A Tangle Near Silence

David Andrew Riedstra

Submitted in accordance with the requirements for the degree of Doctor of Philosophy

The University of Leeds

School of Music

September 2023

Acknowledgements

Abstract

This thesis is a byproduct of a program of practice research in which I used quiet sound to orient experience towards entanglement. I suggest that attuning to entanglement can offer situated, embodied, and active understanding thereof, which can in turn generate aesthetic appreciation for and facility for (intra-)action with multi-milieux mingling. My understanding of entanglement speculatively mingles Donna Haraway's sympoiesis, Karen Barad's intra-action, and Gilbert Simondon's transindividuation, and finds further company in the process philosophies of Brian Massumi and Henri Bergson, the queer phenomenology of Sara Ahmed, and the everyday aesthetics of Yuriko Saito. My research began by continuing my practice of composing music that uses extreme quiet in a performance setting to encourage embodied sensitivity to acoustic, physical, and social environments. My experimentation quickly broadened, partly owing to the pandemic, to include more diverse situations and practices. Thanks to the refractive and reflexive capacities of practice research, I investigated entanglement and process in my own experience as well as in the experiences I contributed to with my works. As a result, notions of speculation, discovery, byproduct, and feedback became central to my understanding of what it means, in Haraway's terms, to 'stay with the trouble'. In addition to various sonic exercises, software tools, situated techniques, and scraps of wood, as well as this thesis, my practice research produced a number of artworks: the compositions *Pith* for solo violoncello, *Common* for three players on one concert bass drum, and *Ripples* for solo percussionist; the interactive web scores *What's at Hand* and *Revelling in Mists of Constellations of Pine Points and Waltzes*; the wandering public sound installation *Pathside Box*; and the self-constructed tactile feedback sculpture *Haptic Box*.

Contents

Practice

The following practice files are included in the accompanying archive. At the time of writing, certain resources can be also accessed online at the provided URL; these are likely to change from the versions included in the archive.

Pith
- Score (PDF)

What's at Hand
- Web score (web code and audio assets)
  - Live: https://daveriedstra.com/whats-at-hand
  - Git repository: https://gitlab.com/daveriedstra/whats-at-hand
- Audio project files (Pure Data code and support files, audio recordings)

Revelling in Mists of Constellations of Pine Points and Waltzes
- Web score (web code and audio assets)
  - Live: https://daveriedstra.com/revelling

Table
- Score (PDF)

Pathside Box
- Project files (Pure Data and Bash code)
- Video recording (MP4)

Haptic Box
- Web score (Pandoc markdown source and generated web code)
  - Live: https://daveriedstra.com/works/haptic-box
- Project files (SuperCollider, Python, and Bash code; notes and diagrams as build aids)
  - Git repository: https://gitlab.com/daveriedstra/haptic-box

Common
- Score (PDF)
- Video recording (MP4)

Ripples
- Score (PDF)
- Video recording (MP4)

Other
- grains~ (Pure Data code)
  - Git repository: https://gitlab.com/daveriedstra/grains
- turns (Rust code)
  - Git repository: https://gitlab.com/daveriedstra/turns
- dried-utils (Pure Data code)
  - Git repository: https://gitlab.com/daveriedstra/dried-utils

Table of figures

Ways (with)in and (ab)out

> The task is to make kin in lines of inventive connection as a practice of learning to
> live and die well with each other in a thick present.[1]

Sound tangles well with Donna Haraway's injunction to practise ongoing sensitive and
creative connections with others and environment. Proposed not as a salve to ecological
catastrophe but as a method for carrying on with and despite it, her invective resonates
with a broad spectrum of thought which takes process and mixture as defining
characteristics. I find similarity between the organic sympoiesis by which Haraway
describes we 'become-with each other or not at all' and Karen Barad's intra-action, a
'radical re-working of the traditional notion of causality' which 'signifies the mutual
constitution of entangled agencies'.[2] Ongoing, active, and situated mutual constitution also
describes Gilbert Simondon's transindividuation, the process by which becoming an
individual produces self, other, and milieu in continued situated transduction.[3] Haraway's
biological orientation, already in the good company of Lynn Margulis, Anna Lowenhaupt
Tsing, and many others, finds further resonances with eco-materialist writing of Frances
Dyson and Timothy Morton.[4] Her attention to the boundaries of the body might also be seen

---

1. Donna J. Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham, NC: Duke University Press, 2016), 1.

2. Haraway describes sympoiesis simply as 'making-with', writing that 'nothing makes itself; nothing is really autopoietic or self-organizing. In the words of the Inupiat computer "world game," earthlings are *never alone*.' Barad continues her definition: 'the notion of intra-action recognizes that distinct agencies do not precede, but rather emerge through, their intra-action.' Haraway, 58; Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007), 33.

3. Simondon figures the individual as both byproduct and excess of a broader, pre-individual process of being. 'Being', Muriel Combes clarifies, 'always simultaneously gives birth to an individual mediating two orders of magnitude *and* to a milieu at the same level of being'. Muriel Combes, *Gilbert Simondon and the Philosophy of the Transindividual*, Technologies of Lived Abstraction (Cambridge, MA: MIT Press, 2013), 4; for more on transindividuation in my research, see 'About *Pathside Box*'.

4. Haraway, *Staying with the Trouble*, 5; Anna Lowenhaupt Tsing et al., eds., *Arts of Living on a Damaged Planet: Ghosts and Monsters of the Anthropocene* (Minneapolis: University Of Minnesota Press, 2017); Frances Dyson, *The Tone of Our Times: Sound,*

in the writing of Michel Serres, who describes the body as in a continual process of mingling with the world, a stance also taken by some recent research in embodied cognition.[5] Phenomenologists after and including Maurice Merleau-Ponty draw attention to the intra-action of human social and material flows, attuning to what Haraway refers to with 'material semiotics'.[6]

Sound, for its part, presents an appropriate modality for orienting experience toward entangled and situated process. Sound's multi-dimensional emanation in space implicates the listener in a relationship with that space. Dyson writes that 'sound is the immersive medium par excellence … in listening, one is engaged in a synergy with the world and the senses'.[7] While sound might be a medium in artistic terms, its behaviour in the world is vibration and movement, active, contingent, and participatory, and reveals the mixture of its participants.[8] Taking in sound by listening meets sound's terms in embodied activity embedded in an environment which it takes as extension.[9] Listening is thus a powerful technique for learning about one's environment, and is often used by practitioners with that goal.[10] But as a co-creative participant in that environment, the listener also produces and modulates sound in ways that are equally somatic and embedded. Sensitivity to sound, then, is sensitivity to ongoing, situated, and emergent becoming-with.

I use quiet sound to blend this variegated thought and explore entanglement through experience. The core problematic of my research is the experience of ongoing co-

Sense, Economy, and Ecology, ed. Roger F. Malina and Sean Cubitt (Cambridge, MA: MIT Press, 2014); Timothy Morton, *Dark Ecology: For a Logic of Future Coexistence* (New York: Columbia University Press, 2016).

5. Michel Serres, *The Five Senses: A Philosophy of Mingled Bodies (I)*, trans. Margaret Sankey and Peter Cowley (London: Continuum, 2008); for embodied cognition in the context of music, see Andrea Schiavio, 'Music in (En)Action. Sense-Making and Neurophenomenology of Musical Experience' (PhD thesis, University of Sheffield, 2014), http://etheses.whiterose.ac.uk/6256; for distributed cognition in general, see N. Katherine Hayles, *Unthought: The Power of the Cognitive Nonconscious* (Chicago: University of Chicago Press, 2017).

6. See for instance Monika M. Langer, *Merleau-Ponty's Phenomenology of Perception: A Guide and Commentary* (Basingstoke: Macmillan, 1989); Sara Ahmed, *Queer Phenomenology: Orientations, Objects, Others* (Durham, NC: Duke University Press, 2006); 'material semiotics' passim in Haraway, *Staying with the Trouble*.

7. Frances Dyson, *Sounding New Media: Immersion and Embodiment in the Arts and Culture* (Berkeley: University of California Press, 2009), 4.

8. As Serres writes, 'I do not wish to call the place in which I live a medium, I prefer to say that things mingle with each other and that I am no exception to that, I mix with the world and the world mixes with me'. Serres, *The Five Senses*, 80.

9. These are the four Es of 4E cognition: embodied, enacted, embedded, extended. Schiavio, 'Music in (En)Action. Sense-Making and Neurophenomenology of Musical Experience', 9–10; see also Mariusz Kozak, *Enacting Musical Time: The Bodily Experience of New Music*, Oxford Studies in Music Theory (New York: Oxford University Press, 2020).

10. For instance, Christina Kubisch's electromagnetic sound walks, sonic documentation work by acoustic ecologists such as Hildegard Westerkamp and R. Murray Schafer, the probing of acoustic and otoactoustic phenomena by Alvin Lucier and Maryanne Amacher, and Alex de Little's spatial listening. Tara Rodgers, *Pink Noises: Women on Electronic Music and Sound* (Durham, NC: Duke University Press, 2010); Brandon LaBelle, *Background Noise: Perspectives on Sound Art* (New York ; Continuum, 2006); Christof Migone, *Sonic Somatic: Performances of the Unsound Body* (Los Angeles: Errant Bodies Press, 2012); Alexander Paul De Little, 'Spatial Listening' (PhD thesis, University of Leeds, 2018), http://etheses.whiterose.ac.uk/23981/.

composition (transindividuation, sympoiesis, intra-action) in complex nexuses of multi- and inter-milieux mingling. I research these both by orienting my artistic work towards aesthetic encounters with entanglement and by attuning to entanglement myself in my own working. I generate embodied and enacted understandings of the mixtures of milieux: how one co-composes environments (social, acoustic, material, or otherwise) and how environments in different spheres co-compose. By engendering a sensitivity to these mutual becomings, I try to foster both an appreciation for environments that can lead to feelings of respect for and responsibility to them, and also a groundwork for a technique or skill of navigating entanglement as a constituent. Entanglement is quite a broad thing to study, especially considering the ubiquity that I suggest it has, but orienting towards mutual constitutions and ongoing inter-situating in the context of my practice has led to unlikely corners of thought and experience. Tangling near silence has led to, for instance, the empirical exploration of process philosophy via woodworking; the mixing of so-called new materialist thought with embodied cognition by way of digital and physical audio glitches; and meditations on discovery and transindividuation with a box in the woods.

A recurring quagmire of my project is accounting for one's effects: both my own practical techniques for enabling experiences of always affecting others, as well as the ways in which I and my own history cannot be extricated from my work. The impossibility of experiencing something without also affecting it, caricatured by the quantum observer effect and by John Cage's Sisyphean striving to remove himself from his work, folds back on Haraway's sympoietic emphasis on becoming-with and troubles the notion of letting-be.[11] Since everything observed is entangled with the observer, absolute letting-be is impracticable and better replaced by getting-along-with. Since these tangles are so impossibly dense as to preclude prediction of one's effects on them (intentional or not), techniques for staying with the trouble of entanglement are needed. Haraway gestures to a few such practices, two of which in particular I explore in my practice: situation and speculation. Situation as a technique pays mind to the effects of contextual entanglement on the activity taking place among it, and vice-versa: 'it matters what thoughts think

---

11. 'Like any good experimentalist of the modern era, [Cage] claimed to have attenuated his own role in his musical trials so that we might have direct, unmediated access to this world. And yet, his compositional practice contradicted this modernist ontology of nature at every turn by actively forming that world that he purported merely to discover.' Benjamin Piekut, 'Chance and Certainty: John Cage's Politics of Nature', *Cultural Critique* 84, no. 1 (17 August 2013): 135.

thoughts'.[12] Speculation imagines alternative possibilities and orients activity towards their bringing-forth.[13] What regulates speculation from escaping into flights of fancy or crashing down with the weight of contingency is an active feedback loop between the idea and ongoing attempts to bring it about.[14]

Researching by way of sonic artistic practice, I traverse this territory with a similarly diverse assemblage of techniques. Woodworking, circuit building, creative and utilitarian coding, double bass practice, modular synthesis, skateboarding (briefly), and even occasionally pen-and-paper composition mingle and merge. Their byproduct—concert works ranging from a cello solo called *Pith* to a pithy one-paragraph text score, sound sculptures and web installations for multiply sharing space, open-source software and hardware, and a stream of sonic artefacts channelled to a small online community— speculatively returns to the contexts which fostered and continue to foster them.[15]

Suitably, the field of this research project is the mingling of a number of contexts. Its theoretical backing draws on process philosophy, phenomenology, embodied cognition, and everyday life studies.[16] My artistic practice is influenced by adjacent experimental musics: the quiet associated with lowercase music, Wandelweiser, and Onkyokei; the slowly unfolding sonic minutiae of drone and noise music as well as certain meandering or quasi-repetitive chamber works; and 'generative' processes of artists such as Ryoji Ikeda and Alice Eldridge. The many forms of my practice's output engage in a variety of situations. Its artistic output is presented in new music concerts, as web art, and as public sound art, and its tools and studies participate in communities of experimental electronic music, DIY, and open-source practitioners.

The following chapters consider this practice research. The longest meditates on practice in process, moving through various modalities of my work to explore what might

---

12. Haraway, *Staying with the Trouble*, 35.

13. I do not relate artistic and financial speculation; for that, see Marina Vishmidt, *Speculation as a Mode of Production: Forms of Value Subjectivity in Art and Capital* (Leiden: Brill, 2018).

14. For more on feedback and speculation, see 'About *Ripples'*.

15. My use of the word 'byproduct' (and near-synonyms like 'debris' and 'artefact') is intended to link intentional and unintentional effects of entangled intra-action with milieux. Unintentional effects can be just as profound or relevant as those that are intended, and orienting toward the effects one imagines or hopes can draw attention away from what is actually happening. In particular, by using 'byproduct' with reference to aspects of my own work I hope to unsettle the priority of its designated output objects (compositions, artworks, thesis paper, neatly delineated findings) and gesture towards effects which would otherwise be considered incidental: tools, prototypes, techniques, social relations, and importantly, experience. These latter as much as the former recirculate in the various ecologies of my practice, humus that supports its continued activity.

16. Among others; a notable exclusion here is sound studies, which likely emerged as an effect of focusing on synthetic experience.

be left behind by focusing on the work's artworks. Spending time in my practice reveals the interaction of its different flows, a way to attune to an aesthetic experience of everyday process, the debris it generates and consumes, and certain effects that come (from being) out of practice. By attuning to process, I don't mean to rule out its more stable moments, and the pieces I made each have a chapter in turn. I carry on my practice of composing for very quiet acoustic performance with the cello solo *Pith* (2019), feeling out the enacted connective tissues between sense modalities, semiotic situation, and the material environment. This entanglement turns to the everyday in *What's at Hand* (2020), an interactive web-based score which mingles quiet audio glitches, ready-to-hand devices, and public space to generate timbres of digital, social, and physical materiality. I wrestled with my own entanglement in situation in the early coronavirus lockdowns, producing the situated 'tape' piece *Revelling in Mists of Constellations of Pine Points and Waltzes* (2020) as an incidental trace with its own potential for aesthetic discovery. *Pathside Box* (2021) creates similar potential as a transient public sound installation, drawing my attention towards the feedback that the byproduct of previous practice generates even as I try to generate a sensitivity to similar becoming-with by way of those byproducts. Quotidian 'relational material-semiotic worlding' becomes tangible in the creation of *Haptic Box* (2021–22), a web-based refractive instruction set for building a tactile feedback sound sculpture.[17] Such worlding is also played out by the performers of *Common* (2021) as they relate their real-time decision making through mutual contact with the skin of a bass drum. I carry on this tactile mingling with the text score *Ripples* (2022) for solo percussionist, exploring the possibilities afforded by speculation and image.

Though drawing provisional lines around ideas is a necessary part of the abstraction-process feedback loop, a concise ending and straight narrative would be anathema to the thrust of this project, through which I instead hope to emphasise situated, multi-modal, distributed, and unfinished ways of knowing and practising.[18] Rather than a linear path through these chapters that leads to a concise conclusion, I suggest a mobile approach, following connections across the chapters and indulging slippages between the text, the portfolio, its documentation, external resources, and even some of the contexts in which the work took place. This approach is inspired by works such as *Milles Plateaux* and *A Pattern*

---

17. Haraway, *Staying with the Trouble*, 13.
18. For more about abstraction, see 'About *Ripples*'.

Language and the inter-document fluidity of everyday hypertext.[19] Moving within and about these works is a way to generate familiarity with its territory and to 'know the thing in knowing, in continually and presently moving toward it'.[20] To a hopefully sensible degree, the text enables and performs this meandering, presents explicit and implicit links and nods between chapters, retreads ground from different angles, and gestures out to contexts in which the work that it describes was (and is) practised. In doing so, the text enables the generation of situated and ongoing knowledge that is known in its exercise, through active relation to the contexts that participate in its generation and use even as it contributes to the knower's participation in those contexts. There is therefore no concluding statement delineating discrete outcomes. Instead, I encourage readers of this text to follow its links and to be sensitive to resonances they discover; to jump between points, craftily switch contexts, revel in odd and surprising conjunctions, and 'make lines of inventive connection'—as I endeavour to do in my practice.[21]

> In fact, staying with the trouble requires learning to be truly present, not as a vanishing pivot between awful or edenic pasts and apocalyptic or salvific futures, but as mortal critters entwined in myriad unfinished configurations of places, times, matters, meanings.[22]

---

19. Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi, 2nd ed. (Minneapolis: University of Minnesota Press, 1987); Christopher Alexander, *A Pattern Language: Towns, Buildings, Construction*, Center for Environmental Structure (New York: Oxford University Press, 1977).

20. Salomé Voegelin, *Sonic Possible Worlds: Hearing the Continuum of Sound* (New York: Bloomsbury Academic, 2014), 4.

21. 'The Greek *metic* should be thought of alongside of the Latin *métis*, the French *métissage*, which designate various mixings, various combinations, odd, often surprising, conjunctions.' Dan Mellamphy and Nandita Biswas Mellamphy, 'An Algorʰythmic Agartha or the Underworᴸd of Underᵀones' (Tuning Speculation II, Toronto, 7 November 2014), http://vimeo.com/117054449, 35:10; Haraway, *Staying with the Trouble*, 1.

22. Haraway, *Staying with the Trouble*, 1.

Practising process, processing practice

The other chapters of this document coalesce around single works in the portfolio. Jumping between these chapters, connecting any point to any other, is a fine way to navigate the tangle of my work over the past few years, but focusing on product risks eliding variegated exploratory processes from which seemingly independent artefacts depart. And while it may be apparent from these pieces' diversity of form the similarly diverse ways of working that generate them, there is much of practice and process that is not expressed by their artefacts. Spending time feeling out the tone of their time by orienting this chapter towards process allows me to bring into scope these other expressions. Starting in the middle, I can address the relationships between the various practices that make up my research, and similarly between that multifarious research and would-be 'external' entanglements including environments, situations, and communities. These tangled tangles produce more than just the works in the portfolio: software and hardware tools, sonic exercises, scores written for no audience, and embodied knowledge are products of this work which would take a backseat in an artwork-oriented discussion but which are critical to the unfolding of artistic work. Similarly, mingled and mingling processes invoke their temporal nature. My artistic research labour participates in a particular moment (era, zeitgeist, vibe) that conditions it, is expressed by it, and is formed by it as they both continue their intra-active becoming. That this work has a durational property is also brought into scope, allowing for the consideration of embodied phenomena such as lived-in-ness and forgetfulness, and gestures towards a notion of out-of-practice research.

Understanding my practice as polymingling situated and enacted practi*sing* is a reflexive and refractive move. Attuning to entangled process myself better enables me to offer similar experiences with my work, meaning that the method of working is analogous to the method of taking in the work. I better understand aesthesias of sympoiesis by encountering and enacting them in my practising. Through these encounters, I learn things such as that entangled encounters are enacted and that speculated situations generate contingent feedback, and I learn them in ways that are contextualized and embodied (though reading the same in the works of writers such as Andrea Schiavio, N. Katherine Hayles, and Jonathan de Souza helps to prime sensitivities).[23] This situational, embodied, entangled knowledge thus guides my work both as a goal and as a method. It both is and isn't teleological: the high level of contingency in the experiences I try to bring out means that a similarly high level of play and open-ended experimentation is needed in order to discover what might 'work' to do so. (And that exploration is also reflexive, being both an element of my method and of the experiences it brings about.) As with the pieces, the effects of the practice's method and learning outcomes return to its flow as constituent, transindividuating processes.

This chapter will take a look at practice as situated activity that I have performed in and as the course of this research. In the process, I invoke ideas from (new) materialism, process philosophy, and other critical theory. While doing so might be an oblique way to explain what from this thought influences my work, it's no less oblique than in the chapters which start with discrete works, since the way that this thought makes its way into the pieces is through the work*ing*. Though this chapter orients towards process, I hope not to disavow objects entirely, and don't think I do any more than I disavow process in the piece-oriented chapters; both objects and process participate in both discussions. (It's even arguable that discussing processes actually proliferates objects by naming, isolating, and abstracting flows, thereby hypostatizing them in a similar and inverse way to understanding objects as metastable moments in material processes.)

At the same time, this introduction's own pitting of process against object sets up a potentially limiting dualism. Such binaries are not new, even in process(-oriented)

---

23. Schiavio, 'Music in (En)Action. Sense-Making and Neurophenomenology of Musical Experience'; Hayles, *Unthought: The Power of the Cognitive Nonconscious*; Jonathan De Souza, *Music at Hand: Instruments, Bodies, and Cognition*, Oxford Studies in Music Theory (New York: Oxford University Press, 2017).

philosophy: I'm influenced by Henri Bergson's analysis-intuition, Erin Manning and Brian Massumi's entrainment-entertainment, Gilles Deleuze's striated-smooth, and Serres's hard-soft. Maintaining these binaries risks generating a simplistic and restrictive ontology which reinforces a circularity that closes off possibility and difference. Indulging in process as a corrective to potential problems of object-orientation would perform a similar reaction as political anti-violence which Salomé Voegelin, citing Étienne Balibar, suggests 'traps the possibility of politics within their incompatibility, from which even a revolutionary counter-politics does not escape, but which it only reaffirms, as "merely its echo"'.[24] In other words, an opposition to problematic fixity sets up a schema which is itself already too fixed.

One way that I try to unthink this binary trap is with transindividuating feedback. My understanding of transindividuation is informed by resonances I read between Simondon's ideas, Barad's intra-action, and Haraway's sympoiesis. Each of these concepts expresses with different valences the becoming-with of objects, actors, and organisms, taking and giving, enacting boundaries even in their crossing, situating and being situated. Feedback inheres in this 'semiotic material involution' as the effects of previous becoming become situation for ongoing becoming.[25] Momentary stabilities in this complex interaction of flow can be thought of as its objective aspect, what in sonic feedback would be the development and sustaining of an oscillation, a resonance supported by and interacting with contexts of more and less fluid movement. 'Objective', then, refers not to a notion of concrete factuality but a local aspect of a process, in that these resonances (whether in physical material that settles into a shape or in patterns of thought that circle around an idea or in social behaviour designating a piece of music) generate affordances commonly associated with physical things.[26]

One of those affordances is analytical readiness, enabling one to refer to a locality, designate a boundary, and refer to it as an 'it'. An effect of this analysis is a sundering of the resonance-object from the environment of movement that makes it and to which it contributes. So analysed, the object is experienced as a given unit, detached from its conditions of origin, sustenance, and effects. In this way, objects can be understood both as

---

24. Salomé Voegelin, *The Political Possibility of Sound: Fragments of Listening* (New York: Bloomsbury Academic, 2019), 17.

25. 'Critters do not precede their relatings; they make each other through semiotic material involution, out of the beings of previous such entanglements.' Haraway, *Staying with the Trouble*, 60.

26. Object as an aspect of process follows Massumi's 'activist philosophy' outlined in *Semblance and Event: Activist Philosophy and the Occurrent Arts*, ed. Erin Manning (Cambridge, MA: MIT Press, 2011).

an aspect of their constituent and continuing flows and as byproducts thereof: artefacts, debris. An object's distinction from its environment is not a property of the object but a process of analysis enacted in relation to the environment, which means that that sundering can be experienced, as can the interaction with the processes that sustain the object's resonance. From this perspective, my interest in the present research project is to afford aesthesias of the transindividuation between process and object to foster and maintain embodied familiarity with their interplay, both in the process of the material that supports the object and in the process of actively objectifying (analysing objects and also being-becoming objects, object-ing).

Rolling up object and process in the other attempts to unthink their binary not by exploding it into plurality but by reducing it to one, thereby rendering both terms compatible expressions of the same thing, but I'm not sure that this figuration entirely undoes the binary. In one sense, understanding process and object as two aspects, phases, or expressions of being-becoming affords new ways of experiencing-thinking how these aspects transductively (in)form each other and themselves. But understanding everything as the same stuff and process risks a homogenizing monism that calls out to Dyson's 'count-as-one', a coercive reduction that Voegelin describes as unifying a multiplicity and suppressing other possibilities.[27] (On the other hand, sometimes there are simply one or two things.) Maybe there are other aspects worth tangling into or out of the provisional process-object dyad. I have made no effort to account for the spiritual, supernatural, or weird, and I have left transparent any distinction between milieux of processes, planes thereof, or the manner of their intra-action. But ultimately, the intent of this research project is to bring (ab)out tangled and processual *aesthesias* for others and for myself, not primarily to write about them or to rehash an ontology. Writing (this document and the unseen volume of notes behind it) serves to generate a trace and diagram of those experiences and, like reading, as a way to exercise facility with thought generated by them, through playful sharing of time and space.

---

27. Voegelin, *The Political Possibility of Sound: Fragments of Listening*, 20.

Practising roots

My orientation towards quiet sonic experiences of sympoietic becoming stems from a history of disciplinary practice in both music composition and instrumental performance. For a long time I considered these parallel but distinct activities: composition was where I did my critical and conceptual work while playing was something I did just for enjoyment. Even when the two crossed paths and I played in a performance of my own composition, I still considered them separate. However, instrumental practice as a hands-on interaction with sound not only predates my work as a composer but underwrites it. This is particularly apparent and relevant when considering that a primary mechanism that I use to enable entangled acoustic encounters is active participation in a socio-sonic situation.

I play contrabass, a practice that enables in-the-moment embodied relating to the manipulation of sound and of musical interactions. Particularly when bowing a large resonant instrument, I feel the interplay between my actions and the material environments I affect. As I draw the bow across a string, I experience through sound and through touch various elements of the interaction: more stable components such as the weight of the bow, the acoustic affordances of the wooden body, and the characteristics of the strings, as well as more variable entanglements like the ambient humidity of the room, the evenness of my rosin application on the bow, and my body's current state of muscle soreness and limberness. Through experiences like this, I understand shaping sound not to be a simple matter of executing certain actions, but a responsive negotiation of an entangled, complex, contingent feedback network of environments, actors, pasts, and others.[28]

My instrumental practice also allows me to experience the navigation of social entanglements through musical ensemble performance. Playing new music composed by other people enables me to come to the new social relations that a score might perform for the first time. Occasionally playing in my own pieces lets me experience the challenges I set before my performers. When I prepared]   [(2016) with Cathy Fern Lewis and Christopher Reiche and ‖|‖|‖‖|‖|‖||‖||‖|'||||||||‖|‖||||‖| (2016) with Annette

---

28. I relate a great deal to Naomi Cumming's description of sustained tone in *The Sonic Self: Musical Subjectivity and Signification* (Bloomington: Indiana University Press, 2001).

Brosin, I felt what it meant to memorize a volume of material and jump from point to point within it, both in terms of doing those things live as well as the long duration needed to actually form a technique of it.[29] Effectively memorizing those pieces moved the technique of performance further into the performer body and the long relating between performers in their rehearsals, generating immediate real-world effects like joy and frustration and camaraderie and bitterness. Curtailing rehearsal periods in the name of efficiency, as is the norm for much of contemporary music, largely prevents these effects (but the use of open navigation of scored material is still possible and generates relevant effects, as I discuss below with respect to *Common*).

In these ways and others, my own relating to the manipulation of sound with an instrument and through sound to others is a practice of embodied and enacted thinking-through-doing comparable to what I want to enable in the experiences of my composition and sound art. This enacted thought is performed through negotiation of relationships between my body and its environments as it and I participate in social, material, acoustic, and other situations, embedded in and contributing to them. As I relate to these mingled modes of multiple milieux, my body becomes a mediating environment through which I connect to them.[30] Simultaneously, I generate facility with aspects of the environments through which I assert and receive influence, which then become like a part of my body.[31] (For example, things in the environment like my bass, cultural traditions like composer-performer relationships, and social affordances like mutually understood affective signals.) In this way, thinking is performed through active relating with various environments, and therefore these environments actively participate in the thinking.[32] Sensitivity to this

29. Dave Riedstra,]   [, 2016, https://daveriedstra.com/scores/Riedstra%20-%20%5d%20%5b.pdf; Dave Riedstra, ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖, 2016, https://daveriedstra.com/scores/Riedstra%20-%20%7c%7c%7c%7c%7c%7c%7c.pdf.

30. The thinking body-subject and the effects of both having and being a body are generally associated with Merleau-Ponty. Langer, *Merleau-Ponty's Phenomenology of Perception*.

