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Sonic Elongation and Sonic Aporia: Two Modes of Disrupted Listening in Film

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Sound and music have always enjoyed a creative fluidity in film. But when the fluidity results in a morphological change that complicates the audiovisual relationship, sounds can take on an aesthetically challenging role able to disrupt traditional processes of cinematic listening. When a sound breaks from its original audiovisual affiliation to form a de-synchronised musical texture, our familiar modes of aural attentiveness—the ways in which we hear and process a soundscape—are troubled; when these sounds arise from beyond the visual world altogether, audiovisual perception can become fractured and unstable. Here, I suggest that the dismantling of traditional audiovisual textures through soundscape composition can happen in one of two ways and the result can be either a strong form of engagement, or a complicated form of distanciation. The first mode I call *sonic elongation*; the second *sonic aporia*.[1] Sonic elongation arises when noise from within the film's world is broadened until it becomes unfamiliar: when source sounds abstract from their visual referents to take on musical form and texture. Such moments are related to—yet significantly develop—common sound design processes. Although environmental sounds have traditionally been used to substantiate the image in fiction film, William Whittington draws our attention to their artificiality: "sound is often one of the most highly constructed aspects of cinema … it is understood that sound design does not simply capture reality, but rather constructs an entirely new 'cinematic reality', augmenting it through attentiveness to considerations such as sound perspective, localization, pyschoacoustics, and spectacle."[2] Along similar lines, Michel Chion acknowledges that "Sound that rings true for the spectator and sound that *is* true are two very different things. In order to assess the truth of a sound, we refer much more to codes established by cinema itself, by television, and narrative-representational arts in general, than

to our hypothetical lived experience."[3] Such augmented sound design, built on endlessly deferred semiotic codes, is highly mediated, and sonic "realism" as we have come to understand it in a cinematic context is highly fabricated.

So established are these cinematic codes that transient intensifications to their audiovisual textures can be comfortably negotiated. In some cases, drawing attention to onscreen sounds can help to secure the sound-to-sound coherence of the film without jarring an audience from their suspended disbelief. For instance, James Wierzbicki has referred to moments when a real-world sound or sound-effect is heightened to provide an emotional resonance as "affect sound," something he describes as an auditory instant that, while working seamlessly with the image to ensure against any audiovisual rupture, nevertheless draws attention to itself in order "to trigger in its listeners emotional responses, or affects, at least as deep as those stirred by a film's extra-diegetic music."[4] By contrast, Jeff Smith argues that technological developments have enabled the audiovisual "fidelity" sought in classical forms of storytelling to expand in creative ways, paving the way for a more sustained augmentation of the sonic palette. Mapping the sonic resonances of postclassical film onto David Bordwell's "impact aesthetic" of intensified visual continuity, Smith identifies "increased volume; low frequency effects; expanded frequency range; the spatialisation of sound; the 'hyperdetail' of contemporary Foley work, and the use of nondiegetic sound effects as stylistic punctuation" as new forms of sonic mediation. At the same time, however, such "intensified sonic continuity" can express in a highly self-reflexive way: speaking of the use of "whooshing" sounds to underscore camera movements and so on, for instance, Smith suggests that such ambiguously situated sounds "not only serve to heighten the expressive quality of particular effects by increasing their sense of speed and pace, but also increase the self-consciousness of the film's narration."[5] Both the sporadic heightening of affect sound and the more persistent augmentations of intensified aural

continuity demonstrate our fluency with cinematic vocabulary and the strength not only of the "irresistible weld" between sound and image that Chion attributes to the lure of "synchresis"—that "spontaneous and irresistible weld produced between a particular auditory phenomenon and visual phenomenon when they occur at the same time"—but also to the "emergent meaning" that Nicholas Cook finds arising from most audiovisual combinations.[6] These processes of production and perception enable the absorption of unusual—even challenging—audiovisual relationships by which new and stretched configurations can easily be resolved.

But when attention is drawn to sounds beyond their relationship with a visual source, or when synchresis is significantly challenged, audiovisual gaps can arise that block an easily navigable passage through the filmic texture. This can be unnerving. While moments of sonic elongation share the hyperreal affect and self-consciousness of a film's audiovisual intensification, they also press further to embrace the unsettling qualities of sustained sensory fissure. If affect sounds operate as a temporary harbinger for semiotic excess—"Whereas well-executed sound effects help make a story seem credible, sound affect helps tell a story," argues Wierzbicki—sonically elongated ones trouble both the credibility and smoothness of filmic narratology.[7] Although beginning with the vertical augmentation of synchronicity, elongated sounds gradually pull away and abstract from their referent images until they become barely recognisable. During this process, environmental sound is heightened and enlarged until it gathers together into a musical flow. The term elongation is useful here as it does not suggest the dilution of sonic material that "stretching" might suggest, but rather a textural and aesthetic accumulation. For the process to be successful, audiovisual synchronicity needs first to be established, then maintained, even if the sounds undergo significant transformation. Like affect sound and intensified continuity, then, sonic

elongation can lead us deep into the heart of the fiction, generating moments of intense interiority through the gradual dislocation of sound from image.

Sonic aporia is different. While sonic elongation is built on the memory of a strong auditory landmark—or "soundmark" as R. Murray Schafer referred to such events in the context of soundscape composition—[8], aporetic audiovisuality arises when real-world sounds (or sound-effects) from beyond the film's world are used to form a poetic or allegorical soundscape that does not assimilate with the images but sits alongside them. Like sonically-elongated soundscapes, these often recognisable sounds undergo compositional transformation and yet their lack of a visual anchor, or, in some cases, their active opposition to what we see, leads our attention beyond the screen. The first step in the process is similar to the early soviet experiments in what Kristin Thompson has called "non-fidelity" sound, whereby the noises we expect to accompany an image are replaced by symbolically-infused alternatives. Through an analysis of eleven sound films from early Soviet practice, Thompson concludes that "abrupt sound cutting" is a defining audiovisual principle of the period and can be found in films such as Lev Kuleshov's 1933 film *The Great Consoler*, "when a prisoner in a jail cell hurls a stool across the room; the sound synchronized with its impact is a cymbal clash": this, she says, "roughens perception."[9] It can also function conceptually: at one stage in Dziga Vertov's first synchronous sound film, *Enthusiasm: Symphony of the Donbas* (1931), which is awash with symbolic sound that frequently comments ironically on the image, workers are seen mounting a church spire armed with tools, accompanied by Nikolai Timofeev's jolly wind ensemble. After attaching wires to the spire, they begin to pull until it becomes unstable; as it starts to wobble, drums and cymbals gradually dominate the music with insistent rhythms that seem to fragment the image into shuddering juxtapositions (figure 1). Finally, a brass call accompanies the spire as it falls, but when it hits the floor the music is silenced and we don't hear a crash, but the sound of a gunshot. Here, a real-world

noise, derived from a clearly discernable source, is misplaced, juxtaposed with an incongruent image in tight synchronicity. In both films, the audiovisual dissonance results in heightened audibility, whereby the texture, timbre, and style of the soundscape temporarily commands our attention and initiates a brief re-arrangement of our mode of perception. Yet these moments are fleeting and easily resolvable, as the nonfidelity sounds point towards parallel messages already manifesting within each film. As a result, the cognitive dissonance of the juxtapositions is dispersed through convergence; the significance of both sound and image is retained, but rather than vibrating against each other, rational interpretation enables the dissonant elements to reach an easy reconciliation without changing their contradictory identities, or reducing the resonant affect of the other.

