Seeing and Hearing through Glass: An Exegesis of the Artificial in *Der Sandmann*✤

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ABSTRACT

Glass prevailed in nineteenth-century European culture as both material and metaphor. Its transparency, its ability to create optical illusions, and the sound of glass musical instruments suggested a presence that appealed to the senses even as it misguided them. In this article, I argue that glass helps to define an object that both resembles and yet contradicts humanity in E. T. A. Hoffmann's *Der Sandmann* and J. Offenbach's *Les contes d'Hoffmann*. Hoffmann and Offenbach referenced glass's visual and sonic attributes to depict the artificiality of the automaton Olympia. They also drew on associations between glass and illusion to enforce the negative meaning of its artificiality. This reading reflects nineteenth-century authors' and artists' responses to visual perception's susceptibility to external manipulation. It also reveals cultural anxieties over the definition of humanity.

KEYWORDS: glass, illusion, artificiality, humanity, Hoffmann, Offenbach

I. Introduction

In E. T. A. Hoffmann's 1817 novella *Der Sandmann*, the protagonist Nathaniel falls in love with Olympia, an automaton that he mistakes for a woman. Observing "her" musical performance through the glass lens of his newly-acquired telescope, he is entranced by her voice and appearance:

> Olympia . . . performed . . . a bravura aria in an almost piercingly clear, [glass] bell-like voice. Nathaniel was utterly entranced. He . . . took out Coppola's glass . . . and looked at her across the room. Ah! then he became aware how she was gazing across at him with eyes full of desire and how every note she sang merged with the look of love which was burning its way into his heart! (Hoffmann, *Tales* 113)[1]

Hoffmann's dramatization of glass's quasi-magical nature and ability to manipulate sensory perception reflects the prevailing understanding of glass in his time. An increasingly common product in post-Industrial Revolution Europe, glass was frequently associated with an ambiguous and artificial presence in both everyday European life, and in works of literature and art. From a technological perspective, glass was a crucial element in theatrical devices that created optical illusions in the public entertainment industry. In literature, its visual and sonic attributes were often portrayed as unreal and uncanny. In creating a sensory experience resembling humanity, glass stood for something artificial, which in turn often prompted a sense of skepticism from its viewers and listeners.

In this article, I explore the relationship between glass and artificiality in Hoffmann's *Der Sandmann* and J. Offenbach's musical setting of the novella in his 1881 opera *Les contes d'Hoffmann*. Placing glass-generated illusions in the larger context of nineteenth-century European culture, I demonstrate how glass served as a tool for authors and artists to explore the idea of the artificial, and how such readings manifested in narrative and compositional devices in nineteenth-century literature and music. While Hoffmann emphasized glass's

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[1] In the German original of *Der Sandmann*, Hoffmann describes Olympia's voice in this cited passage as *Glasglockenstimme* (literally "the sound of a glass bell"). The English translator in this edition, from which I cite, omits the reference to glass, hence my parenthetical addition of "glass" to this quote.

magical power to create optical illusions that mislead the protagonist's visual perception, Offenbach translated this confusion of vision into sound, creating an emphatically unnatural music to reveal Olympia's identity as an android. This musical setting extends from conventional readings of glass's auditory component, using glass's artificiality as a critique of virtuosic technical display and senseless reproduction of tradition. These presentations of glass's visual and sonic attributes informed reflect nineteenth-century intellectuals' critical approach to the credibility of the human eye. They also reveal an anxiety in the public response to scientific progress, which seemed to prompt an enthusiastic effort from authors and composers to redefine humanity by ridiculing the artificiality that glass products represented.