31. As always, the body's boundary is political, and its relation to technology represented by cybernetics is no exception. Cy. Jillian Weise points to the cyborg in mainstream philosophy as a figure used by able-bodied writers who have largely failed to take into account the perspectives of physically disabled people who live the cyborg's radical entanglement with material environments. Cybernetics also resonates with a problematic group of ideologies that Timnit Gebru and Émile Torres call 'TESCREAL': transhumanism, extropianism, singulatarianism, cosmism, rationalism, effective altruism, and longtermism. Alice Wong, 'A Very Kind Conversation Between a Cyborg and Some Biohackers', Disability Visibility Project, 6 October 2020, https://disabilityvisibilityproject.com/2020/10/06/a-very-kind-conversation-between-a-cyborg-and-some-biohackers/; Émile P. Torres, 'TESCREALism: The Acronym Behind Our Wildest AI Dreams and Nightmares', Truthdig, 15 June 2023, https://www.truthdig.com/articles/the-acronym-behind-our-wildest-ai-dreams-and-nightmares/; For a consideration of a musical instrument becoming as part of the body, see Jonathan De Souza, 'Beethoven's Prosthesis', in *Music at Hand: Instruments, Bodies, and Cognition*, Oxford Studies in Music Theory (New York: Oxford University Press, 2017).

32. De Souza draws out the connection between Merleau-Ponty's theory of embodiment to instrumental affordances, suggesting that Beethoven was able to continue playing piano and thinking 'in' twelve-tone equal-temperament despite severe

profound entanglement is one of the things I try to explore and spend time with in my composition and sound art work.

Thinking as decentralised from the mind and performed in the body's active relating with its environment means that this work suffers when reduced to text or sound: it must be actively experienced. As when scaling a mountain or learning to swim, putting the body into relation with an environment allows for the taking up of otherness generated by that relating into the body in the form of habit, skill, technique, or embodied knowledge. Deleuze describes learning to swim in choppy water as the *combination* of a body with a wave that brings difference and otherness into 'the repetitive space thereby constituted', which is to say the body-environment combination in the practice (practising) of swimming, by which the swimmer learns better to swim.[33] The ability to swim, then, or any other technique, is not a learned set of actions selectively performed in response to scenarios, nor even a distilled mental model of the task filtered through the body to the mind.[34] It is a familiarity with being *combined* with an environment—intra-active mingling, sympoietic tangling, transindividuating embedded co-creating—and what it is like to move in and with it.

Practising bass, I enact this mixing. Through playing, I practise sensitivity to interactive participation with sound, collaborative group dynamics, and the combination of body, instrument, bow, seat, floor, humidity, room reflections, HVAC sound, the feeling that passers-by can hear what I'm playing, the memory of the smell of previous rehearsal rooms. Researching these tangles and tanglings involves playful exploration and sustained activity. Taking on the otherness that learning a technique requires requires me to be open, fluid, pliable, and also curious and explorative, going in unforeseen directions sometimes and spending time in a place others. Through directed and open-ended instrumental practice, I become familiar and fluent with entangled situations my other work might offer.

---

hearing loss because 'motor habits are perceptual habits'. De Souza, 'Beethoven's Prosthesis', 20; Hayles points to biological evidence for non-conscious cognition distributed throughout the human body and postulates a cognitive ecology including 'cognitive assemblages' of organisms (humans, animals, and plants) and technical systems. Hayles, *Unthought: The Power of the Cognitive Nonconscious*.

33. Gilles Deleuze, *Difference and Repetition*, trans. Paul Patton, 2nd ed. (London: Continuum, 1994), 23.

34. Serres explores this mixture by playing with the old empiricist adage 'there is nothing in the mind that has not first been in the senses' throughout *The Five Senses*, before stating in *Variations on the Body* that 'there is nothing in knowledge which has not been first in the entire body. … We don't know anything or anyone … until the body joins in a dance with its demeanor'. Steven Connor and Michel Serres, 'Introduction', in *The Five Senses: A Philosophy of Mingled Bodies (I)*, trans. Peter Cowley and Margaret Sankey (London: Continuum, 2008), 5–6; Michel Serres, *Variations on the Body*, trans. Randolph Burks (Minneapolis: Univocal, 2012), 70.

I had intended on maintaining that practice during my research at the University of Leeds. Since my work at the university was initially supposed to take place in England and thus on the other side of an ocean from my home, I was separated from my own instrument and rehearsal situation and I needed to rely on the university's affordances for my practice. However the university's basses were under-maintained to a point of being barely useable and the practice situation was too competitive to support a meaningful pattern of practice. As a result, my double bass playing dwindled to a barely active level.[35] My work turned to more textual research and traditional composing opportunities (leading among other things to *Pith*). When the COVID-19 pandemic hit and I returned to Canada in March of 2020, I returned to a small apartment among small apartments in a small apartment building: not a suitable situation in which to play (or even store) a large, low, resonant instrument.[36] Instead, I continued my nascent work in electronic music techniques with Pure Data.

Playing with electronic audio

Working closely with computers has been a valence throughout my life. Though the two had occasionally met (for instance, in works like *802.11* (2016–2018)), I had generally preferred to keep computing separate from my sound and music work.[37] However, as can be found in the portfolio, electronic technologies quickly and lastingly joined the techniques I used in this project. Computer music allowed me to continue my work when, after moving to Leeds, I found it difficult to find opportunities to work with performers. It enabled me to sonically experiment with an immediacy similar to playing an instrument, which I didn't have ready access to. It afforded the presentation of sound-oriented work in relevant contexts, putting the user-listener in closer contact with the materiality of devices already at hand, with unlikely encounters of inanimate objects in the outdoors, and with the intentional shaping of objects. But again an orientation to the portfolio work risks occluding the more fluid process that generated them. The affordances of electronic audio systems are contingent on my capacity to work with the technology, a capacity which is primed by my

---

35. I mention this not to chastise anyone for the disregard of the university's instrument fleet, but to gesture towards the entanglement between process(es), situations, practice, work, and works.

36. Before beginning research at the University of Leeds I had rented a room at a nearby rehearsal studio for this purpose and practised in a concrete basement alongside metal bands and dance music producers. When I moved to Leeds to begin my research, I loaned my instrument to my friend Joel Saunders, who took good care of it (thanks Joel). At the beginning of the pandemic there was no option to return to renting a rehearsal space and the particular studio I had previously rented has now closed.

37. Dave Riedstra, *802.11*, 9 March 2018, sound installation, https://daveriedstra.com/works/802-11/.

personal history but which also depends on a continuing use and exploration of the tools. Thus an important aspect of the history of this project is the play and experimentation I carried out between and around the portfolio works: the fascia or pith holding them together.

Open-ended, sensing, meandering, and risk-taking, play can generate technique through an increase of familiarity with situated interaction. Play displaces skill's goal-directedness with a motivation based in sensitivity, discovery, and enjoyment. Rather than abstract the sensations generated by one's actions to a result related to some goal, play's guideposts are the experience of the interaction itself: the enjoyment, wonder, or curiosity that the activity brings in the moment. Like Yuriko Saito's everyday aesthetics, play is active and involved participation with the problem space the player explores, but oriented towards experience and discovery rather than by the efficacy motivating many everyday interactions.[38] Through participative involvement in their environment, the player experiences effects of their actions as ripples refracted by the world back to them, which they spend time enjoying by discovering what and how they propagate. Indulging in this discovery means to spend time retreading the same entanglement of self with environment, a repetition which always involves the newness generated by the learning and curiosity sparked by previous and ongoing encounters there. This repetition for its own sake takes up the difference it generates into the body of the player in the form of effects like familiarity and muscle memory which begin to constitute a technique for navigating, modulating, and generating similar entangled effects as those spent time with in play.[39] In this way, play shares its experimental method with the Adornian essay, which Voegelin writes 'encourage[s] a desire to know the thing in knowing, in continually and presently moving toward it' and whose products 'in their imagination can influence how we understand sound to affect the way we perceive the work and the world'.[40] This sensitive

---

38. Which is not to say that in that aesthetic orientation play mimics the remove endorsed by what Saito calls 'paradigmatic art'. Play's aesthetic appreciation 'concerns *the way in which* all [its object's] sensuous aspects converge and work together' like Saito's everyday aesthetics, but play also sets up a frame and rules of interaction in a similar way to practices of paradigmatic art. (Unlike with paradigmatic art, really experimental play is happy to change its frame and rules of engagement on a whim, making it also like a dream.) Yuriko Saito, *Everyday Aesthetics* (New York: Oxford University Press, 2007), 27.

39. Mariusz Kozak writes that 'kinesthetic knowledge is a contextual enactment of the dynamics, affectivity, and intercorporeality of our bodily involvement with the world … it constitutes a dialogue between habit and novelty.' *Enacting Musical Time*, 127.

40. Voegelin, *Sonic Possible Worlds*, 4.

experimentation that generates a familiarity and technique of being in the world is also an aspect of the experiences I hope to enable in my work.

My experimental electronic audio research continued from my position of general computing fluency and from specific strengths within it owing to my previous work as a software developer. While I was broadly familiar with acoustic and electroacoustic principles, I was less so with idiomatic techniques of electronic audio, and found that I approached the practice from the perspective of a coder. One of my guiding intentions during the period of exploration that took place during the first few lockdowns was to familiarize myself with standard synthesis techniques, enjoying their sound, building facility with their terms, and keeping an ear open for ways in which I might work with them to facilitate sensitive entangled environments in my sound art work.

My computational bias manifested in a few ways: a tendency to think of audio as a stream of numerical values which can be subjected to mathematical or analytical operations, an obsession with code and patch cleanliness and reusability, and an attraction to generative systems (notwithstanding an ambivalence towards particular pitch class sets or harmonic relationships).[41] To broaden my understanding and explore synthesis idioms, I experimented with audio rate frequency and amplitude modulation with drones to better hear the generated sidebands, recreated a chime sample using additive synthesis, developed a Karplus-Strong plucked string voice, used both as software instruments to hear their interaction and behaviour over a range of pitch and dynamics, and played with granular synthesis, filters, delays, and feedback.[42] To experiment with developing systems that integrate these techniques, I built replicas of instruments from descriptions of them, including Catherine Lamb's Secondary Rainbow Synthesizer, the 4ms Spectral Multiband

---

41. Dave Riedstra (@driedstr@vis.social), 'This Patch Selects Frequencies from Environmental Sound and Plays Them Back as 3.5-Second Sine Tones.', Mastodon post, *Vis.Social*, 1 September 2020, https://vis.social/@driedstr/104790487865481996; Dave Riedstra (@driedstr@vis.social), 'Exercise: #generative #sound Thing, No Subpatches, No Sends, Keep It Legible.', Mastodon post, *Vis.Social*, 28 October 2020, https://vis.social/@driedstr/105114906726780056.

42. Dave Riedstra (@driedstr@vis.social), 'Getting Lost in FM & AM Drones', Mastodon post, *Vis.Social*, 31 August 2020, https://vis.social/@driedstr/104785450786565076; Dave Riedstra (@dried@fosstodon.org), 'Not My "Primary Research" but Some Fun Sounds.', Mastodon post, *Fosstodon*, 11 August 2020, https://fosstodon.org/@dried/104672052248318886; Dave Riedstra (@driedstr@vis.social), 'Been Working on a #PureData Granular Synth Abstraction for Months and It's Almost Ready for a 0.1 Release.', Mastodon post, *Vis.Social*, 13 September 2020, https://vis.social/@driedstr/104855410941266850; Dave Riedstra (@driedstr@vis.social), 'Classic Filtered Noise Study Can Be Spooky.', Mastodon post, *Vis.Social*, 16 October 2020, https://vis.social/@driedstr/105045196797752775; Dave Riedstra (@driedstr@vis.social), 'This Patch Takes the Amplitude Envelope from the Environmental Sound (Slightly Shaped) and Runs That through Three High-Pass Filters before Playing It Back into the Environment Heavily Amplified.', Mastodon post, *Vis.Social*, 24 September 2020, https://vis.social/@driedstr/104921661539110695.

Resonator, the Serge Resonant Equalizer, and the Xaoc Odessa additive oscillator.[43] While I don't think my affinities towards sanitary code and generative systems have changed, my understanding of conventional audio processes seems to have broadened.

The synthesis conventions I explored are ossified intersections of flows joining across multiple milieux. Interacting with the basic terms of electrical flow, such as the capacitance of a certain point in a circuit, can become a technique called 'filtering' through repeated use, discussion, and documentation, activities which interact with socio-economic impetus, aesthetic taste, play, privilege, ecological resource exploitation, and so on. In a similar way, my discovery and practice of electronic audio techniques (and I suppose anyone's, including their early proponents) ossifies into a similar semi-stable thing variously called skill, familiarity, or knowledge. My development of these skills also had a tangle of contextual influences: discussing techniques and books like Allen Strange's *Electronic Music* and Curtis Roads' *Microsound* with my close friend Mitch Renaud kept those ideas in the air, exercised our conceptual fluidity with the ideas, and shared our experience; posting my experiments online garnered feedback from other experimentally-minded electronic musicians who became a community to work within.[44]

As I developed familiarity with digital and electronic audio through experimental learning, technique generated objective things-in-the-world which afforded its exercise. At first these were just reusable bits of code ('abstractions' in Pure Data parlance) for often-repeated operations. As I collected more of these snippets, I needed to keep them organized and remind myself of why I had them and how I used them, so I wrote some documentation. Once documentation existed, it was simple enough to give these abstractions the name `dried-utils` and share them online for others to use.[45] While and after reading *Microsound* with Renaud I developed a granular synthesis engine for

---

43. Dave Riedstra (@driedstr@vis.social), 'A Quick Recording of a Recreation of Cat Lamb's Secondary Rainbow Synthesizer.', Mastodon post, *Vis.Social*, 28 August 2020, https://vis.social/@driedstr/104767285091601683; Dave Riedstra (@driedstr@vis.social), 'Bonus #beepboopvember Post Because the Past Few Days Haven't Been Hugely Productive.', Mastodon post, *Vis.Social*, 6 November 2020, https://vis.social/@driedstr/105165663048582001.

44. Allen Strange, *Electronic Music: Systems, Techniques, and Controls*, 2nd ed. (Toronto: Responsive Ecologies Lab, 2022); Curtis Roads, *Microsound* (Cambridge, MA: MIT Press, 2004).

45. Though I'm not sure anyone does, the abstractions being somewhat rough and embodying some of my own idiosyncratic approach (some of the socio-technical contingency of this set of tools). The source code for dried-utils is included and can also be accessed at Dave Riedstra, 'Dave Riedstra / Dried-Utils', GitLab, 15 September 2021, https://gitlab.com/daveriedstra/dried-utils.

Pure Data called `grains~` to more easily apply the concepts we were reading about.[46] I intentionally conceived of `grains~` as a tool that I was making for myself and for others to use (having observed a lack of similar options in the Pure Data ecosystem), so I approached its design in such a way as to keep it flexible and friendly.

Through writing `grains~` I felt and enacted various ways in which tools as objects are shaped by their contextual flows: the time it takes to build them, the traditions and idioms in which they operate, the personal conditions of their authors, and the work they are made for. As with the experimentation that led to the birdies section of *What's at Hand*, working on `grains~` put me in intimate contact with the materiality of Pure Data's signal processing. Through this process of work, I became familiar with Pure Data's unique approach to polyphony, I synchronised control-rate messages with audio buffers across multiple sub-patches, and I implemented a circular buffer that took advantage of some of Pure Data's table affordances. I used `grains~` in a number of different projects: demonstrations of `grains~` itself and other tools, processing in *Revelling of Mists of Contellations of Pine Points and Waltzes*, and in more recent explorations of Jaap Vink's iconic ring modulated tape delay feedback.[47] I was pleased that some online connections also tried out `grains~`. In both their uses and mine, though, `grains~` exhibited some particularities that made it impractical for general use. In the first case, `grains~` performed poorly, consuming too much processing power. A major culprit is overuse of audio-rate processing when control-rate processing would suffice. To address this, I implemented selective disabling of audio-rate processing for inactive grain voices, which reduced the processing load noticeably but the performance was still poor. There might be improvements possible through refactoring (reorganizing the internals while retaining similar functionality), but certain aspects of Pure Data's own architecture (running its user interface and networking on the same thread as its audio processing, as well as its generalist design) limit how well `grains~` can perform while retaining its own flexibility. Simultaneously, the per-voice DSP toggling introduced new audio glitches resulting from

---

46. For more about grains~, see the included source code and Dave Riedstra, 'Grains~', accessed 22 September 2023, https://daveriedstra.com/code/grains/.

47. Dave Riedstra (@dried@sonomu.club), 'Recently Discovered the "Random Step" Mode in the M32 Sequencer...', Mastodon post, *SoNoMu.Club*, 23 February 2021, https://sonomu.club/@dried/105777770762365936; *Four-Tap Grampler*, 2022, https://vimeo.com/694369730/f493fbb41b; Dave Riedstra, '2022-11-24', *Debris | Dave Riedstra* (blog), 24 November 2022, https://daveriedstra.com/debris#2022-11-24.

the DSP engaging or disengaging at the wrong times. I was able to fix some of these 'gremlins' in turn, but not entirely eradicate them.

Throughout all of this I was falling out of love with Pure Data. In addition to its architecture not being a good match for the kinds of tasks I was tending towards, its visual patcher idiom did not fit well with my approach to computing, which is steeped in the textual operations of software development. Though Pure Data generates text files, these are basically inscrutable to humans and must be used in the Pure Data graphical environment to be of any use, and so they are impractical for use with my favoured tools such as Git and Neovim. Through online discussions on SoNuMu.club, other experimental electronic musicians encouraged me to try out SuperCollider. While I was hesitant to go through another learning process and lose some of the mise-en-place and workflow tools I had developed (such as `dried-utils`), SuperCollider addressed some of my concerns with Pure Data: it is text-based and its server-client architecture means that graphical user interface and networking don't weigh down the audio thread. The switch was prolific and I ended up using SuperCollider for *Haptic Box*.

`grains~`, in the meantime, remains as it is, which is to say that I am not currently working on or with it. I have back-burner intentions of revisiting it to address its shortcomings, as I would like to contribute to the community of Pure Data users. That continuing work would take place through refactoring or through rewriting the circular buffer or all of `grains~` in a lower-level language like C or Rust, but for the near future I have neither time nor energy to. My needs for granular processing are covered partly by what `grains~` already does and partly by the granular processing readily available in SuperCollider. A similar story can be told about Turns, software which I wrote for general use of the Monome Arc controller with desktop signal processing platforms like Pure Data and SuperCollider.[48] Though Turns evolved from a combination of wanting a better workflow for the Arc in Pure Data and a desire to learn the programming language Rust, its use in SuperCollider is less friendly and I have fallen too far out of practice with Rust to make the change I would want to have.

---

48. For more about Turns, see the included source code or Dave Riedstra, 'Turns', Dave Riedstra, accessed 22 September 2023, https://daveriedstra.com/code/turns/.

Through experimental play with electronic audio, I participate in a flow of activity that generates technique, tools, and audible traces. These objective results are relative stases in the interactions between the processes that mingle through my practice: things like my life, digital storage in various computers, the physical environment, and the semiotic meaning of the recordings and of the affordances of the tools and techniques. Tool and technique inform their mutual emergence and sedimentation, neither preceding the other but rather becoming-with together. Technique as kinaesthetic knowledge is change in the body just like the change in material that becomes the tool and the change in the environment that results from their use. Change is what the tool sets forth: not just a world made possible by the tool's effects on the environment, but also a world in which the tool *is used*: the world in which the user changes through time spent in active entangled becoming-with the tool.[49] Through their continued sympoietic becoming, 'bodies as well as objects take shape through being oriented toward each other', 'tak[ing] the shape of the work they do'.[50] Developed for use in a certain context, the efficacy of tool and technique are entangled with that situation, including temporally, and can go out of practice or become disused. Thus these relative stases are like resonances in the oscillations of their moving processes that need reinforcement through continued practice and maintenance.

At a particular table

When my partner and I moved from Toronto to Guelph near the end of 2020, I was reunited with my double bass and with an appropriate space to practice. I worked through the awkward and guilt-laden process of restoring facility and muscle strength particular to the instrument. I didn't have an immediate goal in mind for doing so, only that I enjoyed playing the instrument and wanted to continue to be able to. When I was again able to play with decent time, tuning, and timbre, and without too much strain, I began to think about and work on a composition for myself that I called *Table* (2021).

---

49. J.F. Martel suggests that building a tool is a way to create a universe in which that tool exists, and the capacity to imagine that possibility is more important than the building of the tool, resonating with Elizabeth Grosz's assertion that the power of art comes from its expression of the possibility of difference. J. F. Martel and Phil Ford, 'Art in the Age of Artifice', Weird Studies, 28 April 2021, https://www.weirdstudies.com/97, podcast, 25:00; Elizabeth Grosz, *Chaos, Territory, Art: Deleuze and the Framing of the Earth* (New York: Columbia University Press, 2008).

50. Ahmed, *Queer Phenomenology*, 54, 44.

I chose the name *Table* because of what I wanted to do with the piece, both in writing and in practising it. A table is a surface at which to think through relating: you might lay out on its surface the materials of a difficult thought problem, or maybe a meal or a card game. As a verb, *table* can mean both to include or to exclude a topic for consideration, suggesting a mediating function of the table. While in a musical context *Tafelmusik* refers to a Baroque tradition of light music to accompany social meals, I also think of the Renaissance amateur music practice of playing consort music with friends in private around a table supporting the sheet music.

Figure 1. Abraham Bosse, 'Musical Society' from *Five Senses*, 1635, copper engraving, Bibliothèque nationale, Paris, https://www.wga.hu/frames-e.html?/html/b/bosse/musi_soc.html

I wrote *Table* as an activity that allowed me to work through a few things for myself. The material of the piece is laid out in a moderately challenging register of the instrument and calls for a bowing technique I (still) have not yet mastered. The bowing technique itself is fairly simple on paper, a 'connected *détaché*' similar to the legato stroke with which nearly every player starts learning the bow. I had hoped that by using this bowing as I did in the score, I'd be able to build a sound world somewhere between viol consort playing (as in my memory of the Hespèrion XX recordings of Henry Purcell's fantasias) and moments in the Bozzini Quartet recording of Martin Arnold's *Aberrare (Casting)* (2004), textures I'd become enamoured with.[51] Though straightforward in more traditional bass playing, the bowing proved difficult in the context of the piece. So I first thought of the piece as something I would write just for myself, a little more than a study but certainly not a

---

51. Hespèrion XX, *Fantasias for the Viols 1680*, CD (Vanves: Auvidis, 1995), E 8536; Quatuor Bozzini, *Aberrare*, CD (Montréal: Collection QB, 2011), CQB 1112.

concert piece, in order to develop the technique and inhabit a sound world I enjoyed but which had little in common with my more intentionally public-facing work. *Table* was meant to be a set-up for play within those parameters.

While writing *Table*, I wondered how I would be able to share it with others at all, or whether I should. *Table* is a piece to be played: the experience of it is composed around the unique challenges of relating to its register, key, and double stop interval while producing, hearing, and feeling its sound. Its particular affordances are only really available from the contemporary contrabass. The way that its fingerings ask the hand to wander around the heel, never quite resting in thumb position, and dance between the more sure references south of the heel are important aspects of the piece. Though this restricts the intended experience of the piece to those who play bass, it's unimaginable any other way. The piece would be a completely unrelated experience if played in the higher register of a cello or with the frets of a violone. In fact, these fingerings might not even garner the same challenges to movement on a bass constructed slightly differently, say with an E-flat neck or narrower shoulders.[52] The piece is really to be played on an average contemporary bass, then, something with a pattern similar to Czech workshop gamba-corner instruments and with a D neck. Since the bowing challenges are a relation between the left-hand fingerings and the bowing itself, the bass should be strung with Evah Pirazzi Weich strings, like mine, and the piece played with a French-style bow using hard rosin in order to access the particular movement-feeling of drawing out the fluffy-flighty timbres I want to target.[53] I've noticed that a hallmark characteristic of the piece as I play it is a clarinet throat-register feeling which sometimes gives me shivers. This effect has much to do with the flautato bowing technique and double-stops the piece asks for, but is also affected by the wolf tone on my instrument which unsettles the G♯, A♯, and B. To secure that aspect of the experience of learning the piece, the player should try to play it on an instrument with a similar wolf, and for maximum effect, play with older rosin in a slightly humid part of the world during a mild spring.

---

52. A bass neck is named by the note that is stopped on the G string when the thumb is the crook of the heel. Though the nomenclature is loosely-defined, E-flat and D necks are understood to be the most common options. The heel makes one of the most sure pitch position references on the neck, the other being the nut. On a D neck, the pitches in *Table* avoid this position, meaning the hand is floating unsure until it descends to its brief moments of contact with the familiar half-position and first position at the nut. With an E-flat neck, this challenge is mitigated.

53. Using a German-style bow or a sticky rosin like Pop's would be challenging as well, but in a way unrelated to the work I wanted to do at this table.

To generate the experience that makes learning and playing *Table* what it is, the piece is effectively written for the habitually out-of-practice intermediate double bassist (with more electric bass training than upright), to be played on C.S. Shen SB150 number 2016-2-43 strung with Evah Pirazzi Weich A-G and Evah Pirazzi Mittel E (string heights 6-9mm) and set up with a shallow camber, with a certain pernambuco French-style bow of unknown origin having a hair length of 54.5cm and in dire need of a rehairing, using three year old Carlsson rosin, from March through June 2021 in the living room of my residence on Palmer St, Guelph, Ontario, Canada.

This high degree of particularity makes *Table* impractical as a piece the experience of which is meant to be shared with others. Without these precise prerequisites, or even something close to them, taking in the piece (through learning and playing it) is to play in a different set of terms with different meanings than the milieux I hoped to explore through playing it. Attempting to share the experience of *Table* would be similar to performing Jennifer Walshe's *THIS IS WHY PEOPLE O.D. ON PILLS* (2004), a solo concert piece in which the performer is asked to share an imagined experience of skateboarding a route (having just learned) using the gestural language of their instrument.[54] But whereas Walshe's piece foregrounds the mediated nature of sharing experience and the virtual-embodied experience that relating to the performer's gestures can effect, *Table* is concerned with the *im*mediate relating to its terms through playing among them. The world that *Table* brings forth is one that is actually enabled by the possibilities its technique and aesthetic familiarity generate in the context of the environments its performer is already situated in.

This specificity is why I don't care to try to share the experience of *Table*. It's meant for myself to explore aspects of my own entanglements and spend time in a certain aesthetic combination of them.[55] From a certain perspective, *Table* actually *is* the mingling of its particularities that I enacted when I wrote and learned it in the spring of 2021, not a composition but a performance piece with myself as its performer and only witness. Its aesthetic experience may have similar aspects to what I want to enable in my public facing work but its particularities are too strict to generate them: I was the only person who could

---

54. Jennifer Walshe, *THIS IS WHY PEOPLE O.D. ON PILLS*, 2004, solo performer, 2004, https://www.cmc.ie/music/why-people-od-pillsand-jump-golden-gate-bridge.

55. In that respect, *Table* follows Saito's injunction to aesthetic appreciation of objects, moments, and experiences already at hand.

fulfil its demanding instrumentation requirements and site-specificity (though, in the course of writing the present document I have fallen out of practice on the instrument and am becoming close to being that person again). Additionally, the problems that the piece plays in and the aesthetic worlds I wanted to bring forth with it are specific to its entanglements. These include the bowing technique and musical territory as well as the parallel explorations of thinking through doing and the current line of thought that thinks through thinking through doing.

Though *Table* might only exist or have existed as its self-performance in the living room where I currently write, its effects continue to propagate. You are reading one of them now, another is included as a score in the portfolio. More meaningful (to me) are things like the memories of working on the piece and technique developed thereby, the flighty feel of the bowings that became gritty and sludgy as it moved into the lower register, the pain in the wrist of my bowing arm, Renaud referring me to Sara Ahmed's discussion of tables in *Queer Phenomenology*. These effects are like the momentarily stable resonances of the techniques and tools I developed in my simultaneous electronic audio practice. They result from entangled relating with an environment over a period of time and require reinforcement to continue. Like my digital tools, *Table*'s score and technique accumulated together through playful, exploratory practice. While *Table*'s relating sensitively explores its terms, its openness is more strongly bounded by intention, clearly having a corner of the sandbox it wants to play in, certain tools it wants to play with, and an idea of the sandcastle it wants to build. Its objective effects take on the character of these intentions, and can be understood as that intentionality objectified, a way in which objects take the shape of what they are for.[56]

Table's intentional objects—its score, its techniques, its sounds, its memories, this chapter—are ways to imagine and bring about a world in which they exist. A score is a technique that enables a world in which its performance exists, and learning a bowing technique enables a world in which I can perform sounds with that technique. Momentarily stabilizing intentions about those worlds, these objects speculate about what those worlds might be like and move towards them. The particularities these speculations

---

56. 'The object has been shaped for something, *which means it takes the shape of what it is for*.' Ahmed, *Queer Phenomenology*, 46.

inherit from their situation and heritage make their way into the world that they enable. But that is not to say that that outcome is overdetermined. In fact, the immense crystalline structure of the this-ness of every momentarily stable mixture of affordances (skill, tool, opportunity, impulse), its 'plethora of orders', enables 'conditions for being otherwise' through situating feedback.[57] When these affordances are acted on or with, they do so in a world infinitely more specific than what they imagine, and the difference of this specificity is taken back up into the user as something that shapes their interaction with that tool, technique, or object. That difference informs the continued transindividuation of the tangle of actor, tool, and environment.