[PLEASE INSERT FIGURE 1 ABOUT HERE]

Although sharing many of its traits, aporetic sound differs from non-fidelity effects in two significant ways: first, it rarely delivers moments of direct synchronicity with an image; and second, it develops horizontally on its own terms, as though referring to an alternative, or parallel, world to the one we see. The resultant disconnect between what we see and what we hear encourages a jarring navigation between levels of audiovisual attentiveness. The borrowing of the Latin term *aporia* from philosophical theory provides a useful context for this investigation, as it describes a logical disjunction or contradiction within an argument or a text more generally. In rhetorics, the literal meaning of the term—a state of being at a loss—is used to describe a perplexing internal conflict that casts doubt on the best way to proceed. Fraught with paradox, an aporia, which Nicholas Rescher describes as "any cognitive situation in which the threat of inconsistency confronts us," suggests a logical incompatibility that nevertheless seems credible as evidence exists that both proves and

disproves the argument: it is, he writes, "a group of individually plausible but collectively incompatible theses."[10] The most famous aporia is the story in which a Cretan declares that all Cretans are liars. Any attempt to synthesise the two, individually plausible sides of this statement results in a paradox and an intellectual impasse; if they are all liars, and the speaker is one, then she too must be a liar—but if she's a liar, does that mean that what she says is untrue? That Cretans never lie? In which case, we must believe her statement and we are back where we began. The two halves of the declaration repel and contradict each other and it is impossible to ratify the information in a logical way, without taking a risk, or enacting a large interpretative jump in logic in order to draw together the illogical and incongruent juxtapositions. When mapped onto the densely multi-voiced texture of audiovisual work, the concept is extremely useful. With resonances of both fissure and connection, it suggests that the components make sense in and of themselves, yet when combined there arises a contradiction that promotes a sense of irresolvable doubt.

Building on previous scholarly investigations into creative soundscapes, the following investigates moments when sound is used affectively, but doesn't simmer back down into the synchronous texture we would expect to be upheld to maintain "cinematic reality," moments when its creative treatment is either sustained and pulls away from its corresponding image becoming loud, arresting, musical, or arises from another space altogether. In both instances several things happen: as the roles of sound and music become ambiguous and disjointed, soundscape begins to exceed image; and, as audiovisual gaps begin to open, they engender new processes of auditory attention that complicate traditional modes of audiovisual consumption.

Audiovisual Rupture

Audiovisual rupture, dissonance, counterpoint, and incongruence has, until recently, been quite rare in narrative film traditions (in experimental and avant-garde films they are relatively common) as it can call into question the coherence of what we are being offered. Continuity editing, shot reverse shot, crossfades, and overlaps—even in their "intensified" form—are visual tools to help blend the gaps inherent in a film's construction so that, writes Kaja Silverman, the individual components "seem to constitute a perfect whole" in order that the viewer's "gaze suffers under no constraints."[11] Synchronous sound and congruent music can embody these visual traits along a vertical axis, as sound designer Walter Murch famously argued: for him, the re-association of image and sound during post-production is the "fundamental pillar upon which the creative use of sound rests, and without which it would collapse."[12] In order to construct the "fundamental pillar" of creative sound design, a clear sense of causation between what we see and hear needs to be present. Chion takes this idea further: "The sound film … is dualistic," he writes; "[i]ts dualism is hidden or disavowed to varying extents; sometimes cinema's split is even on display. The physical nature of film necessarily makes an incision or cut between the body and the voice. Then the cinema does its best to restitch the two together again at the seam."[13] Such a notion underpins Chion's assertion that "*there is no soundtrack*," an idea predicated on the belief that each sound is locatable in an image, and thus films are constructed—and received—according to constantly flexing vertical audiovisual relationships that constructs a tightly-knit mesh of audiovisuality.[14] Many others agree. For Mary Ann Doane, this synchronous re-stitching of audio and visual elements gives us a feeling of a whole and unified body; a return to the pre-linguistic Chora, as Caryl Flinn would have it.[15]

The bodily metaphors that underpin discussions of the "irresistible weld" accord with the more recent sensory turn in cultural studies, which describes the desire to reconnect divergent audiovisuality as a perceptual, sensorial process that happens before any cultural or

aesthetic conditioning can take effect. In his work on multisensory, audio-tactile environments and virtual reality, for instance, Pontus Larsson argues that sensory synergy is achieved when sound and image are perceived as matching.[16] And as we saw in the two examples of non-fidelity sound, we are able to forge connections even when the two senses seem to point in different directions or speak from different symbolic dimensions. Free from the constraints of synchronous sound, music is able to push the fissures of a symbolic and aesthetic relationship even further. It can work rhythmically with the image; but be inappropriate or unexpected emotionally, stylistically, historically, texturally; or in terms of mood or affect. This can happen in several different ways that all work through a disparity between what is expected as a result of our learnt behavior and what is delivered. And yet, most often, this does not result in a fragmented work but rather one with a complex accumulation of layered interactions that opens up previous theorisations of the sensory nature of cinema and the positioning of a viewer's listening body. The oft-used term "counterpoint" for moments of audiovisual dissonance thus makes sense as within this musical form, as Dean Duncan argues, "musical lines do not … collide—they flow."[17] The preference for this musical term counterpoint over dissonance suggests that both music and image tracks have an independence, yet remain tightly connected, working through tension and resolution, question, answer and elaboration to reach a common understanding, a process that Pudovkin referred to as "intellectual synthesis."[18] Cross-modal processing would seem to suggest that many types of audiovisual clash in fiction film are easy to resolve, as they can be subsumed within the overall texture without threatening the greater narrative cohesion of the film.

Moments of audiovisual rupture in film have received only scant scholarly attention, perhaps because in the mainstream tradition they are relatively uncommon, even in post-classical and contemporary cinematic culture, in which traditional audiovisual bonds have

been significantly "intensified." This is no doubt due to the specificities of a learnt vocabulary that has developed through film's audiovisual history and our resultant expectations about how we might navigate through a film's texture in a meaningful and emotionally compelling way.[19] In the examinations that do exist—Nicholas Cook's model of similarity/difference and Chion's theory of "*dissonant harmony*" and "true *free counterpoint*" are the most notable examples—music, rather than sound, forms the basis for much of the discussion.[20] Focusing on classical narrative film, for instance, Steven Willemsen and Miklós Kiss evoke multimodal theory to explore the ways in which an audience, even when given contrasting sensory information, "attempts to bridge the gap of multimodal information in order to create a single, clear, cognitively consonant meaning."[21] What they call "*incongruent film music*" disturbs this process and arises at the moment of perception rather than as a result of "intellectual synthesis": "We propose that the particular affect produced in the emotional collision of music and visuals results from a distinct cognitive interplay. This interplay, as we argue, results from our (evolutionary) propensity to perceive and process cross-modally, combining sensory data from different senses preconsciously… incongruent film music … precedes any culturally influenced interpretation." If an easy, or coherent reconnection is difficult to formulate, however, "some vague uneasiness, an unsettling feeling" can arise. Willemsen and Kiss note that when faced with such a disjunction, there is a tendency to interpret the fissure as ironic or comedic in order to diffuse the "unsettling feeling."

