtonian ether provided the connection between the body and the infinite cosmos, where "somehow, through the subtlest of vibrations, bodily sensation partakes of other bodies, objects, and the outer reaches of God's sensorium." Milutis, *Ether,* 8.

[47]Isaac Newton, *Opticks: or, A Treatise of the Reflections, Refractions, Inflections, and Colors of Light* (London: W. & J. Innys, 1718), 328.

[48]Charles Bonnet, *Essai analytique sur les facultés de l'âme* (1760); Johann Gottlob Krüger, *Naturlehre: Welcher die Physiologie, oder Lehre von dem Leben und der Gesundheit der Menschen in sich fasset* (1748); Johann Georg Sulzer, *Erklärung eines psychologischen paradoxen Satzes* (1759).

[49]Robert Miles, *Anne Radcliffe: The Great Enchantress* (Manchester: Manchester University Press, 1995), 49.

[50]Swedenborg offered one of the earliest neurophysiological explanations for sympathy using musical metaphors: "It also frequently happens that a person falls into the thought of another person, that he perceives what another is doing and thinking, that is, that his membrane trembles from the tremulation [*sic*] of the other person's cerebral membranes, just as one string is affected by another, if they are tuned in the same key." Emanuel Swedenborg, *On Tremulation,* trans. Carl T. Odhner (Boston: Massachusetts New Church Union, 1899), 6.

[51]Emanuel Swedenborg, *Arcana Cœlestia,* vol. 2, trans. anonymous (Boston: Otis Clapp, 1838), 236.

[52]Mesmer wrote, "I have supposed that a universal fluid exists in nature, a fluid which penetrates all animate or

netism" shared many features with other etherlike postulates of the time, such as Georg Stahl's "phlogiston."[53] Moreover, Mesmer famously applied music in his treatment of nervous ailments. His magnetizing techniques assumed that the harmonious proportions of specific sounds, particularly the ethereal tones of the glass harmonica, could recalibrate the nervous fluid through sympathetic resonance.[54]

The search for an underlying universal substance was not limited to Mesmer. As John Tresch notes, the idea of a single essential force or ether linked "Franz Anton Mesmer's notion of a universal subtle fluid, Erasmus Darwin's materialist account of the origins of life, Immanuel Kant's dynamic account of matter, and Humphrey Davy's innovations in chemistry."[55] Toward the end of the eighteenth century, various theories of nervous function sought this underlying force in the workings of electricity within the body. Schools of thought ranged from Alessandro Volta's theory of electric fluids, to Luigi Galvani's hypothesis of distinctly animal "galvanic" electricity, to the Vitalists, who sought out life-organizing principles such as Barthez's *Principe de vie,* or Medicus's *Lebenskraft*.

While natural scientists were studying electricity within the nerves as an expression of ethereal fluid, *Naturphilosophie* philosophers expanded the contemporaneous idea of nervous vibration to model the influence of affect on subjectivity through the ethereal transmission of the *Weltseele.*[56] The equation of ether with a "world soul" had ancient precedents, notably various Classical cosmogonies based on elements from Anaximenes and Heraclitus.[57] Miklós Vassányi suggests that at various points in their lives Herder, Schleiermacher, and Schelling identified ether with an omnipresent life principle.[58] In his treatise *Vom Wärmestoff* (1786), the *Naturphilosophie* physicist Franz Xaver von Baader explicitly identified a caloric ether (heat) with the *Weltseele* and claimed that all related phenomena, including electricity, heat, light and magnetism, could ultimately be reduced to the chemical operations of a single ether.[59]

One link between vibrating ether, the subject, and the world soul was the wind, a symbol relating back to the *pneuma* discussed by *Naturphilosophie* thinkers.[60] Describing the poems of Coleridge, Wordsworth, Shelley, and Byron as "thoroughly ventilated," M. H. Abrams suggests that "air-in-motion, whether it occurs as breeze or breath, wind or respiration [is] a metaphor for a change in the poet's mind."[61] A phenomenon linked to an electrically charged

inanimate bodies. The phenomena of electricity, as well as those of magnetism, affected this opinion of mine. Thus, I adopted the system of the noble Newton regarding the motion of celestial bodies." Franz Anton Mesmer, *Mesmerism: A Translation of the Original Scientific and Medical Writings of F. A. Mesmer,* trans. George Bloch (Los Altos: William Kaufmann, 1980), 33. Alan Gauld claims that Mesmer's doctoral dissertation, an exploration of the effects of the planets upon human ailments, is based on Newtonian physics and suggests that it was not considered an eccentric work in its day. Alan Gauld, *A History of Hypnotism* (Cambridge: University of Cambridge Press, 1992), 1–2.

[53]See Robert Darnton, *Mesmerism and the End of the Enlightenment in France* (Cambridge, MA: Harvard University Press, 1968), 10–11.

[54]Heather Hadlock suggests that the sounds of the glass harmonica thus "breach the boundary between self and outside world, producing pleasurable but also potentially morbid reactions." Hadlock, "Sonorous Bodies: Women and the Glass Harmonica," 524.

[55]John Tresch, "The Machine Awakens: The Science and Politics of the Fantastic Automaton," *French Historical Studies* 34 (Winter 2011): 94. Not all thinkers believed in ethers—Joseph Priestley, Thomas Reid, and Auguste Comte were notable skeptics—nor did all scientists necessarily subscribe to the principle that ethers could transmit affect.

[56]See Miklós Vassányi, *Anima mundi: The Rise of the World Soul Theory in Modern German Philosophy* (Heidelberg: Springer, 2011). Veit Erlmann phrases the central tenet of *Naturphilosophie* as the idea that, other than the Absolute, everything was a medium operating within an infinitely large electric circuit. Veit Erlmann, *Reason and Resonance* (New York: Zone Books, 2010), 20.

[57]As Cantor and Hodge emphasize, "equate fire with *aither* [*sic*] and *aither* with *pneuma,* and one has the world arising from the condensation and rarefaction of an original ethereal source." See introduction, *Conceptions of the Ether,* 2.

[58]Vassányi, *Anima mundi,* 122; *Conceptions of the Ether,* 326.

[59]*Conceptions of the Ether,* 363.

[60]This idea can be found in classical philosophy; the Stoics identified the world soul with air and breath (*pneuma*), while in the Aristotelian cosmos the *pneuma* is the worldly correlate to the heavenly ether, a fifth element confined strictly to the heavenly spheres. See Cantor and Hodge, introduction, *Conceptions of the Ether,* 2–5.

[61]M. H. Abrams, "The Correspondent Breeze: A Romantic Metaphor," *Kenyon Review* (1957): 113.

nature, the action of the wind also evoked later theories that electrical changes in the internal bodily ether were integral to the process of nervous transmission.

The interaction between poetic depictions of the wind and contemporaneous models of ether-activated vibrating nerve strings can be seen in the rise of the figure of the Aeolian harp, an instrument that resonated sympathetically with the breeze. This relationship was often explicit, with literary depictions of a wind-blown harp evoking the nerves and brain as well as a transcendent *pneuma.* The Aeolian harp thus modeled the workings of the brain while also expressing the resonance of the *Weltseele*.[62] Consider the metaphorical language of Christoph Martin Wieland's essay *Sendschreiben an einen jungen Dichter* (1782), which uses the Aeolian harp to model the process of poetic creativity as one of resonance with the very breath of nature: "The softest breath of Nature causes the entire organ of the soul to vibrate harmoniously like an Aeolian harp; and every sensation gives back, with heightened beauty and the purest accord, like a perfect echo, the melody of the object, and grows ever sweeter as it gradually dies away."[63]

Similar examples abound. Jean Paul states that "the fibers of our brains are the strings of an Aeolian harp, which under the breath of a long-forgotten hour begin again to sound."[64] Andreas von Rebmann describes the human body as an Aeolian harp strung with nerves, whose tuning (*Stimmung*) is dependent on "digestion, and all other bodily juices."[65] In "The Eolian Harp" (1795), Samuel Taylor Coleridge compares the workings of his brain to an Aeolian harp vibrating in response to a divine breeze, "plastic and vast, one intellectual breeze, at once the Soul of each, and God of all."[66] In "An die Äolsharfe" (1809), Herder addresses the instrument alternately as "Harfe der Lüfte" and "Weltgeist."[67]

Literary representations of the Aeolian harp reveal a repeated emphasis on qualities of sympathetic vibration, swelling sounds, and ethereal timbres. Table 1 displays a selection of English-language poems addressed to the Aeolian harp composed between 1748 and 1815. This list is by no means exhaustive; as Michael Ferber emphasizes, nearly every early Romantic poet addressed the instrument in some fashion.[68] For my purpose it is sufficient that these texts display some of the shared language used to describe the timbre and expression of the Aeolian harp. This discourse remains remarkably consistent among the poems, as do representations of the instrument evoking sympathetic vibration in the nerves or mind. Compare the similar use of adjectives relating to the heavens in the column on timbre, the repeated use of the verb *swell* in the column on expression, and a resonant, vibratory conception of perception in the column on mental effect. These excerpts clearly show that the ethereal sounds of the Aeolian harp have a specific sonic and dynamic profile, and that they are often directly linked with mental effect generated through sympathy or association.