Table and its object-effects are byproducts of a period in my practice, dust, debris, ripples in the mingled milieux in which I played. But these are real things carried forward in the world's process and generate difference for others in the same way as they do for me, becoming part of the infinitely specific situation that others participate in, are affected by, and experience. In the same way, though a performance of *THIS IS WHY* might not be very effective at communicating the experience of skateboarding, it does nevertheless generate a real experience, and the nature of that experience is much more open than it would be if the communication was made using a more appropriate method, such as a virtual reality helmet or a skateboarding lesson. In their capacity to have an unpredictable agency beyond their imagined and intended effects, these objects are like an egregore, an (alleged) experimental spiritual being borne from a collective imagining, the a ghost of a non-existent person. Phil Ford and J.F. Martel recount the story of an egregore created with the impossible identity of a sixteenth-century auto mechanic who is tortured by this impossible identity to the point of irritatedly wreaking havoc and eventually disintegrating.[58] I bring up this story not to say anything about its probability but because it points to a compelling thing: that the effects of imaginings and speculations generate experience which, though unknowable and unpredictable, is worth considering as a guidance for actions that might

57. 'The clearest image of [transduction], according to Simondon, is that of the crystal that, from a very small seed, grows in all directions within its aqueous solution, wherein "each molecular layer already constituted serves as a structuring base for the layer in the process of forming".' Combes, *Gilbert Simondon and the Philosophy of the Transindividual*, 6; Grosz, *Chaos, Territory, Art*, 5.

58. Whereas Ford and Martel discuss the egregore as a parable of mindfulness over one's effects, the idea of creating a truth from nothing imitates a monotheistic omnipotence that seeks to escape individual and collective responsibility, historical context, and mindfulness of others and environment. I am also wary of Nick Land's hyperstition and the 'post-truth' it represents. J. F. Martel and Phil Ford, 'Notes on Hyperstition', Weird Studies, accessed 13 April 2020, http://www.weirdstudies.com/articles/hyperstition.

ossify the speculations that bring it about, in order to prevent potentially tortuous outcomes.

As the outcome of a collective speculation, the egregore has in common with Ahmed's survey of tables in phenomenological discourse the work of others in the ongoing shaping of objects and object-like effects. Ahmed examines the work of influential thinkers including Edmund Husserl, Martin Heidegger, and Merleau-Ponty, but also brings to the table the unacknowledged others whose work supports these writers sitting at and writing about the table. Their respective orientations shape both what the table and what their work become. Phenomenological inquiry without accounting for the labours of housekeeping proliferates maleness implicit in the field, as 'to sustain an orientation toward the writing table might depend on [housework done by women], while it erases the signs of that work, as signs of dependence,' and generates a table which disappears in the work it affords, or otherwise appears as a 'neutral' object, 'present at hand'.[59] Taking responsibility for a share of domestic work influences philosophical work, exemplified in the account of Adrienne Rich being literally pulled away from writing by her children, and brings into purview the history of objects such as tables: their wear and its significance as well as 'what must have already taken place for the table to arrive'.[60]

Whether tables, shared concepts of philosophy or simulacra-ghosts, artworks or experiences of them, resonating object-effects accumulate and refract within activity distributed and situated among actors, environment, and historical context. Becoming-with these structures, objective resonances carry forward certain characteristics of their entanglement in a lasting nexus of particular intra-action beyond a momentary mingling. Through these resonances and their debris, the effects of momentary entanglements both outlast and propagate the influences of the activity that spurred them.

As Haraway, following Marilyn Strathern, writes, 'it matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with; it matters what knots knot knots'.[61] The orientations one takes—shaped and supported by the particularity of situation, collaborators, unseen supporters, and tools at hand—imbue

---

59. Ahmed, *Queer Phenomenology*, 37.
60. Ahmed, 32, 37.
61. Haraway, *Staying with the Trouble*, 12; after Marilyn Strathern, *The Gender of the Gift: Problems with Women and Problems with Society in Melanesia* (Berkeley: University of California Press, 1990).

themselves into the effects of one's activity (whether artwork(s), tools, and skills, or out-of-orientation effects such as emphasis on some mode of production or time not spent doing something). These resonances bring the particularities that shape them into surprising new entanglements with others. Ahmed writes in tune with Haraway that 'the "thisness" of this table does not, as it were, belong to it', that 'what we do with the table [and] the people who are "at" the table are also part of what makes the table itself', and that this distributed and ongoing history of use shapes the relational possibilities the table supports.[62] The effects of entangled action, their intentions and orientations made objective, propagate particularities of their situation, setting forth a world shaped by them.

Table is no different. As a mode of practice, it is enabled by various privileges I have enjoyed my whole life and by ongoing support from my partner, family, friends, and community. More acutely, *Table*'s musical style manifests my instructional heritage and musical tastes: its relatively flat surface reflecting work with Christopher Butterfield and Martin Iddon; its meandering line, simple structure, and vaguely modal harmony similar to some of Arnold's work, which in turn draw from his close study of *ars subtilior* style (though the hallmark rhythms are not apparent in *Table*) and, as with Butterfield, study with Rudolf Komorous. That I would write what might boil down to a dressed-up bowing study for myself speaks to a history of tension between my musical activities as player and composer, such that both are wanted by the other, the in-process interaction with sound by composing and the structuring and authorship by playing. (It also speaks to my lack of formal training on the double bass, in particular the weak spot arising from playing French bow and studying primarily with German-bowing instructors.) The guiding theoretical theme of thinking-through-doing comes partly from researching in a corner of the academic world where practice research is currently a trend and partly from conversations with Renaud. To speak even more specifically of particular affective, psycho-social, financial, and other influences would be to enter into a level of autobiographical granularity I have no interest in documenting, but these influences and others are also carried forward to my own process and others' in the piece's debris.

---

62. Ahmed, *Queer Phenomenology*, 44–45.

Becoming-with boxes

When my partner and I moved to Guelph in 2020, I also took up woodworking. This was at first a practically-motivated move which, in addition to addressing general desires to become more handy and less reliant on mass-produced plastic widgets, offered to fill the space of a material practice that I felt my inclination toward sound art wanted. Added to the already within reach ability to affect sound electronically, I speculated that the possibility of wrapping up those electronic sound processes in a self-contained physical form would untether me from designated music and art situations and better enable me to interact with the situational aspect and framing of my work's experience as parameters of the work. Woodworking, I hoped, would allow me to be more selective and creative with the environment in which a piece and its auditors might participate.

To enable this broadening of experiential possibilities, I had to wrap up sonic processes in an object that would become identified with them. With my fledgeling skills the mostly likely shape was a box, with its associations of containment, rigid definitions, and separation from the world. As a convenient shape, boxes figure in the history of Western sound art and sculpture. Boxes perform noticeable but perfunctory roles as containers for the contents of works like Marcel Duchamp's *The Bride Stripped Bare by Her Bachelors, Even (The Green Box)* (1934, Bowdoin College Museum of Art, Brunswick, Maine) and Cage and Julie Lazar's *Rolywholyover: A Circus* (1992–3, Museum of Contemporary Art, Los Angeles), and as resonators as in Pauline Oliveros' apple boxes used in performances including *Time Perspectives* (1961), *Applebox* (1965), and *Applebox Double* (1965).[63] However, two sculptures give the box a more salient role: Duchamp's *With Hidden Noise* (1916, National Gallery of Canada, Ottawa) and Robert Morris's *Box with the Sound of Its Own Making* (1961, Seattle Art Museum).

With Hidden Noise does not use a wooden box but nevertheless centres itself around multiple layers of boxing. The sculpture's physical form is a roll of yarn shut between two brass plates, into which some object was inserted. The object is hidden from the work's viewers and the nature of the object was hidden from the sculptor. Moreover, the title of the work and the artist's discourse suggests that sound is important, Duchamp having stated

---

63. Oliveros's use of apple boxes is mentioned in You Nakai, *Reminded by the Instruments: David Tudor's Music* (Oxford, New York: Oxford University Press, 2021), 155–56.

that 'the object makes a sound when it is shaken'.[64] The secret object is only visibly hidden, its acoustic properties (and presumably its approximate weight, shape, and hardness) can be felt through shaking. In this case, Duchamp has scarcely more knowledge of what's inside than anyone else, except through virtue of familiarity with the assemblage: Duchamp attempts to box himself out of certain authorship, allowing even the selection of the work's materials to be 'readymade', but that boxing is itself limited by the fact of Duchamp's involvement as the work's assembler and handler. A degree of boxing is, however, restored by the work's assumption of a place in art history. Whether stored in a vault, locked in a display case, or carefully shuttled between locations, the noise of the work's title is once again unavailable. These layers of protection serve to maintain the piece's physical integrity, preventing the decay or unravelling of its yarn and the unboxing of its secret object. The preservation of works functions partly as a result of reverence for their and their author's role in history, but in this case the preservation undoes an important function of the work (to hear but not see the secret object by shaking the piece). The glass box the work occupies in the gallery also boxes what seems to be the author's intended experience of the piece, and by changing the nature of how one can interact with the piece, arguably undoes some of the work of preservation.

While *With Hidden Noise* boxes up an object to remove some of its aspects from sensibility, *Box with the Sound of Its Own Making* makes some aspects more available. *Box with the Sound* takes the form of a roughly one-foot-cubed wooden box inside of which a tape recording of its construction plays back. In this pithy way, the sculpture wraps up its conditions of origin, presenting itself as a trace which makes them available in a gallery setting. However, two things are accomplished as a result: the work identifies itself as a stable index of a moment of creation, and the work suggests that it can offer something of an experience of that moment. Both of these actually function to bracket (box out) aspects of the box's making. The sound recording captures a limited moment of the labour of making the box, but presumably focuses on Morris's direct intervention with the materials and not his procuring or transporting the lumber, sketching the plans, or conceptualizing the piece. The recording also could not have captured important moments directly involved in the making of the piece, such as starting the recording device and sealing it inside the

---

64. 'With Hidden Noise', National Gallery of Canada, accessed 14 September 2023, https://www.gallery.ca/collection/artwork/with-hidden-noise.

box. Even still, the recording is over three hours long, well over the amount of time most gallery-goers can be expected to take in its sounds. In addition to the bulk of the sound, the work's gallery presentation brackets other sensations of labour: the expenditure of energy, the smell and feel of sawdust gathering on sweaty skin, the touch of wooden and metal tools and their weight in hand. Though in a gallery space the sounds of construction will likely be taken as an addition, they point to the messy situation they stand in for, as both index and icon. From its title, *Box with the Sound of Its Own Making* suggests the process of labour as interaction that influences its material shape, but what is actually boxed up is the necessary bracketing of that process. As a result, the labour that the work presents is framed as the efforts of a single skilled author and thereby supports ideas of solo artistic genius with an analogous notion pertaining to craft.[65]

Attending to what is omitted by Duchamp's and Morris's boxes enables an arm's-length guess about situated experiences of labour and ongoing relationships with material. These are essentially the experiences of entanglement that I want to bring out with my sonic work: the feeling of relating to others, environment, material, and sound in an ongoing assemblage that builds on its history, that transindividuates continually and communally enacted boundaries rather than enforcing strict object or process orientation. But these experiences can only be understood in their doing. Reading a textual description of the interacting visceral histories of materials and labour or listening to some of them play out generates a different experience with different valences.[66]

Though it wasn't an area I intended to explore through woodworking, taking up woodworking allowed me to attune to the kinds of entangled materialities elided by Morris's and Duchamp's boxes. Coming to woodworking with neither tools nor materials, only tangentially related experience, and with a small exposed-concrete room as a workshop formatively shaped the way I worked. The cramped, poorly-ventilated space and my limited budget meant that power tools were not an option, so I turned to hand tools. I learned techniques from woodworking YouTube channels, blogs, and forums, and as a result of these resources' overall pragmatic leanings, my work was heavily influenced by

---

65. Furthermore, bracketing the various contingencies of labour generates an author who also lacks those contingencies and whose thought can appear universal, which Ahmed writes reinforces the masculinity of a discipline. Ahmed, *Queer Phenomenology*, 33–34.
66. Though one could imagine practices oriented towards a hauntology of a material trace's labour.

cabinetry and furniture-making traditions, which in turn reinforced my tendency towards boxes and other simple forms.

One implication of using manual methods and traditional tools was that I spent a lot of time in contact with the wood I was working. A basic operation like bringing a board from a rough-cut state to the correct measurements ('dimensioning' the board) generally would take a few minutes with the right power tools (a thicknesser planer, table saw, and maybe band saw if the board needs to be resawn). But as a beginner armed with hand tools and working on hard maple (which I later learned is notorious for its difficulty to work by hand), dimensioning was sometimes a day's work or more. Cutting joints, though more precise and prestigious work, operates on a smaller area and usually took at longest as much time as dimensioning. My intra-action with the wood, tools, and space was (is) shaped by the extended duration hand tool work requires.[67] I began to develop a sensitivity to nameable aspects of the lumber I worked like hardness, density, and grain, and embodied familiarity with actions like sawing and planing and their sometimes painful muscle memories. I became that snob who prefers the gloss of a planed finish to the diffuse, fluffy surface that sanding renders. I learned an appreciation for steel and metalworks by way of frustration with the inexpensive tools I first used. (Few retailers in Canada sell hand planes worth using, fewer still at an accessible price, and it's true that the mid-century Stanley planes found in antiques markets are perfectly serviceable tools.) All of these I learned as fully-synthesized embodied aesthetic knowledge through mindful sensitivity to the multi-milieux tangles of everyday work.

Maybe more interesting is the relationship I developed to materiality through working wood by hand. Operations like cutting a board with a hand saw require continual and sensitive action to maintain the desired relationship between wood, tools, and other objects in the space.[68] These operations do more than impart a shape to the workpiece: in an

---

67. Ahmed writes that 'an arrival takes time, and the time that it takes shapes "what" it is that arrives. The object could even be described as the transformation of time into form, which itself could be redefined as the "direction" of matter.' *Queer Phenomenology*, 40.

68. The board must be held to the workbench, often in a vise but sometimes with clamps, and its immobility is an effect of the weight of the workbench and how it sits on the ground. In my shop, this is extra apparent to me because I built the bench myself and have the memory of moving its component parts around, and the floor of my shop is very unlevel. The immobility of the board-vise-workbench arrangement is important to resist the force of the saw and produce the cutting operation. This begins with 'nibbling' the point where the marked line meets the corner opposite the sawer, then lowering the saw to extend the cut along the 'waste' side of the line until the cut connects both corners. The cut is continued down the near edge or face, with care to follow the line in order to establish a straight kerf. After a few inches, the saw will follow the kerf but can still be steered toward or away from the line by rotating the wrist (which can also happen incidentally as a result of posture). If the cut is a cross

appreciable way, cutting a board by hand really feels like splitting one piece into two boards plus sawdust rather than a good board and a volume of scrap. Planing, similarly, is a process which severs very thin shavings from the face of a board, and sawing, planing, chiselling, and especially sanding transform solid wood into floating particulate matter, dust, which can settle on shelves or the lenses of eyewear or in lungs. Intentionally acting with wood, tools, and space, I join with a moment of the flow of that material's process, and I feel that material as process. A board is somewhat stable, having once been a little more mobile as a growing tree, but the parts that I turn into shavings are very fluid and readily swept into a box for transport to my sister's chickens, where they will decompose and join the processes of who knows what soil-consuming organism. I am very conscious that the shavings I plane off or the length of board on the waste side of a cut are from the same material process as the piece that will end up in whatever project I am building, and it is only as a result of my brief mixture with the board that their flows diverge. I also feel the effects of that interaction on its other participants: steel is more lasting than wood but the blade's edge dulls when repeatedly made to sever the wood's fibres. Sharpening in turn consumes the blade and shapes the oilstone as both grind the other into particles carried away when I wipe off the slurry. As I work the wood, the wood works my tools and me, and I feel this as transindividuation of mingling material flows.

Spending a lot of time in the wood shop, I practise orientation towards these material flows and the various object-effects that ripple out from them. Like any other, this orientation is supported by and interacts with an economy of attention: every turning towards is also a turning away, both resulting in and enabled by bracketing. Ahmed writes that 'attention involves a political economy. … whether we can sustain our orientation toward the writing table depends on other orientations which affect what we can face at any given moment in time'.[69] The economy of orientation includes both the various orientations that a person takes as well as the orientations of others adjacent to them. My

---

cut, it is taken down until near the end of the line, where extra care must be taken not to blow out the edge fibres, which no longer have the support of their neighbours. This precaution is still advisable for rip cuts, even though the sawing action is along the grain, because the saw teeth can still catch on fibres and pull them out in chunks. For resawing (a special case of rip cut in which the board is split along its width to produce two thinner boards), extra attention to the sawing strategy is needed due to the volume of wood the saw must be in contact with and cut through. The sawer alternates from both sides of the board such that the saw is always cutting an angle rather than a flat surface, and finishes the cut by starting from the opposite end rather than continuing through it. Resawing takes a long time of continuous sawing, even for a soft wood such as cedar, and produces a rough surface which must be planed again. Cutting the two panels for the sides of *Haptic Box* was an afternoon's work.

69. Ahmed, *Queer Phenomenology*, 32.

orientation towards woodworking is reinforced by and interacts with a system of orientations that support such an activity as an aspect of my research or expression of my interests, as well as things like sharing knowledge and experience online and exchanging materials for money. An object-effect that is sustained like a resonance in a vibrational system, orientation as practised can be understood as a local effect or a locale within a topography of orientation that becomes-with material, social, environmental, and other entangled milieux.

Becoming sensitive to an ecosystem of orientation and bracketing reveals a dramatic interplay between Western art traditions and Morris's and Duchamp's boxes. An orientation towards entanglements of situation, labour, and sound that might be found in these works is in tension with the isolated, atomic, and selectively disengaged approach favoured by Western gallery arts (which may have been even more pronounced at the time of their initial showings). Saito characterizes paradigmatic Western art as 'a more or less identifiable and stable object bounded by a frame, spatially or temporally, distinct from its surroundings, typically experienced through sight and sound with a spectator-like, distancing attitude, and in a certain expected and a prescribed mode'.[70] Paradigmatic art boxes up its materiality and safely puts it aside, which Ahmed suggests 'might also confirm the fantasy of a subject who is transcendent, who places himself above the contingent world of social matter, a world that differentiates objects and subjects according to how they already appear'.[71] Morris's and Duchamp's boxes attempt to steer the orientation of gallery practices toward material and social entanglement but are stymied by a degree of adherence to the gallery's traditional orientation towards spectatorial remove. More successful, I think, are participatory works such as William Forsythe's 'Choreographic Objects' which I clambered through, dodged, and hung from when I visited the exhibition The Fact of Matter at the Museum für Moderne Kunst in Frankfurt in the autumn of 2015.[72] Climbing through works like these generates an experience not of isolated and transposed things, but of interaction between objects, space, and the active body of the experiencer.

---

70. Saito, *Everyday Aesthetics*, 27.

71. Ahmed is in pointed agreement with Saito when she writes that 'what is "put aside," we might say, is the very space of the familiar'. *Queer Phenomenology*, 33, 34.

72. For a video about the exhibition, see Museum MMK für Moderne Kunst, 'Ausstellungsfilm: William Forsythe. The Fact of Matter', 20 October 2015, https://youtu.be/watch?v=OAyNzdaKjIk.

(One could imagine becoming physically entangled in the wall-to-wall forest of hanging hoops that made up the exhibition's eponymous installation.)

Situating themselves within certain entanglements of Western art tradition and invoking various tangents, Forsythe's, Morris's, and Duchamp's works orient to certain aspects of entanglement and bracket others. Woodworking presented a way for me to engage different situations with my work, parting with the assumptions of galleries and concert venues to take up an adjacency to the multisensual realm of the everyday that is bracketed in those three works. In the actual practice of those relations by working closely with wood, I became sensitive to material as plural process, tangling with intra-acting material and non-material flows. This sensitivity in turn contributed to the image of the experience I wanted my work to orient around (in particular *Haptic Box*).

Figure 2. William Forsythe, *The Fact of Matter,* 2015, Museum für Moderne Kunst, Frankfurt, https://www.williamforsythe.com/exhibitions2015.html

Out of practice research

Orientation as practised, in the active, orient*ing*, is activity sustained within and affected by local-temporal entanglements. Some of what orienting turns towards, in addition to its general object, are things that allow for its continued practice. These can be thought of as what James Gibson calls 'affordances': perceived features of an environment that afford some interaction or use.[73] Importantly, as aspects of perception of the environment, affordances are enacted relations between the perceiver and their situation.[74] The interaction with or use of the environment as afforded to the perceiver, and that interaction's outcome, are distributed in the ways that the various participants orient.

---

73. De Souza, 'Beethoven's Prosthesis', 12.
74. 'Each ecologically-situated creature *enacts*, *brings forth* or *co-constitutes* a world through evolutionarily-selected sensorimotor and goal-directed patterns of meaningful actions.' Schiavio, 'Music in (En)Action. Sense-Making and Neurophenomenology of Musical Experience', 49.

Ahmed writes that 'the failure of work is not, then, "in" the thing or "in" the person but rather is about whether the person and the thing face each other *in the right way*'.[75] The outcomes of continued becoming-with that become the next environment for that continued becoming are partly determined by the activity of this relational-distributed orientation.

This paints a fairly vivid spatial image of entangled action with an environment that might afford the practice of an orientation. As I move towards my tool shelf, my bench planes become more easily within reach, and if I move from a larger to a smaller city, rehearsal space and venue rental might be more affordable but events might have lower attendance. From this image, the non-cumulative nature of affordances might be more intuitively understood. Rather than gathered as additional possibilities for action, affordances are brought into and out of 'reach' by navigation of the environment in which the actor is entangled. However, not only must the actor navigate the spatial environment which they perceive might afford some action from some situation, they also need to reconcile interactions among their own various orientations. Furthermore, affordances are not only generated by or interpreted from a spatial-material environment; an equally complex entanglement with personal history must be navigated.

The lull in my bass playing that I encountered when I moved to Leeds in 2019 was not the first in my history with the double bass. While I was disappointed not to be able to continue my bass practice as I would have liked at Leeds, I knew I would eventually be able to come back from it because I had done so before and knew, consciously and non-consciously, what it was like to be out of practice and to work through the rehabilitation of skills. I have a similar pattern with my electric bass playing, which can be sidelined by my double bass practice, as well as with electronic audio, woodworking, pen-and-paper composition, and other practices which jostle for my time and energy. It would not be a stretch to say that my artistic practice broadly involves a practice of being out-of-practice.[76]

A meta-practice of negotiating the contingencies produced by my other practices, being out-of-practice in one area produces phases pertaining to others: recuperating skill,

---

75. Ahmed describes orientation as something done both by people and objects, reflecting the way their intra-action affects the way they 'face'. Ahmed, *Queer Phenomenology*, 51.
76. Which is not to say that I endorse that approach.

becoming rustier, and being in-practice or practising. As with the rest of the processes they relate to, these phases are continually mobile and their borders porous. Attuning to the operation of the whole system may be appropriately designated 'out-of-practice research'. Continually negotiating the ecology of my practices and that ecology's situation in my person and my own evolving entanglements, practising out-of-practice research has generated a familiarity with embodied navigation of *temporal* entanglements, affordances, and anti-affordances. Out-of-practice research might constitute a method for investigating the temporal affordances that come out of practice research.

Gibson's theory of affordances relies on a notion of 'invariant' features of an environment which are perceived as stable enough to reliably interact with.[77] Understanding object as process, I might insist that these are always *relatively* invariant, but even without that caveat, a want for stability can readily be felt in the continual change of practice's environments. Musical instruments behave with temper in different weather and rooms, the digital ecosystem in which code operates is continually in flux (and far from some 'pure' realm divorced from material, social, and other contingencies), lumber is a system of fibres with varying density the shape of which contorts as its humidity changes (which is to say nothing of knots, burl, spalting, or differences between species), and the body of the artist grows sore, tired, stronger, more focused, less determined, more attuned to certain sensations, bored.[78] Negotiating this unstable space of relations, the practitioner increases familiarity with its few stabilities and generates an embodied knowledge of *how* change moves through the system, the way things go.

That accumulation of familiarity and embodied knowledge is built up in a practice of relating to situation and can be understood as a temporal affordance. The practitioner is more accustomed to those flows and better able to act with(in) them, and that ability is a relation between the practitioner and their entanglement within a flow of time that affords certain action. As with spatial affordances, temporal affordances are available in relation to a region of their milieu. Having recently built up familiarity through practice, the practitioner is better able to make use of that familiarity but may find other embodied

---

77. De Souza, 'Beethoven's Prosthesis', 12.

78. For more on the materiality of the digital and its intentionally obscured ecological impact, see Wendy Hui Kyong Chun, 'The Enduring Ephemeral, or the Future Is a Memory', *Critical Inquiry* 35, no. 1 (Autumn 2008): 148–71, https://doi.org/10.1086/595632; Joana Moll, 'Data Extraction, Materiality and Agency', in *Tactics & Practice #12: New Extractivism* (Tactics & Practice, Cukrarna Gallery Ljubljana, 2022), https://youtu.be/watch?v=PGtQT_PGeGQ.

knowledge less available if its practice has been displaced. Negotiating instabilities, unable to rely on a particular temporal locale but radically and intimately involved in one, the practitioner's negotiation of the tangle of their practices of orientation is an exercise of something that Michel de Certeau might characterise as tactical.[79] The temporal affordances generated by their weaving of entangled activity could be called 'skill' or 'technique'.

Skill shares with things their in-process object-effect status. Both are effects of entangled activity that contribute back to the activity that generate them.[80] From a certain angle, they might look like debris or artefacts, curiosities that can generate new possibilities in different situations. As relational process-effects distributed among a system that supports them, skill and object can be thought of as resonance. Skills and objects rise and degrade over different scales of time, mutating, dispersing, and joining with other flows, but like resonances, can also be maintained and developed through regular contribution of time and energy into the entangled environment from which they arise. In their objective capacity, skills and things generate a gravity or momentum, not quite autopoietic but a little self-perpetuating. Partly as a result, their feedback contributions are emergent and unpredictable, like a resonance in a complex system of sonic feedback the terms of which might be possible to analyse but which behaves chaotically.

With a mixture of playful openness and intentional exploration, my out-of-practice research enacts the phases of skill's resonance in systems of orientation. Attuning to their patterns of reinforcement and decay, I take on experience of becoming situation for their development. At the same time, I sense how skills, tools, things, and other objects become identifiable and outlast their nascent processes. Their resonating effects are excess that suggest difference is possible: a world that might be brought forth, saturated with the particularities of the system in which it was oriented, the unknown situation it might occupy, and the chaotically intra-acting contingent processes by which it might be implemented.

---

79. 'I call a "tactic," on the other hand, a calculus which cannot count on a "proper" (a spatial or institutional localization), nor thus on a border line distinguishing the other as a visible totality. ... The "proper" is a victory of space over time. On the contrary, because it does not have a place, a tactic depends on time—it is always on the watch for opportunities that must be seized "on the wing."' Michel de Certeau, *The Practice of Everyday Life* (Berkeley: University of California Press, 1984), xix.

80. Drawing on Alfred Whitehead, Massumi figures objective and subjective as dimensions of process, writing that 'the objective belongs to the immediate past of just this occasion. But it just as immediately belongs to that occasion's proximate future.' Massumi, *Semblance and Event*, 9.

About *Pith*

Written for a workshop with Séverine Ballon in November 2019, *Pith* is the first
composition in the course of my research at the University of Leeds and served to kick the
tires on a practice-led research programme and bring elements of my prior practice into
focus. In doing so, the work allowed me to critique my working assumptions and hone my
research topics. Specifically, by toying with phrasing coherence in a triple-dance like idiom
in the context of a very quiet concert performance, *Pith* uncovered possible inquiries into
embodied and enacted cognition and an assumption of segregation I had been making
between 'modes' of experience which led to a bias toward empirical rather than ontological
thinking.

Quiet sonic materials

In its basic construction, *Pith* represents a continuation of my previous composition work,
particularly *Burl* (2018) and *Trombone Solo* (2015). Notably, all three solos occupy the
nearly-inaudible dynamic range which characterises my practice to date. In *Pith* this is
described by the following performance instruction:

> Perform the entire piece at a dynamic that requires listeners to exert some effort to hear.
> The sound of the performance should be quieter to a listener than the sound of their
> neighbour shuffling in their seat and comparable to the sound of the room or to the
> listener's own breathing.

The dynamic is also activated by the nature of the performance materials. These are
divided into the left and right hands. The left taps lightly at harmonic nodes on the strings,

sometimes immediately bouncing off in order to let the harmonic ring, sometimes muting the string to create a tapping sound with less discernible pitch content. The right hand taps on the instrument body, either near the shoulder or the foot of the bridge, creating high or low sounds. The dynamic range of these materials is limited to the approximate range I intended by the performance instruction, with some room to be either quieter or louder. That they can be played louder means that the physical actions and intent of the performer can match the sound's low acoustic volume: they are to perform quiet materials quietly.