II. Glass and European culture: History and perception reception

Throughout European history, glass has been associated with secrecy, elitism, wealth, and power. Since the Middle Ages, the high technical demands for producing glass made glassmaking an esoteric industry, and local governments guarded the skills and trade secrets of glass production carefully. The most famous example is the seclusion of Venetian glass factories in Renaissance Italy; strict laws and severe penalties forbade glass factory workers from emigrating, and Venetian glass factories were concentrated on the island of Murano (Mentasti 27; Stuart 729). From the mid-seventeenth century, and in the reign of Louis XIV in particular, the French government offered beneficial conditions to attract Italian glass factory workers to migrate to France, where the carefully guarded secrets of Venetian glass-making technology spread (Scoville 155-56; Mentasti 27). The association between glass and technological advancement, which relegated glass products to the powerful and the wealthy, quickly translated to literature. On the one hand, glass's reflective quality became a sign of moral corruption. On the other hand, glass's transparency symbolized wealth, wonder, and luxury. In Hoffmann's 1818 mystery thriller *Mademoiselle de Scuderi*, set in seventeenth-century France, the aged author Scuderi rides in a glass coach, which attracts the attention of the crowd and leads her to important clues to a murder mystery (*Tales* 40).

In English culture, glass's ambiguous nature and magical appeal to authors and artists date back to the Renaissance. Rayna Kalas attributes some poets' judgmental approaches to glass to its dual material identity in Renaissance

English poetry. Liquid in the production process, but solid as a finished product, glass became something difficult to pin down in both definition and existence. It thus needed to be controlled by framing, both technologically and metaphorically. For poets such as George Gascoigne and Ben Jonson, glass often symbolized a rejection of or "detachment" from reality (Kalas 175-85). Isobel Armstrong describes glass's physical and visual attributes with a rhetoric of uncertainty and paradox and details how such impressions manifested in Victorian culture. An "antithetical" material, glass's "visible invisibility" stands out; its transparency and light transmittance make it both medium and barrier (Armstrong, *Victorian Glassworlds* 11, 96). These slippery visual attributes create an "as if" impression on its viewers, as Ersoy Ufuk puts it (238).

By the late eighteenth century, improved understanding of the mixing materials for glass and the Industrial Revolution led to glass products in better quality and greater diversity. By the mid-nineteenth century, industrial glass could be mass produced (Wigginton 12; Mentasti 25; Banerjee). Interestingly, glass's increasing accessibility in the everyday life of Europeans seemed to inspire authors and artists to exploit its mysterious aura. In her discussions of Wordsworth's trachoma set in the context of the history of ophthalmology, Heather Tilley points out that nineteenth-century authors such as Kleist and Dickens frequently used colored spectacles and green eyeshades as a metaphor for "distorted vision" that conveyed the "gap between reality and perception of the external world" (49). In the public entertainment industry, glass became a crucial component in theatrical devices that produced optical illusions. This is especially telling in the cases of the magic lantern and Pepper's Ghost. The magic lantern, used for projecting spirit images, consists of painted images on glass slides, which are illuminated by a light source installed inside the lantern, then projected onto a screen (Castle 27). Pepper's Ghost, which became fashionable in England in the 1860s, presented a life-size image of a ghost-like figure. The reflection of an actor was projected on a large glass sheet in a hidden spot below the stage, then projected onto another large glass sheet installed between the stage and the auditorium. Through this double reflection, the audience saw a semi-transparent "apparition" that interacted with an actor on stage.[2]

Relying on glass's transparency and reflective quality to create special visual effects associated with supernatural themes, these visual wonders

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[2] For a discussion of the history and reception of Pepper's Ghost, see Brenda Weeden 71-86.