The application of vibratory metaphors to both the human and the world soul had an additional unexpected effect. Shelley Trower suggests that the comparison between the workings of the nerves and specific musical instruments led to the belief that those instruments had a special influence over the nervous system.[69] In a musical context, the instruments thought to have the most direct access to the

[62]As late as 1859, Johann Michael Fischer suggested that the sounds of the Aeolian harp were "the embodied organ of the *Weltseele*." Johann Michael Fischer, *Musikalische Rundschau über die letzten drei Jahrhunderte* (Leipzig: Veit & Co., 1859), 4 (my trans.).

[63]Christoph Martin Wieland, "Letters to a Young Poet," in *The Library of Choice Literature: Prose and Poetry Selected from the Most Admired Authors,* vol. 5, trans. Ainsworth R. Spofford (Philadelphia: Gebbie & Co., 1883), 219.

[64]Jean Paul Richter, *The Invisible Lodge,* trans. Charles T. Brooks (New York: United States Book Co., 1883), 363.

[65]Andreas von Rebmann, *Die Zauberlanterne* (Leipzig: W. Heinsius, 1804), 58 (my trans.).

[66]Samuel Taylor Coleridge, "The Eolian Harp," in *The Collected Works of Samuel Taylor Coleridge,* vol. 75 (Princeton: Princeton University Press, 2001), 118.

[67]Johann Gottfried Herder, "An die Äolsharfe," in *Adrastea und das Achtzente Jahrhundert,* ed. Johannes Müller (Stuttgart: J. G. Cotta, 1829), 301.

[68]Michael Ferber, *The Cambridge Introduction to British Romantic Poetry* (Cambridge: Cambridge University Press, 2012), 30.

[69]Shelley Trower, "'Nerves, Vibration and the Aeolian Harp,'" *Erudit: Romanticism and Victorianism on the Net* 54 (2009).

Table 1
Aeolian Harp Poems, 1748–1815

Author, Poem	Timbre	Expression	Mental Effect
James Thomson, "An Ode on Aeolus' Harp" (1748)[1]	The full celestial choir	Swell the lofty hymn	x
Samuel T. Coleridge, "The Eolian Harp" (1795)[2]	Soft floating witchery of sound,	Long sequacious notes / Over delicious surges sink and rise. / [. . .] swell and flutter on this subject Lute!	Full many a thought uncalled and undetained, / And many idle flitting phantasies, / Traverse my indolent and passive brain, / . . . And what if all of animated nature / Be but organic Harps diversely framed, / That tremble into thought, as o'er them sweeps / Plastic and vast, one intellectual breeze, / At once the Soul of each, and God of all?
Amelia Alderson, "Stanzas Written under Aeolus' Harp" (1795)[3]	The melting strains / A choir of angels	Solemn and slow yon murmuring cadence rolls, / Till on the attentive ear it dies away	Do they not wake thy trembling nerves, O Love, / And into warmer life thy feelings call?
Peter Bayley "On Hearing an Aeolian Harp" (1804)[4]	The voice of choired saints	falls and dying symphonies.	Faintly perceived, like some expiring ray / Of memory that trembles o'er the mind,
Maria Hester Park, "Lines Addressed to an Eolian Harp" (1806)[5]	Choirs of airy spirits heard on high / cherub-voice	Swells into celestial harmony / Whose swell is ecstasy, whose close is bliss!	x
Thomas Stott "To an Aeolian Harp" (1810)[6]	Such notes as Seraphs sing,	grandly swelling, solemn, clear, and slow / now grandly sinking, plaintive, soft, and low!	x

[1]James Thomson, *The Works of James Thomson: With His Last Corrections and Improvements. To which is Prefixed, An Account of His Life and Writings,* vol. 1 (Edinburgh: A Donaldson, 1763), 436.
[2]Samuel Taylor Coleridge, "The Eolian Harp," in *The Collected Works of Samuel Taylor Coleridge,* vol. 75 (Princeton: Princeton University Press, 2001), 118.
[3]Amelia Alderson, "Stanzas Written under Aeolus' Harp," in *Romantic Women Poets, 1770–1838,* vol. 1, ed. Andrew Ashfield (Manchester: Manchester University Press, 1997), 151.
[4]Peter Bayley, "On Hearing an Aeolian Harp," in *Poems* (Philadelphia: T. & G. Palmer, 1804), 96.
[5]Maria Hester Park, "Lines Addressed to an Eolian Harp," in *The Monthly Mirror: Reflecting Men and Manners,* vol. 21 (London: J. Wright, 1806), 196.
[6]Thomas Stott, "To an Aeolian Harp Placed in a Window at Dromore House," in *The Songs of Deardra, translated from the Irish, with other poems* (London: S. Gosnell, 1824), 95.

Table 1 (*continued*)

Author, Poem	Timbre	Expression	Mental Effect
Josiah Conder "To an Eolian Harp, Heard at Night" (1811)[7]	Like angel echoes from a distant sphere.	[Thy tones] only to the heart they swell, / And wake an echo there.	O wizard Harp! strange power is thine, / And more than music thou canst give . . . / [Thy tones] shades of forms beloved they bring, / And draw the distant near. / . . . It is the sigh that Memory heaves
R. W., "Lines to the Aeolian Harp" (1815)[8]	Enchanting sound, pure seraphic joy	Melodious strains now deeply swell. And now an higher note they dwell,	Awhile those sweet vibrations cease, / Which filled the anguished mind with peace,

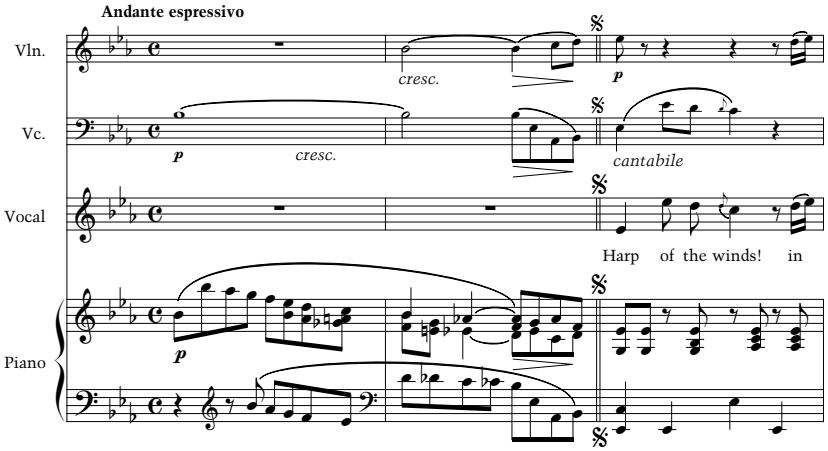
[7]Josiah Conder, "To an Eolian Harp, Heard at Night," in *Star of the East with Other Poems* (London: Taylor and Hessey, 1824), 152.
[8]R. W., "Lines to the Aeolian Harp," *Salopian Magazine* 8 (1815): 79–80.

nerves were often those whose tones were regularly described as "ethereal." For example, in *Versuch einer Philosophie des Schönen in der Musik, oder Aesthetik der Tonkunst* (1838), Gustav Schilling emphasizes that the worldly musician cannot compete with the invisible muse behind the Aeolian harp's "truly ethereal sounds. . . . [The harp's] resonating string constitutes the clearest evidence that the life-nerve within us can sympathetically vibrate."[70] The multiple meanings of ether thus interacted closely with each other and led to an overdetermined link between the idea of ethereal music and instrumental sound.