Manifesting directly from sound, moments of sonic elongation and sonic aporia complicate both the pre-conscious process of cross-modal fusion and subsequent forms of "intellectual synthesis." In fact, both forms openly promote the "unsettling feeling" that arises when film's illusory unity is threatened. While sonic elongation gradually unstitches film along its audiovisual seam until the text gapes open, aporetic moments begin with rupture and toy with its implications for sensory fragmentation. Such fragmentation encourages us to

think in new ways about the productive expansion into non-visual modes of understanding and embodiment encouraged by the various manifestations of the sensory turn. This unsuturing of both the text and the forms of engagement it engenders has implications for the ways in which we can theorise a coherent listener. Or rather, it complicates the idea of a single mode of listening, with its implication of physical normativity, and the limits of multimodal fusion altogether. Larsson argues that, if a mismatch arises, the resultant ambiguity can encourage the receiver to focus on one sense over the other: most often, he maintains, attention will be grabbed by the visual information. Here, I want to suggest that in film the opposite happens: that, in densely woven cinematic audiovisuality, attention is nearly always drawn to the film's aural components when they break from their traditionally-conceived role. And yet the physical and aesthetic gap between sound and image requires the receiver to work in ways different from the pre-cultural processing of multimodal fusion identified by Willemsen and Kiss above. And when interpretation begins with sound, it is not enough to refer to the result simply as engendering an "unsettling feeling". This leads to several questions. When the cross-modal and syncretic forms of cinematic listening are troubled, are traditional forms of audiovisual engagement abandoned or extended? Can visuality be refocused to include not only different sensory experiences, but also new forms of sonic comprehension? Does the disruption of familiar multimodal patterns engender new modes of listening? And if so, what do these new modes suggest for the ways in which we can theorise cinematic listening?

Sonic Elongation

Occurring when sounds are closely and unambiguously substantiated by a visual referent—either through audiovisual synchronicity or environmental plausibility—before dislocating into musical textures, sonic elongation embraces its passage to incongruence. A variant of

this process—by which location sounds or sound-effects are heightened, often through a process of "hyperorchestration" (Sergi Casanelles) until it blends with the instruments of the dramatic score—can be found throughout film history.[22] Coming to the attention of mainstream culture with Murch's creative sound design and Carmine Coppola's electronic score for *Apocalypse Now* (Francis Ford Coppola, 1979), this sonic morphing has become a popular technique in the unification of a film's sound. Whittington identifies this process at work in *Jurassic Park* (Steven Spielberg, 1993), for instance, where the low-frequency sounds that precede the visual arrival of the T-Rex morph fluently into John Williams' score, which "picks up this pattern of panic and mayhem by engaging an orchestration of high-pitched and high-frequency stringed instruments in a frenetic arrangement."[23] Other examples abound, from the sound of the typewriter that underpins Dario Marinelli's opening score for *Atonement* (Joe Wright, 2007), the tapping of a pencil on a table that becomes the percussive propulsion for Hans Zimmer's sonic wash in *The Dark Knight* (Christopher Nolan, 2008), the churns of the propeller planes that fuse with Zimmer's score in *Dunkirk* (Nolan, 2017), or the sound of Baby's tinnitus (Ansel Elgort) that blends into The Jon Spencer Blues Explosion's "Bellbottoms" on his iPod that opens *Baby Driver* (Edgar Wright, 2017). All use source sound as a rhythmic or textural foundation for the dramatic music.

This form of sonic convergence serves not only to stitch together the film's different layers of aurality, but also to deeply entangle the music with the images; in turn, this encourages a thorough immersion in the film's unified textures. The morphing of real-world sounds into the rhythmic drive for imagined sonic spectacle by Per Streit for Lars Von Trier's *Dancer in the Dark* (2000) takes this process to an extreme and is an example of sonic fusion that invites the audience in. Björk's character Selma is stricken with a progressive and devastating eye condition. As her vision recedes, she moves into an increasingly aural realm, where the sounds of machinery and passing trains become progressively rhythmicised, until

they are converted into the foundation for a full blown musical number that, she imagines, mobilises all those around her. Here, affect sound initiates a process of acoustic lengthening that moves way beyond its original sonic container and corresponding image to fluidly merge with orchestral instruments. In these moments, we are drawn into the protagonist's anguished internal turmoil and, as the soundscape pulls image away from its realistic aesthetic and mobilises it in tribute to the Hollywood musical, we are given a glimpse of Selma's desire to escape her tormented mind *through* music. Although von Trier's move into pure musicality is arresting, it is not jarring; the synchronicity of the original audiovisual moment is so clearly established that the subsequent shift into music is coherent, flowing.

What I'm interested in here, however, is a form of hyper-soundscape by which a found sound or sound-effect is stretched beyond its practical application, even at its most aesthetically, or affectively heightened, and is not absorbed into an existing musical texture, but rather forms it via a creative stretching of its own original materials. Sound, in other words, that not only outstrips audiovisual viability and disturbs synchronicity, but eventually also foregoes its vertical relationships altogether in favour of a strong musical, horizontal coherence. Like the examples above, such moments can stretch the connection between source sound and image to its limit while staying within the diegesis. The slippage between sound and music is not, of course, unique to film. In fact, it has informed the most significant expansions in compositional strategy since the turn of the twentieth century, running through the early century experiments with location sound and noise of Italian Futurist Luigi Russolo, Pierre Schaeffer's experimentation with *musique concrète* in the 1940s and 1950s, John Cage's engagement with the "organisation of sound" in the 1950s, the use of everyday objects in the mid-century work of Xenakis and others, through to the rise of noise music acts that include the industrial soundworlds of Throbbing Gristle and This Heat, the DIY improvisation of the Los Angeles Free Music Society, the power electronics of projects like

SPK and Whitehouse, the wall noise of Japanese acts like Hijokaidan and Merzbow, and, more recently, the sound art of figures like Florian Hecker.[24] As Paul Hegarty notes, noise and music are no longer distinct categories, but rather occupy the two ends of a single continuum; "[n]oise is not an objective fact. It occurs in relation to perception—both direct (sensory) and according to presumptions made by an individual. These are going to vary according to historical, geographical and cultural location."[25] Chion voices a similar sentiment to Hegarty's sonic continuum when constructing his framework for analysing film sound: the distinction between music and noise is, he points out, "completely relative, and has to do with what we are listening for"; the way in which we listen "depends on the listener's cultural references."[26]

Sonic elongation moves smoothly along Hegarty's spectrum and plays with the idea that noise is "relative" by de-stabilising established audiovisual connections. Although this can test the boundaries of the audience's "cultural references," however, the sonic fluidity rarely threatens a harmonious and convergent audiovisual reading as it augments, rather than shatters, the parameters of a common cinematic vocabulary. At its most simple, sounds from different locations can slip into sync with one another, as happens in the noisy bed scene from *Delicatessen* (directed by Marc Caro and Jean-Pierre Jeunet, music by Carlos d'Alessio, 1991): here, the regular beat of bouncing bed springs spreads throughout an apartment block, uniting with the brushstrokes of a painter, the laboured notes of a cello scale, a metronome, a lady beating a mat, a boy pumping his bike tyres and so on. Unlike the emergent musicality of *Dancer in the Dark*, acoustic or electronic instruments alien to the environment are not added to the texture. However, the creative intervention between the different sounds is limited; the beat remains consistent, and, although the texture varies, it doesn't mature beyond its original audiovisual synchronicity.