corresponded to contemporary authors' focus on glass's ability to manipulate its viewers' sensory perceptions, as well as the connection between glass and the otherworldly. For example, Hans Christian Andersen's 1844 fairytale *The Snow Queen* begins with a description of the devil's magic mirror, which has "a power of making everything good and beautiful reflected in it disappear almost to nothing, while all that was bad and ugly . . . far worse than it really [is]" (*Hans Andersen's Fairy Tales* 228). In Andersen's 1834 tale *The Little Mermaid*, a court ball takes place under the sea. The experience of seeing through the ballroom, the walls and ceiling of which are made "of thick but clear glass," is presented as an exotic experience, a "splendor such as you would never see on earth" (91). Interestingly, this fairytale rhetoric resonated in the reception of a glass construction in the real world. A gigantic glass building designed by Joseph Paxton to host the 1851 Great Exhibition in London, the Crystal Palace made a powerful impression on its visitors. According to some eyewitness accounts, it was as though the sensation of seeing into and through an all-transparent building was so overwhelming that it cast an unreal and mysterious aura on them. One visitor used fairytale imagery to convey this sensation, describing the construction as "[a] palace as for a fairy prince"; another described its nave as "so fairy-paradisy" that the construction "cannot be built by men . . . oh it was Eden itself" (McKean 29). These accounts reflect a common association between glass and the supernatural in popular fairytales and novels, in which glass products often appeared outside the human world and represented something beyond the full grasp of human understanding. Even though the magic mirror in *The Snow Queen* and the glass ballroom in *The Little Mermaid* are products of Andersen's imagination, they are based on contemporary technological developments. The powerful sensation that the Crystal Palace triggered in its viewers in fact derived from contemporary European culture.

Glass's magic power appealed not only to the eye, but also the ear of eighteenth- and nineteenth-century Europeans. Invented by Benjamin Franklin in 1761, the glass armonica created a sensation in Europe with its ethereal and, to some, nerve-breaking timbre.[3] Stanley Finger describes its mystifying impact

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[3] For the history of Franklin's invention of the glass armonica, see Alec Hyatt King, "Musical Glasses [armonica, harmonica; glass harmonica]." NB: Regarding the spelling of this musical instrument, Heather Hadlock uses the spelling of "harmonica." But Stanley Finger emphasizes that "armonica" rather than the more common spelling "harmonica" is correct. See Heather Hadlock, "Sonorous Bodies" 507; Stanley Finger 243. Throughout this article, I follow Finger's spelling.

on its listeners' psychological state. For example, it was documented to have triggered extreme psychological reactions such as insanity from its listeners. The famous hypnotist Anton Mesmer used it as a musical accompaniment for his therapeutic sessions in the 1770s and 1780s (235, 245-48). This instrument's association with the psychologically deranged led to its famous inclusion in the mad scene of Donizetti's 1835 opera *Lucia di Lammermoor* (Hadlock, "Sonorous Bodies" 534-35). [4] In the imagination of late eighteenth- and nineteenth-century Europeans, glass's visual and sonic attributes represented something suspiciously otherworldly, abnormal, and unnatural.

III. Glass the artificial: Hoffmann, *Der Sandmann*

Hoffmann's novella *Der Sandmann* is saturated with references to glass products. While his presentation of glass's visual and auditory attributes reflects the prevailing reading of glass in contemporary Europe, he dramatized these attributes to bring out glass's dangerous charm and its artificial nature. Nathaniel's obsession with Olympia and his illusion of her as a woman derive from the optical illusion that the glass lens of his telescope produces. This optical illusion is so strong that it overrules both his initial, correct judgments, as well as the red flags raised by his other senses. When he first observes Olympia across the street from his balcony, he finds her as lovely as she is "stiff" and "rigid," like a "beautiful statue" (Hoffmann, *Tales* 109). However, looking at her through his newly-acquired pocket telescope, which "brought objects to the eyes so sharply and clearly defined," he sees differently (110). Initially, looking through the glass lens of the telescope, he finds Olympia lifeless and dull; "[t]he eyes alone seemed to him strangely fixed and dead." However, ". . . as the image in the glass grew sharper and sharper it seemed as though the beams of moonlight began to rise within them; it was as if they were at that moment acquiring the power of sight, and that glance grew ever warmer and lively" (110).

Nathaniel's optical illusion undergoes a series of confrontations with his other senses, claiming victory every time. At the ball, Olympia sings and plays on the piano. Her voice strikes him and other guests as "piercingly clear," like the sound of a glass bell (*Glasglockenstimme*; Hoffmann, *Tales* 113; Hoffmann,

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[4] According to Hadlock, Donizetti considered including this instrument in the mad scene in his autograph score, then replaced it with the flute.