The single dynamic marking *pp* in the score's notation performs several functions. By avoiding the alternative possibility of proliferating *-issimos* (eg, *pppppp*), the understated *pp* deferentially refers to the dynamic given in the performance instruction, indicating to the performer that the dynamic is not meant to be extreme or liminal for its own sake, but rather to enable the particular *relative* quietness *and character* indicated in the instructions. The *pp* further serves that character by defining an overall dynamic flatness to the piece. I intended this to allow fluctuations in loudness and articulation resulting from the player's intuitive phrasal interpretation to provide the dynamic interest, which would have been disrupted or rendered 'stale' or 'forced' by a higher granularity of dynamic indications. Using the single dynamic marking also has the pragmatic benefit of avoiding cluttering the score with dynamics which might be misleading (moving upward toward *mf*) or difficult to parse visually (moving downward toward *pppp* or *ppppp*).

Enacted phrasing

The phrasing of these quiet tapping sounds is organized around a melody and accompaniment dance while meaningfully departing from the idiom. *Pith*'s gestures falter and misstep around the well-known dance feel in charming and intentional ways, creating uncanny-valley weirdness rich with a specificity of feel that invites attentive listening. Faltering also enables the phrases to dovetail into the environmental sound in moments when their pulse becomes uncertain or loses steam. Dovetailing is further created by the nature and use of the sonic materials chosen. Through these deviations, *Pith* continues my venture of using focused listening to engage an experience of relation between listening body, audience body, performer body, and space.

Pith dances around the dance by seemingly 'knowing' the idiom but refusing to settle in to it. Its phrases slip between dominantly 6/8 and 9/8 metres and wander through other metres (7/8, 5/8), beat groupings (in which the dotted crotchet, crotchet, and dotted quaver all get the beat), and tempi (via tuplet modulation). Such slippages can be seen near the bottom of the score's first page. In mm. 29, a strong 9/8 phrase winds down to end in a triplet, only to modulate its meter based on that triplet in the next phrase (beginning mm. 32). The triplet-meter material stutters in fits and starts before returning to the original feel in mm. 37, with the following phrase alternating between triple (mm. 40–41) and duple (mm. 42–44) pulse, sometimes simultaneously (mm. 39, last beat of 41 and beginning of 42), before again ending in a triplet modulation. This game of wink-at-the-camera refusal of regularity is announced in the first few measures with the use of contorted waltz phrases. The first measure mimes a 6/8 pick-up but distributes the content through the hands; the second measure stretches the expected dotted-quaver pulse to four semi-quavers in the first half, then gives a dotted quaver in the second but as a 'snap' rhythm (♪♩) which nonetheless buoys an expectation of a triple feel; the third measure is a semiquaver short; in the fourth and fifth measures the 6/8 is finally given, only to fall apart again in the sixth measure. This aimless metric meandering creates a complexity of rhythmic feel and particularity of material by rendering the familiar triple dance idiom unpredictable and constantly changing.

Figure 3. *Pith* mm. 1–9

Pith departs from earlier works like *Burl* and *Trombone Solo* in its approach to the question of the piece's border: how sound becomes considered part of the piece's (rhythmic) material. Whereas the stability of tempo and rhythm in *Trombone Solo* creates a similarly

stable (though consistently tenuous) relationship between performed and other sound, the rhythmic density in *Pith* has considerably greater variation. Phrases gather and lose coherence and momentum in their leading and trailing edges, coming from and disintegrating into longer rests, and sometimes faltering with awkward momentary lapses in momentum. These three features can be heard at the transition between the second and third phrases. The second phrase ends (in mm. 28.) with a metered *ritardando*: its rhythm is a near-repetition of the previous measure (essentially ♪♪♩) but the final note is de-emphasized and displaced by a semiquaver. This winds down the momentum into the following long pause. The quaver introducing the next phrase is a bare, awkward pick-up to the strong 9/8 it precedes, but that new momentum only lasts the measure before slowing down in mm. 30. The new triplet pulse introduced in mm. 31 similarly stalls.

Figure 4. *Pith* mm. 22–34

I intended these hairpin phrases to dovetail with environmental sounds, creating opportunities for listeners to hear 'other' sounds as proper to the more identifiable parts of *Pith*'s phrasing. The overall rhythmic and metric uncertainty render each sound a potential clue to a new meter or rhythmic gesture. As a result, sounds don't have to be in the expected place to be significant because the premise of stable rhythmic expectation is relatively subverted. Inversely, the possibilities of metric placement in which a sound can be heard as significant, as well as the implications of that significance, are broadened. For instance, an environmental sound might be heard as the fourth semi-quaver of mm. 30,

transforming it into a conclusion to the 9/8 phrase (♩♪♩.), or it might be heard slightly later as a third quaver, presenting a modulation to duple (♩♩♩) and continuation of momentum.

Opportunities for listeners to weave knocks and clicks of the environment into the piece's phrasing are encouraged by the choice of the sonic material generated by the piece's playing techniques. The limited pitch range and set of the most 'melodic' voice (the ringing-out harmonic) is intended to reduce the focus on that voice as a melody, allowing attention to be distributed among the other materials. These other materials (the muted string taps and taps on the instrument body) in turn have a pitch contour with a greater range and rhythmic density, enabling the shape of the phrases. The result is a variegated set of performed material which encourages a listening approach that relationally integrates its disparate components. The quotidian nature of the tap sounds is intended to enable slippage between the performed sounds and those arising from the environment.

Hearing incidental sounds woven into the musically semantic content of the piece in this way is exemplary of enacted cognition: the environment's sounds form part of the musical phrase through the *action* of hearing them so. Not only is this a mingling of the 'internal' and 'external' sounds of the performance, but also of the listening body with its environment as it actively interprets its relation to the sounds it hears with recourse to its social context and cultural history. As such, it is also a mingling of the material-acoustic, personal, and social. Though others have pointed out that active embodied engagement with the environment is the mechanism of cognition in general, my point in *Pith* is to bring that entanglement to the foreground so that it can become a characteristic of the listening experience (conscious or not).[81]

Embodied parsing

Embodied environmental engagement is further enacted in the piece through the way it invites a feeling of *groove.* As a sensation emerging from interactions between the body, its environment, and personal history and taste, groove is difficult to describe, much less prescribe with a score. Reframing it as virtual embodied pulse synchronicity points to features relevant to my intentions (even if that framing doesn't capture it entirely), but

---

81. For more on 4E cognition (enacted, embodied, embedded, extended) in the context of music, see Schiavio, 'Music in (En)Action. Sense-Making and Neurophenomenology of Musical Experience'; De Souza, *Music at Hand*; Kozak, *Enacting Musical Time*.

doesn't indicate many concrete musical features beyond the fairly obvious 'pulse' requirement. While many aspects of groove arise from intuitive 'feel' and surely can't be notated in any detail (colourful phrases like 'in the pocket', 'push', and 'pull' hint at the evasiveness of the quality), certain musical constructions have stood out to me as calling out to an embodied rhythmic sense. In particular, these include a regular pulse dramatically changing to another one, being interrupted or extended by fractions of the pulse (especially when it results in a feeling of asymmetric lilt), or carrying on for an unexpectedly awkward duration.[82] I wrote each of these features into the score of *Pith* in order to court a sense of embodied investment in the pulse (and also because they fit with my musical tastes).

Pith's virtual embodied pulse synchronicity is intended to further bring out the feeling of intermingled engagements. In the first case, musical pulse is a reconciling of personal-historical, environmental-acoustic, embodied, and cultural features. Like the construction of *Pith*'s phrases, pulse is enacted by the listener in the process of listening.[83] Mariusz Kozak writes that listening to music is the performance of an embodied knowledge of how to engage with the environment: 'kinesthetic knowledge is a contextual enactment of the dynamics, affectivity, and *intercorporeality of our bodily involvement with the world.* … it constitutes a dialogue between habit and novelty'.[84] Involvement with the world includes but is not limited to the immediate acoustic, material, and social environment. In particular, habit and affect represent an ongoing history of mingling with the world which informs the experience at hand. Furthermore, feeling a groove while sitting still highlights the *virtual* aspect of the experience, both physical (what it might be like to move in relation to this pulse) and affective (what eldritch Priest calls 'an understanding of one's capacity to feel the *possibility* of feelings').[85]

Pith's quiet and frayed edges play on the corporal effects foregrounded by its groove-like features. The musical material the body struggles to integrate and virtually dance with must be done so through rapt attention and limiting real-physical movements to avoid

---

82. A personal history of involvement with features such as these would encounter *ars subtilior* techniques through guidance from Arnold, the folk meters of Béla Bartók's middle string quartets, and mathcore bands like Dillinger Escape Plan and Botch.

83. Discussed at length in Mariusz Kozak, 'Body', in *Enacting Musical Time: The Bodily Experience of New Music*, Oxford Studies in Music Theory (New York: Oxford University Press, 2020).

84. Emphasis added. Kozak, 129.

85. Eldritch Priest, 'Felt as Thought (or, Musical Abstraction and the Semblance of Affect)', in *Sound, Music, Affect: Theorizing Sonic Experience*, ed. Marie Thompson and Ian Biddle (New York: Bloomsbury Academic, 2013), 47.

obscuring sounds. The resulting tension is the foregrounding of the connective tissue tangling together disparate assemblages: the pith of the title, an activity which usually goes unnoticed in day-to-day experience.

Reflections

Through these features of construction, I intended *Pith* to draw out the action of connecting different aspects of experience in what Haraway calls a 'thick present'.[86] Its quiet and cheerfully evasive knocks and taps invite listeners to dance with it and the local environment in a tangle of ongoing relating. *Pith* also provided opportunity to continue my own practical and theoretical trajectories in its manifestations of them.

On a theoretical level, I had been thinking about *Pith*'s connections in terms of mixing modes of experience, which needed unpacking. While sense faculties are to some extent discrete, they are immediately mixed in the body such that, for instance, the *experience* of sight cannot be disentangled from that of proprioception without becoming a *different* experience. Segregating experience into 'modes' is even less applicable to more internal experiences such as those of memory or affect, or distributed encounters with the social. This separation being artificially imposed, it would have been better not to think of the terms being tangled as independent but rather start from the assumption of their co-constitution, which is ultimately the aspect I hope my work brings out.[87] Considering such a shift reveals the more fundamental problem that the tangling that I have in mind is not clearly a matter of epistemology or ontology.

Several pragmatic outcomes also manifested. As with previous quiet works, some personal communication was required to intimate the degree of quiet. This in itself was not a problem, except that we didn't quite get quiet enough and given the context of the workshop I decided to save the time to work on other parts of the piece. In particular, the body taps were louder than expected. In retrospect, part of the reason they were more challenging to bring down to the right volume level was because the gestures required a

---

86. 'The task is to make kin in lines of inventive connection as a practice of learning to live and die well with each other in a thick present.' Haraway, *Staying with the Trouble*, 1.

87. My awkward use of colouristic terms like 'tangle' and 'assemblage,' though not without their own references, is partially a result of the challenge that thinking of a variegated but integrated whole puts to the abstractive tendencies of a language which delineates discrete referents. A shift to focus on these nouns as events may be in order (a tangling, an assembling), though it would merely shift the terms of abstraction in a more temporal direction.

greater range of movement than I had noticed when experimenting. Not only did the larger gestures incur more physical momentum leading to a louder sound, they made the individual impacts more visibly apparent, undercutting much of the sonic ambiguity I had in mind for the material. The visual-sonic integration that results *does* enact a mingling of sense faculties but does so in a way which for me is at best uninteresting and at worst approaching a theatricality that would detract from the sensory and empirical attunement I hope to enable.

Finally, Scott McLaughlin suggested that the relative stability of the material palette I used in the piece might also undercut its sonic ambiguity, and that a more diverse and shifting range of sounds would match the unpredictability of the rhythmic and phrasing techniques and similarly encourage environmental listening. In principle I agree and find that my intuitive reaction against the suggestion is rooted in wanting the performed material to have a musical continuity that invites a close listening through its engaging with idioms (whereas a continually shifting and very diverse sonic palette would be less likely to have the same musical 'glue').[88] There may be some room to work toward the suggestion while retaining 'glue' but my research path led elsewhere.

---

88. In the sense of Henry Cowell's remark that the New York school tried 'to get rid of the glue so that sounds would be themselves.' John Cage, 'History of Experimental Music in the United States', in *Silence: Lectures and Writings by John Cage*, 50th Anniversary Edition (Middletown, CT: Wesleyan University Press, 1973), 71.

About *What's at Hand*

What's at Hand is a self-performed piece that invites a listener to risk upsetting the quiet of a public place by performing the piece to themselves. The piece's interactive web-based score features a short prose introduction and a minimal set of controls allowing the listener-performer to play, pause, and change the volume of three audio tracks independently.[89] The text suggests that this be done in a quiet place where the performance might be heard by others, but at such a volume level that it likely won't be. The three tracks are quiet byproducts of noisy digital audio processes that invoke the 'materiality' of their generative activity at the site of their becoming fixed to a track as well as at the site of their 're'-production as physical sound, and further in their saturation with personal histories (mine and the listener's).

My speculation is that assuming an active role in sound-making can direct sensitivity to mixture and mixing of production and reception in sonic-social-material entanglement, as well as to the spaces, objects, skills, and others involved. The audio tracks' material contingency demonstrates that imbrication with context is unavoidable. The trace of this imbrication can't be considered an addition to to some 'core' of the thing but as a constituent element of it. This material particularity is what becomes familiar with aesthetic perception, what Saito calls an object's 'distinctive characteristics'.[90] If aesthetically attending to objects can lead to a feeling of respect for and responsibility to them on their own terms, then the same might be possible for non-physical objects. The

---

89. The web score for *What's at Hand* can be visited at https://daveriedstra.com/whats-at-hand.
90. Saito, *Everyday Aesthetics*, chap. 3: 'Aesthetics of Distinctive Characteristics and Ambience,' 104–148, and *passim*.

unavoidable material entanglement forming the stuff of sound plays out in the process of self-performing the score, and as the listener-performer rides the faders they might become increasingly aware of their presence as a feature of the environment. The awareness of the ongoing participatory relationship with entangled milieux and the related affect joins with the sonic-visual-tactile experience to form the aesthetic object. The aspect of responsibility to objects that Saito delineates can thus be experienced as an intuitive understanding of one's ongoing and potential effects on these environments (largely via the risk of being heard). Situating this encounter as one with everyday objects, others, and settings, I hope to further suggest that the feeling of engagement with a world that might be brought about by one's effects is not necessarily reserved for interactions with things qualified as art or tools but that it is and is with what's already at hand.

Banal balance

The particular balance of focus among producing sound, listening to it, and attending to its effects in an everyday setting was difficult to find and is responsible for much of the piece's shape, so I referred to other works which had seemingly similar goals. I am sceptical of the ability of performing listeners to fully attend to listening in works such as David Dunn's *Purposeful Listening in Complex States of Time* (1997–98) or Bill Dietz's *Nuvole Detail Prototype with Holiday Vignettes* (2013–14), which would preoccupy the listener with performing their notation. Rehearsal would be required, in which case the listener becomes habituated to different aspects of the pieces as they learn them, rendering the experience of performing the pieces one of repeating a rote process.[91] The need to rehearse these pieces is reinforced by the normative conditions of their 'successful' execution. Dietz writes that '"successful" performance is unlikely on your first try. Performance can and should be "rehearsed"'.[92] That a performance of these scores might be 'unsuccessful' suggests that the goal of the performance (its 'success' condition) is not the experience of listening (with its inbuilt openness), but rather the following of the actions that the composer has set out, perhaps in juxtaposition with the openness of listening. The smooth continuum that this

---

91. David Dunn, *Purposeful Listening in Complex States of Time*, 1997–98, https://static1.1.sqspcdn.com/static/f/288545/5477319/1264209903233/Plicsot.pdf%3Ftoken %3DSPX5LGQDjV7rGvTggs3sIqpLyE8%253D; Bill Dietz, *Nuvole Detail Prototype with Holiday Vignettes*, 2013, https://www.lateraladdition.org/?page=5#9.

92. Dietz, *Nuvole Detail Prototype with Holiday Vignettes*.

draws from casual rehearsal to rarefied performance and the experience of undergoing that change in perception interests me, but the approach was not appropriate for my purposes here.

Listening and openness are common focal points of text and media scores such as Peter Ablinger's *Listening Piece in 2 Parts* (2006) and Manfred Werder's *2005/1* (2005), as well as Oliveros's *Sonic Meditations* (1971).[93] These works typically require a lot of connection-making from the performer-listener. Their brevity and finitude of direct reference leaves a great deal undetermined, to be filled in through contingencies of the performance. Ablinger's *Listening Piece*, for instance, simply verbally gestures to the transition between two sizes of rooms in either direction. The benefits of this form effectively requiring active decision-making work from its interpreter are both precipitated and, for me, outweighed by its openness. Though openness in these pieces is not necessarily a lack of definition (the experience of openness in the pieces is particular), it is self-referential. Werder's piece is an extreme example: consisting only of the words 'place,' 'time,' and 'sounds,' the piece gives the interpreter almost nothing to work with. The experience of the piece as a text score for self-performance becomes explicitly organized around the conundrum of what to do with the minimal number of maximally broad elements offered, leading to questions of agency, authorial intention, and the inevitability of things happening.[94] The degree of contemplation that this invokes is a far way from active engagement with the world, and while that offers a potentially interesting transition into that engagement, the engagement becomes secondary. Some of Oliveros's *Sonic Meditations* (such as 'V: Native' and 'VIII: Environmental Dialogue') feature the kind of active relating to the world that I had in mind, but their self-positioning as meditations invokes cultural traditions I don't feel comfortable engaging with, and I wanted to have an active influence on the timbres, rhythms, and temporal-affective shape of the sonic experience.[95]

The balance I found was in interacting with pre-rendered audio. This kept the user from the requirement to continually exert control over the audio while retaining the

---

93. Aljoscha Hofmann, 'Peter Ablinger: Listening Piece in 2 Parts', 18 August 2006, https://ablinger.mur.at/ww15_2parts.html; Manfred Werder, *2005/1*, 2005, http://placetime.blogspot.com/; Pauline Oliveros, *Sonic Meditations* (Sharon, VT: Smith, 1971).

94. For more on Werder's text scores, see G. Douglas Barrett, *After Sound: Toward a Critical Music* (London: Bloomsbury, 2016), 39–59.

95. In this way my musical interests and heritage formatively make their way into the piece, just as Oliveros's musical background and spiritual interests inform hers.

possibility of spontaneous manipulation. It also allowed me to shape the audio finely. Centring the experience around mixing three tracks created some openness within the performed sound which would give the user further control (and with it the feeling of control) as well as an openness that made the experience contingent on the interaction to a greater extent than poking at a fixed media file would have.

Figure 5. *What's at Hand* running on a laptop on a futon

The audio tracks

Using pre-rendered audio enabled me to contribute a particular shape and quality to the sonic experience. This was important for a few reasons. The sound needed to be relatively innocuous in the quiet public environment I had in mind when writing the piece such that if the user strayed too far into audibility the piece wouldn't immediately cause a disturbance (though the user would likely still feel the risk of doing so). For that reason, sounds which draw a lot of attention to themselves, such as alarms, cries, speech, or music, were not suitable. Instead I found sounds which might be incidentally created in an environment where machines are present: electrical hums, whines, and clicks. Additionally, the sounds needed to be organized in such a way as to be discoverable by the listener and to encourage sustained listening, particularly given their low volume and relatively consistent

timbre. In other words, both musical 'glue' and material self-determination contribute to the tracks' aesthetic object. Along with the contingencies on the outcome of the mixing performance and the situation, both of these aspects contribute to the particular character of the resulting sound and can thereby enhance the feeling of respectful caretaking of the sound.

An analogous practice of discovery in both the 'musical' connecting of sounds and their materiality led to their shape. 'Clicks and Pops' invokes the materiality of digital audio's sample-based abstraction for its content. While experimenting with Pure Data, I began to think of the processes I was building as working on streams of individual numerical values (DSP samples). Digital audio glitches of the sort that manifest when a system can't keep up with its workload are typically disjunctions in adjacent samples. The connecting line that should be smooth encounters a crag which is duly produced in the sounding output. The materiality of this abstract unending list of points is abutted here, when it is sent to the output mechanism. What the digital process maintains as a set of discrete states the speaker diaphragm smoothly connects, occupying the space between samples in its journey to connect the dots.[96] Wildly disjunct jumps in adjacent values challenge both digital and analogue authority in this equation. The speaker's ability to 'accurately' or 'neutrally' represent the audio stream is undercut by the impossibility of rendering an infinitesimally short transition between values (see also the ideal 'brick wall' filter), which is itself exposed as an 'impossible' sound with no physical correlate: the resulting sound is the speaker's failed attempt to perform the jump. In the otherwise null stream of 'Clicks and Pops', single full-amplitude samples and extremely short envelopes play out this lively recipe, additionally contingent on their digital and physical contexts. The degree of disjunction that the click or pop will have is relative to the other audio streams mixed in during performance and will be higher during moments of rest and lower if, for instance, the slow movement of 'Pulses' swings in the same direction. Similarly, the sound resulting from the disjunctions will be highly characterized by every aspect of the system performing it: the digital-to-analogue converter, speaker, its housing, and any resampling or other digital signal processing performed by the user or operating system will all contribute to the sound's character.

---

96. Supported by a digital-to-analogue converter and possibly hardware filtering, both of which also introduce temporal-material colouration.

The musical-semantic aspect of the piece also plays on the 'materiality' of phrase comprehension. Initially, I wanted to come up with a standalone track (before working on *What's at Hand*) that could be played quietly from a speaker in a public place in order to provide the opportunity for hazy recognition of a coincidental pattern in some environmental sound. The recognition (ascription) of musical attributes in sound which is heard but not actively listened to depends on factors such as the listener's musical tastes and listening history, their physical and affective state, and the acoustic situation.[97] The physical, acoustic, social, historical, affective, and electric all interact, refract, and transduce; their would-be independent particularities even more particular in their combination. The particularity of these milieux intersecting just so can evoke the grain of the encounter, the feeling of their ongoing and fleeting combination in that punctuating moment. Though the important aspect of incidental discovery was modified in the piece's adoption into *What's at Hand*, the listener-oriented materiality remains a foil for the digital materialities of the piece's production. To bake these in, I notated a score of slow, sparse phrases using these clicks and pops in a musical style drawing on the dance rhythms of *Pith* and the spaciousness of my *Trombone Solo* (2015).[98] The track was rendered by playing the score from notation software and using the MIDI output to control a Pure Data patch, the output of which was captured in real time.

'Pulses' follows the same pattern of entangled materialities in its moments of production and reception. The track is a product of experiments with acoustic beating in sub-audio frequencies. By placing two sine waves in precise phase and frequency relationships, I was able to generate pulses of low tones in the interference relationship between the two waves. The duration and amplitude envelope of the pulse is correlated with the difference in frequency, and the resulting audible tone is the midpoint between them. In other words, what is heard is the relation between the origin waves more than the waves themselves. This mode of production also dictated the organization of the sound: the relationships between the waves needed to be precisely determined ahead of each pulse and the oscillator parameters could only be adjusted at the moment of zero amplitude

---

97. For a cognitive perspective of enacted musical ascription, see eg. Schiavio, 'Music in (En)Action. Sense-Making and Neurophenomenology of Musical Experience'; for listening away from incidental music, see eldritch Priest, *Boring Formless Nonsense: Experimental Music and The Aesthetics of Failure* (New York: Continuum, 2013).

98. Dave Riedstra, *Trombone Solo*, 2015, https://daveriedstra.com/works/trombone-solo/.

between them otherwise discontinuities producing clicks and pops would be produced. Working with this characteristic, I created a Pure Data patch which generated pulses according to a text file score that defined events by duration, amplitude, and centre frequency.[99] I recorded the output of this patch directly to the audio file which is used in the interactive website.
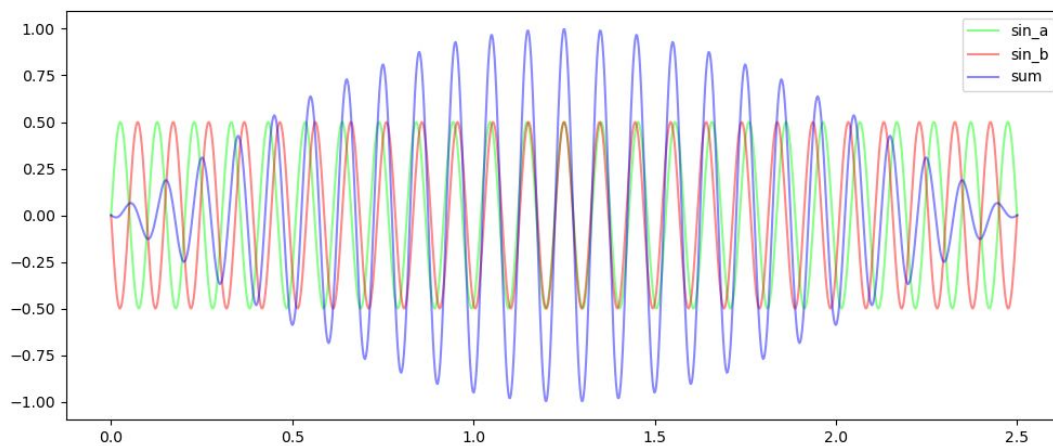
Figure 6: A pulse generated by the interference pattern between two sines with close frequencies in opposite initial phase

These pulses are heard and felt as disturbances in the physical apparatus playing back the audio. Low frequencies necessarily invoke movement. Aside from the intuitive gut-punch feeling of a solid bass, low tones clip speakers, rattle housings, and shake objects into skittering across desks and cabinets. The lower a pitch becomes, the less its periodic vibrations are perceptible as frequency and the more they are about the position of whatever material is oscillating. The periodic connection between peaks becomes unsure as pitch descends into rhythm and gaps in their regularity leave room to question whether the next one will occur on schedule. The mixed regularity of the pulses is a point on a line of continuity between the piece's form, the rhythm of its slow phrases, the 10 to 14 Hz vibrations making up the pulses, the harmonics and noise generated by their vibrating the laptop chassis and clipping its speaker, the 48 kHz sample rate churning away behind the DAC, the 2-ish GHz frequency of the device's processor filling the sample buffers (among other things), the tiny hum of the electrons that charge the 24 bits of those samples' binary

---

99. The score is a plain text file with a simple syntax and is stored in the same repository that holds the Pure Data file. I also used a small amount of $\tanh$ saturation to give the poor mobile device speakers a little more frequency content to 'chew on', both in case of a high-pass filter before the speaker and because I enjoy the sound.

states, and who knows what else. Some of these vibrations are felt in the skin, but just like the room that colours the sonic vibrations and fills them with noise, the plastic or metal of the device, the oil on its surface, and the callous on the fingertips all modulate and substantially contribute the timbre of this feeling, which does not exist without their being there to transfer it. The sensuous becoming of the sound of 'Pulses' is ultimately a function of the relation between its components.

Having worked with sounds at the limits of hearing owing to their brevity and their low frequency, I thought I would turn in the other direction and explore sounds at the upper frequency range of hearing. I had recently learned of audio artefacts called 'birdies' which are produced when frequencies in a digital audio stream flirt too close to its Nyquist frequency (the effective upper limit for what frequencies can be represented at a given sample rate). In the noisy contexts of cymbal washes in which these artefacts are usually found, they can sound like birds whistling at a distance and can be difficult to hear. I hoped to invoke that embedded, hidden quality in a way that would avoid disturbing others even if it was heard.

While working with the low tones of 'Pulses', I discovered similar sounds which should not have been produced in that context.[100] After some empirical investigation and a brief discussion on the lines online forum, I outlined three processes responsible for the origin of these sounds.[101] First, the inability of the stock hi-pass filter to remove the DC offset of very low frequencies created dynamic high-frequency artefacts. Second, interpolation errors caused by the stock sine tone's wavetable at very low frequencies manifested as very high overtones (particularly the 512th) when fed through an aggressive low-pass filter. Finally, an 'optimization' in Pure Data introduces a quiet noisy sample once every bin which, when amplified, creates a whine at the sixty-fourth subharmonic of the sample rate. These processes are deeply entangled with the materiality of the Pure Data software, its relation to the underlying operating system, and its history.[102]

---

100. I explore the processes generating these sounds in *2020-03-09 17-31-49 - Hi Pass Artifacts*, 2020, https://vimeo.com/396514538; *2020-03-15 16-23-50 - Hi-Pass with Rawosc~*, 2020, https://vimeo.com/397799230.

101. Thanks to @zebra (Ezra Buchla) and @synthetivv (Kenji G) for their insight. Dave Riedstra, Ezra Buchla, and Kenji G, 'Puredata! (Thread)', *Lines*, 10 March 2020, https://llllllll.co/t/puredata-thread/7291/480.

102. For instance, the sine oscillator's use of a wavetable is a mechanism to improve efficiency by avoiding the need to newly calculate the value of each sample. On modern computers this is generally not needed, but Pure Data's development history is long and also targets use cases including low-resource environments such as single-board computers., interactive mixed media, and video game engines.

