

# Echoic Re-Presencing: Towards a Feminist Media-Archaeological Listening

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## Abstract

*This paper considers listening as a method in media archaeology—a cluster of technology-oriented approaches to the past that attend to “dead end” inventions outside teleological narratives of progress. In particular, Wolfgang Ernst’s media-archaeological ear advances a materialist approach which favors listening to “the technical signifier rather than [...] the acoustic or musical signified.” However, this perspective is subject to recurrent critiques from feminist scholars who highlight the lack of regard for the asymmetrical power structures that undergird technical objects and their exclusion from historical narratives. As a case study, and interrogation of the possibilities for a feminist media archaeology, this paper examines the work of Daphne Oram, a British composer whose contributions to electronic music were overlooked during her lifetime, and the excavation of her work in *Oramics: Atlantis Anew* (2011), a film by Aura Satz. The archival vestiges of Oram’s composition technique, in which visual notations on glass slides and celluloid are sonified by her *Oramics Machine*, align with, and demand consideration beyond, Ernst’s “ascetic approach to signals.” Through a close reading of Satz’s film, I suggest that her simultaneous attention to the material processes of sound technologies and the erasure of women’s labor posits a necessary extension to this mode of enquiry. Considering recent feminist interventions in media archaeology, as well as critiques in sound studies that drawn on feminist Science and Technology Studies to challenge the presumed universality of listening, this paper proposes a framework of media-archaeological listening as echoic re-presencing. Oram’s work, and Satz’s re-presencing of it, therefore open up possibilities for listening otherwise to the sonic past.*

## Introduction

Throughout her body of work, artist and filmmaker Aura Satz attends to forgotten moments in the history of music and technology, or as she aptly describes it, “unsung pockets of history” (2016). But how precisely does one listen to the sonic past, particularly events that have as yet remained “unsung” in narrative accounts? This paper takes Satz’s film *Oramics: Atlantis Anew* (2011), which addresses the work of British composer and inventor Daphne Oram (1925-2003), as a catalyst to consider practices of listening as advanced in the heterogeneous “discipline” of media archaeology (Huhtamo and Parikka 2011). Focusing in particular on Wolfgang Ernst’s (2016) theories of media-archaeological listening, I consider the ways in which Satz’s film attends to the erasure of women’s labor in sonic histories and posits a necessary extension to this mode of enquiry.

Oram began working as a studio engineer for the BBC in 1942, and co-founded the BBC Radiophonic Workshop in 1958, a studio devoted to developing electronic techniques for music and sound effects in broadcast programming.<sup>1</sup> However, Oram resigned from her position as Director of the workshop after only one year and established an independent studio in her home. Throughout the 1960s, Oram's efforts were consumed by the development of her Oramics Machine (Fig. 1), an electronic sound synthesizer characterized by a distinctive audio-visual input technique. Oramics is a compositional method in which the composer applies abstract notation by hand onto glass slides (Fig. 2) and a set of ten 35mm film strips. The strips are then synchronized and processed by the Oramics Machine (Fig. 3), which reads the notation via a series of photoelectric transistors, generating electrical charges to control frequency, amplitude, and duration, thereby sonifying the composition. Upon Oram's death, her archive was acquired by Goldsmiths College, University of London. The Oramics Machine itself, thought to have been lost following the dismantling of Oram's studio after she suffered a stroke in the early 1990s, was recovered in a private collection in France in 2008 and purchased by the national Science Museum in London. The Oramics Machine was displayed in a temporary exhibition at the museum in 2011 titled *Oramics to Electronica*, for which Satz's film *Oramics: Atlantis Anew* was commissioned.



Figure 1. Oramics Machine. 1959. London: The Science Museum Group Collection. <https://collection.sciencemuseumgroup.org.uk/objects/co8188395/oramics-machine-synthesizer>. © The Board of Trustees of the Science Museum. This image is released under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 Licence.

<sup>1</sup> For a more in-depth overview of Oram's life, method and the revived interest in the Oramics Machine in recent years, see Boon and Grierson (2013), Manning (2012), and Richards (2018).



Figure 2. Oramics Machine. 1959. London: The Science Museum Group Collection. <https://collection.sciencemuseumgroup.org.uk/objects/co8188395/oramics-machine-synthesizer>. © The Board of Trustees of the Science Museum. This image is released under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 Licence.