More adventurous sonically-elongated textures allow the process of transformation to eventually dislocate this synchronicity in order to challenge what it is we are "listening for." In his analysis of Michelangelo Antonioni's sound worlds, for instance, Roberto Calabretto has noted that the director's "soundscape often assumes the semblance of an actual musical score—which was exactly his intention—in which the sounds are woven into melodic phrasings which reflect the rhythm of the visual images."[27] Calabretto shows how advanced Antonioni's methods of concrete and electro-acoustic scores were, not only in Italian film culture of the 1960s, but in the history of film music more generally. The director's meticulous manipulation and abstraction of real-world sounds and their reconfigured appearance against the image track drives films such as *L'avventura* (music by Giovanni Fusco, 1961), in which the sonic link with the visual information is at once established and stretched to form a simultaneity that vibrates between the vertical function of sound effects and the horizontal flow of music. This process can be mapped onto Barry Truax's first understanding of soundscape composition, in which "Listener recognizability of the source material is maintained, even if it subsequently undergoes transformation."[28] In soundscape terminology, this can be referred to as an elongated form of phonography, a type of found-sound manipulation identified by Truax as "recorded soundscapes with minimal or no alteration that can be listened to as if they were music, in the sense of an organised sound structure with differing levels of meaning."[29] In sonically-elongated film sound, synchronous audiovisual textures gradually disintegrate as the found-sound composition undergoes transformation—or heightening—to provide the audience with differing, yet related, "levels of meaning." This type of morphology creates a complicated form of audiovisual reception that asks us to navigate distinct aural planes, while ensuring a maintained and strong immersion in the text.

This coexistence between "listener recognisability" and "differing levels of meaning" drives *Stalker*, Andrei Tarkovsky's 1979 post-apocalyptic sci-fi. Edward Artemiev's electro-acoustic score, with its cutting-edge manipulation of electronic and natural sounds, moves fluidly along Hegarty's continuum to a point of audiovisual rupture, as the director explains: "As soon as the sounds of the visible world, reflected by the screen, are removed from it, or that world is filled, for the sake of the image, with extraneous sounds that don't exist literally, or if the real sounds are distorted so that they no longer correspond with the image—then the film acquires a resonance."[30] In *Stalker*, real-world sounds are consistently heightened, blending and repelling each other before undergoing electronic manipulation that chips away at the causal bonds and troubles points of audition.

[PLEASE INSERT FIGURE 2 ABOUT HERE]

The process of sonic elongation is most clear during the four-minute scene that sees the protagonists journey towards the Zone on a small draisine. As in *Dancer in the Dark*, this scene arises from railway sounds, and yet their treatment is significantly different. Here, train sounds have already infused the film's soundscape, emerging from the *acousmêtre* in the opening shot of Stalker's room and persisting amongst the intense, disembodied industrial sounds that accompany the protagonist as he leaves his house. When the draisine enters our visual realm, however, its motorized splutters refuse audiovisual confluence, sounding instead like an electronically-processed diesel engine. Although the sound disappears beneath the lurching rhythms of a traveling train as soon as the vehicle moves outside, sonic clarity is rapidly muddled, phasing in and out across the screen and becoming more industrial, opaque, and reverberant with each iteration. Three minutes in and the sounds are almost entirely abstracted by electronic distortion and "resonance." Apart from a brief spoken exchange at

the start, we hear nothing else. During this sonic elongation, the cinematography is dominated by close views of the backs and sides of the three protagonists—Stalker, the Writer, and the Professor—as they look at their surrounding which are, for most of the time, blurred (figure 2). Together with the disassociating sound, the images seem to suggest an internalisation; a move into physical and emotional interiorisation. Speaking of such "magic moments," Slavoj Žižek praises:

> the ambiguous way in which Tarkovsky uses the natural sounds of the environs: their status is ontologically undecidable, it is as if they were still part of the "spontaneous" texture of non-intentional natural sounds, and simultaneously already somehow "musical," displaying a deeper spiritual structuring principle. It seems as if Nature itself miraculously starts to speak, the confused and chaotic symphony of its murmurs imperceptibly passing over into Music proper.[31]

Here, the "cinematic reality" is stretched to the limits of sonic coherence, and yet we go with it willingly because its base connection—its synchresis—has been securely established. As the audiovisual gap develops, in other words, we can undertake the journey from real-world sound to interiority because the elongation is gradual; the route clearly laid out.

Sonic Aporia

Sonic aporia refuses such stability. Formed from sounds that, while instantly recognisable, have no obvious connection with the image, aporetic moments question the plausibility of the film space. Without an initial moment of audiovisual synchronicity, sound and image begin and remain in a dislocated and discordant state, not only physically but also aesthetically. This can initiate a troubled and disquieting audiovisual experience that resists multimodal fusion. To return to the etymological root of aporia; one thought does not logically stem from

the other and points of contact are difficult to find. As a result, the filmic elements remain unstitched and the materiality of the film is pushed into our perceptual foreground.

Sonic aporia occurs less frequently than elongated soundscapes and most examples arise within experimental or art film, whose structures are malleable and conventions volatile. The slow works of Béla Tarr provide a particularly fertile space for aporetic sound structures to manifest. The opening of *Damnation* (*Kárhozat*; music by Mihály Víg, 1988), for instance, offers a static black and white shot of pylons marching across a black and white wasteland before eventually drawing back to reveal a closed window and the back of a man's head resting in a completive posture; alongside this visual scene jostles a highly-treated, reverberant aural track formed from an array of industrial sounds that fracture the point of audition. These noises could be generated by the moving pulley travelling alongside the pylons, and yet the point of view is located inside, with the man; either this is an audiovisual rupture from within the filmed space, or these sounds emanate from beyond it altogether (figure 3). Either way, the audiovisual relationship remains unclear.