The emphasis on swelling dynamic capabilities and heavenly timbres extended to musical descriptions of the sonic qualities of the Aeolian harp.[71] Christian Friedrich Quandt's detailed account of the experience of listening to the Aeolian harp in *Versuche und Bemerkungen über die Äolsharfe* (1795) mentions the instrument's "enchanting" timbre and compares it to a number of sounds, including "an organ, a harmonica, violin, flute, distant singing, or the arpeggio of a harp."[72] Quandt provides a list of the instrument's qualities using technical terms for dynamics and intervals and emphasizing the emerging presence of the dominant-seventh chord:[73]

> The gradual increase of the wind causes a beautiful swelling crescendo, which can be a few minutes long. The decrescendo is often faster. The weaker wind excites the fundamental, the strong wind evokes the fifth and octave, as well as the major third, that is, the full triad, so purely tuned as no human ear could coax from another instrument. The minor seventh also often occurs, and, when the wind grows strongly, a scale occurs in the third octave from the fundamental, in the manner in which they appear on a horn or trumpet.[74]

[70]"Wahre ätherische Klänge sind es. . . . Die Aeolsharfe liefert den sichersten Beweis, dass mit der schwingenden Saite der zarte Lebens-Nerv selbst gleichsam in uns vibrirt." Gustav Schilling, *Versuch einer Philosophie des Schönen in der Musik, oder Aesthetik der Tonkunst* (Mainz: Schott's Söhne, 1838), 496–97.
[71]The qualities of slow crescendo and swift decrescendo and unusual instrumental timbre frequently appear in subsequent nineteenth-century musical depictions of the Aeolian harp. See also Georges Kastner, *Stephan ou la harpe d'Éole* (1854).
[72]Christian Friedrich Quandt, "Versuche und Bemerkungen über die Äolsharfe," *Lausizische Monatsschrift* (1795): 279.
[73]The dominant-seventh chord also appears in Matthew Young's transcription of an Aeolian harp. Matthew Young, *An Enquiry into the Principal Phænomena of Sounds* (Dublin: Joseph Hill, 1784), 170.
[74]Quandt, "Versuche und Bemerkungen über die Äolsharfe," 279.



Example 1: Beethoven, "To an Aeolian Harp," mm. 1–3.

In *Die Aeolsharfe: Ein allegorischer Traum* (1801), Johann Friedrich Hugo von Dalberg comments on the Aeolian harp's magically whispering timbre, slowly rising into sound only to then disappear in affecting echoes.[75] In his *Musikalisches Lexicon* (1802), Heinrich Christoph Koch emphasizes that the instrument is rendered "still more attractive by its quite individual and inimitable crescendo and decrescendo."[76] E. T. A. Hoffmann likewise links the "imperceptible commencement, the swelling and the gradual dying of those nature-tones" to the Aeolian harp's powerful influence upon inner mental states,[77] while Robert Schumann associates the ethereal, floating quality of the Aeolian harp's doubtful seventh chord (*zweifelvoller Septimenaccord*) with a transcendent vision of the next world.[78] These acoustic descriptions present a specific sonic profile linking the Aeolian harp with otherworldly sounds and gradual wind-blown swells.

A number of composers scored acoustic features of the Aeolian harp in their works. One example is Beethoven's arrangement of "To an Aeolian Harp," from his twenty-six *Walisische Lieder* WoO 155 (1809–10). Beethoven's two-measure interlude builds on the Aeolian harp's swelling sounds, slow response, and quick decrescendo, characteristic octave, and dominant-seventh harmony, as shown in ex. 1.

A more elaborate example of the inscription of idealized Aeolian characteristics in music occurs in *Die Äolsharfe, oder Der Triumph der Musik und Liebe* (1808), an opera by the German composer and theorist Justin Heinrich Knecht (1752–1817) to a libretto by Nicolas Remmele. Subtitled "a Romantic opera in four acts," the work is built around the power of the Aeolian harp to transform all men into brothers.[79] As Knecht notes in his performance in-

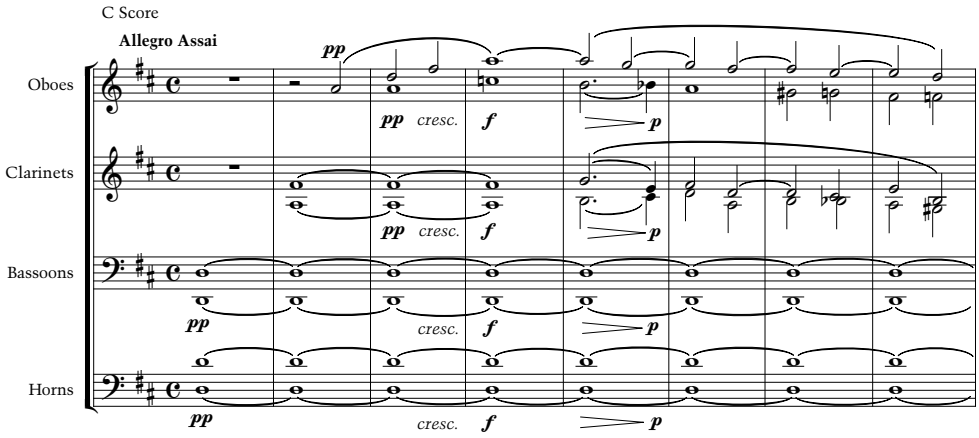
[75]Johann Friedrich Hugo von Dalberg, *Die Aeolsharfe: Ein allegorischer Traum* (Erfurt: Beyer und Maring, 1801), 6 (my trans.).

[76]Heinrich Christoph Koch, "Die Äolsharfe," in *Musikalisches Lexikon* (Frankfurt am Main: August Hermann dem Jüngeren 1802), 82–90.

[77]Hoffmann illustrates this claim with a specific description of the sounds of the Aeolian harp, emphasizing its swelling sounds and emergent seventh chord: "On quiet nights, with a moderate breeze blowing, I used distinctly to hear tones, sometimes resembling the deep, stopped, pedal pipe of an organ, and sometimes like the vibrations from a deep, soft-toned bell. I often distinguished, quite clearly, the low F, and the fifth above it (the C), and not seldom the minor third above, E flat, was perceptible as well; and then this tremendous seventh chord, so woeful and so solemn, produced on one the effect of the most intense sorrow, and even of terror!" E. T. A. Hoffmann, "The Serapion Brethren," trans. Alex Ewing (London: George Bell and Sons, 1908). Emily Dolan analyzes Hoffmann's tale in relation to the influence of idealized nature sounds upon the development of the harmonichord. Dolan, "E. T. A. Hoffmann," 7–26.

[78]Robert Schumann, *Tagebücher*, vol. 1, ed. Georg Eismann (Leipzig: Deutscher Verlag für Musik, 1971), 136.

[79]The story begins with the theft of a large wind harp by marauding Turks from a mythical Greek island, home to the Aeolian people. The effect of the Aeolian harp is so strong that it causes the leader of the Turks and the high priestess of the harp to fall in love, and ultimately leads to reconciliation between the Turks and Aeolians.



Example 2: Knecht, "Spiel der Äolsharfe," mm. 1–8.

structions, the opera hinges on the harp, and an exact imitation of its sounds is therefore essential. Knecht takes particular care to stage the instrument's ethereal timbre. He requires the Aeolian sounds to be imitated by a group of offstage woodwind players hidden by curtains. Emphasizing that he desires an "organ-like tone," Knecht asks the performers to observe carefully the *pianissimo,* crescendo, and decrescendo dynamics.

The opera contains an instrumental interlude entitled "Spiel der Äolsharfe," which begins toward the end of the first act with a gradual swelling of sound from the offstage winds. Exceeding Beethoven, Knecht follows Quandt's description to the letter, presenting octaves in the bassoons and horns followed by the unfolding of the fifth and third in the clarinet in the second measure and continued by the oboes in the second and third measures. The gathering sounds culminate in the addition of the minor seventh in m. 4 (see ex. 2). Moreover, like Beethoven's, Knecht's careful dynamic markings call for a long crescendo (mm. 1–3) followed by a swift decrescendo (m. 5). After this striking beginning, however, the rest of the interlude is mostly conventional, highly reminiscent of the Mannheim school.