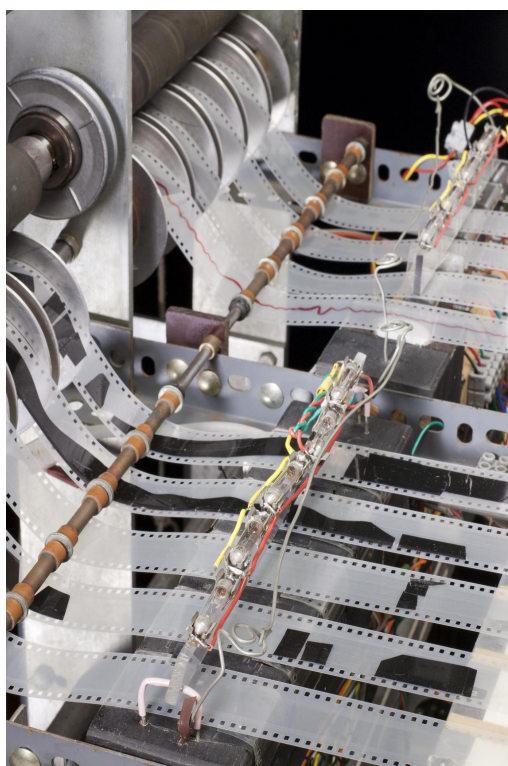


Figure 3. Oramics Machine. 1959. London: The Science Museum Group Collection. <https://collection.sciencemuseumgroup.org.uk/objects/co8188395/oramics-machine-synthesizer>. © The Board of Trustees of the Science Museum. This image is released under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 Licence.

The first section of this paper will introduce Wolfgang Ernst's techno-materialist approach to media archaeology, suggesting that his concepts of implicit sonicity and sonics are particularly salient to the study of Oramic notation as an example of drawn sound. Shifting focus to *Oramics: Atlantis*

*Anew*, the second section considers the ways in which Satz has approached Oram's work as an object of media-archaeological study. I discuss the film in the context of feminist critiques of media archaeology (Skågeby and Rahm 2018, Shorey and Rosner 2019), examining the ways in which Satz's approach to Oram and her work—as both technical object and undead interlocutor—reworks the non-discursive perspective upon which Ernst insists. I further consider media-archaeological approaches in specifically sonic terms, drawing upon recent scholarship in sound studies (Goh 2017, Thompson 2017) that advance perspectives in feminist science and technology studies (STS) to critique the presumed neutrality and universality of listening practices. In the final section, I refine my concept of *echoic re-presencing* as a proposed approach to listening to the sonic past that embraces a politics of situatedness (Haraway 1988) and material-discursive intra-action (Barad 2003).

### **The Remainder After Meaning**

In many respects, the Oramics Machine presents an ideal object for media-archaeological study. According to Erkki Huhtamo and Jussi Parikka (2011), the term “media archaeology” describes past-oriented research that seeks to:

construct alternate histories of suppressed, neglected, and forgotten media that do not point teleologically to the present media-cultural condition as their “perfection.” Dead ends, losers, and inventions that never made it into a material product have important stories to tell. (3)

As a technology developed outside an institutional context that was never reproduced, mass produced, or applied as a compositional method by anyone other than its inventor,<sup>2</sup> one might consider the Oramics Machine as such a “dead end” device. Tim Boon and Mick Grierson (2013) have suggested that Oram's method of sonifying visual material on film might be situated in relation to filmmakers including Oskar Fischinger, Rudolf Pfenninger, John and James Whitney, Norman McLaren, and Len Lye, and the work that emerged from the BBC Radiophonic Workshop might be considered alongside explorations into electronic sound at the Office de Radiodiffusion-Télévision Française in Paris and the Westdeutscher Rundfunk in Cologne, two centers associated with the work of Pierre Schaffer and Karlheinz Stockhausen respectively. However, media-archaeological study is unconcerned with charting historical genealogies that narrate technological progress, or instating claims to innovative first-ness. Although media archaeology tends to refer to a nomadic cluster of academic and artistic explorations, rather than a cohesive discipline, these approaches might be loosely characterized as a materialist consideration of historical artifacts, which attends to the specific forms, structures, and operations of a given technology, rather than interpreting the content it might produce or analyzing its social implications. In particular, scholars working in the wake of Friedrich Kittler (1999) have gravitated away from discourse analysis in seeking a more media-specific way of examining cultural histories. As Parikka succinctly describes, media archaeology emerges as “a perspective on the remainder after meaning” (2011, 257).