[PLEASE INSERT FIGURE 3 ABOUT HERE]

Such aporetic ambiguity has become a hallmark of David Lynch's soundscapes. Whereas in normal practice, presence, or room tone, is a unifying form of "silence" used during dialogue editing to suggest a realistic ambience or acoustic architecture, Lynch's atmospheres throb, hum, click, and wheeze with rarely identifiable sounds that are loud, often continuous, and always noticeable. What Chion describes as a "constant rush of boiler sounds, whirlpools, electronic organ chords, and the like" vibrates through *The Elephant Man* (1980), for instance, while unresolved *acousmêtre* dominates the soundscape of *Twin Peaks*

(1990-1991, 2017) and *Fire Walk with Me* (1992), phases in and out of *Blue Velvet* (2001), and rises to prominence when thresholds are crossed in *Inland Empire* (2006).[32]

To some extent, Lynch's sonic aporia stems from his close, almost obsessive, involvement with all aspects of his sound worlds: "there are sound effects, there are abstract sound effects," then "music turns into sounds, and sounds turn into music," he explains.[33] Elsewhere he articulates this transition even more clearly: "The borderline between sound effects and music is the most *beautiful* area."[34] Exploration of this "*beautiful* area" was undertaken in collaboration with Alan Splet until his death (*The Grandmother*, 1970; *Eraserhead*, 1977; *The Elephant Man*; *Dune*, 1984; *Blue Velvet*, 1986), when, after a less-successful partnership with Randy Thom (*Lost Highway*, 1997), Lynch assumed control of the sound design himself. From the outset, the collaborative process between Spelt and Lynch, which often began before principle photography, emerged through analogue *musique concrète* methods, which abstract real-world noises from their sources and reconfigure them as autonomous sound objects. Speaking about gathering the sound for the short film *The Grandmother*, for instance, Splet recalls that "we'd start scouring the company for things to make sounds with—you know, like crushing a plastic box, or in one case we used a pencil sharpener, and in another case we used a staple gun."[35]

Forged from everyday objects, the soundscapes of Lynch's world quickly become mysterious. In his analysis of *Lost Highway*, Philip Brophy fashions an uncanny link between the "thick, pregnant, alive" rumbling drones and "deeper neurological states: headaches, migraines, hang-overs, stress, etc."[36] This is a common device in film; it explicitly pulses through several of Clint Mansell's collaborations with Darren Aronofsky, for instance, including *Pi* (1998), in which the concrete score renders the protagonist's mathematically-induced migraines audible for the audience, while the manipulation of disembodied hisses, rattles, and clicks into musical textures and motives that punctuate *Black Swan* (2010) signify

the moments when Natalie Portman's character Nina is particularly troubled. Neither soundscape is explicitly located in the image, yet both signify in emotionally resonant ways, as though emanating from within a character's mind. By contrast, Lynch's continuous—even disinterested—"room tones" rarely point towards a clearly identifiable source or emotional state within the visual space; instead, they constantly signify away from themselves, deflecting attention from onscreen action and suggesting another, peripheral space that is monstrous, unattainable, beyond conscious thought. If we think about these acoustic atmospheres in terms of sonic aporia, we can understand the sounds as taking us not deeper into interior states, but beyond them. Lynch's room tone opens up an audiovisual aporia, whereby the sounds reveal the presence of an absence so strong that we are compelled to search for a source; yet the source is constantly withheld.

This process is clearly laid out in his first feature, *Eraserhead*, which follows the puzzling and gloomy world of Henry (John Nance). The film is dominated by Splet's almost continuous wash of warped industrial sounds, roars, barks, and whooshes which, unlike Artemiev's extended sounds that remain within *Stalker*'s universe, float free, untethered to the visual space. And unlike Mansell's anguished sonic manifestations, Lynch and Splet's arresting, almost deafening soundscape rarely garners acknowledgement from the characters, whether or not they are aware of its presence. The only points of audiovisual confluence occur at scene changes; the texture of the sonic wash seems to react to a move between visual spaces, simmering down from a hectic roar into a hum when Henry first enters his girlfriend's house, for instance. Specific points of reference, however, are hard to find. In his reading of the film, Chion identifies a process of inverted sonic elongation, when the sound of an electronic organ dissolves into the drone of a boiler, although elsewhere he finds an "absence of any separation between the music and its overall atmosphere."[37] This entanglement leads to uncertainty. Unlike sonically elongated sounds, Lynch's aporetic noise-music is formed

from, or intended to resemble, source sounds that remain not only untethered to the visual world, but also form an implausibly noisy environmental wash. They remain unsubstantiated, lacking auditory landmarks, audiovisual synchronicity, and semantic stability. However, we are so attuned to conventional points of audition that we cannot help but seek a connection despite the film's refusal to provide one. This is certainly true for K.J. Donnelly, who refers to the noises as "as acousmatic sound effects: seemingly the sounds emanating from some dreadful but indistinct industrial machines somewhere in the distance."[38] The result is an emphasis on liminal spaces; on the places where connections should be but have been dissolved. What are these musicalised sounds stretching away from? And if the sounds have been creatively manipulated, how can we even begin to trace them back to an implied image? Where is this acoustic information leading us? And why is it so hard to let go to resist the lure of a representational anchor for film sound, even when the detachment is so obvious?

Although for Donnelly the noise manifests from "acousmatic sound effects," their horizontal development troubles the very idea of both off-screen and sound effect, both of which suggest a strong visual connection. Such temporarily un-synchronised—or unseen—sound can be extraordinarily powerful. Most often, acousmatic film sound is used to substantiate the film's world by spreading the confined screen-space into a multidimensional acoustic universe in several well-theorised ways. First—and what Chion refers to as "visualised sound"—a coordinated sound and image event cements the audiovisual relationship before the sound becomes "acousmatized," taking with it its associations but spreading out the sonic space in multiple directions. Often these sounds operate in a "passive" (Chion) way as environmental and atmospheric texture. Second, a sound can be heard first, only matching up with a visual source later on. In certain instances it is used as a tool to withhold knowledge entirely, assuming the traits of omniscience, ubiquity, and, as a result, a certain form of power; the unseen monster, the disembodied scream. Where are these

sounds coming from and what do they mean? These questions induce, suggests Chion, an active mode of reception that compels us actively to seek their audiovisual substantiation.[39] In such instances, an acousmatic sound draws attention to auditory perception and highlights the process of listening itself. The process of "de-acousmaticization" can often diffuse the power of the disembodied utterance as the sound becomes "embodied"; "identified with an image, demythologized, classified," a process famously illustrated by Toto's tug of the curtain to reveal the small "man behind the curtain" in *The Wizard of Oz* (directed by Victor Fleming, music by Harold Arlen and Herbert Stothart, 1939). Chion states that "the opposition between visualised and acousmatic provides a basis for the fundamental audiovisual notion of offscreen space."[40]

In many ways, sonic aporia shares the attributes of acousmatic sound: it roams through our perceptual awareness, adrift from clear visual or semantic anchors. Yet while there exist examples of acousmatic sound that remain disembodied, an aporetic moment sees a fundamental transformation of the original sonic material, as we have seen; there is a sense of linear progress and growth that makes indexical listening more difficult. In *Damnation*, sounds move quickly away from their original utterance, developing rhythms, textures, and form that is creative in and of itself. In *Eraserhead*, this process radiates through the entire film. While at first we speculate feasible sources for these atmospheric sounds, as the film progresses, they undergo a process of such abstraction that the "organised sound structure," configured from layers of drones and internal beats, confounds identification entirely. In fact, there is a sonic consistency and development clearly discernible in the 38 minutes of the 89 minutes of the film's sound that was released as a soundtrack album (1982 by I.R.S Records; reissued on vinyl in 2012 by Sacred Bones). Unlike the *acousmêtre*, then, these soundworlds do not simply extend the dimensionality of the visual world, but rather vibrate in dissonance against it. As the visual and aural tracks rub alongside each other, an aporetic shift occurs;

rather than a coherent world fleshed out by acousmatic sound, we are presented with two "individually plausible but collectively incompatible" voices that confound cross-modal re-association.