Der Sandmann 21). While this voice, whose clarity and piercing quality evokes glass's transparency and clarity, should have been a red flag for Nathaniel, he turns a deaf ear to his sense of hearing. Holding her as they dance, his sense of touch gives what should have been another alarming signal about Olympia's true identity. Her hand is "icy cold"; holding her, he feels "a coldness as of death thrill through him" (Hoffmann, *Tales* 114). Her movement is too stable and precise: ". . . the peculiar rhythmical steadiness with which Olympia moved, and which often put him completely out, soon showed him, that his time was very defective" (114). The messages from Nathaniel's senses of hearing and touch should have aroused his suspicion. However, gazing into Olympia's eyes a while longer when they dance—presumably without the aid of the telescope—mutes the alarming signals. Looking into her eyes, he feels that she "gazed back at him full of love and desire; and at that moment it seemed as though a pulse began to glow, too" (114). It is as if the act of looking revives "her," a mechanical doll in actuality, in a quasi-Frankenstein manner. The power of Nathaniel's manipulated vision once again drowns out the conflicting messages that his other senses convey to him. The menace of this optical illusion lies not only in its power to misguide his senses, but also its lingering duration. Even when Nathaniel removes the telescope from his eyes, he remains under the influence of the illusion. Like a charm, literally, the act of gazing at Olympia alone at close range now suffices to maintain the illusion that she is alive. Functioning much like the glass slides in the magic lantern and the glass sheets that create the Pepper's Ghost, the glass lens of Nathaniel's telescope creates an optical illusion that confronts and defeats his other senses. Glass thus serves as a metaphor for sensory manipulation, wielding a menacing and supernatural power over its users.

IV. *Der Sandmann* and studies of optical illusion

Situated alongside contemporary philosophical and literary writings, *Der Sandmann* exemplifies several ideas that dominated the discourse about vision in nineteenth-century Europe. The potentially flawed and easily manipulatable nature of vision is a leitmotiv in this discourse. In his *Theory of Colours* (1810), a monograph based on observations that he made through a prism and small glass sheets, Goethe suggests that visual perception of a viewed object's color and size is determined not only by the eye, but also by exterior factors such as

light, the condition of the eye, and the duration of viewing. This increasing skepticism of vision's credibility led to a different way of looking. Erich Heller explores Goethe's idea of "inner vision," which downplays appearance, as it is secondary to "scientific truth," which is invisible (29-34). Jonathan Crary finds this newly-founded suspicion of vision's truth value indicative of a new way of looking in nineteenth-century visual culture. In his *Techniques of the Observer*, Crary proposes his theory of "subjective vision," in which a viewer's visual perception is determined by his or her physical condition rather than that of the viewed object (9, 14, 16).[5] Hoffmann himself explored these new ways of looking in several of his literary works. In his 1822 novel *Des Vetters Eckfenster*, two cousins (one healthy and one ill) look down from a building's corner window and conduct a lengthy dialogue about what they see and how they interpret their visual perceptions. Andrea Krauß compares the two cousins' contrasting viewing experiences to two modes of seeing central to Hoffmann's works. While the healthy cousin sees indistinguishable colors and spots, the ill and physically immobile cousin sees with his "inner eye," which enables him to make sense of the seemingly blurred view (Krauß 408).[6] Maria Tatar points out that, in Hoffmann's *Der Kampf der Sänger* and *Der goldne Topf*, he stresses the protagonists' perception of a higher level of reality, which is not immediately visible until they can see through an "inner eye" (125-26, 128). To further dramatize the intense physical effect of this "poetic vision," Hoffmann enlists other senses to enhance its impact (Tatar 125, 128).