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<sup>2</sup> One notable exception is Tom Richards's recent research, which involved the re-imaging and building a Mini Oramics following Oram's designs and inviting composers to create new work with it. See Richards (2018).

This materialist approach holds dominant in the work of Wolfgang Ernst, whose writing, given his attention to sound and the sonic, might be examined, elucidated, and challenged in relation to Oramics and recent interventions into Oram's archive. Ernst's perspective foregrounds the material constellations imposed by media technologies, while the epistemological settings for representation and discourse are considered secondary (Parikka 2011, 257). In *Sonic Time Machines* (Ernst 2016), he advances an approach to sonic archives in which the narrativizing tendencies of historiography are rejected in favor of a "hermeneutically distant" (127) approach that ostensibly evades interpretive bias by listening to, and with, technical media. He describes the function of media-archaeological ears attuned to "the actual media articulation contained in the technical archive itself" (139) in order to "to hear the sonic past [...] by absorbing the vibrations and resonance of media in operation" (12). Deploying recurrent metaphors of freezing and thawing in his prose, Ernst suggests that media-archaeological listening to audio recordings not only makes audible the stored semantic meaning and cultural content, but also liquefies technical knowledges, "a kind of frozen media memory embodied in engineering" (126). It is this "para-archival modality of subtextual, signal-based recording" that Ernst dubs "the sound of times past," (119) and to which he suggests media archaeology should attend. Indeed, he states that "media-archaeological listening to the sonic past pays more attention to such techno-acoustical signifiers than to the musical signified" (89). Ernst therefore advocates for a practice of close listening to the noise of the technical apparatus, like phonographic crackle or bandwidth restrictions, as bearers of the "medium's message" as it is necessarily co-articulated within audio recordings (100-101).

Ernst further suggests that such media-archaeological listening must consider traces of the sonic past that exceed human auditory perception. Drawing upon Marshall McLuhan's formulation of the electronic mediascape as an intrinsically acoustic space, referring to its epistemological structure rather than audible properties, Ernst declares that "within an electronic system, sound exists implicitly" (25-26). Ernst introduces the term "sonicity" to describe oscillatory events that are deliberately distinguished from acoustic sound, which he describes as "the deceptive top of an iceberg visible above the water" (21) that conceals the essential vibratory and temporal nature of sonic events with what is merely audible. Using the example of phonographic recording, he explains that "the *implicit* sonicity of an acoustic event depends on a temporalizing medium like the record player to make it *explicit* through time-sequential unfolding" (22). Rather than merely a method of extracting archival sounds for historical analysis, attending to sonicity "is a mode of revealing modalities of temporal processuality" (27). Ernst's titular "sonic time machines" therefore refer to numerous enfolded technical events and apparatuses: the vibrational and rhythmic events in both analog and digital recording, playback, and synthesis all constitute sonic, yet inaudible, temporal operations. The act of listening in Ernst's formulation is therefore reoriented away from perceptible sound and towards this implicit sonicity that requires technological excavation:

Media archaeology is not just a human mode of understanding technology, it is also a form of technical perception in which the technological device itself turns into a listening organ. The concept of sonicity is suspended from the privileged anthropocentric perspective in favor of its capacity for exploratory and open access to implicit sonospheres. (31)

Sonicity therefore not only distinguishes audible sound from the sonic, but additionally becomes a vital term for extending media-archaeological listening into arenas that might have otherwise remained silent when considered within the frame of human perception.

Ernst further distinguishes a “special subclass” of sonicity that he terms “sonics” (23), referring to sounds born of electro-technical processes that require explicit sonification to be made audible at all. Without deliberate technological intervention, “sonics exists in electronic latency like songs and voices recorded on magnetic tape prior to playback” (23). Although throughout *Sonic Time Machines*, Ernst emphatically eschews the analysis of cultural productions such as music, he suggests that sonics offers an appropriate term to describe “acoustic or musical experience that depends on the technological” (22), and indeed refers to early 20<sup>th</sup> century experiments in drawn sound as crucial antecedents to the concept of sonicity itself. He foregrounds in particular the work of Russian acoustician Boris Yankovsky, who adopted a mathematical approach to sound in seeking to create and analyze graphical representations of sound waves that might be re-sonified in what he termed a “new science” of “synthetic acoustics” (23). Yankovsky’s process, according to Ernst, “turns symbolic abstraction into a media event in physical time” (54), making explicit an implicit sonicity in graphical notation.