The process of extraction from an expected moment of de-acousmaticization to an understanding of the soundscape as a parallel track that thwarts vertical connection reads similarly to the acoustic reduction that underpins the processes of soundscape composition. Speaking of the musical object within the context of his explorations into soundscape composition, Pierre Schaeffer explained that "Often surprised, often uncertain, we discover that much of what we thought we were hearing was in reality only seen, and explained, by the context."[41] According to his early thinking, once the visual context is removed, a sound object arises that no longer relies on another medium for clarification; the process of listening is redirected, as the sounds condense down to an autonomous entity. As a result, *musique concrète* produces an *acousmêtre*—"a sound that one hears without seeing what causes it" (Schaeffer)—which, when recorded to ensure repeatability and transmission to make it concrete, encourages a process of "reduced listening."[42] Following from this, Randolph Jordan makes a useful designation:

> "between acousmatic music and acousmatic sound; the former is about an intentional removal of causal and semantic elements within a composition, while the latter simply designates a sound which has been separated from its source. … When we hear a well-designed piece of acousmatic music, we don't attach a sense of the sources to the sounds. We just hear them as they are."[43]

But to "just hear them as they are" is a complicated process that undermines our common cognitive and perceptual sensibilities. As Brian Kane writes, the "sound object" in de-visualised listening "is never quite autonomous." Speaking of soundscape composition,

Kane identifies an unease that arises when a source is withheld and a persistent desire to seek an originating and embodied gesture; "one central, replicated feature of acousmatic listening appears to be that under-determination of the sonic source encourages imaginative supplementation."[44] Along similar lines, Rolfe Inge Godøy predicates the supplementation in terms of an implied form of visual motion, an irresistible connection that re-unites reduced listening with visuality through a process of "embodied cognition, meaning that virtually all domains of human perception and thinking, even seemingly abstract domains, are related to images of movement."[45]

Within the theorisation of cinematic listening and multimodal synergy, this process becomes unstable and extremely fraught. In this medium, the fracture of sound from image, and the "imaginative supplementation" that this can encourage can collide with an actualised visualisation that vies for a synergistic union. When the source of a "soundmark" is persistently withheld in an audio*visual* medium such as film, where our patterns of consumption adhere to clear codes of "cinematic reality" and synchresis, the process of "imaginative supplementation" is troubled further: acousmatic music has already been re-visualised, but the "supplementation" doesn't fit, at least not in the way we would expect it to. We are compelled to find a connection between what we hear and what we see, but sonic aporia rebuffs an easy re-integration. As we have seen, multimodal theorists suggest that we are biologically compelled to reunite ruptured sensory inputs; to blend them together to make an informed and cross-referenced interpretation. The nature of audiovisuality as a multimodal experience leads us to seek a resolution and further impedes reduced listening, even when the sounds seem, at least initially, to suggest clear visual sources that are not part of the film's world. And yet to do so requires intense interpretative leaps that can threaten the tightly-stitched cinematic body. However, we can take this further. If sounds keep travelling away not only from image, but also from their first concrete utterance, our attention can become

divided between the senses. If this process goes so far that even an audiovisual Kuleshov effect becomes strained, then the acousmatic music may draw attention to itself to enable a form of "imaginative supplementation" to arise between the lines. Whereas Cook suggests that an "emergent meaning" arises when any sound and image combination is created, our multimodal drive, along with the power of synchresis, seeks a more concrete connection. In other words, we may begin to fabricate audiovisual objects that are not really there, creating a secondary, "imaginary" visual narrative that coexists—even contradicts—the one we are given. This can lead to a proliferation of visuality. Not only does sonic aporia make us question what we see and how we process visual information, it also forces us to fabricate around the edges, laying down a re-visualisation on top of the film's images according to the increasingly strange trajectory of the sonic material. We can see this at play in the acousmatic music of *Eraserhead*, which provides moments when it is as though we witnessing two worlds at once: one we see; one we hear. As a result, we are prompted to hold together in our minds the two worlds simultaneously. The fissure of sonic aporia, then, enacts a type of "schizophonia" (Schafer) that leaves the sounds adrift within the audiovisuality.[46] The appropriateness of the term aporia, with its connotations of impasse, contradiction, and interpretative rupture, for this audiovisual situation not only now becomes clear, but also points to a distinction between the physical body of the receiver, and the potentially schizophonic version reconfigured by the cinematic experience.. If the physical and affective gap between sound and image is truly aporetic, the pre-cultural processing identified by Willemsen and Kiss struggles to reach an audiovisual resolution. Thwarted by two modes of information too distinct for effective multimodal cross-checking, the effect is not simply "unsettling," but presses interpretation into the conscious, active, socially-conditioned mind; into cognition. If we here recall Hegarty's assertion that noise is relative, when presented with the untethered wash of aporetic sound, the receiver, lacking the guidance of audiovisual

(aesthetic or rhythmic) synchronicity, must activate what Chion refers to above as her "cultural references." Audiovisually dislocated, these sounds can never be "passive" (Chion). With multiple variability in their reception, they are not only catalysts for imaginative play but also activate strong modes of cognitive dissonance in the audience; they are both active and activating.

It is here that sonic aporia differs from both sonic elongation and the *acousmêtre*. Sonically-elongated sounds begin with synchronicity and undergo creative manipulation until they outstrip their visual sources. Once musically adrift, however, such soundscape retains the grain of recognition and even if sound and image subsequently diverge, the memory of fusion encourages an enduring semantic compatibility. Acousmatic sounds, while undeniably—even intentionally—encouraging rich imaginative extensions, nevertheless imply "offscreen space"; that is, space that lurks beyond the frame but within the diegesis. Again, there may be disquieting, but there is also unity, spatial coherence, semantic extension. Aporetic sound, however, arises from a different space and remains there. At first we are compelled to seek a possible source, but when the audiovisual synchronicity is consistently withheld and the sounds take on a compositional life of their own, "imaginative supplementation" encourages "surplus meaning" to arise.[47] When the same sounds undergo prolonged and profound creative treatment, sound and image refuse to re-embody each other and instead begin to embrace their autonomy.