I hoped to score them as I had with the lower tones, but found that the processes which made these sounds possible were resistant to fixation. Because some of the artefacts were generated by the movement of the low-frequency oscillator through certain ranges of values, others by certain frequencies of movement, and others by the phase of the oscillator, influence over the sounding result was necessarily oblique. I couldn't just reset the phase of the underlying oscillator to control when an artefact it created would begin to manifest because doing so would cause very loud sounds and interact with other ongoing processes. These processes had a lifelike behaviour which I found myself needing to respond to: more than playing the patch, I was playing *with* the patch, responding to and guiding it. I recorded a few takes which met the general outline I hoped for—sustained, complex, short enough not to fatigue the ear—and chose the most suitable as the representative artefact of this process.

Occupying the upper limit of frequencies typical of both human hearing and consumer device audio outputs, the chirps and whistles of 'Birds' point to the materials they interact with in the process of performance. Their higher frequencies are more contingent on physical distance, emanating less far from the user's device. There is great variability also in the hearing mechanism of the listener, whose upper frequencies degrade more quickly with age and with exposure to sound, a mark of social and personal history etched onto the body. The sound's apparent fragility is effected before even hitting the air. Since some of the mechanisms that produce birdies have to do with an insufficient number of samples, each carries a proportionally greater role in the production of the sound. Compared this to 'Pulses', the slow movement of which is abstracted across a great number of values. As a result, anything modifying the audio stream—forgotten equalization or Dolby Atmos settings, operating system-level sample rate or depth conversions, or other unknown-to-me processes in the digital to analogue conversion—has profound effects on the resulting sound, to the extent that it might be entirely different between devices. The role of the stream of samples as representing some sound is subverted in this edge-case. The absence of an original does not make it a simulacrum but rather a score that the device and its entangled processes interpret, a tiny analogue to the ongoing interpretation of the text score by the listener-performer.
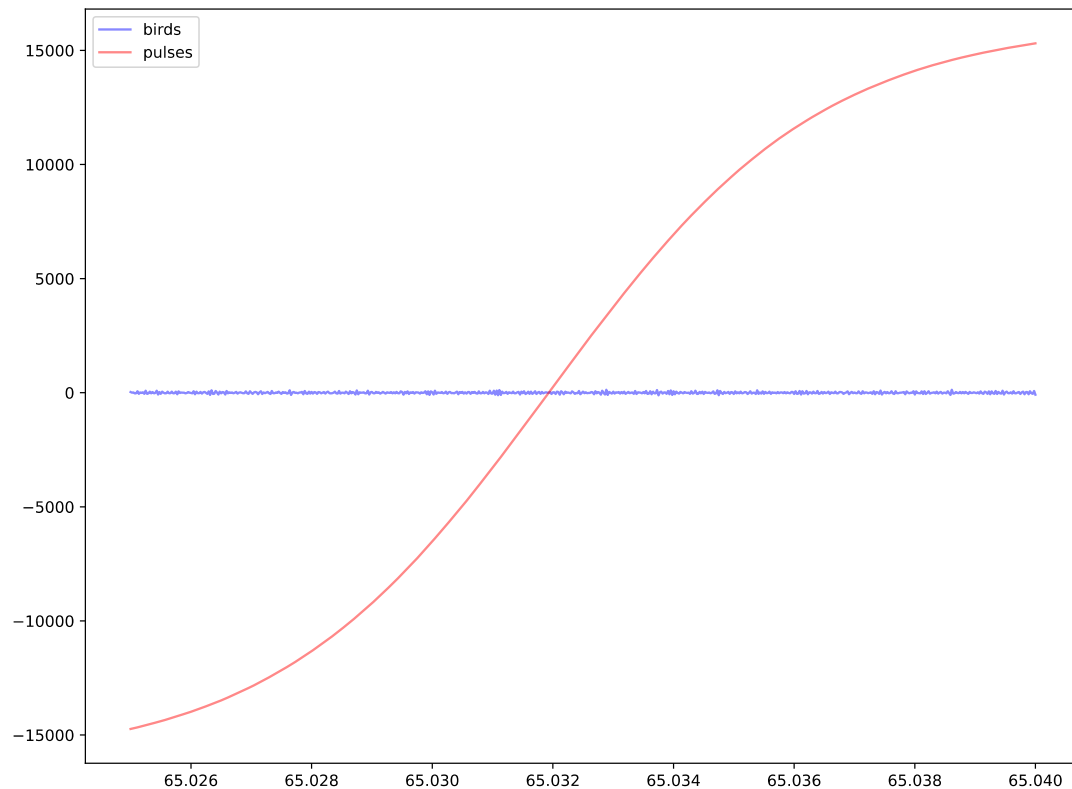
Figure 7. The waveforms of 'Birds' and 'Pulses' superimposed (fifteen millisecond excerpt)

The score

Just as these audio elements form more-or-less stable momentary intersections of processes informing and performing future events, the browser-based score forms a chunk of debris spun off from my various practices which agglomerates into future events such as the self-performance and the writing of the text you are currently reading. My attempts to use the score to steer the performance of the piece toward an experience of embedded entanglement led to two guiding principles, self-awareness and deference, which structured some of the decisions I made while shaping the code that generates the score.

Self-awareness is a facet of the experience of entanglement which I generally imagine for my work. The feeling of actively co-composing a dense tangle of milieux involves a participation which stands out as it subtends an atomistic conception of the individual. Being in an environment means to *be* the environment, both from another perspective and in the sense that one profoundly depends on the environment. Orienting perception to one's effects on the environment and others in it and to their effects in the inverse direction

is to encounter the sometimes porous and diffuse nature of what is called a boundary.[103] In this way, what can emerge is a feeling of self that includes the environment and variously interwoven milieux (social, historical, acoustic, electronic, and so on): in other words, the experience of entanglement I imagine *is* an awareness of self that encapsulates sympoietic, intra-active participation in relational co-constitutive becoming. In more immediately practical terms, self-awareness indicates attention to one's effects on the environment (and the inverse), an accounting for one's history, and physical effects like coenaesthesia, proprioception, and a relational sense of material space.

Deference is a personal ethical standpoint that I take in response to (and with) this self-awareness. Where I might have an effect on others or on the environment which I can influence, I try to defer the direction of that influence to the well-being of the other, either by exerting influence toward what I understand is a more desirable outcome for them or by delaying the extent and moment of my inevitable influence where possible. Doing so is to a degree necessarily speculative, as I can't tell in every case what would be most in the interest of the other. Deference is not a direct result of self-awareness as just described (I'm neither prepared nor equipped to make that ethical argument) but I think it is a sensible approach. (All of that awkwardly to say that I just want the experience to be nice.)

The principles of self-awareness and deference guided the development of the score, which in retrospect I approached via three facets: its text, its graphical interface, and its implementation in code. These two principles informed the text of the score in several ways. The language uses a carefully chosen combination of suggestion, imperative, and acknowledgement of intent. For instance, the opening statement that 'these tracks are designed for' a particular medium and setting of playback conditions the following imperatives to 'play them where they might be overheard' and 'play them at a volume that…' as suggestions, the implication being that if the user wants to follow the intended design, these are the steps that should be taken. The combination is meant to suggest that while the piece is created with a particular application in mind, there is no failure condition for its misuse or 'poor' or 'inadequate' performance (and indeed other uses are welcome).

---

103. Which is not to say that boundaries don't exist. While my work emphasizes their fluidity and crossing, their establishment and reinforcement are daily life-and-death issues. By creating opportunities to draw close and become more sensitive to them, I hope to join Haraway in arguing 'for pleasure in the confusion of boundaries and for responsibility in their construction'. Donna J. Haraway, 'A Cyborg Manifesto', in *Manifestly Haraway* (University of Minnesota Press, 2016), 7.

The use of open suggestion places decision making in the hands of the user, both allowing them to take in the piece in a way that suits them (in terms of comfort and of ability) and requiring them to exert some agency (deciding to perform the piece near others in a library or near a friend's 'smart' speaker). The player does not thoughtlessly iterate the actions laid out in the score but takes a participatory role as co-creator of the experience. These aspects of the text are confluences of self-awareness and deference: I cannot extricate myself or my intentions from the piece so I clearly lay out what I'm trying to do (self-awareness) and allow the user to use it otherwise (deference). More explicit are the autograph line and the assurance that there aren't any jump scares. Similarly, the length of the text and the lightness of its language are meant to reserve attention to the actions needed by the performance rather than preface the score with a long article justifying the decisions I've made in the piece and drawing out theoretical connections (which interested parties could find easily elsewhere on my website).

Self-awareness and deference took more practical roles in terms of the graphical design and implementation. I chose a high-contrast colour scheme for legibility and used self-evident graphical symbols where appropriate. The text is broken up into a small number of short paragraphs, the first sentence of which is emphasized to allow for quick parsing and navigation. I chose simple coding paradigms to reduce complexity and the number of dependencies, thereby minimizing the download size of the page and theoretically improving performance.[104] Using the minimum necessary code made it simple to avoid frameworks, services, or paradigms that might infringe on user privacy through the use of tracking.[105] Further work is planned to improve accessibility and minimize network traffic.[106] With these steps I attempt to defer to the well-being of the user, their device, and the environments affected by the resources the web score utilizes. I self-consciously indicate some of these with the footer message that links to the source code.

---

104. I did not test against frameworks such as Angular, React, or Vue, but since these generally abstract the browser functions I utilized directly, I doubt they could offer any improvement.

105. For another artistic take on digital surveillance and materiality, see the work of Joana Moll, such as Moll, 'Data Extraction, Materiality and Agency'.

106. Among other things, I plan to do a more rigorous WCAG compatibility check, implement the preferred colour scheme CSS, and create options to use local audio and to switch between low and high resolution audio files.

The device and the browser

Incorporating the user's device as the site of the score, the tool controlling the sound, and the mechanism of sound production enables a close relation to the tangled materiality of consumer devices. The intersections of these functions in *What's at Hand* stand in for broader entanglements of consumer hardware as social artefacts and interfaces, propagators of incredible quantities of electromechanical and electrical waste, products of exploitative work conditions, enablers of corporate and individual surveillance, and mechanisms of mass social influence.[107] At the same time, these devices have a high amount of unused potential, not only in terms of raw computing power but also alternative uses in, for instance, social or artistic applications.[108] By drawing out the materiality of these ready-to-hand devices in a way that relates them to a familiar social context in a physical space, I hope to create opportunities for the kind of aesthetic appreciation that Saito suggests can lead to a feeling of respect for and responsibility to objects. As with quiet sounds in an acoustically lively space and the possibility of being overheard in a quiet situation, this feeling of responsibility is one of fostering, protecting, and appreciating the particular characteristics of what it is that's cared for. In the case of a consumer device, this might

107. See, for instance, Tom Bryson, 'E-Waste: Toxic Techno Trash', Ethical Consumer, 30 September 2022, https://www.ethicalconsumer.org/technology/e-waste-toxic-techno-trash; Karen Hao, 'Training a Single AI Model Can Emit as Much Carbon as Five Cars in Their Lifetimes', MIT Technology Review, 6 June 2019, https://www.technologyreview.com/2019/06/06/239031/training-a-single-ai-model-can-emit-as-much-carbon-as-five-cars-in-their-lifetimes/; Todd C. Frankel, 'The Cobalt Pipeline', Washington Post, 30 September 2016, https://www.washingtonpost.com/graphics/business/batteries/congo-cobalt-mining-for-lithium-ion-battery/; Access Now Europe, 'TikTok's "Focused View": The Creepy New Feature Aims to Monetise Your Emotions', European Digital Rights (EDRi), 16 February 2023, https://edri.org/our-work/tiktoks-focused-view-the-creepy-new-feature-aims-to-monetise-your-emotions/; Samantha Cole, 'Police Records Show Women Are Being Stalked With Apple AirTags Across the Country', Vice, 6 April 2022, https://www.vice.com/en/article/y3vj3y/apple-airtags-police-reports-stalking-harassment; Stephanie Kirchgaessner et al., 'Revealed: The Hacking and Disinformation Team Meddling in Elections', The Guardian, 15 February 2023, https://www.theguardian.com/world/2023/feb/15/revealed-disinformation-team-jorge-claim-meddling-elections-tal-hanan; 'Research + Policy', Center for Countering Digital Hate | CCDH, accessed 21 September 2023, https://counterhate.com/research/.

108. Alternative uses might include peer-to-peer social networking with protocols such as ActivityPub, Matrix, or SSB; offline information browsing in Kiwix; or extremely light-weight 'smolnet' protocols such as Gemini (which can also be browsed offline using offpunk). These projects creatively resist the centralization and increased resource consumption of digital activity. Modern devices have a disproportionately high resource use thanks to their generalization and the popularity of high-resolution media. The magnitude of this is sometimes illustrated by comparison of a modern smartphone such as the iPhone 14, which hosts at least 6 gigabytes of RAM, to the navigational computer for first NASA moon landing, which used less than 80 kilobytes of combined memory. Wim Vanderbauwhede points out that computing already accounts for 2% of global emissions and is projected to reach 80% by 2040, partly due to unexamined inefficient resource use. Christine Lemmer-Webber, 'ActivityPub Rocks!', accessed 21 September 2023, https://activitypub.rocks/; 'Matrix.Org', accessed 21 September 2023, https://matrix.org/; Secure Scuttlebutt Consortium, 'Scuttlebutt', accessed 21 September 2023, https://scuttlebutt.nz/; Kiwix Association, 'Explore Offline Wikipedia and Educational Content with Kiwix', Kiwix, accessed 21 September 2023, https://kiwix.org/en/; 'Project Gemini', accessed 21 September 2023, https://geminiprotocol.net/; Lionel Dricot, 'Offpunk: An Offline First Command-Line Browser for the Smolnet', sourcehut, accessed 21 September 2023, https://sr.ht/~lioploum/offpunk/; 'Apple iPhone 14 - Full Phone Specifications', accessed 21 February 2023, https://www.gsmarena.com/apple_iphone_14-11861.php; Charles Averill, 'A Brief Analysis of the Apollo Guidance Computer' (arXiv, 6 January 2022), https://doi.org/10.48550/arXiv.2201.08230; Wim Vanderbauwhede, 'Frugal Computing', Wim Vanderbauwhede, 29 June 2021, https://wimvanderbauwhede.codeberg.page/articles/frugal-computing.

translate into improved maintenance that prolongs its life and reduces electronic waste, or increased familiarity with the device's computational and physical capabilities that in turn leads to an increased diversity of potential uses for this or other *existing* hardware (again prolonging its life) or attention to the possible things that the device might be doing unbeknownst to the user (such as bloatware or runaway processes, coercive design choices, or quotidian advertising tracking and surveillance).

The use of the web browser as a medium for the interactive score reflects these concerns. Browsers are commonplace deployment targets for software and have their own particularities: though we no longer live in the days of Internet Explorer, different browsers have their own ways of interpreting software and vary between operating systems and devices. Browsers also have a disproportionate amount of potential compared to their primary use case. Browsers are increasingly the deployment target for applications which formerly would be deployed to the desktop (thanks to application frameworks like Angular, React, and Vue) and are even capable of multimedia-intense processing. However, they are not resource-efficient as hosts for desktop-style applications, and the perpetuation of Electron applications is a driver of acceleration in hardware development cycles.[109] The reason browser-based application frameworks have become prolific is their efficiency in development time and in access, and as a result of their popularity these frameworks are also increasingly used in inappropriate situations such as simple text-and-image web pages, which further contributes to resource waste. Becoming more sensitive to the materiality of the browser is to become intuitively familiar with the electronic resources one is using in everyday content consumption and their growth-driven motivators.

Though I avoided frameworks, I used the browser for *What's at Hand* because of its efficiency of development and use. My history as a web developer meant that I had familiarity with the platform, and its ubiquity meant that the piece could be accessed on the majority of devices. I attempted to mitigate disproportionate resource consumption by developing in plain HTML, CSS, and JavaScript (that is, without the use of a framework). As

---

109. Electron is a framework for creating desktop applications from code written for web browser APIs and frameworks. Its resource inefficiency is a result of needing to run generalist browser rendering and JavaScript engines in order to execute application code, and needing to do this separately for each application using the framework, effectively running a separate web browser for each. Popular applications built with Electron include Microsoft Teams, WhatsApp, and Discord. The popularity of these and other resource-inefficient software paradigms both results from and contributes to continued growth of hardware capabilities, in turn shortening device lifecycles and leading to more electronic waste production.

a side effect of directly using browser APIs (programmatic interfaces to the browser's affordances) as opposed to accessing them through the abstractions of a framework, the application is generally computationally lighter but also exposes itself to the differences between deployment environments, and with them, potential bugs. I continue to maintain the website to improve deployment coverage, responding to discoveries of incompatibilities with existing and future differences in deployment environments, and also to improve efficiency and accessibility features. In this way, my support of the web score evidences the processual aspect of its objectivity, as something that needs to be maintained, fostered, and cared for.[110]

At hand

What's at Hand centres on participatory, ongoing, inter- and intra-active use. The inherent enactivism of listening (and perception more broadly) finds a parallel in the score's performance: there is no sound without the listener performing the score, and there is no performance of the score without conscious and non-conscious decision making. A core of (my speculative conception of) the experience that characterizes *What's at Hand* is the interaction with the device, the space, and the others in it, leading to a feeling of responsiveness to the relationships between them. Furthermore, much of this use is *mis*use. Audio software and hardware are pushed to their limits for their incidental byproducts, consumer devices are used as musical scores and instruments, quiet spaces and their associated social norms are gently stressed, the role of music is used to lead to relational sensations normally 'outside' its realm, and the piece itself is presented as open to its own misuse.

While I could not prevent the misuse of the score even if I had wanted to, the emphasis on use and misuse is meant as a way to encourage attentive aesthetic engagement with participatory interactions with given milieux.[111] Doing so, I speculate, is a way to exercise the *bricolage* that fascinates de Certeau.[112] *Bricolage* in *What's at Hand* is not only the ingenious creative making-do with a set of imposed products or vocabulary (the objects

---

110. The web score depends on a mutual support manifesting from continued accessibility of the software and hardware platforms the score uses as well as user interest (or at least my perception of it). In that way as well as others, the score is similar to the egregore mentioned in 'Practising process, processing practice' with regard to *Table*.

111. And also to avoid replicating the colonizing logic of the producing class described by de Certeau.

112. de Certeau, *The Practice of Everyday Life*.

of de Certeau's study) but the same approach extended to the entanglement of milieux in which one finds themselves: insinuating oneself 'into the other's place, fragmentarily, without taking it over in its entirety, without being able to keep it at a distance'.[113] This tactical approach to the given employs a responsive art of timely combination absent a security of footing from which to create new products for oneself.[114] The *bricoleur* performing *What's at Hand* for themselves comes to terms with their situation as embedded in a chaotic set of inter-informing environments (social, physical, aesthetic, historical, acoustic, digital, other) which they must navigate.

The negotiation of these situations is not an act of benign perception: the performing listener also co-composes the environments they audit, contributing their presence-process to the environments while also taking up the environments into their own process. Ahmed describes this as a 'submersion' of bodies 'such that they become the space they inhabit; in taking up space, bodies move through space and are affected by the "where" of that movement. It is through this movement that the *surface of spaces* as well as bodies takes shape'.[115] This movement is not only through physical space but also through the spaces of other relations, such as the positioning of one's dialogue through the use of a given vocabulary, occupying a profession historically not oriented to certain people, or performing sounds and not letting them escape to be heard by others. Each of these spatial movements defines the space and the one moving through it *in their moving* and continual reconfiguration of borders. This is why de Certeau introduces *The Practice of Everyday Life* with the counterintuitive statement that 'a relation (always social) determines its terms, and not the reverse', and why Haraway writes that 'natures, cultures, subjects, and objects do not preexist their intertwined worldings'.[116]

Co-composition also manifests in relationships with objects, especially ones that provide affordances for intentionally interacting with the world. Tools develop through their ongoing use, taking the shape of what they are for, and changing the way a body

---

113. de Certeau, xix.

114. de Certeau describes a 'tactic' as 'a calculus which cannot count on a "proper" (a spatial or institutional localization), nor thus on a border line distinguishing the other as a visible totality. … because it does not have a place, a tactic depends on time—it is always on the watch for opportunities that must be seized "on the wing."' This description resonates strongly with the 'learning to be truly present … as mortal critters entwined in myriad unfinished configurations of places, times, matters, meanings' of Haraway's *Staying with the Trouble.* de Certeau, xviii; Haraway, *Staying with the Trouble*, 1.

115. Ahmed, *Queer Phenomenology*, 53, emphasis mine.

116. de Certeau, *The Practice of Everyday Life*, xi; Haraway, *Staying with the Trouble*, 13.

relates to the world in the process of that relating.[117] Through use, a user's experience of co-composing with the world can be engaged. 'Action involves the intimate co-dwelling of bodies and objects', writes Ahmed, and this intimacy brings about a particular felt understanding of the tool-object that is more than a distanced perception.[118] Saito illustrates this feeling with the example of cutting with a knife: 'the aesthetic value of a knife consists not only of its visual qualities and its feel in my hand, determined by its surface texture, weight, and balance but, most importantly, by how smoothly and effortlessly I can cut an object with it'.[119] Through using the knife, Saito experiences an understanding of the quality of relationships that are being performed between the knife, the user, and the object being cut. These relationships can be speculatively-empirically encountered in the presence of the tool.[120] Quoting Heidegger, Ahmed writes that an 'object as practice, as something we do something with, involves "its own kind of sight"', an understanding of what using the object might be like.[121] Continuing this reading of Heidegger's Z*uhandenkeit*, Ahmed clarifies that this 'kind of sight' is one of the *relationship* that the tool, the user, and the world might have.[122] The use of an object, or the potential for its use through its closeness to hand, involves a perception of co-composing tangled milieux.

What's at Hand is meant to engage this perception through active aesthetic interaction: as Anna Munster points out, '*networking* … is what generates an aesthesia of networks'.[123] I have three speculative interests related to this gambit as it relates to the corner of my research in which *What's at Hand* is situated. First and most basic, I want the piece to enable a feeling of responsibility for and to the digital technology at hand: their parameters of use, the effects of their use on others and oneself, and maybe even the material waste associated with the physical devices. Saito suggests that aesthetically appreciating objects for their unique characteristics can generate this feeling of respect, a

---

117. 'The object has been shaped for something, which means it takes the shape of what it is for.' Ahmed, *Queer Phenomenology*, 46.

118. Ahmed, 52.

119. Saito, *Everyday Aesthetics*, 27.

120. Massumi might call this 'virtual'. Massumi, *Semblance and Event*.

121. Ahmed, *Queer Phenomenology*, 47; paraphrasing Martin Heidegger, *Poetry, Language, and Thought*, trans. Albert Hofstadter (New York: HarperCollins, 1975), 99.

122. By re-introducing the user to the process of examining the usage-interrupted tool in the state that Heidegger calls 'present-to-hand' (as opposed to 'ready-to-hand'), Ahmed shows that the perception of properties is never divorced from the object's relationship to the world, including the user. 'Failure … is not a property of an object … but rather of the failure of an object to extend a body'. Ahmed, *Queer Phenomenology*, 49.

123. Anna Munster, *An Aesthesia of Networks: Conjunctive Experience in Art and Technology*, ed. Brian Massumi and Erin Manning (Cambridge, MA: MIT Press, 2013), 8–9.

feeling which in my experience is connected to the entangled material, social, historical, and ecological conditions for the object's nascent and continuing becoming.[124] As Saito's suggestion indicates, appreciating the uniqueness of objects through closely interacting with them is not restricted to using tools (just as aesthetic appreciation is not limited to paradigmatically aesthetic objects of attention such as art or landscape). My second interest is to develop sensitivities to close material interactions that may be unintentional, both in that the interaction might be unintended and that it may not have an intentional goal. This is to (speculatively) take phenomenological and empirical approaches to understanding tools and apply them to interactions with the world more generally.[125] While on the one hand this extends the boundaries of the tool in the direction of objects and interactions which are not intentionally, traditionally, or explicitly attributed with affordances, it also asks to extend sensitivity to technical interactions that use a non-objective tool. And so my third speculative interest is to aesthetically encounter the use of these non-physical technical loci for interacting with milieux: for instance socio-cultural conventions, psycho-somatic utilities, and even technicity itself. As with objective tool use, unintentional physical interactions as well as interactions with non-physical tools enable aesthetic experiences of co-composing entangled milieux that can lead to more intimate understanding of their unique characteristics, feelings of appreciation and responsibility to them, and an intuitive sense of the worlds they offer and what it might be like to interact with them. In doing so, these moments of heightened aesthetic entanglement can foster sensitivity to what's at hand.

---

124. Saito, *Everyday Aesthetics*.

125. Tool use can be understood as a close and intentional engagement with the tool and the world it changes. *What's at Hand* deals primarily with the closeness of the relationship, for more on the intentional, see speculation in 'About *Common*' and the image in 'About *Ripples*'.

About *Revelling in Mists of Constellations of Pine Points and Waltzes*

Following and slightly overlapping with *What's at Hand* and in the thick of the first pandemic lockdown, I began work on what would eventually become *Revelling in Mists of Constellations of Pine Points and Waltzes*. *Revelling* is a fixed ('tape') piece about thirteen minutes long accompanied by a short textual introduction and found on a small static page on my website.[126] The low gurgling and occasional crisp clinks of the fixed track are heavily processed field recordings from two sources: vehicle traffic in Tkaronto's Don Valley and mason jars rattling inside my apartment a few blocks away.[127] The text briefly gives a background to the audio and suggests a way of listening using a portable device.

The seemingly unending noise and vibration of the city aggravated a months-long episode of misophonia, and I approached the piece in a slightly desperate attempt to create anything sonic at all in an environment which seemed to constantly infringe my sonic and tactile senses. I intended to do this by using audio to draw out haptic vibrations from a portable personal device like a cellphone or tablet, hoping to unite quiet sound and touch in a localized assertion of my right to take up space. I was unable to create tactile vibrations from my phone's speakers consistently but enjoyed the material and the experience of searching for the possibility of touch enough to keep the piece around. Listening back after

---

126. The page can be accessed at https://daveriedstra.com/revelling.

127. The name 'Toronto' derives from the Kanien'kéha (Mohawk) name *Tkaronto* which referred to a fishing place near what is today known as Lake Simcoe, some 100 kilometres to the north. I will use both the Kanien'kéha and Westernized forms interchangeably. Like Tkaronto's sometime name 'York', the name 'Don' was given to the river by Lieutenant Governor John Graves Simcoe in the eighteenth century. There are at least two documented Anishnaabe toponyms for the river, *Necheng Qua Kekonk* and *Wonscotanach*. For clarity, I use 'Don' throughout. Patrick Metzger, 'Toronto Urban Legends: Naming the City', Torontoist, 23 May 2013, https://torontoist.com/2013/05/toronto-urban-legends-naming-the-city/; 'Don Valley', City of Toronto, 17 November 2017, https://www.toronto.ca/explore-enjoy/recreation/golf/don-valley/.

moving away from the noisy Queen Street apartment where my partner, her cat, and I lived, I discovered that the piece had a way of casting its higher frequencies to sound like they were originating from some point elsewhere in the room.

Though an unusual piece among my output, which until that point had little to do with field recordings, the experience of assembling and listening to *Revelling* catalysed concepts which substantially informed my thinking and practice. The acknowledgement of my own situatedness and its influence on my work which had begun explicitly in *What's at Hand* became profoundly unavoidable here. The nested tangle of situation and process contributed to an understanding of artwork as by-product produced by a practice of relating abstract intention to embedded sensation in a continual feedback loop. As a process of joyful movement through sensuous relation with the environment, indulging in 'the time that it takes' to bring situations into contact, artistic practice could appropriately be described as revelling.[128]

The audio

Revelling's source recordings come from two places: the lower Don River and the inside of my nearby apartment. While not the first time I had made field recordings, it was the first time I had used them in a piece. I was familiar with and enjoyed works by musicians such as Toshiya Tsunoda, Andy Guthrie, Michael Pisaro, and Judith Hamann which feature field recordings, but the bare referentiality to place, time, and archival practices had seemed inappropriate to the kinds of experiences I wanted to enable with my work.[129] In the moments of relative exhaustion in which I began the piece, however, recordings provided quick and low-effort access to sonic material to work with. The way these recordings reflect their specificity to situation is not through representation, even a contorted one, but rather through the characteristics that result from the activity of recording performed in their situation, having been made in a certain place at a certain time and interacting with the affordances of the digital signal processing I later carried out with them. The recordings

---

128. 'An arrival takes time, and the time that it takes shapes "what" it is that arrives.' Ahmed, *Queer Phenomenology*, 40.
129. Toshiya Tsunoda et al., *The Temple Recording*, CD (Japan: edition.t, 2013), e.03; Andy Guthrie, *Brass Orchids*, CD (Cincinnati: Students of Decay, 2018), SOD119LP, credited as Anne Guthrie; Michael Pisaro et al., *Continuum Unbound*, CD (US: Gravity Wave, 2014), gw 011-013; Judith Hamann, *Hinterhof*, CD (Sydney, Australia: Longform Editions, 2021), LE075.

gather streams of audio from the flows of traffic, water, and air, and merge them with the currents of my practice to branch off as tributaries of experience for listeners.