I argue that this idea of new ways of looking and vision's subjectivity, as Crary puts it, derives from the intellectuals' acknowledgement of the manipulatable nature of visual perception and relies heavily on the eye's passivity. While the authors and scholars mentioned above emphasize the importance of looking beyond normal vision, *Der Sandmann* offers an ironic response to the new cultural faith in looking differently or with a different pair of eyes, so to speak. Hoffmann provides a satire, showing strong fear and harsh judgment of external factors that influence vision. Nathaniel's problem with vision comes from the fact that he does not trust his naked eye, but allows it to be deceived by an external pair of eyes. Instead of acquiring a "poetic" or "inner" vision, he is doomed by relying on unnatural means while looking. This satirical take on Nathaniel's telescope resonates with Paola Mayer's discussion

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[5] Also see Crary "Techniques of the Observer" 4, 6, 8, 15, 20, 24.
[6] My summary of *Des Vetters Eckfenster* derives from Krauß's article.

of "transgressive science" in Hoffmann's works. Mayer ranks the creators and sellers of optical instruments as a group of primary villains in Hoffmann's works, as their major acts of transgression include the manipulation of human senses (66, 71). Furthermore, Hoffmann uses glass's unnatural connotations as a plot device, thus actively responding to the prevailing reading of its material and metaphorical nature in contemporary European culture. His portrayal of glass's sonic attribute seems to derive directly from glass's visual aspect; the "piercingly clear" quality of Olympia's glass-bell-like singing voice applies equally to glass's visual attributes, especially its transparency. Rather than referencing the glass armonica, the sound of which would have a mind-gripping power over Nathaniel just as strong as the telescope's control over his vision, Hoffmann chose the glass bell to reference Olympia's voice, using a more literal rather than liberal translation of glass's visual quality in his portrayal of the automaton's sound. Even more importantly, Hoffmann's description of Nathaniel's senses of touch and hearing during his encounter with Olympia emphatically associates her with glass's artificiality in that she sounds and feels unnatural and inhuman. As cited above, her icy-cold hand makes "a coldness as of death thrill through him," and her dance steps are overwhelmingly precise and impossibly stable. Although, to his confused eye, she resembles a human in appearance, her glass-like sound and touch clearly give away her identity as an object that is cold and "dead."

Hoffmann's severe judgment of glass's artificiality in *Der Sandmann* is echoed in some visitors' responses to the Crystal Palace. They observed the negative effect of the Palace on some exhibited diamonds, which lost their charm when presented under natural light shining through the glass construction. Armstrong reports that the jewelry, which should have sparkled brightly when shown in artificial light, lost so much luster that a re-display was arranged in order to "bring back their 'value'" ("Languages" 64). In this case, glass provides an unwelcoming optical context that interferes with the viewers' expectation that the diamonds should have shone brighter. Presented under natural light and viewed through glass panes, these jewels, as Armstrong puts it bluntly, "might as well be glass" ("Languages" 65).[7] This incident suggests not only the novelty of glass as a large-scale construction material, but also a new way of looking that glass as a medium introduced to, and even forced on,

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[7] Armstrong's discussion of glass's "artificial material" in this context is similar to my thesis in this article; see Armstrong "Languages" 62-65.

the unsuspecting viewers of the fake-looking diamonds. Furthermore, it also imbued this observation of basic optics with glass's magic ability to alter the viewers' perception of the viewed objects' true value.

V. Singing android: Offenbach, *Les contes d'Hoffmann*

Although Hoffmann's description of Olympia's voice presents a literal rather than liberal translation of glass's visual attributes, his use of glass's auditory dimension to stress its artificial quality offers us an entry point to examine *Les contes d'Hoffmann*, Offenbach's operatic setting of *Der Sandmann*. Whereas Hoffmann endowed Nathaniel's optical illusion with impressive credibility to compete with his other senses, Offenbach and his librettists Jules Barbier and Michel Carré simplified and downplayed this aspect of the drama. Eliminating the reference to the sense of touch completely in the libretto when Hoffmann, the opera's protagonist, is under the spell of his newly-acquired telescope, Offenbach and his librettists confine the opposition between illusion and reality to sight and sound. However, they flatten the tension in the opposition by presenting the protagonist's visual perception in a comic and trivial manner.