The deconstructed properties of an aporetic soundscape, then, hover between the traditional functions of environmental sounds and dramatic music; yet reject the unifying tendencies of both. Its dualism avowed, aporetic scenes tear the audiovisual fabric, expose the materiality of the phantasmic body and repel our ability to intellectually synthesise the flow of contrasting lines. But although such ruptures do draw attention to the images, they also

emphasise sound as sound, encouraging us to question how we hear film and what it is we are listening for.

Listening Across the Edges

If we return to Hegarty's assertion that an understanding of noise is variable, and Chion's that it is relative to a "listener's cultural references," combined with the history of sound design that has led to particular readings of sound's synchronous or acousmatic role in film, it can be suggested that aural attentiveness undergoes a significant reconfiguration during moments of sonic aporia. Brandon LaBelle speaks of something similar when he locates the "expanded sonic palette" of experimental music within "an intensification of listening experience—in volume, in location, and in procedure."[48] Such intensification has had a profound impact on the relationship between the attentive, interpretative strategies of listening and the "less reflective" mobilisation of hearing, which Hegarty understands as "a physical process we can do nothing about."[49]

Within this spectrum, Schafer proposed various punctuating points that influence our levels of audition, identifying "keynote," consistent sounds (such as the continuous ebb and flow of waves) that "may not always be heard consciously," and yet "the fact that they are ubiquitously there suggests the possibility of a deep and pervasive influence on our behaviour and moods." Standing out from the hum of keynote sounds are "signals," that draw attention to themselves as isolated events: "Signals are foreground sounds and are listened to consciously," such as "acoustic warning devices: bells, whistles, horns and sirens."[50] The disordering and re-activating of sonic focus can lead to what Joanna Demers calls "Aesthetic Listening," which sees participants slip between various kinds of attention and consider individual sonorities instead of large-scale forms; a sort of reordering similar to Chion's audiovisual theory of vertical synchresis mentioned above.[51]

These different modes of listening open up almost limitless levels of possible perception that are fluid and subject to continual reordering according to their relationships not only with each other, but also to other sensory inputs, and it is here that these ideas become useful for cinematic forms. Unlike the activated listening strategies of experimental music and sound art, film consumption requires an audio*visual* mode of engagement, something that initially appears at odds with the very notion of reduced listening. In films like *Dancer in the Dark*, the sonically-elongated noise music is not concrete as the visual references remain, albeit moving closer and further away at different points: sound extends from the fictional image, but does not become abstracted from it. The peripheral attention required to process keynote sounds is confounded as our attention is suddenly drawn to them in their newly elongated state.

Chion's three modes of listening are helpful here, as they address auditive attention within an audiovisual, rather than purely sonic, context. These modes are very simple. Causal listening occurs when we try to locate a source: "in cinema, causal listening is constantly manipulated by the audiovisual contract itself, especially through the phenomenon of synchresis. Most of the time we are dealing not with the real initial cause of the sounds, but causes that the film makes us believe in." Semantic listening, on the other hand, is "that which refers to a code of a language to interpret a message." Finally, reduced listening is similar to Schaeffer's understanding outlined above.[52] If we map Chion's various levels of listening onto sonic elongation and sonic aporia, we can see that each deconstructs our patterns of audiovisual consumption in different ways. Sonically-elongated sound moves fluidly—sometimes imperceptibly—between Chion's three modes, at first safely-channelling keynote and signal sounds through causal listening to a clear visual source, as we saw in *Delicatessen*, before it gradually abstracts, initiating a process of semantic reception that flows through *L'avventura* and *Stalker*. Sonic aporia, on the other hand, begins with reduced

listening and thwarts attempts to move into causal listening, or hearing. Whereas sonic elongation abstracts and complicates cinematic listening, then, it does not evoke a ruptured experience as the various layers of simultaneous aural attentiveness it requires embolden each other. Sonic elongation, then, augments a film's soundscape by encouraging "an intensification of listening experience" (LaBelle), freeing itself from the image while remaining firmly enmeshed within its semantic textures. Sonic aporia does the opposite. The acousmatic music during these moments distorts traditional forms of sound design entirely and encourages new forms not only of cinematic listening, but also of cinematic seeing. By denying causal listening, disrupted audiovisuality can contradict what we are seeing and encourage visual fabrication that diverts our attention not to the acousmatic space, but to the aporetic one.

These aporetic spaces are extremely significant. At the start of this chapter, I mentioned "traditional processes of cinematic listening," and implied that these processes operated through the syncretic nature of the "irresistible weld" in audiovisual cinema, and the apparent inevitability of some kind of relatively stable—or at least contained—emergence of meaning. During instances of aporetic incongruence, the pre-conscious synergising drive behind multimodal perception becomes fraught. As Willemsen and Kiss argue, audiovisual discontinuity can make us feel uncomfortable as it threatens the (seemingly) natural biological impulse to use one sense to validate information received by another. Faced with gaping holes in the audiovisual fabric—with "two individually plausible but collectively incompatible" statements—film goers are required to hold together multiple spaces and possibilities in their mind at once. To navigate through these moments of impasse requires imaginative, cognitive play. Disrupted audiovisual listening and the attentive audition it requires, in other words, would seem to resist the cross-modal and syncretic forms of listening that drive the new sensory turn and forces our attention into conscious, cognitive

modes of interpretation. These moments are significant for a theorisation of cinematic listening, as they not only resist a single logical or universal model for analysis, but also complicate the very idea of a normative listening behaviour in the first place. But perhaps it is even more than this. Perhaps the discomfort of audiovisual aporia arises first from the troubling of sensory integration and the resultant cognitive dissonance it engenders, but also from the move from subconscious process to a conscious recognition of the work required to navigate the audiovisual space. To put this another way: rupture challenges expectations and forces our processes of engagement, consumption, and multimodal meaning-making into the foreground: we become aware of the *process* of interpretation.

[1] I use this term in the context of documentary film in "Sonic Elongation: Creative Audition in Documentary Film," in *Cinema Journal* 55, no. 2 (2020): forthcoming.

[2] Whittington, "Lost in Sensation: Re-Evaluating the Role of Cinematic Sound in the Digital Age," in *The Oxford Handbook of Music and Sound in Digital Media*, edited by Carol Vernallis, Amy Herzog and John Richardson (New York: Oxford University Press, 2014), 64.

[3] Chion, *Audio-Vision: Sound on Screen*, trans. Claudia Gorbman (New York: Columbia University Press, 1994), 107.

[4] Wierzbicki, "Sound Effects/Sound Affects: 'Meaningful' Noise in the Cinema," in *The Palgrave Handbook of Sound Design and Music in Screen Media: Integrated Soundtracks*, edited by Liz Greene and Danijela Kulezic-Wilson (London: Palgrave, 2016), 156.

[5] Smith, "The Sound of Intensified Continuity", in *The Oxford Handbook of New Audiovisual Aesthetics*, edited by John Richardson, Claudia Gorbman and Carol Vernallis (New York: Oxford University Press, 2013), 337, 338. See also David Bordwell, "Intensified Continuity: Visual Style in Contemporary Hollywood Film," in *Film Quarterly* 55, no. 3 (2002): 16-28

[6] Chion, *Audio-Vision*, 5, 63; Cook, *Analysing Musical Multimedia* (New York: Oxford University Press, 1998), 97.