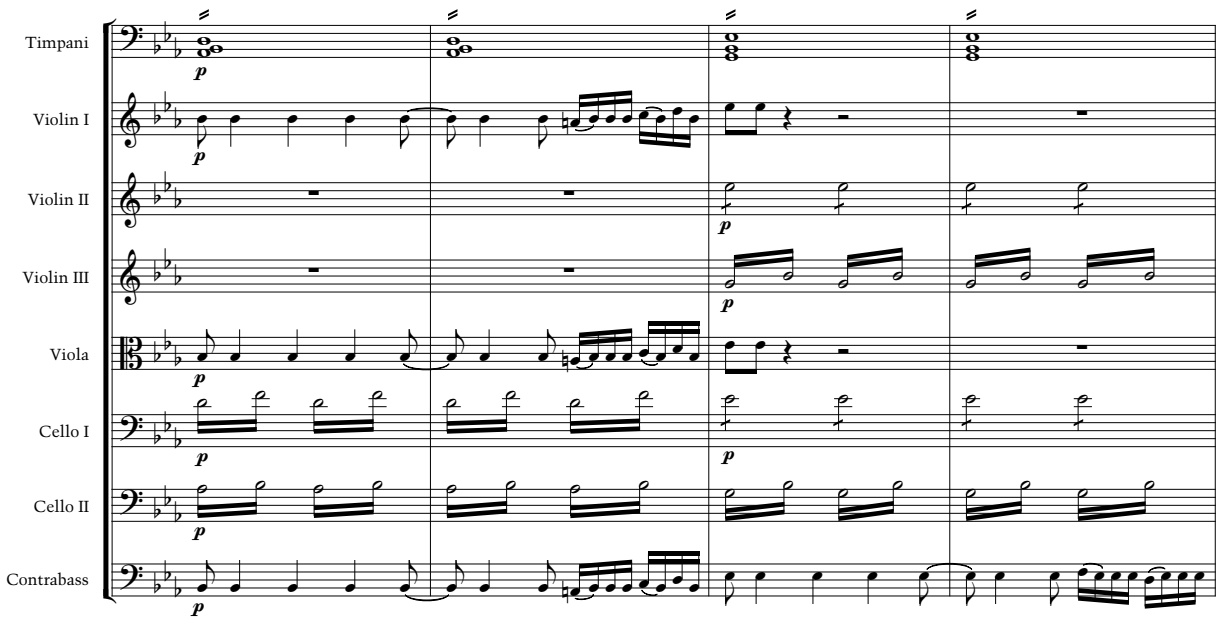
Like Knecht, Anton Reicha marshals unusual instrumentation to depict the Aeolian harp in his orchestral setting of Gotthard Ludwig Kosegarten's poem "Die Harmonie der Sphären." Reicha sets only the opening two lines, which transfer the age-old trope of cosmic creation through music to the sound of the Aeolian harp:

> Hear! How the Aeolian harp of creation roars and burbles
> Over and under and around, its trembling gold sounds.

Appended to the second volume of Reicha's *Traité de haute composition musicale* (1826), the work follows a discussion of extremely large orchestras of up to 400 players and the expanded sounds and techniques such ensembles offer. Noting that he was inspired by the effect of Kosegarten's poem, Reicha calls for no less than four timpani players on eight drums tuned in two chromatic tetrachords (G–A♭–A–B♭; C–D♭–D–E♭), plus a string orchestra and two SATB choirs. He further specifies that the violins divide into three groups and the cellos into two, involving a total of eighty-two performers. According to Reicha, the robust timpani section is intended to represent the effect of the "immeasurable space of the rotating spheres by means of an uninterrupted harmony."[80]

As shown in ex. 3, Reicha deploys his timpani to create a constant murmuring underpinning the string players' tremolo and syncopating figures, illustrating the text's description of the roaring, burbling Aeolian harp of creation.

[80]Anton Reicha, *Traité de haute composition musicale,* vol. 2 (Paris: Zetter, 1826) (my trans.).



Example 3: Reicha, "Horch! wie orgelt" mm. 9–12.

The resulting trembling mass gradually crescendos from *piano* in m. 1 to *forte* in m. 28, then swiftly subsides in a two-measure-long decrescendo back to *piano* in m. 30.

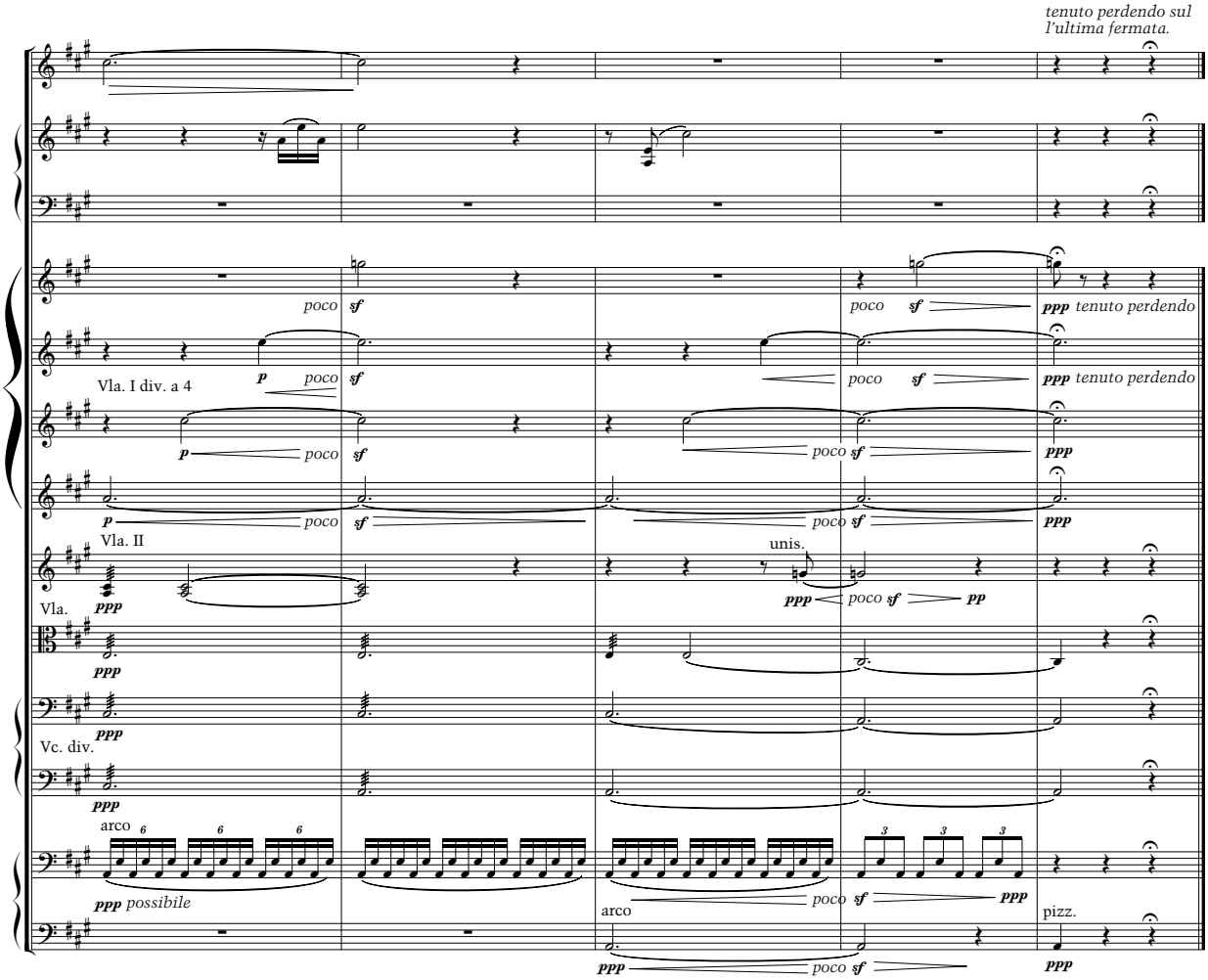
The fifth movement of Hector Berlioz's symphonic monodrama *Lélio, ou le retour à la vie* (1831), shown in ex. 4, displays another interpretation of the Aeolian harp. This short movement is entitled *La harpe éolienne—Souvenirs.* Its last five measures feature a representation of the Aeolian harp's characteristically swelling sound. Against unmeasured tremolos in violas and second violins, the triadic harmony begins ***ppp possibile*** with measured tremolos in the cellos and basses and continues with entrances in the upper strings in a gradual crescendo that culminates (and descends) after the appearance of the minor seventh. Moreover, in an effect reminiscent of Knecht's offstage winds, both the clarinet and the strings are muted.