Figure 8. Field recording where the old Eastern Avenue bridge crosses the Don River

Together with the Humber, the Don River is a conventional boundary of the 'old' city of Toronto.[130] Once cutting a winding course and opening into Lake Ontario via a broad forks, the river and its valley have a long and complex human history.[131] Though it has been settled for thousands of years, some of the most direct geological influence humans have had on the area is the re-routing of the river by European settlers in the nineteenth and twentieth centuries.[132] Today the lower part of the river runs straight and unproblematically through the Don Valley, which also hosts a railway and highway.[133] The multi-use trails running along the river connect to the Great Lakes Waterfront Trail after passing by some new condominiums. While volunteers pick up trash along the river, development and rerouting continue to be applied to address the recurring flooding of the Don, its diminishing biodiversity, and the growing infrastructure needs of the city.[134] The

130. This may not technically be true but it makes sense to me. East of the Don is the Beaches, which is basically Scarborough; west of the Humber is Mimico, which is basically Etobicoke.

131. James Maurice Stockford Careless, 'Toronto', in *The Canadian Encyclopedia*, ed. Elaine Young and Erin James-Abra, 11 March 2022, https://www.thecanadianencyclopedia.ca/en/article/toronto.

132. For a history of the river valley and European colonial interaction, see Jennifer L. Bonnell, *Reclaiming the Don: An Environmental History of Toronto's Don River Valley* (Toronto: University of Toronto Press, 2014).

133. Though they run in parallel, enough people prefer the stop-and-go traffic of the Don Valley Parkway to the GO Transit train that the highway has earned the nickname 'Don Valley parking lot'.

134. 'Don't Mess with the Don!', Don't Mess with the Don!, accessed 21 September 2023, https://www.dontmesswiththedon.ca; Joanna Lavoie, 'Environmental Groups Shocked after Metrolinx Announces Plan to Chop 2,800 Trees in the Don Valley', Toronto, 7 March 2023, https://toronto.ctvnews.ca/environmental-groups-shocked-after-metrolinx-announces-plan-to-chop-2-800-trees-in-the-don-valley-1.6303561; 'Don Mouth Naturalization and Port Lands Flood

river valley is thus a site where various human, environmental, and geographic forces tensely mingle. Near a retired rail bridge there I took a recording of the traffic, wind, and water.

About 500 metres away, heavy machinery shook the old building where I lived. The overlap of the King and Queen streetcars in front of our apartment had meant it was never a particularly quiet place; the century-old machine shop was not built to dampen the vibrations of the 'light' rail that now rumbled by metres away. The addition of new condo developments on the other side of the street added the noise of heavy trucks, demolition, and construction, and a poorly timed underpinning operation had begun in our building (which at the time of writing only recently finished). The vibrations that shook the foundations of my home unsettled me, interrupting my ability to work acoustically, to sleep, and to concentrate. I took a recording of a rattling flat of mason jars and used it in the piece. (A few months later we moved out of the city.)
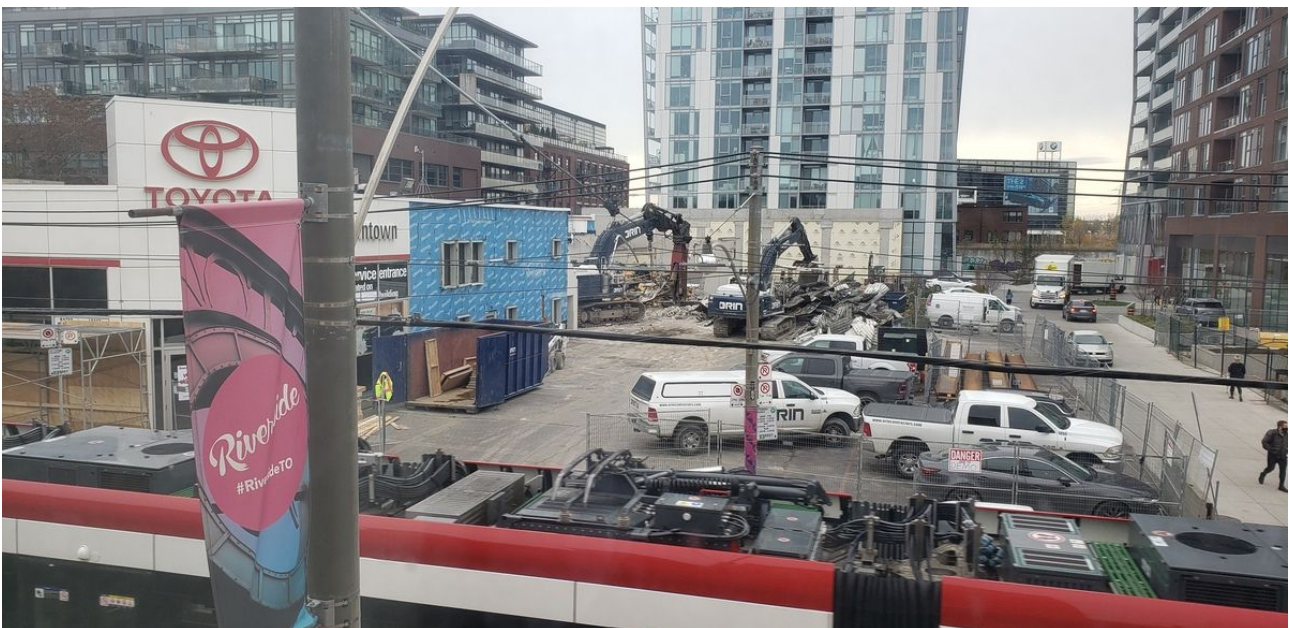
Figure 9. Construction, demolition, and the 501 streetcar from our living room window

These source recordings are object-like debris washed up by mingled streams: environmental, political, personal, historical, economic, pandemic.[135] That is not to say that they are archival objects from which some aspect of these threads could be reconstructed

Protection Project', Toronto and Region Conservation Authority (TRCA), accessed 21 September 2023, https://trca.ca/conservation/infrastructure-projects/don-mouth-naturalization-port-lands-flood-protection-project/.

135. I was briefly also using a third source recording, taken from my cell phone at the Kirkstall Abbey in Leeds, England, but omitted it in the final mix for reasons of taste.

or pointed to. The recordings are digital side-effects of an electro-mechanical process performed at a particular place and time. Nor is it to say that they are static or have some essence. As a file format, the waveform behaves like software code which, as Wendy Chun points out, performs the conflation of instruction and deed.[136] The file exists as audio (even as a file at all) only as long as it is continually (re)interpreted as one, which means that its objectivity depends on a continued flow of human-machine and human-human interaction. Like the continual reshaping of tools which take on characteristics of their (mis)use, this fluidity contests the would-be stability of objects, showing them to be as liquid as the processes from which they break off.[137]

I processed this audio quite radically. The goal I had in mind was to bring out tactile vibrations through the device chassis while using mostly quiet sound. In order to do this I focused on the low frequency content of the audio, isolating them with filters and multi-band compression. I kept the rattle of the mason jars in, mixed fairly low relative to the rumble. I also used a granular synthesis delay (with `grains~`) to obfuscate the sound of the low rumble. The moments of apparent amplitude accents are emergent results of the characteristics of the two audio files individually (whether wind on microphone or passing streetcar or dump truck), their interaction via sidechaining, and pseudo-random granulation parameters. Similarly, the nature of the processing resulted from processes in my own life. My stubborn commitment to open-source software meant that Ardour and Calf plugins were the most convenient software tools.[138] Granular synthesis came onto my radar by way of reading Roads' *Microsound* with Renaud, which was also mostly responsible for the development and use of `grains~`.

Though in the early moments of working on the piece its idea had mainly to do with wanting to centre myself, tangible audio also has tributaries in earlier streams of my research. Taking in a sensual experience simultaneously through touch and hearing is to perform the mingling of the senses that Serres discusses in *The Five Senses*, a mixture which

---

136. Chun writes, 'Software … conflates word with result, logos with action'. Wendy Hui Kyong Chun, 'On "Sourcery," or Code as Fetish', *Configurations* 16, no. 3 (2008): 303, https://doi.org/10.1353/con.0.0064; see also Chun, 'The Enduring Ephemeral, or the Future Is a Memory'.

137. See the discussion of use and misuse of tools in *What's at Hand* and *Table*.

138. Paul Davis, 'Ardour', Ardour DAW, 2022, https://ardour.org/; Krzysztof Foltman et al., 'Calf Studio Gear - GNU/Linux Audio Plug-Ins', accessed 21 September 2023, https://calf-studio-gear.org/.

rhymes with the body's mixture with the world.[139] While it might seem to emphasize rather than ameliorate the embodied porousness against which I struggled in my paint shaker Tkaronto apartment, the integration of body and material environment registers to me as an aspect of technical transduction which I suspected could provide the affirmation I sought. Both the transduction between one and many and the poly-modal understanding of perception and sensation were prominent topics in my earlier work at the University of Victoria, where I explored them in the context of musical improvisation using pre-composed materials.[140] Improvisation in turn has been a substantial component of my musical practice since my undergraduate study at the University of Guelph. This constellation of personal processes and historical factors put these tools and interests with their particular affordances into my purview, influencing what kinds of interactions with the audio recordings were possible, practical, desirable, and apparent.

The page

After many conversations had with fellow composers about programme notes, their potential influence on a listening experience, and whether they should be considered proper to a piece, it only strikes me now the degree to which I felt the text an inseparable aspect of *Revelling*. Perhaps the relatively invariant aspects of concert presentation in which experimental composition typically finds itself render the accompanying text an afterthought, some additional chore the composers carry out to flag for listeners the salient points of the work itself. With *Revelling* calling its home online, however, text precedes listening since interested parties find their way to the piece by way of web browsing. The text and its presentation on the web page situate the piece, fusing the listening and web-browsing processes.

Revelling's self-presentation sits somewhere between that of music, sound art, and interactive web installation. It shares much of its visual style with its immediate precedent, *What's at Hand*, offering up the audio alongside a few short paragraphs on a simple dedicated web page. The audio in this case is given as a pair of download links with some

---

139. 'I do not wish to call the place in which I live a medium, I prefer to say that things mingle with each other and that I am no exception to that, I mix with the world which mixes with me.' Serres, *The Five Senses*, 80.

140. Dave Riedstra, 'Mathesis and Technicity in ▮■▲▬●', March 2015, https://www.academia.edu/12007070/Mathesis_and_Technicity_in_.

accompanying metadata (format and size). Displaying these details and having the listener download the file continues some of the work done in *What's at Hand* to create closer connections to the underlying digital materiality, briefly putting the user in 'touch' with requesting and handling the audio file. This is in contrast to the typical presentation of music on the internet, which involves a streaming audio player and obfuscates details about file transfer in favour of an unproblematic and seamless listening experience. That seamlessness is shared with the tendency of web installations to include a substantial visual component to share aesthetic attention with listening. Where these installations are explicitly 'interactive', the interactions they afford are with virtual elements using the mouse, keyboard, or touchscreen. Occasionally an unusual sensor such as a device's gyroscope, camera, or microphone is used, but focus is kept on the audio and visuals produced by the installation, thus maintaining separation between its digital-virtual being and the world outside the device.

The interactions suggested in *Revelling*'s text, however, expose and reinforce the graft between the spaces of browsing and listening. The digital materiality the user encounters in the choice between downloadable file formats gestures to the seams between the web page content and the reality of its getting there: files have size and must be stored on and transported from some server somewhere to some location on the user's device's filesystem, an operation which can be made much more efficient at the cost of loss to the audio quality from compression as an MP3, a cost which might necessarily be incurred if the user's device is incapable of decoding FLAC. The text also invites consciously traversing the seams of the digital world with the user's physical situation. By listening to built-in speakers, disabling the screen, holding the device in a particular way, and manipulating the output volume in relation to their surroundings, the relationships forged between the user, device, immediate environment, and web infrastructure mix physical and digital materialities.

In the same way that the experience of browsing bleeds into the experience of listening, the conditions of my assembling the piece bleed into it. The title is a collection of words taken from titles to other music I have been influenced by. These are arranged in a way that suggests indulgent enjoyment of natural complexity, a theme that could be connected to earlier works such as *Burl* (2018) and *Spalting* (2018), the principle of

enjoyment of the unusual promoted by past mentors Arnold and Butterfield, or my recent inspiration from the evolutionary ecology work of Alice Eldridge.[141] The first paragraph of the text plainly describes my intention to make a track for myself in response to the noisy conditions of my living situation. Not only are my ongoing artistic interests in embodied relating to sound and objects thus traced into the text, but actors constructing my own situation become situation for the audio files and a listening experience. These acknowledgements of my intentions, inspirations, and other conditions of my thinking and working on the piece make explicit the unavoidable imbrication of the process of my own life with the outcomes of the work that I do.

Situation

Revelling, like *What's at Hand,* foregrounds a conflation of situations. I use 'situation' here rather than 'site' to maintain the sense of temporal-relational contingency: whereas 'site' (misleadingly) connotes a location that can be returned to independent of what happens there, a situation is also full of others and self, as well as their states, pasts, and futures. *Revelling*'s situation relates strongly to site, drawing into itself traces of the retired rail bridge over the Don River and the interior of 201-3 Munro St., but even in doing so reveals site to be, like situation, an entangled and contingent process. The apartment above 3 Munro Street is different now from what it was when my partner and I lived there, and that building and that rail bridge probably would not even exist if not for the series of changes to the Don River in the nineteenth and twentieth centuries. While it might be possible to return to the same geographical location, the site of the events that happened there changes or disappears. As the sign above the Queen Street bridge says: 'This river I step in is not the river I stand in'.[142]

There are (at least) three moments of situation that *Revelling* participates in. The piece's origin is situated in Toronto's Riverside district: the two field recording situations and the computer setup where I processed the audio and wrote the text and website code.

---

141. Dave Riedstra, *Burl*, 2018, https://daveriedstra.com/works/burl/; Dave Riedstra, *Spalting*, 2018, https://daveriedstra.com/works/spalting/; Martin Arnold, 'Listening on the Edge: After Rudolf Komorous', *Musicworks*, Spring 2004; Alice Eldridge and Alan Dorin, 'Filterscape: Energy Recycling in a Creative Ecosystem', in *Applications of Evolutionary Computing*, Lecture Notes in Computer Science (Berlin, Heidelberg: Springer Berlin Heidelberg, n.d.), 508–17, https://doi.org/10.1007/978-3-642-01129-0_57.

142. Eldon Garnet, *Time: And a Clock*, 1995, stainless steel letters, 18 inches in height, supported between steel beams, a six foot diameter ring of light as a clock, 1995, Queen Street Viaduct, Riverside Business Improvement Area, Toronto.

Revelling then also 'inhabits' a complex situation as a web page. Its digital assets are stored on a DigitalOcean server in the TOR1 region (and also backed up elsewhere!) and transferred through various ISPs when a request is made to `https://daveriedstra.com/revelling`. This situation is not exclusively digital or electromagnetic but also profoundly social. As illustrated above in respect to audio files, the mechanics of software only work because they are maintained, their 'effectiveness relies on human and machinic rituals'.[143] Moreover, characteristics of its presentation situate the piece affectively. The tone and content of its text, the gruvbox-inspired colour scheme, and the online pathways the user takes to stumbling on the piece's existence or intentionally navigating to its URL: *Revelling* exists in relation to all of these.[144] The final situation is the one in which the listener takes in the piece, which may be in a quiet room in their home through the onboard speakers of a portable device as suggested, or it might be loudly through studio monitors that shake the desk they sit on, or some other way.

'Where' it is that these founding sites or situations 'go' might be thought of as their influence on the future situations they bleed into. Each of these situations inform and are situated in each other. The affective state of the listener is informed by the visual cues and process of *Revelling*'s online situation, which is situated in decisions made while assembling the piece in Toronto, which draw on my previous work, ongoing practice, and other situations I have found myself in. Each situation draws on these other previous and parallel entanglements recursively to infinity, taking up some remnant of their activity as a formative element into its own becoming.[145] This is where situations go: they disintegrate to re-form as components of future situations.

The remnant debris that maintains through the kaleidoscope bloom of nested situating is sometimes what is referred to by words like 'file' or 'artwork' (or 'object'). These are not exclusively objective: they are also processes maintained by the situation that they participate in. Massumi writes that 'the objectivity of an experience is that quantum of the surrounding activity that the coming occasion of experience selectively takes up into itself as it separates off to phase into the occasion of its own becoming.'[146] A collection of

---

143. Chun, 'On "Sourcery"', 311.
144. Pavel Pertsev, 'Morhetz/Gruvbox: Retro Groove Color Scheme for Vim', GitHub, 21 September 2023, https://github.com/morhetz/gruvbox.
145. This and the following is informed by the 'activist' philosophy Massumi describes in *Semblance and Event*, 5–10.
146. Massumi, 9.

electromagnetic oscillations is only 'a file' inasmuch as it is experienced as a file, and that experience is itself a situated process. Those oscillations must move within a system of components that draws power from some source to continually emit light and sound in order to be actively interpreted as a file. The processes that comprise physical things like tables behave similarly (but vaster and more slow); I wrote about them with reference to Ahmed's *Queer Phenomenology* in my reflections on *Haptic Box* and on practice and process.[147]

Revelling, like the field recordings that contribute to its sonic-digital material, is debris from my situated artistic practice that contributes to a situation for listening (or feeling or thinking or reading or not). It doesn't matter that my attempts to mingle touch and sound in the device failed, because they provided a point of focus for my labour. Orienting my sensitivities toward the intermingling of tangible sound, consumer electronics, space, and sonic and vibrational irritations created an encounter with a momentary network of influences that contributed to the shape of the process's by-product ('the work') as well as to the continuation of the process (my artistic practice/practising). The orientations I took while working are also themselves by-products of previous orientations and situations: the noisy apartment, *What's at Hand*, encounters with Serres's *Variations on the Body* and some disowned writing by Deleuze.[148] To paraphrase Ahmed: these orientations shape what I did and do, and my practice is shaped by orientations it already has, as an effect of the situated work that had to take place for the practice to become what it is.[149]

Revelling

Ahmed points out that every orientation towards something is an orientation away from something else.[150] I find that this bracketing has many correlates.[151] The conflation of code

---

147. Though I encountered Ahmed's text after working on *Revelling*, it informs my thinking about the work here. Ahmed, *Queer Phenomenology*.

148. Serres, *Variations on the Body*; Gilles Deleuze, 'Mathesis, Science, and Philosophy', *Collapse* 3 (2007): 140–55.

149. 'Orientations shape what bodies do, while bodies are shaped by orientations they already have, as effects of the work that must take place for a body to arrive where it does.' Ahmed, *Queer Phenomenology*, 58.

150. 'Perception is a way of facing something. … The object is an effect of towardness; it is the thing toward which I am directed and which in being posited as a thing, as being something or another for me, takes me in some directions rather than others.' Ahmed, 27.

151. Here I continue to conflate different domains based on an apparently similar mechanic. Cognition and perception are perhaps the closest, and while it has been suggested that they are contiguous, it's not my intent to state that they are based on these sources. Alexandra Michel, 'Cognition and Perception: Is There Really a Distinction?', *APS Observer* 33 (29 January 2020), https://www.psychologicalscience.org/observer/cognition-and-perception-is-there-really-a-distinction.

and its function that Chun describes is the bracketing of the materiality of interpretation and labour (machine and human).[152] Hayles describes one of the functions of non-conscious cognition as filtering down the details of sensation to lighten cognitive load.[153] In a similar way, Massumi and Manning describe the neurotypical perception of affordances as a bracketing of sensual co-composition of and with the environment.[154] I connect these to the difference that Bergson outlines between abstraction and intuition, such that abstraction is a bracketing (out and in) of features arrived at through intuitive perception of *durée*.[155] With more time and energy I would love to explore these connections, but the upshot is that bracketing might be to some extent necessary to functionally make one's way through the world, as a consequence of taking some orientation.[156]

But even when orienting towards function, bracketing isn't the whole story. Pragmatic orientation relies on an *ongoing* relating of affordances, action, environment, and self that must continually undo and redo the work of abstraction in reducing the overwhelming field of sensation to a delineated set of manageable percepts or objects. Cognition, perception, and abstraction are performed in reference to a field in which they are vested and into which their effects propagate, which then need to be accounted for. While bracketing may be necessary, the undoing phase of this feedback loop resonates with the general orientation of the thought I gestured towards in the previous paragraph: it is concerned with discovery, feeling, and immediacy of involvement in the world.

Failing to engage a haptic sonic sensation with my cell phone pushed me to reorient towards this immediacy, and was a more thorough encounter with material entanglement and assertion of self than if it would have been if I had succeeded. The resistance that my

---

152. 'Software as source relies on a profound logic of "sourcery"—a fetishism that obfuscates the vicissitudes of execution and makes our machines demonic.' Chun, 'On "Sourcery"', 301.

153. 'Perhaps its most important function is to keep consciousness, with its slow uptake and limited processing ability, from being overwhelmed with the floods of interior and exterior information streaming into the brain every millisecond.' Hayles, *Unthought: The Power of the Cognitive Nonconscious*, 10.

154. In *Thought in the Act*, Manning and Massumi study autistic and neurotypical experience and perception, which they describe as not quantitatively different but different in emphasis, 'more and less'. In revealing common but differently oriented 'dance[s] of attention', they provide tools for understanding and describing both. The perceptual 'mode of *entrainment*', in which aspects 'single themselves out as particular affordances from the fielding of the environment', exists in relationship to a 'foregrounding of the immediate field of experience we call *entertainment*', which is 'prior to the distinction between … subject and object'. In my reading, entrainment attenuates entertainment's relational-participatory emphasis, and the latter brackets the isolating-abstracting behaviour of the former. Erin Manning and Brian Massumi, *Thought in the Act: Passages in the Ecology of Experience* (Minneapolis: University of Minnesota Press, 2014), 7–8.

155. Henri Bergson, *An Introduction to Metaphysics*, trans. T. E. Hulme (London: Macmillan, 1913).

156. 'Nothing could be more legitimate, moreover, than this [analytical] method of procedure, so long as we are concerned only with a practical knowledge of reality.' Bergson, 54.

materials put up against my attempts to form them in a certain way drew me closer as I tried to evaluate where, how, and why my techniques misregistered. Eventually resigning my haptic intention meant coming to the experience of the piece open to what it offered on its own terms, not to absolve myself of responsibility but to become more familiar with what it was that I had created.[157] Through this returning I could witness the knots tied by my various situational entanglements as they manifested in the piece. While working on *Revelling* didn't entirely result in the reassertion of self I had imagined in the face of Riverside's noisy incursions, it nevertheless turned out that I was a necessary formative component: not just some body jostled by contingencies but an active participant with a hand in the weaving of the threads of the piece.

Working on *Revelling* followed similar undoing-redoing phases to perception, cognition, and abstraction. The experience of making the piece fed back into my ongoing practice and thought as much as did the various encounters with its sensual by-product. The tangled and non-linear process of planning, making, sensing, and analysing resonates with Manning and Massumi's description of thinking with movement while navigating a shifting field of affordances. Bouncing back and forth between entrainment and entertainment in an 'integral dance of attention', they suggest that walking through a busy crowd is to 'revel in the fluidity of your trajectory, without focusing on it as a feeling-tone separate from the movement'.[158] While the various processes of artistic practice stretch over different scales of time and involve diverse modes of attention, there is in its sensual navigation of mingled situations something of the same revelling in fluidity of trajectory and thinking with movement.

---

157. Bracketing my intentions here looks a little like the misuse of available products that de Certeau valorizes in *The Practice of Everyday Life*; for more, see *What's at Hand*.

158. Manning and Massumi, *Thought in the Act*, 10.

About *Pathside Box*

In the lull between the second and third waves of COVID-19, I was eager to participate publicly in sound and art. My partner and I had recently moved into a living arrangement with better affordance for woodworking than our previous small Toronto apartment, enabling me to begin experimenting with transducer feedback on wooden objects. One result of this experimentation is a quiet feedback box that I installed near the side of a path: *Pathside Box*. Thinking about how its responsive filtering process related to the eventual placement of the piece and to my previous and ongoing explorations of quiet entanglement, an image formed of a listener discovering their presence affecting the behaviour of a complex system. The quiet sonic feedback that plays out through input and output transducers on the surface of the box creates tones that incorporate the box's acoustic characteristics with the sounds of activity in its environment, a mixture that parallels the user's enmeshment in situation. As the box's filters pass on from the resonant nodes that they 'discover', listeners who choose to spend time with the box return to the path, letting it continue its whistling without their participation. The discovery, enjoyment, and letting-be of the box are facets of a technique for navigating entangled becoming-with in a way that fosters respect for others and minimizes one's own effects on them.

Experimenting with transduction

What eventually coalesced into the hastily-assembled box I placed next to the Guelph Radial Trail are concurrent wayward streams intersecting in the ongoing flow of my experimental practice research. Composing music, walking and biking trails, listening to music by Judith

Hamann and the sound of the Cargill plant across the Eramosa River, writing code, thinking with texts by writers such as Haraway and Saito, working with wood and wood-like products, and playing with electronic audio all informed each other. In this case, these threads knotted around my orientation towards enabling experiences of inter-milieux sympoiesis through the use of quiet sound and generated an interest in various forms of transduction.

Transduction is the transfer of something—energy, power, idea, sensation—between disparate media, and is perhaps most easily understood with reference to its common electromechanical applications. Devices that musicians refer to as 'transducers' ferry between physical vibration and voltage oscillations. Piezoelectric contact microphones, for instance, convert vibrational sound into an electrical signal indexing that sound, and contact exciters perform the same in the inverse direction, generating sound through whatever surface they are mounted to. (In fact, to a degree both of these devices can be used interchangeably.) Similarly, microphones and loudspeakers are transducers optimized to convert to and from vibrations in the air. In this electro-acoustic application, energy or power is what is transferred, but transduction figures in other operations as well.[159] The conversion of an electrical signal to a digital representation can be understood as transduction, as can the transmission of an idea into speech. Orienting towards the process of transduction in these examples from electromechanical and communications theory reveals some interesting questions, such as whether and how the process changes what is transduced and how it affects the transducing media.

Transduction is also relevant to a metaphysics of entangled sympoietic becoming-with. Simondon describes becoming as a process of transduction that forms individuals within a structured domain, like the emergent growth of crystals whose shape and composition are determined by the conditions in which they propagate even as they set the conditions for their continuing growth.[160] What it is that becomes is transductively (in)formed by the environment in which it becomes, which itself also is formed in the same

---

159. 'One of the major processes of electronic music is that of "transduction," the transfer of power from one medium to another.' Strange, *Electronic Music*, 225.

160. Simondon writes, 'By transduction, we mean a physical, biological, mental, or social operation, through which an activity propagates from point to point within a domain, while grounding this propagation in the structuration of the domain, which is operated from place to place: each region of the constituted structure serves as a principle of constitution for the next region.' Gilbert Simondon, *L'individuation à la lumière des notions de forme et d'information* (Grenoble: Éditions Jérôme Millon, 2017), 32, quoted in Combes, *Gilbert Simondon and the Philosophy of the Transindividual*, 6.

process.[161] I take the idea of being, then, as in Bergson's metaphysics, as a superimposition of a state onto what is really a stateless process of becoming.[162] Stepping back slightly from Bergson's and Simondon's commitment to understanding the process without recourse to assumptions of static or already-individuated terms allows a more pragmatic imagining: existing at all (being or becoming) is a transduction between individuals and their environment through which they all co-create each other. From this perspective, I understand Haraway's suggestion that 'we become-with each other or not at all' as a bio-social analogue to Simondon's metaphysics that allows and calls for an intuitive understanding of that operation.[163] So too does Ahmed's technical materialism, in which objects and bodies shape and are shaped by each other.[164] This transduction, which Simondon describes in metaphysical terms, Haraway in bio-social, and Ahmed in phenomenological, is a process of entangled becoming which can be experienced but not reduced to discrete learnable principles. Simondon writes that 'we cannot, in the habitual sense of the term, *know individuation*; we can only individuate, individuating ourselves, and individuating within ourselves'.[165]

In my practical sound work, the need to experience transduction aligned with my orientation towards empirical encounters with existing entanglements. Enabling such encounters through my work remained a goal, but my work progressed more intuitively as it gathered around something that began to take the form of a piece. Doing so allowed other aspects of transduction to reveal their importance, including the pragmatic electromechanical and informational transduction between various forms of audio, and the transduction between ideas and materiality, thought and the world. Working intuitively with these modes of transduction enabled my own empirical encounters of enacting transductive processes.

Like Simondon's crystals, this stream of work grew from existing structuration even as it formed it. Previous exposure to audio transducers in situations such as the Victoria

---

161. Combes, *Gilbert Simondon and the Philosophy of the Transindividual*.
162. Bergson, *An Introduction to Metaphysics*.
163. Haraway, *Staying with the Trouble*, 4.
164. 'The object is not reducible to itself, which means that it does not "have" an "itself" that is apart from its contact with others.' Ahmed, *Queer Phenomenology*, 43.
165. 'Individuating within ourselves' can be understood as the formation of knowledge that is analogous to the process of individual becoming. Simondon, *L'individuation à la lumière des notions de forme et d'information*, 36, quoted in Combes, *Gilbert Simondon and the Philosophy of the Transindividual*, 8.