Contrary to Hoffmann, who uses glass's transparency and brightness as a metaphor to describe Olympia's voice, Offenbach conveys Olympia's inhuman identity through the banal structure of her song. Olympia's aria, "*Les oiseaux dans la charmille*," conveys Offenbach's translation of the unnatural and artificial. From the moment of her entrance into the ballroom, Olympia's identity as an automaton is already too obvious for anyone to miss. In the libretto, her entrance is accompanied by the "winding sounds of a spring," noises conspicuous enough to draw everyone's attention. ("*On entend le bruit d'un ressort qu'on remonte. . . . Murmure de curiosité dans la foule*"; Giroud and Kaye 190). Her unusually high tessitura throughout the aria may translate the doll's glass bell-like, piercingly clear timbre in *Der Sandmann*. But it is in the contents of the aria that Offenbach fully exploits his reading of the artificial. In the aria's opening, almost every two measures are repeated once. These unmodified repetitions make fun of the doll's lack of creativity by referring to the periodic structure typical in mid- to late eighteenth-century European art music. This type of structure is twofold. The antecedent measures start off with a question-like phrase, with the consequent measures following and bringing

closure. Each part includes an identical and even number of measures. With both parts completely identical, Olympia's aria presents Offenbach's tongue-in-cheek satire of this simple phrase structure from the past. The quasi-sequential repetitions in the middle of the aria include an augmented fourth, which is repeated in the next beat as a diminished fifth, a treatment that shows yet another deliberate anomaly in tonal music. With their jarring dissonances, augmented and diminished intervals normally prompt composers to avoid their repetition; the closest and less dissonant intervals would have been used in their place in a sequential repetition. The aria concludes with yet another tongue-in-cheek gesture. "Programmed" as a machine that sings on command, Olympia cannot even claim her song as her own. As if summing up her lack of agency, Babier and Carré, co-authors of the play on which the opera libretto was based, concluded this aria with Olympia's reference to her song in the third person: "*Voilà la chanson gentille, la chanson d'Olympia*." This musical setting not only mocks (the character) Hoffmann's the character's optical illusion, which makes him ignore the awkwardness of the doll's music, but it also seems to mock a technology-oriented scientist's understanding of music, in which precision and technical display are top priorities.

Even though Barbier and Carré described the quality of Olympia's singing voice as "loud," with the "vibrant sonority of a harmonica [sic]," Offenbach did not reference the glass armonica in his musical setting for this song (Giroud and Kaye 194). Neither did he need this instrument's maddening quality or spiritual control over its listeners. Offenbach concentrates on translating the artificiality of glass. Combining Olympia's virtuosic technical display with a stereotypical structure, he defines Olympia's android identity through her lack of artistic spontaneity. In her discussion of this aria in her 2000 book, *Mad Loves*, Heather Hadlock points out that, in most recordings of this aria made in the twentieth century, it is customary not to change the embellishment of its second stanza (80). Even though Offenbach was most likely not involved in this performance tradition, this performance decision may be viewed along with his portrayal of the unnatural in his music as a clear statement of the automaton's lack of agency from the singer's perspective. Like Olympia's ultra-precise and exaggeratedly stable dance steps in *Der Sandmann*, this aria presents the android's perfection as a trait that is as inhuman as it is ridiculous. A similar theme appears in Andersen's 1843 tale *The Nightingale*. An artificial nightingale, the king's newly acquired toy, looks very pretty. Wound, the mechanical bird sings

exquisitely and "keeps perfect time" (Andersen, *Hans Christian Andersen's Fairy Tales* 90). Yet it is the real nightingale that saves the dying king from the clutch of Death with its songs. The life-saving quality of the nightingale's singing derives from the fact it comes from a living being that understands "hope and comfort" and includes them in its songs (Andersen, *Hans Christian Andersen's Fairy Tales* 96). Instead of referencing glass's visual and sonic qualities as in *Der Sandmann*, Offenbach uses glass's artificial nature to explore the sound of humanity by showing what humanity is *not*. In this way, glass becomes part of Offenbach's assessment of the past. Serving as his aesthetic agenda, its artificial quality is the tool with which he examines the traditions of music, including structure, virtuosity, and the extent to which a musician can and should use spontaneity and flexibility in performance.