Berlioz assigned this brief piece an unusual power of affective transmission when he analyzed it in his *Grand Traité d'instrumentation et d'orchestration modernes* (1843):

> The broken fragments of melody, interspersed with silences, are also accompanied by tremolos on some of the strings while the double basses' occasional pizzicatos make a kind of heavy pulsation beneath the harmony and a harp sketches out a few broken arpeggios. But here, to give the clarinet sound as indistinct and distant a quality as possible I had the instrument enclosed in a leather bag as a substitute for a mute. This desolate murmuring and the half-stifled sound of the solo recalling a melody already heard in another piece have always made a vivid impression on an audience. This ghostly music produces an effect of desolation and brings tears to the eyes as no other expression of sorrow could do; it wrings the heart as much even as the trembling harmonies of the Aeolian harp itself.[81]

Similar associations appear in a report on the performance of the movement in Berlioz's *Memoirs* (1865), where the composer notes that "the strange sadness of this musical picture sent a shiver through the whole orchestra, and was received with a storm of applause."[82] Moreover, Berlioz relates the actual Aeolian harp to the inspiration of a profoundly melancholy affect: "[Listen] to the weird moans of an Aeolian harp hung in the leafless branches of a tree, and

[81]Berlioz and Macdonald, *A Treatise upon Modern Instrumentation,* 127.
[82]Hector Berlioz, *Memoirs of Hector Berlioz: From 1803 to 1865, Comprising His Travels in Germany, Italy, Russia, and England,* trans. Rachel Scott Russell Holmes and Eleanor Holmes (London: Macmillan, 1884), 74.



Example 4: Berlioz, *Lélio, La harpe éolienne—Souvenirs,* mm. 25–29.

you will experience a feeling of intense sadness, an infinite yearning for another state of existence, an intense disgust with the present; in fact, a regular attack of blue devils and a longing for suicide."[83]

Berlioz thus ascribes unusually powerful qualities of affective transmission to both the actual Aeolian harp and its idealized orchestral version. As evident from the composition and orchestration of *La harpe éolienne—Souvenirs,* he has broken down the ethereal sounds of the instrument into specific dimensions of pitch, timbre, and dynamic and translated them into other media. Berlioz's analysis further suggests that at least a portion of the Aeolian harp's affective power resided in these discrete elements, which could be harnessed in full or in part.

The Aeolian Harp and the Harmonium

As a newly invented wind-operated instrument with slowly swelling sounds and novel, ethereal timbres, the harmonium exemplified many of the idealized acoustic qualities of the Aeolian harp. Early-nineteenth-century instrument manufacturers in England, France, and Germany capitalized on these poetic and psychological

[83]Ibid., 156.

overtones by marketing their instruments as realizations of the Aeolian ideal. For instance, Charles Wheatstone's *eolina* was praised for "the contrasts of its exulting swells and dying cadences, [which] realize the poetical descriptions of the Harp of Aeolus,"[84] while a report on the *aeolodicon* notes that its construction imitates "the principle upon which the Eolian harp [is] sounded, producing musical vibrations by means of a stream of air."[85] Yet another essay on the *seraphine* emphasizes that the instrument's timbres range from "the soft sighing of the Aeolian harp to the grandeur and majesty of the full choir,"[86] while a description of the *orgue expressif* states that it is "to the fiddle, what to the common harp is the Aeolian, that favorite and beautiful illustration of Jean Paul Richter's."[87]

The harmonium was also celebrated in poetry. As early as 1824, J. H. Kaufmann published a sonnet dedicated to the *aeolodicon;* his description of the instrument's ghostly lisps and heavenly melodies (*mit Geisterlispel—Himmels-Melodien*) probably alludes to Goethe's famous description of the lisping tones of the Aeolian harp in the dedication of *Faust.*[88] In "Recollections" (1856), Thomas Pentecoast opens with an invocation to the Aeolian harp and later celebrates the swelling sound of the seraphine.[89] In his poem "The Seraphine" (1831), the American clergyman L. D. Ferguson likens the instrument to a harp and depicts its changing role throughout the various stages of his life, possibly alluding to the similar chronology in James Thomson's 1748 "An Ode on Aeolus' Harp."[90]

Inheriting the affective discourse around the Aeolian harp, the sounds of the harmonium constituted a novel quantity on which poets, instrument designers, and composers could project their fantasies of the affective power of music. Related ideas also appear in contemporaneous medical texts; for example, the renowned psychiatrist Jacques Joseph Moreau notes that the sounds of the harmonium affect a patient immensely,[91] a sentiment echoed by the Austrian physician Franciscus Carolos Hofgartner, who singles out the physharmonica's power to affect the mind in depth.[92] The medical case studies surveyed in the following section suggest that the performance on free-reed instruments was viewed as a valid therapeutic option in the treatment of mental disorders. These case studies are further complemented by a discussion of Balzac's deployment of harmonium instruments to represent mental states in three works of fiction.

The Physiological and Psychological Effects

For early-nineteenth-century doctors interested in animal magnetism, the treatment of mental disorders with specific musical timbres assumed that the ethereal substance pervading the body could be sympathetically recalibrated and returned to a state of harmonious health through sonic vibration. While Mesmer's use of the glass harmonica represented an early consequence of these ideas, the glass harmonica had largely receded from the popular imagination by 1820s due to its perceived pathological influence on the nerves. The invention of the harmonium around the same time made the ethereal qualities of the Aeolian harp available as a more benign therapeutic tool.

Specific curative applications of free-reed instruments appear frequently in the treatment of cateleptic adolescent girls. Although catalepsy was one of the most common nervous disorders of the nineteenth century, its causes were poorly understood. The contemporary psy-

[84]Anonymous, "The Aeolina," *The Kaleidoscope: or, Literary and Scientific Mirror* 9 (31 March 1829): 317.
[85]Anonymous, "The Plectroeuphone," *Harmonicon,* vol. 1 (London: Samuel Leigh, 1828), 37.
[86]Anonymous, "The Seraphine," *Ladies Museum* 3 (June 1831): 319.
[87]Anonymous, "Pierce on Sound," *New York Review* 4 (Jan. 1839): 172.
[88]J. H. Kaufmann, "Das Aeolodicon," *Cäcelia* 1, no. 4 (1824): 379. Johann Wolfgang von Goethe, *Faust: Eine Tragödie,* Kapitel 1, lines 25–28 (Tubingen: J. G. Cotta, 1808), 6.
[89]Thomas Pentecoast, "Recollections," in *The Harp of Aeolus: Fugitive Poems* (London: Edward West, 1856), 195.
[90]L. D. Ferguson, "The Seraphine," in *Occasional Poems* (Rochester, NY: E. Darrow & Brother, 1857), 124–26.
[91]Jacques Joseph Moreau, *Du hachisch et de l'aliénation mentale: études psychologiques* (Paris: Librairie de Fontin, Masson, 1845), 425.
[92]Hofgartner, "Effectus musicus," 35.

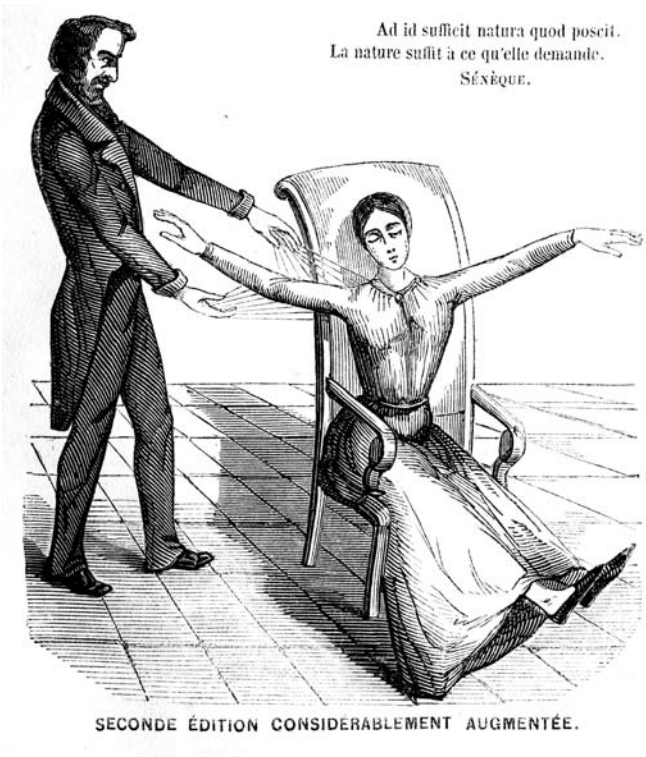


Plate 5: Illustration from frontispiece of the second edition of Charles Lafontaine's *L'art de magnétiser ou le magnétisme animal* (1847). The first edition contains the phrase "État d'insensibilité et de catalepsie" underneath the image. Image courtesy of Yale University, Harvey Cushing/John Hay Whitney Medical Library.

chiatrist German E. Berrios describes its symptoms as "full and sudden motor paralysis, with normal or increased muscle tone, total sensory disconnection with aneasthesia and analgesia, passive posturing (i.e., the subject would remain in any position set by the examiner)."[93] Cataleptic states could be caused by organic disease, emotional and physical shocks, or the manipulations of a hypnotist or magnetizer. Plate 5, part of the frontispiece of Charles Lafontaine's *L'art de magnétiser ou le magnétisme animal* (1847), shows an animal magnetizer inducing catalepsy. Note the transmission of magnetic forces from his hand to his subject's body, as well as her suspended arms and feet.