Drawn sound therefore offers a point of entry into examining Oram’s method via Ernst’s framework. Although the technical intricacies of experiments in graphical sound synthesis are beyond the scope of this paper, the use of film stock and bespoke sonifying devices in Yankovsky’s method, as well as avant-garde instruments of the same period such as Yevgeny Sholpo’s variophone and Ivan Eremeef’s syntronic organ, might be understood to adhere to the same operational principles as the Oramics Machine (Davies 2001). Oram’s hand-drawn notation on 35mm film strips store latent vibrations that depend upon the specific technical apparatus of the Oramics Machine to sonify them, transducing graphical abstractions into audible sound as they pass through the machine. In this respect, Oramic notation aligns with Ernst’s definition of sonics as latent sound that can only be made perceptible through technological activation. Although founded on the principles of Fourier analysis, Oramic notation—comprising looping asymmetrical waveforms, serpentine squiggles, and irregular geometric blocks rendered opaque on clear materials (Fig. 2-3)—demonstrate a more exploratory and expressionistic approach to the graphical representation of sound waves. In her 1972 treatise on her compositional method and musical philosophy, titled *An Individual Note of Music, Sound, and Electronics*, Oram writes:

Really it will be much easier if we can take a pen and just draw [...] and get the machine to scan these wavepatterns and give us the equivalent sounds. Just a few notes from each pattern will allow us to check, by ear, that these are really the timbres we want. If, however, we find that we do not like the sounds that these patterns produce, then we only have to draw other patterns and so empirically explore, by visual-to-aural means, the countless possibilities to the many waveshapes that we can imagine and draw. (98-99)

In contrast to Yankovsky’s desire for a meticulous auditory re-synthesis of mathematically rendered sine waves, Oram takes graphical sound as a means to an aesthetic end. As the above quote describes, she introduces a degree of opacity between sonic oscillations and the visual inscriptions that seek to invoke them, as she uses her machine to listen to and excavate the implicit

sonicity within her intuitive drawings. Satz describes the melodic output generated by optically scanning drawn waveforms as “synthesized sound that comes from nothing” (2019), alluding perhaps to complex status of Oramics in relation to audio recording and playback. Unlike the indexical relationship between an original sonic event and engraved groove on a phonographic record, Oramics generates a new sonic event from graphical traces, with the correlation between “equivalent” sounds and drawings entirely of Oram’s own imagining.

Although Oram’s compositional method introduces a playful and oblique relationship between symbolic abstraction and sonicity, the Oramics Machine nonetheless functions as an Ernstian time machine as it unfreezes vibrational events through temporal playback. Ernst’s interest in sonics—acoustic experiences that remain silent without technological excavation—is that they offer a “non-historical immediacy” (89) to the sonic past, one which he seeks to emulate in his media-archaeological method. Indeed, he posits that technological listening offers a mode to bypass the hermeneutic impulses that inevitably accompany attempts by human ears to listen to the past, stating that “the real archaeologists in media archaeology are the media themselves” (114). With this in mind, one might then ask whether this method has been taken up in recent scholarly and artistic approaches to Oramics. How might the archaeological function of the Oramics Machine itself inform how we listen to this re-discovered music in the present? Given the risks and complexities of reanimating the single unfinished prototype of this long defunct machine, and that the Daphne Oram Collection is full of media which remains as yet under-excavated, what forms of media-archaeological listening might this invite?

### **Passion to Hallucinate**

In her film *Oramics: Atlantis Anew* (2011), Aura Satz takes an approach to Oram’s work that aligns in many respects with media archaeology’s preoccupation with revisiting and reanimating dead-end technologies. Indeed, she describes her “fascination with technologies at the patent stage, that are not quite successful yet, which still reveal a hesitant experimental quality” (2015). Commissioned by the Science Museum, Satz was granted rare special access to the Oramics Machine for the making of her film and proceeded to document the outcomes of her tinkering. This active practice of touching and operating the object of study (2011, 327) is essential to what Vivian Sobchack terms “re-presencing” (a concept that will be examined in depth in the following section) in contrast to representing or interpretive analysis. Satz’s perspective might also be understood in accordance with Ernst’s non-narrative approach as she situates the technical operations of the Oramics Machine itself at the center of the film, leaving out contextual details regarding Oram’s life, the BBC Radiophonic workshop, and adjacent developments in computer music. The 7-minute film comprises stationary shots that record the device in close-up, capturing intricately entangled circuit boards, batteries, wires, switches, and gears, as well as 35mm film strips scored with Oramic notation as they pass through the machine. From this close-up hi-fi perspective, the hand-wrought, haphazard, and in-process nature of the device is apparent, as colored wires are chaotically entangled and labels bearing Oram’s handwriting warn of malfunctioning parts. Satz’s camera also captures indications of the machine’s decay—a patina of dust, scratches, and wear; labels peeling off and text fading away. Satz thus performs a technologically-enabled archaeology, using her camera to reveal elements of the device that would remain otherwise hidden (certainly to viewers attending a museum exhibition), although perhaps not to the same sub-perceptual degree as that which Ernst advocates.