VI. Music and optical illusion

Situated in the context of the public entertainment industry, Offenbach's music for Olympia in fact works against her android identity. In late eighteenth- and nineteenth-century shows that featured optical illusions, sound or music accompaniment was sometimes provided to enhance a sense of realism in the optical illusions. For example, the magic lantern's projections of ghost images were often accompanied by the uncanny sound of the glass armonica. The diorama, which displays two different scenery paintings on the same silk canvas through a change of lighting that is cast on that canvas, was often accompanied by music that corresponded to the theme of the scenery (Castle 36; Finger 248-49; Andriopoulos 50; Tresch, "Prophet" 20). If Olympia's humanoid appearance is meant to convey the optical illusion of a woman, her music would have enhanced that feigned humanity. However, by ridiculing Olympia too soon and too obviously, Offenbach bypasses the suspense between illusion and reality that Hoffmann creates in *Der Sandmann*. Indeed, he seemed keener to break the illusion. Olympia's emphatically awkward music exposes her android identity, showing the sonic contrast to the optical illusion of her appearance. In *Der Sandmann*, glass—Olympia's glass-like touch and voice—shows the cruel reality of her artificial nature. In Offenbach's adaptation, Olympia's manner of singing takes on the function of her glass-like voice and touch in *Der Sandmann*, deconstructing the illusion of her resemblance to a human being.

Recent scholars have limited their discussion of glass's involvement in standard music repertory to a matter-of-fact list of references to the glass armonica's inclusion in a small number of nineteenth-century compositions. Extensive discussion of this musical instrument is confined to its metaphorical meaning (Finger 235-50).[8] Hadlock's article, "Sonorous Bodies: Women and the Glass Harmonica," stands out as a notable exception that associates glass with music. Hadlock focuses on the aesthetic function of the glass armonica, including how it served as a symbol of femininity and represented perfect (or ideal) music to mid-late eighteenth- and early nineteenth-century authors and artists; musical topics such as the glass armonica's integration into standard music repertoire, or the genre or style of the repertory written for this instrument, are mentioned only in passing ("Sonorous Bodies" 508, 536-37, 513-18). However, more recently, scholars researching music and visual culture have devoted some attention to the impact of optical illusion—some of it generated by glass—on the music of this period. These discussions suggest that some composers illustrated visual wonders such as fantasies and dreams with unconventional musical features. Only in rare cases did the part of illusion come out. For example, Thomas Grey compares the "dissolving view," a special effect that the diorama produced, to Mendelssohn's uninterrupted connection between the movements in his *Scottish Symphony*, which was atypical in the music genre of the symphony (57-63). Francesca Brittan reads Mendelssohn's use of small note values and nuanced treatment of dynamic markings as a strategy to portray the sounds of fairies in his Overture to *A Midsummer Night's Dream* (535-42). In these cases, the special effects embedded in the optical illusion offer visual guidelines of sorts to explain the composers' use of atypical musical features. Inge van Rij's discussion of Berlioz's *Symphonie fantastique* is one of the very few examples that, in addition to showing the work's correspondence to visual wonders, points out its nature as an illusion. Berlioz's own program describes the scenario of each movement in this symphony as consecutive parts of a coherent narrative deriving from the fantasies of an artist under the influence of opium. Van Rij shows how Berlioz conceived of a theatrical setting for this symphony; he specified that, when performed along with its sequel, this symphony should be played with the orchestra hidden from view, presenting it as pure fantasies deriving from the artist's head (130).

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[8] Also see Note 3.