Peter Joseph Schneider's *System einer medizinischen Music* (1835) contains a case study describing the cure of a cataleptic patient with the power of a free-reed aeolodicon. This account emphasizes the harmonium's specific acoustic qualities as an integral part of the medical treatment. The doctor's adolescent charge had fallen into a cataleptic state following the sudden death of her suitor, a young Spanish tenor. Having diagnosed her illness as a spiritual malady, Schneider asserts that the cure must be delivered via ethereal sounds: "The soul, which had caused the body so much distress, and brought its life functions to the cusp of the grave, demanded its own treatment, to consist of purely spiritual, ethereal sounds."[94]

The course of treatment is shrewdly planned.

[93]German E. Berrios, *The History of Mental Symptoms: Descriptive Psychopathology since the Nineteenth Century* (Cambridge: Cambridge University Press, 1996), 378–79.

[94]Peter Joseph Schneider, *System einer medizinischen Musik* (Bonn: Carl Giorgi, 1835), 265 (my trans.).

Schneider first improvises a prelude on the aeolodicon, leading into a four-part vocal chorale with the melody in the tenor line. The doctor then begins to play a fantasy in what he terms a "soulful key" (*Seelenstimmung*), E♭ minor:

> Softly, and so, swelling to the strongest fortissimo, and then decreasing to a moderate piano, giving way to a pure triad, and thus through the various voicings and turns of the harmony. We observed at the beginning of the third crescendo and then immediately after began a deep intake of breath and a strong shiver; that is, a complete seizure of the full nervous system. Yet she remained dumb and immoveable. I preluded to G♭ major and began the chorale, swelling from the lightest breaths and back again, and then quartet began to sing. We were not yet at the end, when clearly, supported softly by the choir, the tenor took the melody. Suddenly, the invalid cried loudly, "O! Antonio! Antonio!" (the name of the Spaniard); and began to cry so deeply that we had to stop our chorale; the young girl had to be carried to bed.[95]

Following this catharsis, the girl returns to life and, aided by frequent performances of music on the *aeolodicon,* slowly regains her strength. After sixteen days of musical treatment, Schneider pronounces her cured. In this case, the *aeolodicon*'s swelling sounds are central to the therapy. The cure transpires through the "complete seizure of the full nervous system," which occurs when the patient synchronizes her breathing to the rising and falling sounds she hears. The vision of the deceased Antonio is enabled by the ethereal sounds of the instrument, combined with the holy associations of the four-part chorale and with Schneider's selection of the "soulful" keys E♭ minor and G♭ major. With all these elements in play, the *aeolodicon* evokes a response from the patient consistent with Schneider's conception of the therapeutic application of music by sympathetic resonance: "Like the magnet, which can only exert its force on bodies of a similar composition; so there are certain sounds, which are suitable to the excitation of certain bodies."[96]

While the magnetic reference here suggests an affinity with Mesmeric techniques, Schneider holds very different views about the glass harmonica, which he claims causes the nervous system of hysterics great distress.[97] He thus uses the celestial sounds of the harmonium, rather than the pathological tones of the glass harmonica, to generate a physiological crisis in the patient. As she is carried to her bed, her menses begin to flow, and Schneider wonders in a footnote: "One should almost believe that the soul had been nourishing itself from this blood, but was now returned to its old domain. Was this caused by the ethereal sounds [*ätherischen Klängen*]?"[98]

Schneider's remarkable suggestion that the ethereal tone of the harmonium had caused the wandering soul to return to its domain evokes the "wandering womb" of Hippocrates, with the substitution of a roving *anima* for a misplaced uterus.[99] This is consistent with Schneider's earlier definition of hysteria as a *Verstimmung,* or detuning, of the inner and outer senses.[100] Moreover, the return of Antonio in the musically generated hallucination of the crisis state and the subsequent arrival of the menses appear almost like a ghostly parody of the girl's tragic love affair.

Samuel Warren's memoir, *Passages from the Diary of a Late Physician* (1835), reports a different outcome. Agnes P., a young acquantance of the doctor, was found in cataleptic state after a thunderstorm. After galvanic shocks produce no effect, the unconscious girl is brought to a private performance of hymns on a drawing-room organ. Warren surmises that "the tones of her favorite music, with the blessing of heaven, might rouse a slumbering responsive chord in her bosom."[101] Like Schneider, he prescribes a religious hymn in the hope that it might affect the patient's soul by sympathetic

[95]Ibid., 267.
[96]Ibid., 106.
[97]Ibid., 157.
[98]Ibid., 268 (adapted).
[99]For a discussion of the shifting representations of hysteria, see George S. Rousseau, "'A Strange Pathology': Hysteria in the Early Modern World, 1500–1800," in *Hysteria Beyond Freud,* ed. Sander Gilman (Berkeley: University of California Press, 1993), 91–221.
[100]Ibid., 156.
[101]Samuel Warren, *Passages from the Diary of a Late Physician,* vol. 2 (Paris: Baudry's European Library, 1838), 25.

resonance. Unfortunately, Agnes P. remains unmoved, and ultimately expires:

> As soon as Dr. D. and I had taken seats on each side of our poor patient, the solemn strains of the organ commenced. I never appreciated music, and especially the sublime hymn of Luther, so much as on that occasion. My eyes were fixed with agonizing scrutiny on Miss P. Bar after bar of the music melted on the ear, and thrilled upon the heart; but, alas! produced no more effect upon the placid sufferer than the pealing of an abbey organ on the statues around![102]

Overall, treatment with free-reed instruments had mixed results. In one reported case, the subject remained unresponsive even when an accordion was played at the back of her head.[103] The same treatment (with an *oelian*) failed with a cataleptic patient in Dublin.[104] In Sardinia, a young cataleptic girl remained unresponsive to the sounds of a physharmonica.[105] However, doctors Vyau De Lagarde and Lenormand of Paris reported that a fifteen-year-old cataleptic arose from her stupor upon hearing a street organ.[106] Doctor Antoine Petroz's *Études de thérapeutique et de matière médicale* documents a similar outcome, likewise resulting from the sounds of a street organ, the instrument deemed "the most appropriate" in the treatment of an eighteen-year-old female cataleptic.[107] Like Warren, Petroz hopes that the patient's mind will resonate with the music, "producing impressions, and awakening some memories."[108] Although she remains unresponsive to two opera arias, a popular tune achieves the desired effect.

The many harmoniums mentioned in works by Balzac, Petroz's exact contemporary, provide a fictional correlate to the instrument's medical application. Balzac generally invokes the harmonium within a larger context in which music's effect on the mind is explicated as the influence of ethereal electricity on the nerves via vibration. This paradigm probably stemmed from contemporaneous medical discourse as well as from the author's well-known interest in Swedenborgian spiritualism.[109] Swedenborg's ideas remained a central fixture within the hermetic universe of Balzac's *Comédie humaine,* appearing in various forms throughout his writings between 1830 and 1840.

Balzac habitually deploys the Swedish mystic's terminology to depict affective and mystical experience.[110] In *Louis Lambert* (1832), his most explicitly Swedenborgian novel, the titular figure proposes that an ethereal substance underlies "various phenomena, known inaccurately as electricity, heat, light, the galvanic fluid, the magnetic fluid, and so forth," which are transformed by the brain into the will.[111] The influence of art derives from the current of an electric fluid, "which, in obedience to the high pressure of thought or of feeling, flows in a torrent or is reduced to a mere thread, and collects to flash in lightning."[112]

Written in the same year as *Louis Lambert,* Balzac's short story "Le Dôme des Invalides"

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[102]Ibid., 27.

[103]"The patient, after having submitted to the manipulations of the magnetizer for the space of fifteen minutes, was in a state of sleep so deep, that all the stimuli that could with safety be applied to the senses. . . . An experiment was now resorted to by means of a large accordion played at the back of her head, but without apparent effect." Blanchard Fosgate, "Catalepsy Induced by Animal Magnetism," *American Journal of the Medical Sciences* 3 (Jan. 1842): 132.

[104]"She remained in one fit this morning without intermission for an hour and a half. An oelian [*sic*] was played close to her ear, but she seemed to be unconscious of what [it] was doing: her head was then placed over a bucket, and some cold water was dashed upon her." Andrew Ellis, "Case of Catalepsy," *New England Journal of Medicine* 12, no. 21 (July 1835): 327.