*Oramics: Atlantis Anew* notably deviates from Ernst’s techno-materialist approach, however, when one considers its soundtrack, which is entirely non-diegetic. The film strips that are depicted passing through the machine are replicas created by Satz, and therefore do not produce the music that scores the film, which instead comprises recordings made by Oram of her original compositions. The condition of the machine at the time of the exhibition at the Science Museum is obliquely described as “remarkably intact (not non-operational)” (*The Daphne Oram Trust* 2020) after decades of neglect. Although Satz is operating the device in some capacity, the sonic outputs of her tinkering, and their degree of fidelity to Oram’s recorded music, remain undisclosed to viewers. *Oramics: Atlantis Anew* therefore does not make explicit the sonicity implicit within Oramic notation on film strips. The noise of the decaying medium is absent, thus the message of the medium itself remains latent and inaudible. While the visual presentation of the device might foreground its mechanical materiality, the sonic component of the film crucially inverts Ernst’s formulation by listening to the musical signified, rather than the technical signifier (102). The audibility of Oram’s music—an assemblage of wavering high-pitched whistles, echoing chimes, muted pulses and thunderous rhythmic whirring—is granted priority. *Oramics: Atlantis Anew* thus also stages a crucial gap between the image of the machine in motion and the non-diegetic sound, thus introducing a rupture that Michel Chion (1994) calls the “audio-visual contract” in cinema: a mode of perception in which sounds are causally aligned with images on screen, despite the fact that their actual relationship is always more complex. The disunity might therefore be taken as an acknowledgement of the impossibility of unmediated excavation, thus drifting away from audio-visual synchronicity towards a more expressionistic and affective rendering.

Archival recordings of Oram reading passages from *An Individual Note of Music, Sound, and Electronics* also provide a voiceover narration for the film, which was released seven years following her death. Through the imperfect recording that occasionally muffles and mutes her words, Oram’s theatrical text equally conveys a quasi-mystical interaction between music and technology:

We’re going to enter a strange world, and we’re going to find composers will be mingling with capacitors. Transistors are going to be transmuting triplets, and perchance metaphysics may creep in to mate memory, music, and magnetism in some strange sort of eternal triangle.

In discussing *Oramics: Atlantis Anew*, Satz also refers to her process as one of intimate interlocution, of haunting and ventriloquism stating that the film is “as much as it is about the conversation I am having with [Oram] in the past, through her work, and how I am to a certain degree spoken through her” (Satz 2015). In this respect, Satz adopts a dialogic relationship to her object of study that explicitly counters Ernst’s argument that media-archaeological listening necessarily “suppresses the passion to hallucinate live presence when listening to recorded voices” (85). He further claims that “any historicist impulse to speak with the dead [...] takes place against the better knowledge that every dialogue with the past only mirrors one’s own voice” (61). I suggest, however, that Satz’s embrace this of “passion to hallucinate” is not merely a naïve historicist tendency. Rather, such hallucination is a necessary tactic in order to tune into that which Ernst’s media-archaeological listening fails to register: the structural conditions that permitted the media object to be forgotten in the first place, the people and practices erased alongside it, and the affective experience of its revival.