These approaches stress nineteenth-century composers' use of optical illusion as a source of inspiration. By contrast, recent scholarly discourse in literary criticism and philosophy focuses on the illusory aspect of optical illusion; the spectacles are nothing but void. Terry Castle points out that the projected images from the magic lantern were often compared to imagination or reverie by nineteenth-century German and English authors (29-30, 43-49). Stefan Andriopoulos shows how Kant used magic lantern images as metaphor for an existence that, despite its powerful sense of presence, is nothing but illusion (48-49, 58-59, 61). As music scholars view optical illusion as a strategy that composers could use to explore the unconventional, the more spectacular the illusion appears, the richer its function as a musical inspiration. By contrast, for literary and philosophical scholars, the more attractive the illusion's spectacles, the more convincing its deceptive or fantastic nature is as an illusion.

VII. Conclusion

As both material and metaphor, glass provides us with a key to evaluate artificiality and illusion in nineteenth-century literature and music. Be it a critical view of humanity relative to artificiality or a mocking critique of virtuosity, glass served as a source of inspiration, allowing authors and artists to exploit the invisible and distorted vision and offering a broader context for a different way of looking. The blatant condemnation and ridicule of glass-generated illusions in both *Der Sandmann* and *Les contes d'Hoffmann* reveal a clear anxiety over the definition of humanity. In *Der Sandmann*, Hoffmann offers an easy punishment for the fake. Accused of introducing an automaton and passing it off as real in a public space, the science professor Spalanzani, "father" of Olympia, is expelled by his university. Illusion is conveniently labeled as deception from a legal standpoint. The anxiety over technological progress seems to convey the sentiments that, with all its precision and ability to do what humans can, the technological should *not* be mistaken for human.

The truth of the matter, however, is never so simple and clear-cut as that. In fact, the question of how to define or even duplicate something human attracted both authors and physicians in Hoffmann's time. Aside from Mary Shelly's 1823 novel *Frankenstein*, discussions of what a "humandroid" means appeared in studies of eighteenth- and nineteenth-century physiology. John

Tresch relates optical illusion's entertainment value to studies of perception by the French philosopher Françoise-Pierre-Gonthier Maine de Biran (1766-1824), who proposed that the fragile nature of human perception made the senses easy targets for manipulation by external factors such as habits and drugs (Tresch, *Romantic Machine* 129, 145-48). Myles Jackson points out that, according to physicians Guillaume-Benjamin-Amand Duchenne and Jean-Martin Charcot, human sentiments derived from the nervous system and were revealed outwardly by facial expressions and physical movements. Functioning akin to a code, facial expressions could be duplicated (Jackson 281-86). An extended reading would be that representing emotions through facial expressions need not be an exclusively human trait. That human traits such as sensory perception and emotions could be duplicated or are deemed no longer trustworthy might lead to a decline in the security of a definition of what constituted humanity. Seen in this light, Hoffmann's and Offenbach's condemnation of glass's artificiality may not derive from the fact that glass can oppose humanity, but rather that it threatens to blur the definition of humanity.

While both Hoffmann and Offenbach concentrate on the artificiality of glass, perhaps it is worth asking the extent to which glass stands in contrast to humanity. Armstrong addresses this issue by relating glass products' "paradoxically ethereal" nature to glass-making technology up to the early twentieth century:

> To look through glass in the mid-nineteenth century was most likely to look through and by means of the breath of an unknown artisan. The congealed residues of somebody else's breath remained in the window, decanter, and wineglass, traces of the workman's body in the common bottle, annealed in the substance he worked. Held up to the light a piece of common nineteenth-century window glass will display small blemishes, blisters, almost invisible striae, spectral undulations that are the mark of bodily labour and a brief expectation of life. . . . The glassworker . . . was often mythologized as a figure capable of heroic feats of labour. Yet glass was the spectre of his breath. (*Victorian Glassworlds* 4-5)

Perhaps it is not the incompatibility between glass and humanity that aroused this anxiety and artistic fascination, but rather, the obscured boundary between the human and the artificial. As mentioned earlier, glass's material nature is defined as both liquid and solid. Perhaps it is this in-betweenness that caused such anxiety over the meaning of humanity.

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