Composers' Collective interpretation of David Tudor's *Rainforest IV* (1973) and my own
802.11 (2016–18) put that technology within reach.[166] Thanks to previous experiments
during lockdown and earlier, feedback emerged as both an aesthetically attractive material
as well as a way to invoke both the entangled material presence of a listener and the sound-
producing apparatus. Similarly, the low frequency oscillation that drove the 'Birds' section
of *What's at Hand* became a critical structuring element for the internal movement of the
piece's filtering process. The combination of these elements was facilitated in part by a
balsawood box from a bottle of Amarula liqueur gifted to me by a friend, which allowed me
to experiment with transducer feedback on a wooden structure without needing to build
one right away.

This experimentation was a practice of researching transduction by way of actively
engaging with its process. Interacting with the feedback through activities such as adjusting
transducer positions, damping various points on the wood, and manipulating filters and
other signal processing acting on the feedback loop led to an embodied, intuitive
understanding of the sound's response to changes in its material conditions. Similarly, my
interactions with the real that transduced ideal intentions in order to affect the world's
becoming generated feedback both in the short term, as I incorporated the results of
experimentation in the development of the piece, and in the longer term, as they became
structures on which my future experimental practice would develop. Both of these
experimental transductive processes generated something that might be called knowledge
but which, per Simondon, can't be known discretely and must rather be experienced
through enaction and held in the body.[167] My interest in making transduction salient in
encounters with the piece determined how I would tune the process that modulates its
feedback and characterized my later choices about how and where to present the box.

The box

My early experimentation used the Amarula box (which is now a case for a condenser
microphone), but in order to present the piece I needed to make a new box large enough to
contain the electronic hardware (transducers, amplifier and preamplifier, Raspberry Pi, and

---

166. Dave Riedstra, 802.11, sound installation, 9 March 2018, https://daveriedstra.com/works/802-11/.
167. The relationship between embodied knowledge, practice, and process is explored in 'Practising process, processing practice'.

battery). This coincided with my recently having moved into a housing situation that afforded woodworking, a practice I had wanted to take up for some time. Like my experimental sound practice, woodworking is a way to experience the transductive flow of material becoming by putting oneself in contact with wood such that its shape (and often also that of the worker) changes.[168] Working by hand, without power tools, meant that this relationship was that much more tangible.

By the time the need to build the box presented itself, I had already spent considerable effort building a workbench, a classic woodworker's 'first steps' project and a necessary tool. While the result was satisfactory (and still is), the work was tiring, long, and unpleasant due to the types of materials I used and the lack of an appropriate surface to work on. My workbench used reclaimed pressure-treated fenceposts, dimensional spruce-pine-fir (SPF) construction lumber, and medium-density fibreboard (MDF), none of which are appropriate for the hand-tool woodworking methods I was using. The fenceposts were weathered, dirty, and had high moisture content; construction SPF is low-grade and not appropriately kiln-dried; and MDF is reconstituted wood held together with glue, making it too hard for hand tools. Additionally, the sawdust from both pressure-treated wood and MDF is toxic, requiring careful and irritating masking and cleaning practices. Eager to spend less time more pleasantly to achieve better results, I sourced different types of wood for the box, quickly dimensioned it, and assembled it with nails.

Both of these construction experiences demonstrate the way in which, as Ahmed writes, 'the time that it takes shapes "what" it is that arrives'.[169] The construction of the workbench was lengthy, involving repeatedly consulting various designs, awkward solutions to workholding without a stable bench (at different times grappling the work piece on the floor or clamping it to a shaky folding table), and new relationships with unfamiliar tools, material, and ways of working with them. Though this process was one of experimentation and learning and full of missteps, the investment of time in design choices and careful work resulted in a functional, durable, and extendable bench, despite my relative inexperience. On the other hand, the poor construction of the housing used in *Pathside Box* is an effect of limited temporal investment, both in the amount of time directly

---

168. I write more about this in the chapter on *Haptic Box.*
169. Ahmed, *Queer Phenomenology*, 40.

spent working on the box and in the amount of time spent practising the relevant skills. Some characteristics of the box that directly result from this include poorly chosen materials (both in terms of construction and of acoustics), bad joinery, and ineffective mounting strategies for the internal electronic hardware (which fell out of the box during transportation to its first outing). Some of these undesirable traits were addressed in following boxes, generating new characteristics (desirable and otherwise).

This 'transformation of time into form' was a transduction through which I, the box, the workbench, and the environment mutually shaped our continued coming-into-being.[170] Spending time in close contact with these others trans-formed them from hardware store materials and a dusty concrete cellar into a table, box, and wood shop (windowless and poorly ventilated though it is). I was likewise transformed in the process, accruing embodied effects such as knowledge, muscle memory, heat, soreness, endorphin spikes, and minor scrapes and cuts, effects which I carried forward in my continued becoming-with other contexts (as when, for instance, frustrations with one building experience led to cutting corners in the next). Though I wasn't thinking of it in these terms, mutually becoming through woodworking generated an intimate experience of the non-'hylomorphic' aspects of Simondon's transindividuation. Hylomorphism is an understanding of being which 'makes the individual the result of an encounter between form and matter'.[171] Simondon, however, describes objects taking shape as a process of *information* as opposed to the application of form to matter. Making a brick does not involve formless matter at any point, but rather an encounter between formed materials such as lumps of clay and a mould, through which they transductively inform each other.[172] Similarly, I did not simply impart a form to lumber by working it, but as I in*form*ed its shape I became *informed* by it, taking up the experience of its particular response to chisel cuts or plane strokes to inform my ongoing relating to it. In Ahmed's words, my body, the wood shop, and the various work pieces '[took] shape through being oriented toward each other, as an orientation that [was] experienced as the co-habitation or sharing of space'.[173]

---

170. Ahmed, 40.

171. Combes, *Gilbert Simondon and the Philosophy of the Transindividual*, 2.

172. Combes elaborates: 'clay is not informed by the mold from without: it is potential for deformations; it harbors within it a positive property that allows it to be deformed, such that the mold acts as a limit imposed on these deformations'. 5.

173. Earlier in *Queer Phenomenology*, Ahmed criticizes the reliance of 'the Marxian critique of commodity fetishism … on a distinction between matter and form' for ignoring the multiple histories and systems of labour by which objects and people arrive, noting that Marx and Engel's earlier writing did take a more dynamic view. One effect of ignoring these histories is to understand nature as an eternal and external resource of material awaiting form to be applied. We are living through the

Something of this transductive encounter led to the DIY element of *Haptic Box*. Eventually I ceased building the box and installed the electronics, which allowed me to continue working on the signal processing in a context closer to its intended one.

The patch

The signal processing that *Pathside Box* uses to interact with its sonic environment performs two main functions: modulated feedback filtering and rhythmic clicks. The rhythmic sounds are pinged highpass filters with a low resonance setting which tick away at their own tempo, pseudo-randomly changing beat groupings (three, four, or five) and pitch (arbitrarily selected from a division into thirteen of the third-octave on either side of a root frequency which itself occasionally moves according to similar logic). These sounds and algorithms were directly copied from an earlier Pure Data exercise in developing a simple algorithm to generate something like the kind of slippery grid-shifting rhythms I had previously studied with Arnold.[174] In their application to *Pathside Box*, these clicks are much slower, quieter, more sporadic, and less pitched. They generate their own material, apparently separate from input apart from their own algorithm, 'hidden' not intentionally but only as an incidental effect of their way of being.

Simultaneously and somewhat inversely, the modulated feedback process makes full use of the input and output hardware on the box, reacting to physical sounds and vibrations through analysis of the incoming audio that affects the generated feedback as well as the feedback itself. Two independent banks of eight bandpass filters, one per input-output channel, roam the frequency space. The band frequencies are 'stacked' in equal portions of an octave above a root pitch. The stacking interval, root frequency, and filter widths are all modulated by processes that combine pitch and amplitude analysis of the incoming audio with movement provided by four low-frequency oscillators (LFOs).

The root frequency of each filter bank begins at 80 Hz. When the pitch analysis detects a pitch with an amplitude above a given relative threshold (that is, a certain amount louder than the rest of the audio), that frequency is dropped by octaves until it is below

---

ecological effects of the pervasiveness of that ignorance. *Queer Phenomenology*, 42, 54.

174. The same type of rhythmic feel I sought in Pith. The sketch was itself partly inspired by the release of Meng Qi's instrument the Wing Pinger. Riedstra (@driedstr@vis.social), 'Exercise'; Meng Qi, 'Introduction', 孟奇 Meng Qi, accessed 21 September 2023, https://www.mengqimusic.com/wingpinger-introduction.

160 Hz. The root then transitions to this new value over seven seconds. Because the bank intervals are based on this root value, the whole bank slowly shifts as a result. Additionally, the intervals between the bands are modulated by the four internal LFOs. Two of LFOs run at the same frequency while the other two run at half that frequency. One of each of the faster and slower LFOs is also initially phase-offset from the others by a random value. The frequencies of the LFOs are set to twelve and thirteen octaves below the root frequency of the filter banks. These four LFOs are combined and scaled to create a complex waveform that expands and contracts the spacing between the filters from half an octave to two octaves.[175] The resulting movement of the bands through pitch 'space' is that of a meandering, undulating group. When one of the bands feeds back, by passing through a resonance or being activated by some external movement, it generates a pitch which the analysis identifies and uses to assign a new root, pivoting the entire process.

To build further variation into the process, amplitude is also modulated.[176] It is primarily affected by the bandpass filter width, controlled through their Q value.[177] All of the bandpass filters share the same Q value, which begins relatively broad. When the frequency analysis detects a new pitch, the Q value is slowly increased, effectively reducing each filter's amplitude and constraining the audio that the filter passes to an increasingly limited frequency band. When any nodes that were feeding back are eventually stifled by this effect, the pitch analysis drops below its relative amplitude threshold. This triggers the Q value to begin slowly increasing, allowing more frequencies through and increasing the likelihood of feedback. Amplitude is additionally modulated by envelope-following companders (compressor-expanders) applied to individual bands and to the entirety of each channel, regulating dynamics to within a certain range, limiting runaway feedback and boosting levels in tamer moments to encourage feedback.

---

175. The shape of this waveform is determined by the phase relationship between the two pairs of waves, which is randomized when the patch is opened and maintained throughout its run time. However, I overlooked the effects of phase cancellation, so while the upper amplitude range of the LFOs is accounted for, the lower range could be as low as zero if the randomly generated initial phase is 180 degrees. This will be addressed in future revisions.

176. On the topic of amplitude: an important technical learning outcome for me is that the amplitude of feedback can be controlled independently of the feedback behaviour, enabling feedback performance at any volume, as long as both the input and output levels are controllable and the input has enough gain available. For instance, one can set the maximum desired output volume to taste, then increase the input gain until feedback is generated. This enables working with feedback at the low volume levels required by this project.

177. 'Q' stands for 'quality' and in the context of a bandpass filter inversely correlates to the width of the frequency band that the filter allows to pass. Strange, *Electronic Music*, 149.

The resulting sound is typically quiet, timbrally simple tones swelling and receding at an unhurried but neither languid nor lavish pace, accompanied by occasional phrases of slow rhythmic clicks and pops. Despite the ongoing pitch movement of the filter bands, the set of frequencies that result is limited, occupying a midrange I find pleasing. The behaviour of the sounds is unpredictable, both in that the pitches and rhythms don't form an easily identifiable pattern and, unfortunately, in that they don't noticeably respond to their environment. This is a particularly difficult balance to strike, as that response could be too predictable and turn into a Mickey Mousing effect, so I erred on the side of restraint. While I hope to return to the piece and fine-tune it further, I discovered that other aspects of its presentation still effect some of the desired results.

Figure 10. *Pathside Box* beside a path

Discovery and letting be

How this feedback box came to be associated with its quaint pathside setting is tied in with my own desire for more active engagement with my surroundings in an artistic role, as a facilitator of peculiar entangled aesthetic encounters. (In other words, I simply wanted to get more work out there.) At that moment in the COVID-19 pandemic, many art and music

events in southern Ontario were effectively stalled, especially for low-profile practitioners such as myself, so I sought out an alternative solution. Presenting the piece outdoors was initially only a way to continue offering my work to others, but the public setting radically changed the terms of the experience, generating problems and opportunities which ended up characterizing my conception of the piece and revealing to me important aspects of my own work.

The appropriate setting for the box needed to be relatively quiet in order to hear it, low in movement in order to discern one's own effects on it, and also needed to accommodate spending time with it (inasmuch as I wanted the listener to feel neither in the way nor too preoccupied to engage with the box). These requirements ruled out sites near roads as well as the still relatively busy urban areas and steered me instead toward less developed locations. Forest pathways afforded a channel of potential listeners who were likely out on a stroll and thus on a more flexible schedule, and the vegetation damped most vehicle and construction noise while providing a degree of visual privacy that invited unselfconscious indulgence in curiosity and exploration. Additionally, public health messaging encouraged outdoor activity, making outdoor walks a popular vehicle for much-needed socialization. I had grown fond of walking and biking the trails near our home in Guelph, and decided on a first location along the Guelph Radial Trail not too far from its access point on Victoria Road south of York Road (Future showings will be situated near other trails throughout the area, such as near Guelph Lake, Silvercreek Park, and the Arboretum, and hopefully eventually also in other cities.)

The pathside location presented an important change in the mode of encounter with the piece. Rather than assuming the aesthetic-hermeneutic attention that comes with framing an object as 'Fine Art' by presenting it in an art gallery or festival, I now had to think about the experience of the piece from a broader range of more integrated and everyday sensory experiences. People who might find the box could be chatting with a friend, pushing a stroller, listening to Shania Twain through headphones, or walking one or several dogs: activities which involve the coordination of various senses, cultural-symbolic meaning-making, and embodied situational interaction. The box fits in to all of these as a

feature of the environment that offers something a passer-by might find curious or pleasing enough to spend a little more time in its company.

This interaction is full of mingling. The discoverer's relationship to the box flits between intentional, situated action (moving closer, trying to learn what it's doing and why it's there, considering removing it) and indulgence in the sensory experience of the moment. Both of these facets are negotiations of one's entanglement with other and the environment, orienting in the first case towards change that might be effected in the milieu and in the second toward being affected by the milieu's change. Saito describes the 'action-oriented ... dimension of everyday aesthetics' as a complex multisensory integration in which aesthetic experience often prompts unreflected actions.[178] This dimension is intimately involved with what is experienced, exemplified in examples such as using tools or consuming food and drink, making it difficult to delineate a single object of the experience.[179] (The feeling of using a knife involves not only the knife and its tangled histories of labour and tradition, but also what is cut, the surface on which it is cut, and embodied memories of technique, muscle soreness, and possibly trauma; the experience of tasting also involves what is tasted before, after, and with, the vessels they are tasted in, olfactory and other characteristics of the space they are consumed in, and so on.) Saito suggests that, conversely, 'contemplation-oriented' aesthetic experience, such as that normalized by paradigmatic Western art and the bulk of conventional aesthetic theory, assumes and reinforces a disinterested divide between observer and aesthetic object as well as between the various sense modalities. Even so, I understand these divisions as imposed on an underlying entanglement which does not preclude a contemplative enjoyment of its sensible offerings. Rather, a contemplative orientation to aesthetic experience could be one which focuses on receiving the effects of momentary embroilments with environments and others.

Not only do these orientations have to do with poly-directional mingled relationships, but they themselves mingle in the discovery of the box. The box doesn't

---

178. Saito, *Everyday Aesthetics*, 4.

179. Saito uses cutting with a knife to exemplify aesthetic experience of using tools: 'The aesthetic value of a knife consists not only of its visual qualities, but also of its feeling in my hand, determined by its surface texture, weight, and balance, but most importantly by how smoothly and effortlessly I can cut an object *because of* the material, shape, length, texture, and weight of the blade and handle. The appreciation here is not simply directed toward the fact that the knife functions well; it rather concerns *the way in which* all its sensuous aspects converge and work together to facilitate the ease of use.' Saito, 27.

overtly suggest a particular purpose or mode of interaction on its own, so it's up to the discoverer to decide to focus on the aesthetic experience of the box and spend time appreciating its sensory qualities.[180] Doing so mingles orientations toward action and toward reception, allowing the feeling of outgoing and incoming entangled effects to mix and colour each other. For instance, crouching down to put an ear closer to the box is an action that effects change in the environment (especially when the croucher's body is considered as a constituent) while being oriented toward taking in sensation from the environment. Becoming sensitive to the mixture of outgoing and incoming change is to feel the continued process of becoming-with others and the environment (even if the user's effects on the box's feedback process go unnoticed), a transduction that parallels the other processes of transduction active in the piece described earlier.

Actively deciding to focus attention to the aesthetic experience of spending time with the box is to assert that there might be something of that experience worth taking in. Saito suggests that the aesthetic appreciation of an object's distinctive characteristics and the way that it expresses them can foster a feeling of respect for the object on its own terms.[181] There are clear ecological-ethical implications from this, especially using a broad definition of aesthetic object that includes 'season, time of day, and place', as Saito does.[182] Respect for objects can mean treating them with care, thereby prolonging their life and reducing waste, and respect for places and environments on their own terms (which is to say without imposing the kinds of ideals that prioritize woods over wetlands and turn swamps into shopping malls) can lead to conservation and mitigation of anthropogenic incursion.[183] Choosing to spend time taking in the unusual and unexpected can be thought of as exercising this kind of aesthetic engagement that leads to respect for things and environments on their own terms. Moreover, this choice is also one of respect for oneself:

---

180. This is analogous to the assignment of phases that shift *Haptic Box* from construction to sound art object to leftover debris.

181. While Saito is quick to temper a universality of ethics that unequivocal appreciation for unique characteristics might suggest, I do want to encourage an appreciation of what is discovered. This is not least because of the familiarity that aesthetic engagement can offer regardless of ethical valuation, which, as familiarity with processes of entanglement, seems like a welcome addition to the abstractive, isolationist tendencies of Western thought. Saito, *Everyday Aesthetics*, 104–48.

182. Saito, 129.

183. Swamps and wetlands provide unique wildlife habitats and perform important ecological functions such as water filtration and sequestration. Helen Baulch et al., 'Synthesis of Science: Findings on Canadian Prairie Wetland Drainage', *Canadian Water Resources Journal / Revue Canadienne Des Ressources Hydriques* 46, no. 4 (2 October 2021): 229–41.

allocating time and energy to unplanned aesthetic indulgence means to enjoy something just for the sake of enjoyment.[184]

Through speculating about situations, practicalities, and potential experiences of the piece, I discovered that *discovery* is a critical aspect of *Pathside Box*. The unexpected encounter and subsequent possibility of aesthetic enjoyment of this strange box in the woods is at least as responsible for a potential sensation of entanglement as is its sonic feedback process. This encounter is not simply becoming aware of the box, but also involves an orientation of the body and its senses towards it. Embodied faculties such as sensation, cognition, and motor coordination are not necessarily conscious, and neither is discovery, as newly encountered stimuli can engage these faculties without registering in consciousness.[185] But in this case its presence in consciousness can enable the discoverer to choose to spend time taking in the box, embracing the orientation that discovery precipitated.

Discovery is a feature of the experience of art more broadly (though some approaches may be more or less oriented to it). Elizabeth Grosz asserts that 'art is the opening up of the universe to becoming-other' through which 'the body is, for a moment at least, directly touched by the forces of chaos from which it so carefully shields itself by habit, cliché, and doxa'.[186] Discovering unfamiliar or unexpected sensations as 'forces of chaos' in art is to proliferate the possibility of difference and change, opening up the imagination to them and making the impossible a little more attainable.[187] Despite this characterization, discovery is not always rarefied or profound. Komorous compares listening to music to rummaging through a cabinet of curiosities in a grandparent's attic, suggesting an 'aesthetics of the wonderful' (*estetiku divnosti*) that 'posits art as a co-creative experience that proliferates from the passion of wonder'.[188] Discovery in these sanctioned aesthetic contexts can similarly generate feelings of respect for what is discovered through

---

184. Even more-over, feeling oneself feel in this way can shift the aesthetic object to include the situated and entangled (entangl*ing*) self and the feeling of its relating to the environment, actually feeling the feeling of feeling sympoiesis.

185. For instance, Hayles describes a number of seemingly high-level functions, such as synthesizing sensory inputs into recognizable patterns, to assert that 'nonconscious cognition operates at a level of neuronal processing inaccessible to the modes of awareness but nevertheless performing functions essential to consciousness'. Hayles, *Unthought: The Power of the Cognitive Nonconscious*, 10.

186. Grosz, *Chaos, Territory, Art*, 23, 21.

187. Voegelin, *The Political Possibility of Sound: Fragments of Listening*.

188. Martin Arnold, conversation, 2018; Arnold, 'Listening on the Edge: After Rudolf Komorous', 20.

ascription of value to its particular expression of sensible qualities, of respect for oneself, and of what it might be like to affect the object and its environment.

Furthermore, discovery is an element of the empirical encounter with sympoiesis that I try to generate in my practice in general. Rather than trying to create 'special cases' of new entanglements, I want to enable discovery of *existing* facets of collective and situated becoming-with by encouraging sensitivity to ongoing intra-active processes. Working with the wood of *Haptic Box*, for instance, its builder can discover the flow of situation through the conduit of material which affects their body as they affect it. A user of *What's at Hand* might discover their existing participation in a socio-acoustic situation as listener and sound producer. *Ripples* might afford a discovery of existing feedback between intentional image and its messy actualization in the world. Becoming aware of these entanglements, one can develop a sensitivity to them and generate an embodied, intuitive familiarity with and appreciation for their particular characteristics.

An important aspect of this discovery and aesthetic appreciation of particular entanglements with others is letting what is discovered be. When someone discovers the box on the side of the path, they find a mixture of environments and others that is getting on just fine on its own terms, a becoming already in process.[189] In the same breath, they find that now that they have found it, they are involved, changing those terms. Walking away without interfering (as thankfully everyone who encountered *Pathside Box* seems to have done) is to remove oneself from that local mixture so that it can continue on its own. Doing so exercises a facility of mingling that works to reduce one's effects on a locale of the tangled-with milieu(x): a sensible endeavour if that locale is actually valued for what it is. This facility acknowledges and emphasizes the transience, plurality, and flow of the experience as a co-creative participant, attributes which resist the framing of experience in terms of individual ownership.

---

189. This self-justification of the other is part of the reason why the percussive clicks-and-pops process on the box is not tied to analysis of the feedback. It is a character of its own making, a trace of its hidden past like the box's wooden construction that would take more than a brief sharing of space to alter the course of. The way that the feedback processing responds to changes in the acoustic environment also expresses the character of its construction. Inspired by Alice Eldridge's complex systems, I tried to make a process which unfolded chaotically as a result of its own structure and terms rather than a particular balance of input variables. The emphasis on character that outlasts momentary interactions gestures towards identity, hinting that history and borders are intimately tied up with it. I empathize with Haraway's call 'for *pleasure* in the confusion of boundaries and for *responsibility* in their construction', recognizing that this project skews toward the first and leaves the second open for later work. Haraway, 'A Cyborg Manifesto', 7.

I am wary of a capitalist and colonialist direction I read in Max Neuhaus' description of people discovering his public sound installation *Times Square* (1977). In an interview, Neuhaus describes the experience of the work as 'something which is inadvertent which they take as their own' suggesting that discoverers 'should claim it'.[190] While Neuhaus, like Saito and me, seems to be encouraging a sensitivity to everyday aesthetic experience, in the same breath he reduces experience to a privately owned object extracted from its environment, making its scarcity and ownership more important than the experience itself. This drive to extract and possess reflects the 'settler colonial forms of perception' that Dylan Robinson terms 'hungry listening'.[191] Robinson situates this term in the histories of European settlers whose hunger for both sustenance and extricable commodities drove and drives colonial projects in various spheres:

> As a form of perception, 'hungry listening' is derived from two Halq'eméylem words: shxwelítemelh (the adjective for settler or white person's methods/things) and xwélalà:m (the word for listening). shxweliemelh comes from the word xwelítem (white settler) and more precisely means 'starving person.' The word emerges from the historical encounter between xwélmexw (Stó:lō people) and the largest influx of settlers to the territory during the gold rush. In 1858, thousands of xwelítem (largely men) arrived in a bodily state of starvation, and also brought with them a hunger for gold.[192]

Through the experience of discovering *Pathside Box*, I want to suggest a sensitivity to entanglement that can support the development of a technique for letting others be, thereby beginning to undo the extractivism that Robinson suggests 'characterizes colonial forms of perception'.[193] Hungry listening follows an implicit goal of omniscience, that all of knowledge and potential experience can and ought to be consumed, ignoring historical and ongoing positionality. Conversely, a sensitive technique for becoming-with understands that experiencing something is potentially to have an effect on it, and so the best way to let something be is *not* to be in its presence, *not* to experience it. Acknowledging the finitude of possible experience in this way might seem limiting or masochistic but actually proliferates

---

190. 'A Conversation Between Max Neuhaus and Ulrich Loock: Milan, March 25, 1990', 25 March 1990, https://web.archive.org/web/20080520021507/www.max-neuhaus.info/bibliography/ConversationwithUlrichLoock.htm.

191. Dylan Robinson, *Hungry Listening: Resonant Theory for Indigenous Sound Studies* (Minneapolis: University of Minnesota Press, 2020), 2–3.

192. Robinson, 2.

193. Importantly, Robinson indicates that 'to truly move beyond settler colonial structures of perception requires much more than a nonextractivist approach. … To challenge settler colonial perception requires reorienting the form by which we share knowledge, the way we convey the experience of sound, song, and music.' Robinson, 14, 14–15.

possibility. Letting unknowns exist unknown in their unknown locales is to appreciate that the infinitude of possible expressions of difference can't be taken in and don't need to be understood, witnessed, or supervised; that they exist as 'real alternatives that sound a present polyphony, even when they are not listened to or heard'.[194] Embracing finitude is to become sensitive to entanglement and to renew appreciation for what's already at hand, propagating the as-yet unheard alternatives of the familiar, the unknown within the known.

---

194. Voegelin, *The Political Possibility of Sound: Fragments of Listening*, 19.

About *Haptic Box*

Haptic Box is a box built by its listener which makes tangible sound affected by how it is touched. It is a broad project without a clear definitional status: not decisively a sound sculpture, instrument, composition, performance, or DIY project. Simply put, *Haptic Box* is a sound sculpture with three defining characteristics: its sound is tactile, shaped by an algorithmic feedback process, and the box must be made by its listener. The tactile sound is in the form of low frequency tones (below about 300 Hz) which emanate through the body of the box, driven by contact exciter transducers. These tones are generated not by a fixed composition but by feedback from piezoelectric pickup transducers mounted on the same surface. To keep the feedback in the tactile frequency range, it is run through an algorithmic filtering and limiting process on a Raspberry Pi single-board computer inside the box. Finally, the piece is encountered as a description in the form of its online build logs and guide (which include the proviso that it should be self-constructed) and not a physical object or a score.[195] These three aspects are tightly interlinked and co-constitutive. As I explored in *Revelling*, *Common*, and *Ripples*, touch can facilitate an aesthesia of sympoietic entanglement with the material environment, and through it, others. A vibrational feedback process pinpoints this and invokes temporal and socio-aesthetic dimensions further complexified by the user-listener's social-material-historical relationship to having made the box, which in the first place requires a great deal of touch.[196] *How* these interests

---

195. The build guide for *Haptic Box* can be accessed at https://daveriedstra.com/haptic-box.

196. The seemingly unproblematic uses of reductive designations such as 'the user' and 'the listener' stand in for a necessary speculation about what effects my work might have for others.

conglomerated into the particular form of *Haptic Box* is itself entangled with my personal artistic, social, and material circumstances.

Figure 11. *Haptic Box* and a plant

It must be made by its listener

Self-constructing *Haptic Box* came to be a way to encounter co-creative multi-milieux entanglement as both a pragmatic action and an aesthetic experience of performing that action. Building *Haptic Box* requires a negotiation of and interaction with the builder's own environments as well as my own. Materials must be gathered, skills learned, the form designed, and through this process the builder continually puts their body in salient relationships with its environments, histories, materials, and work in patterns that are shaped by them and that shape them. These negotiations are also negotiations with my entangled practice, represented by *Haptic Box's* existence at all, in its particular form, and through the reflexive language used in its log-documentation-score as well as that document's situation on my personal website. These are profoundly tied up in the experience with the feedback composition: taking it in through touch, sight, movement, smell, and possibly also sound, the builder-user-listener (as I imagine them, anyway) re-encounters the particular acoustic properties of the object they built along with the tactile-embodied memory of building it while engaging in the aesthetic attention to their present interaction with it.

Building *Haptic Box* enables an empirical encounter with an unexpectedly quotidian transindividuation of object and process. Just as pieces (like *What's at Hand*), performances (like that of *Ripples*), and skills (like hand-tool woodworking) are object-like effects of exploratory processes, the built object *Haptic Box* is a side-effect of intersecting processes of being in the world: in my case of artist, coder, maker, privileged with time and ability; in a listener's case something similar. In each case, the side-effect maintains objective and processual dimensions. The objective aspect is the 'thing' that can be pointed to that individuates itself from its generative practices (the piece, the skill, the box). The processual aspect is that thing's continued perpetuation as it plays into and is affected by its contexts. Spending time shaping and being shaped by material is a way to experience the mingling of its processual and objective phases as they are mutually performed by the material being worked, the body of the worker, the tools, and the workspace.