Certainly, *Oramics: Atlantis Anew* can be considered a feminist text as it seeks to draw attention to the often-overlooked contributions of a pioneering female composer. Indeed, *Oramics: Atlantis Anew* ought to be considered within Satz's broader oeuvre attuned to the labor of women who have been erased from the history of technology, including film colorist Natalie Kalmus (*Doorway for Natalie Kalmus* 2013) and astronomer Henrietta Swan Leavitt (*Her Luminous Distance* 2014), as well as her films and collaborations with electronic composers Pauline Oliveros (*Dial Tone Drone* 2014) Laurie Spiegel (*Little Doorways to Paths Not Yet Taken* 2016) and Beatriz Ferreyra (*Making a Diagonal with Music* 2019). However, it is perhaps more compelling to ask what Satz's embrace of haunting and ventriloquism might lend to media archaeology, given the recurrent feminist critiques of the field, and of Ernst's brand of sonic materialism in particular. The media-archaeological imperative to attend to alternative technologies outside teleological narratives of innovation nods to the possibility of addressing gendered and racialized exclusions, however such potential more often goes unrealized. As Jörgen Skågeby and Linda Rahm (2018) describe: "while media archaeology already holds an ambition to read media history 'against the grain,' so far this ambition has only been partly fulfilled—many 'power grains' have been left untouched" (4). In response to media archaeology's techno-materialist focus, Skågeby and Rahm go so far as to ask whether a feminist intervention in the field might even be possible given that "arguably, the very intention of media archaeology has been to downplay social structures in favor of structural-technical [...] determinations" (2).

From this perspective, Ernst's description of a media-archaeological method as an "ascetic approach to signals" (129) might be understood as a listening process that strips away the socio-political life of technologies and their entanglements with oppressive structures. This stance further implies a removed, impartial listening position resistant to "the temptations of premature narrative contextualization" (129). His aforementioned suggestion that the "real archaeologists" (114) are measuring media that decipher and represent sonicity in a manner uncontaminated by hermeneutic analysis indicates a kind of sonic positivism that masks its own investment in the logics of whiteness and patriarchy. Paul Flaig (2018), in a detailed critique of Ernst's recurrent preoccupation with the Homeric myth of the feminized Sirens, both as an analogy for media-archaeological research and as an actual subject of archaeoacoustic excavation, suggests that Ernst "betrays his own desires to conquer the seductions and dangers of an implicitly feminized medium" (108). Indeed, it is precisely such power dynamics that operate within allegedly neutral and universal logics and methods that scholars in feminist STS have sought to critique and counter. For instance, Karen Barad (2003) has advanced an understanding of observational instruments as apparatuses that play a "crucial, indeed constitutive, role in the production of phenomena" (816); measuring technologies are not neutral probes, but rather on-going dynamic practices that re-configure the material world. Rather than operating at a remove—what Ernst might laud as a "passion of distance" (117)—apparatuses and their objects of study intra-act, and in doing so performatively enact specific exclusionary boundaries. With this in mind, a feminist media archaeology would extend beyond attempts to rectify gendered exclusions from history and would examine the ways in which social structures and technical infrastructures are entangled with one another. Such a perspective would attend to the material-discursive practices (Barad 2003, 822) through which media technologies *and* the technological apparatuses that facilitate their excavation permit and foreclose specific material possibilities.

To examine the past in specifically sonic terms, a feminist approach would further necessitate a politics of listening that critically addresses the white, masculine, Eurocentric preconditions of an allegedly objective ear. In contrast to prevalent perceptions of the auditory as an unshielded and unfiltered sensory channel following R. Murray Schafer's oft-repeated claim that "there are no earlids" (1993, 11), recent scholarship in sound studies has considered the politics of listening as a historically situated practice of knowledge production: Jennifer Stoeber (2016) presents an account of diverse practices in late 19<sup>th</sup> and early 20<sup>th</sup> century America that demonstrate "listening's epistemological function as a modality of racial discernment" (13) and the formation of a dominant "listening ear" (7) that reifies a the contours of a sonic color line; Nina Sun Eidsheim (2019) identifies the "micropolitics" of listening (24) and "timbral discrimination" (4) toward racialized singers in contemporary music discourse and pedagogy, such that the study of voice is re-oriented away from the singer and towards the evaluative acts of listeners; and Dylan Robinson (2020) seeks to expose the "unmarked normativity of listening" (38) by attending to the perceptual orientations and sensory paradigms that govern settler-colonial approaches to Indigenous cultural production. This enculturation of the ear is something that Ernst attempts to evade by advancing the use of technological measuring apparatuses, seeking a universal listening immune to the biases that encode themselves in human perception by accessing the sub-perceptual strata of the sonic that precedes them.