[105]Anonymous, "Memoire originali su di una magnetizzazione," *Gazzetta medica italiana, Stati Sardi* 29 (19 July 1858): 225–28.

[106]L. Vyau De Lagarde and Lenormand, "Case of Catalepsy," *Edinburgh Journal of Medical Science* 1 (1826): 213.

[107]Antoine Petroz, *Études de thérapeutique et de matière médicale,* completed posthumously and annotated by Alphonse Crétin (Paris: Baillère et fils, 1864), 290–91.

[108]Ibid. (my trans.).

[109]See Lynn R. Wilkinson, *The Dream of an Absolute Language: Emanuel Swedenborg and French Literary Culture* (Albany: SUNY Press, 1996). Merrill Horton further suggests that the synthesis between material and spiritual worlds in the works of Swedenborg and Newton provided a model for Balzac's thought. Merrill Horton, *Hunting the Sun: Faulkner's Appropriations of Balzac's Writings* (Bern: Peter Lang, 2010), 21.

[110]Lynn R. Wilkinson proposes that Balzac's Swedenborgian references represent a "hidden hierarchical order often in conflict" with the status quo of nature and society. Wilkinson, *The Dream of an Absolute Language,* 152.

[111]Honoré de Balzac, *Louis Lambert,* trans. Clara Bell and James Waring, An Electronic Classics Series Publication (Pennsylvania State University, 2002), 94.

[112]Ibid., 44.

explores the affective qualities of the harmonium with Swedenborgian and psychological consequences. The tale centers on a hallucination caused by the physharmonica, an early harmonium developed by Anton Häckel in Vienna. The story begins with the narrator enjoying a sumptuous meal at the home of a German friend, the Baron de Werther, followed by an impromptu performance by his host:

> He drew from a German instrument sounds that approached the right balance between the shrill tones of a libidinous tomcat dreaming of the joys of the gutter, and the notes of an organ vibrrating in a church.—I do not know what he did with this terrible, melancholy apparatus, but my mind had never been more cruelly shattered. Puffs of air channeled toward metal pipes produced harmonic vibrations so strong, so low, so piercing, that each note immediately attacked a fiber, and the music of a grayish green, these melodies full of arsenic, violently introduced into my soul all the reveries of Jean-Paul, all German ballads, a fantastical poetry so painful that it made me want to escape; I felt at once happy and joyful, yet suffering and restless. I felt split. My inner being left this external form to which one or two women, my family and I have born witness.—The air was not air and my legs were no longer legs, they had a soft nature and consistency and bent and sank in the pavement.[113]

The sounds of the physharmonica generate a massive hallucination in the progagonist, splitting him into an inner being attuned to heavenly spirits and angels and an outer being corresponding to the material world. A similar splitting is the Swedenborgian conceit that forms the central plot device of *Lous Lambert*, in which the first person narrator and the character of Louis may be two sides of the same person.

This harmonium-triggered mania causes the narrator of "Le Dôme des Invalides" to believe he is floating above the sidewalks of Paris and that the dome itself has begun to follow him, moving upside down on its tip. He imagines that he has been endowed with the ability to befriend enormous buildings and considers taking the dome home or perhaps on tour around the world. The narrator abruptly wakes up, soaking wet, only after a cab drives straight into the upside-down dome, which, he then realizes, was actually a reflection in a puddle in the street. The story ends with the observation, "Cursed physharmonica! It plays on the nerves!"[114]

This vignette forcibly links the physharmonica to the protagonist's nervous system. Balzac presents a correlation between the grotesque timbre of the instrument—a cross between a church organ and "the shrill tones of a libidinous tomcat"—and the nature of the delirium. The protagonist's nerve fibers are explicitly "attacked" by foreign harmonic vibrations at once strong, low, and piercing. These unfamiliar frequencies force the nerves to transmit a monstrous synesthetic experience—"music of a grayish green . . . melodies full of arsenic,"—conveying at once sound, color, and even poison. This violation culminates in the insertion of German ballads and the reveries of Jean-Paul Richter into the soul of the protagonist.

The textual allusions suggest that the sounds of the instrument serve as a portal for a full-fledged invasion of German Romanticism into the narrator's consciousness. While under the power of these foreign vibrations, the narrator's perceptions blur and he is unable to distinguish the real from its reflection, or up from down. Balzac's decision to illustrate the dramatic effects of a German physharmonica rather than the local *orgue-expressif* may suggest a slightly tongue-in-cheek tribute to E. T. A. Hoffmann, whose work had been translated into French only six years earlier.[115]

Hoffmann's influence is certainly apparent in Balzac's musical short story, "Gambara" (1837). The story concerns an Italian composer, Paolo Gambara, his beautiful wife Marianne, and the unscrupulous Count Andrea, who cultivates the composer in order to win the affections of his wife. A passionate musician, instrument maker, and man of science, Gambara

[113]Balzac, "Le Dôme des Invalides" (1832) (my trans.).

[114]Ibid., 293.

[115]Balzac's relationship to Hoffmann was not without its complexity; Claudia Albert proposes that Balzac lampoons the Hoffmannesque musician myth in "Gambara" and *Massimilla Doni* (1838). Claudia Albert, "Music and Romantic Narration," in *Romantic Prose Fiction*, ed. Gerald Gillespie, Manfred Engel, and Bernard Dieterle (London: John Benjamins, 2008), 75.

has specific ideas about music's physical qualities, asserting that "a certain ethereal substance diffused upon the air gives us music as it gives us light."[116] Noting that "sound is air in motion," he proposes that musical affect is transmitted through a subjective sympathetic resonance, magnified by the power of the mind: "The air is formed of constituents which, in us, no doubt, meet with analogous elements that respond to them, sympathize, and magnify them by the power of the mind [. . .] these molecules, set in motion by the musician and falling on our ear, answer to our ideas, according to each man's temperament."[117] In light of these theories, the tragedy of Gambara takes on added depth—the composer's temperament is misaligned with his music. Gambara can produce harmonious music only when drunk; his sober music strikes his listeners as a "hideous medley." Throughout most of the story Gambara plays on a piano; however, in a pivotal scene he decides to perform on his homemade panharmonicon—an instrument probably based on descriptions of Mälzel's invention of the same name. It is depicted as piano-sized, with "a second body and its keyboard, supporting the openings or bells of various wind instruments and the closed funnels of a few organ pipes."[118] The result is extreme overexcitement: "Gambara, without being drunk, was in the condition when every power of the brain is over-wrought; when the walls of the room are transparent; when the garret has no roof, and the soul soars in the empyrean of spirits."[119] This precarious mental state is reflected in Gambara's impossible organological fantasy, a harmonium-like hybrid evoking "the effects of a real orchestra"; a "hundred-voiced instrument" combining the tones of an organ and the sounds of string and wind instruments, and the voices of "an invisible chorus of girls."[120]

An organological correlate to madness also appears in *L'Envers de l'histoire contemporaine* (1848), one of Balzac's last novels. In this tale, the idealistic young Godefroid finds meaning in life through joining the Order of the Brotherhood of Consolation, a secret society of good works. While on assignment, he encounters an impoverished invalid named Vanda de Mergi, who longs for a newly invented musical instrument called the *accordéon*. Balzac's description of an instrument operated by foot pressure makes clear that this is a kind of harmonium, and E. P. Robbins translates it accordingly:

> "Well, I will be good," said Vanda, with a saucy pout. "But let me have a harmonium."
>
> This instrument had lately been invented; it could, by a little contrivance, be placed by the invalid's bed, and would only need the pressure of the foot to give out an organ-like tone. . . .
>
> "Yes, Madame, and I can procure you one," replied Godefroid at an appealing glance from the old man. "A friend of mine who is setting out for Algiers has a very fine one, which I will borrow of him; for before buying one, you had better try it. It is quite possible that the sound, which is strongly vibrating, may be too much for you."[121]

Balzac connects the vibrating sounds of the harmonium to the fragility of the invalid's physical and mental state. As Godefroid explains, Vanda suffers from "a nervous disease, with symptoms so strange that no one can imagine them who has not seen them."[122] This disorder, in which new symptoms constantly become manifest and migrate throughout her body, has crippled her physically and emotionally.

In the passage just prior to her request for the harmonium, Vanda enters a state of strange spiritual transcendence: "Her glance was more than a glance; it was a flame, or rather a blaze of divine light, a communicative ray of life and intelligence, thought made visible. The voice, with its endless intonations, supplied the place of movement, gesture, and turns of the head. And her changing color, varying like that of the fabled chameleon, made the illusion—or, if you will, the delusion—complete." We can trace

[116]Honoré de Balzac, "Gambara," trans. Clara Bell and James Waring, An Electronic Classics Series (Pennsylvania State University, 2002), 22.
[117]Ibid.
[118]Ibid.
[119]Ibid., 38.
[120]Ibid., 39.