[7] Wierzbicki, "Sound Effects/Sound Affects," 157.

[8] Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World* (1993; repr. Rochester: Destiny Books, 1994), 10.

[9] Thompson, "Early Sound Counterpoint," in *Yale French Studies*, 60 (1980), 127, 122, 123.

[10] Rescher, *Aporetics: Rational Deliberation in the Face of Inconsistency* (Pittsburgh: University of Pittsburgh Press, 2009), 1.

[11] Silverman, *The Acoustic Mirror: The Female Voice in Psychoanalysis and Cinema* (Bloomington and Indianapolis: Indiana University Press, 1988), 12. Bordwell and Jeff Smith.

[12] Murch, "Stretching Sound to Help the Mind See," in *New York Times* (1 October 2000), at http://www.nytimes.com/2000/10/01/arts/01MURC.html?pagewanted=all (accessed 16 July 2018).

[13] Chion, *The Voice in Cinema*, trans. Claudia Gorbman (Columbia: Columbia University Press, 1999), 125.

[14] Chion, *Audio-Vision*, 3 (italics his).

[15] Doane, "The Voice in the Cinema: The Articulation of Body and Space," in *Yale French Studies*, 60 (1980): 33-50; Flinn, *Strains of Utopia: Gender, Nostalgia and Hollywood Film Music* (Princeton: Princeton University Press, 1992).

[16] Larsson, Daniel Västfjäll, Pierre Olsson and Mendel Kleiner, "When What You Hear is What You See: Presence and Auditory-Visual Integration in Virtual Environments," in *Proceedings of the 10th Annual International Workshop on Presence* (2007), at http://astro.temple.edu/~lombard/ISPR/Proceedings/2007/Larsson,%20Vastfjall,%20Olsson,%20Kleiner.pdf (accessed 16 July 2018).

[17] Duncan, *Charms That Soothe: Classical Music and the Narrative Film* (New York: Fordham University Press, 2003), 81.

[18] Pudovkin quoted in Duncan, *Charms That Soothe,* 85.

[19] For more on the development of a cinematic music vocabulary, see Anahid Kassabian, *Hearing Film: Tracking Identifications in Contemporary Hollywood Film Music* (New York: Routledge, 2001).

[20] Cook, *Analysing Musical Multimedia*, 98-106; Chion, *Audio-Vision*, 38-39, italics in the original. See also Kay Dickinson, *Off Key: When Film and Music Don't Work Together* (New York and Oxford: Oxford University Press, 2008).

[21] Willemsen and Miklós, "Unsettling Melodies: A Cognitive Approach to Incongruent Film Music," in *The Cinema of Sensations*, edited by Ágnes Pethő (Cambridge: Cambridge Scholars Publishing, 2005), 113. See also Lawrence Marks, *The Unity of the Senses: Interrelations Among the Modalities* (New York: Academic Press, 1978).

[22] Casanelles describes a "*hyperorchestra*, a virtual music ensemble that inhabits hyperreality" as "a product of the combination of virtual instruments (sampled and synthetic), real live recording sessions and sound processing" able to embody the "full sound spectrum"; "Mixing as a Hyperorchestration Tool," in *The Palgrave Handbook of Sound Design and Music in Screen Media*, 62.

[23] Whittington, "Lost in Sensation," 62.

[24] Cage, "The Future of Music: Credo," in *Silence* (Cambridge, Mass.: MIT Press, 1970), 3.

[25] Hegarty, *Noise/Music: A History* (New York: Continuum, 2009), 3.

[26] Chion, *Audio-Vision*, 205-6.

[27] Calabretto, "The Soundscape in Michelangelo Antonioni's Cinema," in *The New Soundtrack* 8, no. 1 (2018): 2.

[28] Truax, *Acoustic Communication* (West Port Connecticut, London: Ablex Publishing, 2001), 240.

[29] Truax, "Soundscape Composition as Global Music: Electroacoustic Music as Soundscape," in *Organised Sound* 13, no. 1 (2008): 106.

[30] Tarkovsky quoted in *Sculpting in Time: Andrey Tarkovsky*, trans. Kitty Hunter-Blair (1986; repr. Austin: University of Texas Press, 2003), 162.

[31] Žižek, "The Thing from Inner Space," in *Sexuation*, ed. Renata Salecl (Duke and London: Duke University Press, 2000), 255.

[32] Chion, *David Lynch*, trans. Robert Julian (London: BFI Publishing, 1995), 38.

[33] Lynch quoted in Tom Kenny, *Sound for Picture: Film Sound Through the 1990s* (Vallejo, California: MixBooks, 2000), 133.

[34] Lynch quoted in *Lynch on Lynch*, ed. Chris Rodley (London: Faber and Faber, 1997), 242.

[35] Splet quoted in "Interview: Alan Splet", at *Cagey Films* (December 17, 1981), https://web.archive.org/web/20121201060512/http://www.cageyfilms.com/links/eraserhead/interviews/other-eraserhead-crew/alan-splet/ (accessed 17 July 2018).

[36] Brophy, "Booms, Drones and Other Dark Waves," at http://www.philipbrophy.com/projects/cnsncs/LostHighway.html (accessed 17 July 2018).

[37] Chion, *Lynch*, 43-44.

[38] Donnelly, "*Saw* Heard: Musical Sound Design in Contemporary Cinema," in *Film Theory and Contemporary Hollywood Movies*, edited by Warren Buckland (New York and London: Routledge, 2009), 111.

[39] Chion, *Audio-Vision*, 33.

[40] Chion, *Audio-Vision*, 73.

[41] Schaeffer, *Traité des objets musicaux* (Paris: Editions du Seuil, 1966), 93.

[42] Schaeffer quoted in Brian Kane, *Sound Unseen: Acousmatic Sound in Theory and Practice* (New York: Oxford University Press, 2014), 3.

[43] Jordan, "Film Sound, Acoustic Ecology, and Performance in Electroacoustic Music," in *Music, Sound and Multi-Media*, edited by Jamie Sexton (Edinburgh: University of Edinburgh Press, 2007), 124.

[44] Kane, *Sound Unseen*, 148, 9.

[45] Godøy, "Gestural-Sonorons Objects: Embodied Extensions of Schaeffer's Conceptual Apparatus," in *Organised Sound* 2, no. 2 (2006): 150.

[46] Schafer, *The Tuning of the World* (Toronto: McLeland and Stewart, 1977), 90.

[47] Kane, *Sound Unseen*, 209.

[48] LaBelle, *Background Noise: Perspectives on Sound Art* (New York and London: Continuum, 2006), 9.

[49] Hegarty, *Noise/Music*, 4.

[50] Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World* (1977, repr. Rochester, Vermont: Destiny Books, 1997), 9.

[51] Demers, *Listening Through the Noise: The Aesthetics of Experimental Electronic Music* (New York: Oxford University Press, 2010), 164.

[52] Chion, "The Three Listening Modes," in *The Sound Studies Reader*, edited by Jonathan Sterne (New York: Routledge, 2012), 49, 50.