In this respect, there is a similarity between Ernst's media-archaeological pursuit of implicit sonicity and what Marie Thompson (2017) describes as the ontological turn in sound studies: a perspective that distinguishes itself from studies of auditory cultures, such as those referenced above, to instead consider experimental music and sound art as an interrogation of the non-discursive dimensions of the sonic as such, as exemplified in the work of Christoph Cox (270). Drawing upon Nikki Sullivan's (2012) concept of "white optics" (303), Thompson suggests that perception ought to be considered as an active social process, "an effect and vehicle of sedimented contextual knowledges, which 'constitutes that which is presumed merely to apprehend'" (273). She offers the term "white aurality" to describe a perspective that "amplifies the materiality of 'sound itself' while muffling its sociality" (274). Thompson describes this dampening of sound's political entanglements via Donna Haraway's (1997) use of the term "modesty" to describe the "modernist virtue of scientific and traceless observation" (Thompson 2017, 272): a positionality that observes phenomena from everywhere and nowhere and is entangled with formations of whiteness, masculinity and Eurocentrism. As Thompson describes: "the presence of white aurality is marked by its absence" (274). One might detect such modesty in Ernst's aforementioned "ascetic" (129) approach, or his description of the media archaeologist's "passion of distance" (117) when listening to the sonic past.

As a proposed remedy to a modest white aurality that foregrounds the material nature of the sonic, Thompson suggests that sonic ontologies ought not to be dismissed entirely, but rather that their partiality must be recognized (273). This claim resonates with Haraway's (1988) advocacy of a politics of situatedness in knowledge production as a mode of feminist objectivity. In contrast to what she terms the "view from above, from nowhere, from simplicity" (589) in scientific enquiry that promises a false transcendence of the socio-discursive, she suggests that in situated knowledge production "partiality and not universality is the condition of being heard to make rational knowledge claims" (589). Thompson's critical consideration of listening alongside perspectives in feminist STS permits an understanding of material-discursive contingency a defining property

of listening itself—one that I argue opens up crucial possibilities for accessing the sonic past in feminist terms.

### **Echoic Re-Presencing**

An approach that embraces the critical perspectives brought forth in feminist STS enables one to discern unexpected glimmers of material-discursivity that can be extracted and refined even from Ernst's emphatically technical and anti-hermeneutic method. Indeed, his claim that "it *matters* that sonicity takes place as vibrational event that is distinct from mere symbolization" (24) seems to brush up against Barad's influential interrogation of how matter comes to matter, without taking on the generative intra-actions of matter and discourse that constitute the world in its becoming (2003, 823). In his aforementioned privileging of the material signifier over the acoustic signified (89), Ernst pries the material and discursive apart, insisting on the primacy of one over the other. In this final section, I suggest that it is the task of feminist media archaeology to challenge this false uncoupling and fan the flames of material-discursive potentials within media-archaeological methods. *Oramics: Atlantis Anew*, as an irredeemable entanglement of the technical signifier and the musical signified, offers a starting point for advancing such a practice.

Annie Goh's (2017) re-figuration of the echo offers a compelling model for material-semiotic thinking derived from sonically-oriented excavations of the past. She considers the emerging field of archaeoacoustics, which investigates the acoustic properties of archaeological sites in order to glean a better understanding of human activity that transpired in those locations in the past—a practice that Ernst extolls in his description of research expeditions to test and reconstruct the singing of the Sirens around the Li Galli islands off the coast of southern Italy (49). Given the centrality of listening and physical positionality in archaeoacoustic methods, Goh suggests that to this embodied listening might be added a Harawayian situatedness—an insistence upon the partiality and anti-universalism of knowledge production—although this potential has as yet gone unrealized in the field. She therefore proposes a feminist figuration of the echo as a means to open up new avenues of sonic knowledge production. For Goh, echo simultaneously denotes physical acoustic phenomena and its symbolic conception in the myth of Echo and Narcissus: a material-semiotic figuration (295). She further considers the way in which echoes do not simply mirror a sonic event, but rather produce proliferating plural displacements. Borrowing terminology from Barad (2007), echo is characterized not by reflections but by *diffractions*, which record interactions, interferences, and differences (Goh 2017, 292). As Goh describes: "echo—in the sense of *that which is reflected back*—can act as a disruption in what the knower knows, or believes to know, or be able to know" (297). A method that listens for echo would be attuned to the particularity and partiality of the scene of knowledge production; a situated, diffractive listening to the sonic past that rejects positivist certainty and remains willfully incomplete.