[121]Honoré de Balzac, *The Seamy Side of History*, trans. E. P. Robbins (New York: Collier and Son, 1900), 455.
[122]Ibid., 464.

the ways in which this literary characterization capitalizes on the qualities inherent to the harmonium. Vanda is depicted in imagery evoking the multiple timbres of the *accordéon* she so desires: her voice has "endless intonations" and her color varies "like that of the fabled chameleon." In an overtly Swedenborgian reference, her glance is compared to a flame channeling a divine ray of life.[123] The ethereal vibration of Vanda's gaze, combined with her varied vocal intonations, powerfully affect Godefroid; he can "hardly endure his emotions. . . . This atmosphere, where all was sentiment, ha[d] a celestial influence."[124]

Balzac's correlation of vibration with the nervous effects of the harmonium remains constant between 1831 and 1848. As we have seen, in "Le Dôme des Invalides," the physharmonica evokes strong, low, and piercing vibrations that assault the mind. In "Gambara," the titular figure compares sound to light, as "both act by vibrations which end in man, and which he then transforms in his nerve-centres into thoughts";[125] and in *L'Envers de l'histoire contemporaine,* Godefroid warns that the "strongly vibrating" sounds may overwhelm the invalid Vanda. Moreover, all three excerpts evoke specific medical conditions. The physharmonica generates powerful hallucinations; the panharmonicon symbolizes the mentally unstable Gambara's delusions; and Vanda's desire for an *accordéon,* an instrument that can imitate multiple timbres, mirrors her own hysterical (and possibly feigned) illness, which mimics various symptoms of other diseases.

Conclusion: Ethereal Tuning Forks

Early Romantic thinkers assigned a range of qualities to ethereal sounds, drawn not only from ideas about heavenly timbres but also from the idea of the ether as a medium through which vibrations traveled to affect the body and the nerves. The late eighteenth and early nineteenth centuries indexed this complex of ideas with swelling sounds and masked and varied timbres as composers and instrument designers strived to realize the ephemeral sighs of the Aeolian harp in other expressive media. This staging of ethereal sounds appeared in poetry, orchestral works, instrument design, and medical practice, suggesting that the auditory culture that privileged specific sonic qualities for their ability to affect the nerves extended beyond crank mesmerists and eccentric luthiers and well into the culture of mainstream art music.

Emily Dolan has proposed that the ideal of ethereality is closely linked to an instrument's ability to mimic expressive aspects of a human voice.[126] I would like to extend this suggestion by emphasizing the cultural roots of such mimicry. Even as one class of sounds loses its claim on the affective powers associated with ethereality, another takes its place. Thus, while the glass harmonica was almost completely abandoned by 1820, the next few decades saw instruments like the harmonium realizing the ethereal ideal. By the late 1870s the harmonium was a popular household instrument and as such had lost some of its ethereal sheen. It had mostly faded from medical practice by that time as well. Nervous effects were now increasingly linked with new classes of unusual timbres, for example the sounds of a tuning-fork and tam-tam, which supposedly induced catalepsy in the inmates of Charcot's clinic at the Salpêtrière (see plate 6).[127]

Perhaps the clearest example of changing ideals of ethereality can be found by comparing the original entry on the Aeolian harp in Koch's *Musikalisches Lexicon* (1802) with the revised entry from 1865 by Arrey von Dommer (see Table 2). Dommer provides a more accurate account of the workings of the Aeolian harp by replacing the term "wind" with "stream of air" and emphasizing the production of overtone-series partials. Most notable, however, is his complete omission of Koch's comparison of the instrument's sounds to the "play of ethereal

[123]"The discourse of angels sometimes appears in the world of spirits, and thus before the interior sight, as a vibration of light or resplendent flame, and this with a variation according to the state of the affections of their discourse." Emanuel Swedenborg, *Arcana Cœlestia,* vol. 2 (Boston: Otis Clapp, 1838), 236.
[124]Balzac, *The Seamy Side of History,* 464.
[125]Balzac, "Gambara," 21.
[126]Dolan, "E. T. A. Hoffmann," 7, 11–14.
[127]Jan Goldstein, *Console and Classify: The French Psychiatric Profession in the Nineteenth Century* (Cambridge: Cambridge University Press, 1987), 380, n. 6.

Plate 6: Catalepsy provoked by the sound of a tuning fork. Photograph by Paul Régnard from the *Iconographie photographique de la Salpêtrière* (1876–80).
Image courtesy of Yale University, Harvey Cushing/John Hay Whitney Medical Library.

Table 2
Comparison of Koch and Dommer's Entries on the Aeolian Harp
in Two Editions of the *Musikalisches Lexicon*

Koch: *Musikalisches Lexicon* (1802)	Dommer: *Musikalisches Lexicon, Auf Grundlage des Lexicons von H. Ch. Koch* (1865)
As soon as the wind rises, the strings begin to sound, first in unison, and then as the wind grows stronger they develop into a sweet mix of all tones of the diatonic scale up and downwards, and often unite themselves into harmonic chords. *They sound like the swelling tones of distant choirs, and far more like the play of ethereal creatures [dem Gaukelspiel ätherischer Wesen], than they sound like a work created by humans.*[1]	As soon as the stream of air lightly touches the strings, they begin to sound at first in unison, and as the wind grows stronger they divide themselves into vibrating partials, and develop into a pleasant exchange between harmonic sonorities and diatonic scales up and downwards, *which sound more like the soft swelling and receding of distant choirs.*[2]

[1]Heinrich Christoph Koch, "Die Äolsharfe," in *Musikalisches Lexikon* (Frankfurt am Main: August Hermann dem Jüngeren, 1802), 83 (my trans.).
[2]Heinrich Christoph Koch and Arrey von Dommer, *Musikalisches Lexicon: Zweite durchaus umgearbeitet und vermehrte Auflage von Arrey von Dommer* (Heidelberg: J. C. B. Mohr, 1865), 27 (my trans.).

creatures" and the idea that the music sounds nothing like human creation. Dommer's edits underline the extent to which by 1865 the original rhapsodic description of the Aeolian harp no longer appealed to the readers of the *Musikalisches Lexicon*. However, Dommer does apply the term *ethereal* to the new technique of a series of three- or four-note violin chords: "Recently and not uncommonly, violin lines have been so divided, leading to a three or four-part violin choir. This results in powerful, fully-voiced chords as well as a sweet, ethereal timbre [*eine zarte ätherische Klangfärbung*] arising through melodic voice-leading in high positions."[128]

Dommer's revisions here suggest a close link between the effect of ethereality and sonic novelty. In their day, however, the Aeolian harp, glass harmonica, and Jew's harp had a powerful impact on conceptions of ethereality because, unlike violin chords, the sounds of these new instruments seemed to align with ideas about a vibratory nervous system and ethereal world spirit. These changing ideals suggest that auditory cultures are inseparable from contemporaneous theories of physiology and perception. The study of this interrelationship across multiple instruments and repertoires has the potential of deepening our understanding of the ever-evolving relationships between *musica mundana, humana,* and *instrumentalis*.

Abstract.
A variety of harmoniums populate Honoré de Balzac's novels, including the physharmonica, the *orgue expressif,* the panharmonicon, and the accordion. The sounds of these instruments typically illustrate unusual mental states. Balzac's musical fantasies drew on contemporaneous medical practice, which between 1820 and 1850 used the harmonium regularly to help treat nervous disorders. The linking of

[128]Koch and Dommer, *Musikalisches Lexicon,* 931.

the harmonium with nervous effects resembles earlier associations of the glass harmonica with pathology. However, the medical implementation of the harmonium differs from this tradition both in the instrument's generally positive connotations and in the later trajectory of its use.

Studying the discourse of ethereal mediums helps explain why certain types of sounds were thought to have privileged access to the nerves. The unusual timbres and swelling dynamics of newly popular musical instruments, including the glass harmonica, the Aeolian harp, and the Jew's harp, were conflated with ideas about a vibratory nervous system and an ethereal world spirit. Both ideas were essential to the formation of the culturally determined ideal of ethereality in the eighteenth century. Closely linked to contemporaneous ideas about physiology and nervous transmission, the sounds and their presumed access to the nervous system continued to influence the design and reception of instruments, most notably the harmonium, during much of the nineteenth century.

Keywords: harmonium, Aeolian harp, auditory culture, nerves, ethereal

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