Echo thus affords intriguing possibilities when transposed as a critical consciousness into the context of media-archaeological listening, especially when considered alongside Sobchack's (2011) concept of re-presencing. She describes the primary focus of media archaeology as "the conditions under which the absent past can be said to have 'presence' in the present" (323). In contrast to interpretive modes of historical enquiry, she suggests that media archaeology performs what she terms "re-presencing" (in contrast to representing)—a material engagement with the physical traces of the past. According to Sobchack, presence is that which:

emerges not at the level of narrative and meaning but in meticulous *description*, which is, as potentially endless, always metonymically partial and open—and prior to the summary comprehension accomplished first by naming and then by interpretation” (326). Sobchack acknowledges that any attempt to communicate presence will inevitably entail some degree of interpretation: “the best one can hope for is [...] an oscillation between presence effects and meaning effects” (326). Just as the echo produces diffractions, rather than coherent reflections, of a sonic event, re-presencing does not aspire to coherently fill gaps in historical narratives in order to seamlessly rectify the original loss. The re-presented media object, even in its non-discursive materiality, exists in a state of palpable difference. As Sobchack describes: “although the metonymic fragments and traces of the past do not transport the past directly to the present, in their presence they do numinously reverberate with its absence” (326). Thus, presence is understood as partial and contingent; material traces allude to larger irrecoverable absences as well as their necessary otherness. The Oramics Machine, in its “not non-operational” state, might be understood as such a re-presented technology: it is located in, yet somehow distant from, the world of the present.

In terms of the feminist affordances of re-presencing, Samantha Shorey and Daniela K. Rosner (2019) have discussed re-presencing as a mode that might be extended to “people, locales, and histories of practice that might be brought back into being *along with* their associated artifacts” (9), particularly with regard to accessing under-recognized women’s labor. Satz’s approach in *Oramics: Atlantis Anew* aligns with re-presencing as a cinematic description, rather than narrativization, of the Oramics Machine. Further, her conversant and ventriloquial mode of enquiry certainly seeks to make manifest the presence of Oram herself. While the technical properties of the machine are foregrounded in *Oramics: Atlantis Anew*, Oram’s narration and music provide an evocative spectral accompaniment in excess of the materialist gaze. The aforementioned disunity between image and sound, the subtle rupturing of the audio-visual contract, undermines any possibility of ascribing neutrality to Satz’s close-up stationary camerawork. The eerie quality of Oram’s music further bolsters an atmosphere of the uncanny, as a long-lost machine is reanimated in the present *incompletely*—or to apply Sobchack’s terminology, the device emits numinous reverberations in its re-presencing. To describe this re-presencing as echoic, in Goh’s material-semiotic sense, is to understand such reverberations as diffractions, as disruptions that problematize the apparatuses of the media-archaeological ear. Echoic re-presencing is neither total nor neutral; rather it acknowledges the situatedness of listening to the past as a mode of sonic knowledge production. I suggest that the ghostly aesthetics in *Oramics: Atlantis Anew* seeks to amplify the partiality of its own perspective, lingering in and with gaps and losses in the making present of objects from the past. Therefore, Satz’s media-archaeological listening does not take place through a purportedly modest technological ear, an affectless making explicit of implicit sonicity, but rather as an echoic re-presencing.

## Conclusion

If media archaeology is understood as a practice of reading media objects against the grain of linear history (Huhtamo and Parikka 2011, 3), in this paper, I have suggested that such methods remain

available for feminist re-orientation, if one is prepared to read against the grain of media archaeology itself. The feminist extension of media-archaeological listening as echoic re-presencing that I propose is one that accounts for the situated nature of knowledge production in the performance of its material excavation; the historical object of study is re-presenced in the present in a diffracted form, an echoic trace that bears the audible marks of its re-presencing. Such a perspective does not seek to negate the material specificity of the media object in favor of hermeneutic analysis, but rather sounds its own partiality, interrogating the power structures implicit at every stage in its history and excavation. Satz's re-presencing of Oram's work has provided an opening to begin sketching these possibilities, however, even in this decidedly feminist project, many power grains remain untouched given the predominance of white women among the composers and inventors with whom Satz's has engaged throughout her oeuvre. Further feminist attention to Oramics might also interrogate the assumptions built into its methods and mechanisms; for instance, Oram's determination of which sounds are "equivalent" to her drawings ought not to be taken as an objective transduction, but rather in keeping with her culturally-entrained melodic preferences. I wish to conclude, therefore, with a call for further attention to points of productive friction between seemingly acrimonious materialisms—between archaeoacoustic positionality and feminist situatedness, between sonic and semiotic echoes—so that we might listen differently, listen simultaneously to the materiality and sociality of the sonic past and further interrogate exclusions from it.

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