It feeds back

Though not the only reason for my use of feedback, Ahmed's ideas implicate feedback in profound ways. Her description of bodies and objects and work shaping each other is also a description of feedback interactions within and between various milieux: material, social, historical, economic, environmental, and so on. An orientation that acknowledges its context is also one which engages with its situation in that context as co-constituent in ways that skilfully interact with the feedback instead of behaving linearly without sensitivity to effects on or by one's context.

While I find the conceptual connection between feedback and entanglement compelling, the feedback in *Haptic Box* has an equally large portion of its origin in practice and experimentation. Much of my electronic audio research during the early COVID-19 lockdowns oriented around feedback: many of the instruments and patches I cloned I used to modulate microphone feedback.[197] Other similar experiments during this time involved using pitch analysis to isolate prominent frequencies in the incoming audio and replay them as synthesized sine tones in a sort of fake feedback, filtering feedback to create pleasant crackles and pops in the incoming audio.[198] Later, after moving to Guelph, my

---

197. See 'Practising process, processing practice'.
198. Riedstra (@driedstr@vis.social), 'This Patch Selects Frequencies'; Riedstra (@driedstr@vis.social), 'This Patch Takes the Amplitude Envelope'.

feedback explorations expanded to include the use of physical analogue hardware, double bass playing, and eventually transducers on boxes and purpose-built boxes.[199] Through this experimental practice I felt an involvement in the feedback process. More than listening to the sound, I was participating in it, forming an active relationship between my body, the digital signal processing, and the material situation of the electronic equipment, the space, and other nearby objects.[200]

So feedback was already 'in the air', and in order to enable the feeling of affecting a material-musical process through touch while immediately feeling those effects, I needed to put it into the material. Though there exist other options for correlating the materiality of a listener with a generative sonic process (I had previously explored triangulation through WiFi antennae on smartphones in *802.11*, gyroscopic and visual sensors also come to mind), they all involve a step of analytic redirection. Having the listener-user affect the vibratory process through physical contact injected them into its feedback loop, rendering their effects on the process direct and material. Keeping the vibration frequencies in the tactile range means that they effectively must be touched in order to be taken in, creating the possibility of an immediate experience of entangled intra-action I chase in all my work.

While it was useful to have the form of the piece sorted out, I needed to determine the algorithmic filtering process. Though to some extent I could rely on the user's tactile modulation to provide change, it wasn't enough to keep the vibrational material interesting enough to warrant continued interaction. At the same time, a deterministic process seemed contradictory to the kernel of ongoing evolving-with that *Haptic Box* encapsulates. I needed a system with its own built-in change, but as with gyroscopic or visual sensor-based interactions, a system based on discrete analytical movements and thresholds would be too clunky, indirected, and forced. As I was experimenting with these types of systems, I

199. Dave Riedstra (@dried@sonomu.club), '@PatchNotes@gup.Pe Same Patch Modulating Mic Feedback with Some Double Bass Long Tones around the Same Pitch.', Mastodon post, *SoNoMu*, 19 May 2021, https://sonomu.club/@dried/106263238459667237; Dave Riedstra (@dried@sonomu.club), 'Just a Long Filtered Feedback Session for You. Upper-Midrange and Placid, Nothing Screechy.', Mastodon post, *SoNoMu.Club*, 28 January 2021, https://sonomu.club/@dried/105635427372879562; Dave Riedstra (@dried@sonomu.club), 'Work on the Feedback Box(En) Continues.', Mastodon post, *SoNoMu.Club*, 26 February 2021, https://sonomu.club/@dried/105799357004933933.

200. Study of electronic music in both digital and analogue forms revealed the pervasiveness of feedback as a technique for interacting with flows of electricity, samples, and acoustic vibrations. Notably, feedback is essential to the implementation of digital filters (such as those I used to interact with acoustic feedback), to the resonant circuitry of analogue filters, and to many basic uses of operational amplifiers. 'Filters', Musicdsp.org documentation, 2019, https://www.musicdsp.org/en/latest/Filters/index.html; Paul Horowitz and Hill Winfield, *The Art of Electronics*, 3rd ed. (New York: Cambridge University Press, 2016); *SDIY Class #9 - Intro to OpAmps*, accessed 30 August 2022, https://youtu.be/watch?v=yQlSs3PObyY.

discovered a misunderstanding I had had of the word 'hysteresis'. Thanks to its use in interfaces, I had thought of hysteresis as a cooling-off period before some element becomes open for interaction or change again. While this behaviour is covered by the term, the broader definition I found on Wikipedia as 'the dependence of the state of a system on its history' was enlightening.[201] Instead of defining a set of zones and thresholds for the system to deterministically move through, the character and gradual evolutionary unfolding needed to come from the system's own definition, as in Alice Eldridge's elegant evolutionary systems pieces.[202] The 'organic' quality of change in the tactile sound of *Haptic Box* would grow from its continual reaction to its past states and the way its audio feedback interacts with the material world in which it's embedded: a process memory that plays out similar to the memory Ahmed sees tools and users investing in each other.

Through experimentation I discovered two ways of building memory into the process through reflexive analysis of the ongoing process parameters.[203] One of these is a continuation of the types of process I used in *Pathside Box* and the Birdies section of *What's at Hand*: the slowly roaming bandpass filters which regulate the audio feedback reduce their speed to linger around more resonant frequencies. The changing relationships between the positions of the filters also has an effect on the apparent resonance, as overlapping filters will generate a 'false' resonance when their outputs are summed. Since this behaviour might eventually result in the filters clustering around the same position, another reflexive process was needed to counterbalance its tendency toward stasis.

My ongoing casual experimentation in analogue synthesis provided an inroads to a useful discovery: the analogue shift register. When paired with feedback, the behaviour of the shift register mimics that of a neuron, 'learning' from its own memory while responding to new input. This insight comes from influential Eurorack designer Andrew Fitch's Squid Axon, a circuit implementation of the behaviour of giant squid axons which uses analogue

201. Wikipedia contributors, 'Hysteresis', in *Wikipedia*, 6 September 2022, https://en.wikipedia.org/w/index.php?title=Hysteresis&oldid=1108863922.

202. Her approach to experimental lutherie as 'speculative faction' that interprets the world through making things which then become forces affecting the world furthermore aligns with my reading of objects as feedback processes. Eldridge and Dorin, 'Filterscape'; Alice Eldridge, 'Ecosystemics and Ecoacoustics: Creative Coding for Speculative Faction & (Re)Sensoring Empiricism' (CeReNeM Electric Spring 2019, Huddersfield, 2019), https://www.youtube.com/watch?v=eNCqoNxzY3Y.

203. An explanation of the signal processing is included in the project website at https://daveriedstra.com/works/haptic-box/signal-processing.html

shift registers with feedback.[204] In the context of my exploratory Eurorack feedback patching a feedback shift register provided the kind of behaviour I was looking for: self-regulating but unpredictable, chaotic but not random.[205] Plugging in a feedback shift register to the bandpass movement in the *Haptic Box* SuperCollider patch ensured that the self-organizational behaviour of the tactile feedback continued its slow evolution in its own way, responding to the environment, the user's inputs, and its own process memory.[206]

Feedback thus provides an integral component of various aspects of *Haptic Box*. Its vibratory haptic audio process is feedback in the usual sonic sense; the processing which entangles itself in the audio feedback by regulating it does so with feedback mechanisms in its ongoing parametric evolution and in the signal filtering it performs; the project itself is a slow feedback loop by virtue of gathering its builder's history and context in the form of the box and presenting them back to affect the builder through future encounters. Feedback brings out the salience of environmental entanglement in these processes and smooths out distinctions between object and process, individual and assemblage, and analysis and intuition.

It is held

Placing the musical material of the piece in the tactile register was an elegant way to effectively require involvement in the outcomes of the piece's vibrations in order to experience them at all.[207] The sound must be taken in though touch, but because it plays out as feedback on a material surface, the touch changes the nature of the vibrations while trying to sense them (additionally but not exclusively due to the behaviour of the filtering algorithm changing based on the produced sound). This requirement produces a dynamic

---

204. In this case, 'analogue' refers both to the data stored in the register (which are continuous values, as opposed to a digital shift register which stores binary on and off states) and to its microcontroller-free implementation. Specifically, the Squid Axon implements the Hodgkin-Huxley equation as described in Tetsuya Matsuzaki and Masahiro Nakagawa, 'A Bipolar Logistic Chaos Neuron and Its Hardware Implementation', *Electronics & Communications in Japan* 86, no. 11 (2003): 46–56, cited in Andrew Fitch, 'Squid Axon', Nonlinearcircuits, accessed 15 September 2023, https://www.nonlinearcircuits.com/modules/p/squid-axon.

205. I took considerable influence from the patching style described by the YouTube channel *La Synthèse Humaine*, a Serge-inspired style of feedback patching which seeks evolving self-regulating systems. Émile Zener, 'La Synthèse Humaine', YouTube, accessed 22 September 2023, https://www.youtube.com/@lasynthesehumaine6932.

206. I'm indebted to the work of Alejandro Olarte, whose SuperCollider implementation of Rob Hordijk's Benjolin provided an example of shift registers provided a necessary object of study for my own build. Alejandro Olarte, 'Benjolin Inspired Instrument', forum post, *Scsynth*, 19 June 2019, https://scsynth.org/t/benjolin-inspired-instrument/1074.

207. This 'must' is soft: I imagine that the haptic vibrations are absolutely silent and try to build the piece that way, writing the description of the piece in this paragraph and even in the piece's title to attempt to orient the piece towards tangible vibration, but as Cage discovered there are no real silences. The incidental sounds of the box rattling against the desk or of the haptic listener's shirt rustling or of the box's internal wires shaking might be considered debris, excess of the main process, noise.

similar to that of my quiet concert compositions, in which sitting in the audience in order to hear the performance means probably being louder than it, and thereby viscerally entangling an individual or group of listeners' presence with the performance. Whereas the quiet performance situation changes the acoustic outcome in a social sense, creating felt tensions which make apparent the social contract of concertgoing, the tactile feedback plays out on a material level.[208] Handling the *Haptic Box* affects the ongoing process performed by the filtering, whereas the quiet concert performers are arguably minimally affected by sounds which would be relatively much louder to the audience. Moreover, the terms of entanglement afforded by touch are primarily material, not social: the acoustic feedback is altered through a change in tension caused by fingers pressed against the vibrating wood panel, there are no other listeners to form an audience-body with. Nevertheless, in both cases the embodied nature of listening affects what is listened to, enabling a similarly embodied sense of engagement with the social-material-acoustic situation.

The body of *Haptic Box*'s tactile-listener is further embedded in the experience by way of their having built the box. While taking in 'the piece itself' as a sound sculpture or composition, the user's experience is overloaded with the experience of building. Their touch does not discover a new object but rather traverses a familiar one, one which they have spent a considerable amount of time shaping and whose materials they gathered. Simultaneously, the vibrations and their framing as an artistic object invite exploration and sustained, considered intake. This brings the listener's body into the the piece as a formative component, the experience would be fundamentally different were the box built by someone other than the listener. The piece and its experience are inextricably tied up in the builder's body and history, their access to materials and time, and all of the contingencies of those materials and those periods of building (and of discovering the piece and learning what was needed to build it and…). This entanglement makes the distributed materiality of the piece acutely tangible.

My approach to thinking tactile experience draws on Saito's aesthetics of the everyday, a holistic perspective which advocates for a more sensually-attuned encounter with quotidian acts like food preparation and socializing.[209] Saito applies a definition of

---

208. For more on quiet, see 'About *Common*'.
209. Saito, *Everyday Aesthetics*.

'aesthetic' which does not limit itself to experiences of art or conventional beauty, instead including potentially any experience. 'Aesthetic' then is an aspect and not a type of experience.[210] What this means for *Haptic Box* is that though the sound sculpture might seem to be framed as the aesthetic object, in fact the aesthetic scope is much broader. Seen as a self-performed text score, the construction of the box becomes part of that experience as well, fulfilling Saito's imperative to appreciate mundane tasks and tools. However, this text score is not very well defined, neither in its textual boundaries nor in the boundaries of the performed action. These porous boundaries, which enmesh my life into the performance and both of those into the listener's life, allow the everyday and the rarefied to mingle.

Saito's illustrations heavily influenced how I think about interacting with objects, especially tools. In her description of using a knife (mentioned above), the aesthetic dimension of the experience enmeshes the knife's physical properties, those of the user's body, the user's conscious use of the object (intention, cultural knowledge, technical facility), and the use's embodied feel (that elusive character of the unfolding texture of the moment's process).[211] Use's knot of entanglement reveals the interplay between the environments proper to these aspects, allowing the user to feel the play of their involvement in its mesh, '*the way in which* all its sensuous aspects converge'.[212]

Implicit in Saito's description is the timbre afforded to the experience by familiarity, which invokes the embodied and relational history of the different parties and the particularity of the experience in its unfolding process. The memory of previous experiences wrapped up in familiarity is embedded in the entire body: conscious recollections, repeated movements leading to muscle strength or strain, textures that find their way to the same point on a fingertip. The particularity of the experience plays out as these relationships change over time, for instance as tendons become inflamed from

---

210. Aesthetic as an aspect and not a type of experience figures in the radical empiricism of Massumi, who describes events (which is to say, experience) with two inter-constitutive dimensions, relational and qualitative, later writing that 'the relational/participatory aspect of process could fairly be called political, and the qualitative/creatively-self-enjoying aspect aesthetic'. Massumi, *Semblance and Event*, 12.

211. Saito, *Everyday Aesthetics*, 27–28.

212. Saito, *Everyday Aesthetics*, 28.

repeated use or grip wears the hilt of the knife smooth. The way these unfold in the familiar aspect of an aesthetic experience is an attuning to becoming-with objects.[213]

As with *What's at Hand* and *Revelling*, the point of engaging with familiar objects is not to break their familiarity in order to uncover the sensuous surface of the thing's materiality, but to let that familiarity colour and shape the experience of intra-acting with the thing. Interactions with the sensuous surface of the object are never raw anyway; they are mediated processes informed by variances in bodily shapes and histories and embedded in environments. Drawing aesthetic attention to a familiar tool or technique invests in its process (the user's history of past interactions, the tone of the present carrying on, and ideas of a future) and in the entangled relations to the environments in which the process plays out.

The familiarity invested in *Haptic Box* is not a result of its prior use as a tool (though it has that option), but rather of the user's having built it, resulting in subtle but important differences to the flavour of familiarity. Being the object's maker means that the user has has a relationship with its materials that could be described as formative. The user has determined the object's physical shape through close and sustained encounters with its materials, and the resulting familiarity of touch is informed by this history. A certain rough patch might be felt as a memory of tearout from the day the builder didn't sharpen their plane enough, or the texture of the wood's surface might recall the feeling of its weight and the smell of the linseed oil used to finish it. These changes are indices of past encounters with the material, pieces of oneself left in its shape and what is now its surface. Encountering them through touch becomes an explicit point of contact for the entanglement they enact in their continued returning, highlighting effects like a feeling of responsibility and self-criticism of one's handiwork. The familiar touch thus recognizes the material of the box as a process, the borders of its would-be states made vague by the work of having shaped them, tangling its flow with those of the body, the sound, and the digital audio process.

---

213. The caring for things that Saito calls for resonates with the entangled kinship Haraway expresses in *Staying with the Trouble*. Being a custodian of the objective moment of material is to make kin with objects. Haraway, *Staying with the Trouble*.

It continues

The builder's entanglement with the box of *Haptic Box* continues after the moment of pointed aesthetic focus on its generative tactile feedback. Having been constructed and having performed its composition, the box remains an object in the orbit of the builder, taking up residence in their home, workshop, hackerspace, or somewhere else. At minimum, the builder is faced with a decision of what to do with the thing. Likely options include disposal as waste, disassembly to harvest and re-use components, sharing with colleagues, and keeping around as a tool, art piece, kitsch, or clutter. In each case, the builder continues to intra-act with material processes and other milieux, perhaps feeling responsibility to what they have created and the ecological implications of waste. Even if the builder decides to part ways with the box, there is a period of cohabitation and a point of departure which generate quite different experiences from encounters with sculptural or installation works in their usual contexts of galleries, sculpture parks, and public spaces.

As one of many objects co-composing the builder's environment, the box participates in the builder's thought, actions, and becoming. In their home, it forms a part of the everyday physical milieu in which they are steeped, creating a medium in which they, as Ahmed writes, 'are submerged, such that they become the space they inhabit'.[214] Becoming that space involves thinking with it, allowing it to contribute to the cognitive work one does by 'externalising' affordances and memories, and by imbuing it with affective objects by which one shapes their impression of self.[215] As the everyday space of home and the bodies living in it co-compose, they perform a living assemblage that enacts the emergent growth-upon-growth of Simondon's transindividuating crystals and the continued becoming-with of Haraway's sympoiesis.[216] An artefact of a process undertaken for explicitly aesthetic reasons, *Haptic Box*'s box carries with it traces of that aesthetic orientation and might contribute them to this quotidian tangle to effect a similar appreciation for the 'sensuous qualities with which we interact on a daily basis that ... make up the world in which we live'.[217]

---

214. 'Rather, bodies are submerged, such that they become the space they inhabit; in taking up space, bodies move through space and are affected by the "where" of that movement. It is through this movement that the *surfaces of spaces* as well as bodies takes shape.' Ahmed, *Queer Phenomenology*, 53.

215. See for instance de Souza's discussion of Beethoven's piano 'knowing' equal temperament for him. 'Beethoven's Prosthesis'.

216. Combes, *Gilbert Simondon and the Philosophy of the Transindividual*; Haraway, *Staying with the Trouble*.

217. Saito, *Everyday Aesthetics*, 2.

While the box is a designated aesthetic object, it also contributes tool-like features appropriate for various applications. Its onboard computer can be useful as a standalone signal processor, and its piezo pickups and transducers outputs can be used for audio filtering, feedback performance, or as a simple sound input or output. Though these features might appeal to different people (for instance, sound artists, noise musicians, experimental music fans, or non-musician sound enthusiasts), there is a good chance that if they built the piece they have the capacity to use it otherwise in some way.[218] This capacity for use figures as an affordance of the environment, whether immediate or at a distance, and can 'bring forth a world': the box's tool-like affordances further shape what can be done in the environment as well as the perception of what can be done. These uses allow for different kinds of exploration of the box, generating a familiarity influenced by and complementary to that built by the various other interactions.

For its affordances to be effective, the box must be maintained. Its simple wooden construction requires a bit of care not to dent or crush, the connections among its electronic hardware have a tendency to rattle loose and must be reconnected, and its software should be kept up-to-date if used on a network connected to the internet. I tried to keep these operations in mind when designing the box. Its size is meant to afford easier access to the internals and the use of non-permanent connections is meant to enable the replacement of components as needed. The continued entanglement that this kind of maintenance performs points to the resonant aspects of the box's objective phase, that without reinforcement or the right conditions the box might destabilize and disperse into other material flows (disintegrate via neglect or damage). The destabilization of objective resonances in matter shows that the '"direction" of matter' in time described by Ahmed has do with flow as much as stability.[219]

Maintenance characterizes my own relationship to *Haptic Box* the piece. Aside from the routine support a website needs, the text of the build instructions, the construction of the box, and the signal processing all continue to be informed by (take from from) my own practices in relevant areas, as well as by contingencies in the world that affect the viability

---

218. And if not, there remains the possibility that its *potential* use could still be apparent: that its readiness-to-hand might be ready-to-hand.

219. Ahmed writes, 'the object could even be described as the transformation of time into form, which itself could be redefined as the "direction" of matter.' Ahmed, *Queer Phenomenology*, 40.

of the project. Through this work, I share space with *Haptic Box*, and as I continue to support and shape it, it does me, 'as an orientation that may be experienced as the co-habitation or sharing of space'.[220] Paradoxically, I sustain the objective phase of *Haptic Box* with change as a practice of transindividuation through which I foster sensitivity to my everyday entanglement with the works I produce.

---

220. Ahmed, 54.

About *Common*

Common is a performance by three players on a single concert bass drum.[221] The players move through its quiet material independently, following an open-score improvisation technique which departs from my previous use of *switchcraft*.[222] Though the scored materials are quite simple, the interactions between the players that results from the improvisation and the similar effects of combined actions on a shared instrument generates emergent complexity. The performance uses a very low volume throughout, and like my other quiet works this is intended to enable embodied experiences of ongoing relating to social, material, acoustic, and other environments. While *Common*'s premiere was meant to celebrate in-person performance, a surge of the Omicron COVID-19 variant forced the festival in which it was scheduled to become online-only. Pivoting my conception of the score from a prescription of an ideal to a description of an image to depart from allowed me to respond creatively to the unfolding circumstances that would have prohibited following the idealistic prescription.

These three phases of the piece (the performance, the listening experience, and my personal conception) enact similar approaches to ongoing entanglement. Each manifests as an embedded feedback relationship with continually evolving complexity, the emergent unpredictability of which renders all decisions speculative, and the ongoing processual nature of which reveals that would-be stable features are better thought of as resonances

---

221. *Common* was commissioned by Victoria BC's SALT Festival as a collaboration between Tsilumos Ensemble and the Victoria Composers Collective for the 2022 edition. *Common* was performed by Ajtony Csaba, Nolan Krell, and Michael Dias on 7 January 2022 for an online audience, broadcasting from the University of Victoria's Philip T Young Recital Hall.

222. Switchcraft is a technique for improvising with scored material described below in relation to Common's deviations from it. For more about switchcraft, see Riedstra, 'Mathesis and Technicity in **▎ ■ ▲ ▬ ●**'.

lasting only as long as the activity of the environment supports them. I relate these mechanisms to Haraway's notion of 'staying with the trouble', which I understand as an art of becoming-with complex entangled environments not to solve or succumb definitively to troubles but rather to *stay*.[223]

Sonic material

The entirety of *Common's* performed sonic gestures result from manipulation of the drum skin by its three performers. Notes in the score describe finger movements for creating impulses with taps and 'plucks', sustained sounds drawn out by running the finger along the drum surface, and the manipulation of tension of the drum skin. The gestures are spread across the skin, triangulating a sound as the players reach for locations between its centre and rim. This becoming-intimate of fingers and sounding surface speaks to my experiences as a string player and previous works as far back as 2014's *along your trails*.[224] Serendipitously, *Common*'s performers were two guitarists and a cellist.

Material interference and collection

The mix of momentary attacks and sustained contact produces an interplay in which the sonic outcome of any gesture is necessarily affected by the net interaction with the drum. The ringing out of a plucked sound is shortened if another player is muting part of the drum; drawing a finger along the skin changes the pitch, timbre, and volume of a tap sound; holding one or more fingers on the skin when nobody else is can transfer vibrations from the arm and amplify them through the membrane. The quiet with which these gestures are performed emphasizes their mingling, increasing the likelihood of sounds combining into perceptual composites, and, in my opinion, prevents the performance from becoming a pastiche of itself. Whereas a theoretical louder version would be dominated by sudden choke mutes and dramatic interplay, quietly this drama shares a level with more subtle interactions and effects such as the sound an uninterrupted muting action can make and environmental sounds like the rustle of moving clothing. The performance settles into an ecology of sound and movement, a cluster of interesting activity within activity.

---

223. Haraway, *Staying with the Trouble*.

224. *along your trails* was the experimental composition for string quartet that I brought to the 2014 edition of Quatuor Bozzini's Bozzini Lab workshop, and was the counterpart to the publicly presented composition *Mnemonic* from the same year. Rehearsing the piece was a critical moment for my interest in quiet, as I was invited to sit in the centre of the quartet as they played it.

The constructive and destructive interferences resulting from *Common's* performance techniques problematize the performers' skill by disrupting the expected results of their performed actions. The mechanism of this decoupling is the players mutually affecting each other's sound through the shared instrument. Disjunctions and concatenations of the players' gestures occur in unforeseeable combinations because the the performance is not motivated by a predictable tabulature of transitions from state to state but by the continual listening to the total performed sound and trying to do something with it. Unable to predict to the usual degree the sonic outcome of a particular gesture, the performers are meant to speculate about their sounding effects and discover new sonic mixtures as they work through the material together. In other words, the disrupted coupling of action and its expected result does not mean that the performers are to become ambivalent about that result and simply follow some prescribed action; rather, their investment in the mutually-complicated outcome is what drives the performance. Listening and responding is what puts the players into different locations in the score and what puts them into contact (or not) with the drum at all. In effect, the actions of a single performer of the trio don't exist independently from the whole, even when the other two happen not to be playing at a given moment.[225] The ensemble's actions bring each other into being through mutual investment in and ongoing playful manipulation of the sounding whole.

By disrupting in a small way the skill enabled by a close relation between action and sound, decoupling in *Common* points to the broader skill of navigating embeddedness in milieux. The outcomes of actions have a high degree of contingency; they can be guessed at but not well-known in advance. The results emerge from the ensemble's inter- and intra-actions and, evaluating those results, the performer also learns about themself and the environment. Entangled in this way, performing the piece is not a matter of absolute control or lack thereof over the sound, nor of a collision of disparate atomic elements, but rather of collectively constructing the performance, sound and gestures, in continued engagement with a 'thick present'.[226]

---

225. A player is present in their absence: first because their not participating is an active contribution that allows the drum skin greater freedom to move than if they were in contact with it; second because of the virtual potential their presence carries in the system. This second sense is virtual in the same way that Massumi describes virtual experiences as real and felt: 'The virtual is abstractly lived as the experience runs through itself, from one limit of its unfolding to the other. ... The key is always to hold to the virtual as a coincident dimension of every event's occurrence.' It is also similar to the way that Ahmed describes broken tools referring to their intended use. Massumi, *Semblance and Event*, 17, 18; Ahmed, *Queer Phenomenology*, 46–48.

226. Haraway, *Staying with the Trouble*, 1.

Touch

Navigating the performance through contact between hand and drum, the performers generate unpredictable outcomes through tactile interfacing. As in *Pith*, this touch is a productive mingling of the body of the performer and the materiality of the world in which both effect the other and feel those effects. Pressing a finger on the skin of the drum, the player applies a vector of force to the drum, which in resisting demonstrates its continued presence and sonic pliability. Taking on the energy of the applied force and snapping back into place, the drum head vibrates; pulling away, the player's finger has vibrated the drum skin. Both sides active and receptive, the touch enables a sensitivity to the bodily apparatus of the performer-drum assemblage as such. The body of the drum mingles with that of the player, generating an ad hoc composite self which distributes its identity between the two in their material interface.[227] Neither player nor drum come out of the event unchanged: rather, this interaction is what generates their identity as performer and as drum. Without moments of contact such as this, the drum would remain an unplayed object and the player someone who doesn't play, but in their intimate sharing of space they comprise a-player-playing-a-drum-just-so.[228] Both sides of this equation are required and do not pre-exist the interaction. The bass drum *becomes* a quiet musical instrument through the touch just as the performer becomes one who plays a drum quietly. They are, in Haraway's words, 'ontologically heterogenous partners [who] become who and what they are in relational material-semiotic worlding'.[229] The self of the player-drum assemblage cannot be reduced to the concatenation of its parts but is neither their total dissolution into the new whole.

Unlike the performer of *Pith,* the three players of *Common* also encounter each other through the surface of their shared instrument. Just as the characteristics of the drum define the sound that emerges from its contact with a player, each player's touch also *a*ffects the vibrations of the others'. Simultaneously, what each player learns through feeling is not

---

227. I use 'self' here in the same sense as Serres, who locates it at particular points of self-touch. Recalling the experience of being trapped in the porthole of a sinking ship on fire, Serres proclaims that 'the soul inhabits a quasi-point where the I is determined'. Points of especial sensitivity in the body can locate a 'consciousness' when the body is 'tangential to itself': 'I touch my lips, which are already conscious of themselves, with my finger. I can then kiss my finger and, what amounts to almost the same thing, touch my lips with it. The I vibrates alternately on both sides of the contact, and all of a sudden presents its other face to the world, or, suddenly passing over the immediate vicinity, leaves behind nothing but an object.' In both cases, the self is experienced through momentary and tenuous determination of the body as a sensing-sensed entity in the world (recalling a similar moment discussed by Merleau-Ponty, which I encounter below.) Serres, *The Five Senses*, 21, 22, 80.

228. Ahmed describes the relational identity shared by people and objects, writing that 'this body with this table is a different body than it would be without it. And, the table is a different table when it is with me than it would be without me.' Ahmed, *Queer Phenomenology*, 54.

229. Haraway, *Staying with the Trouble*, 12–13.

only how the drum is responding to their touch in that moment, but how their touch is interacting with the whole ecology of vibrations in the drum skin. In one sense, the players learn about their becoming-an-assemblage through a tactile feel characterised by the bass drum, which becomes a common resource shared among them. The drum, however, is not a passive ground on which the players figure, it is an active, co-creative, and indispensable participant in their assemblage. The commons is rather the group interaction: their collective becoming-with. Commons, too, are performed processual assemblages, actively contributed to, irreducible, emergent.[230] Touch thus enables the players an experience of becoming a resource for others as part of their field, becoming environmental to them.

The interaction's bi-directionality and temporality reveal that it is a feedback process. The assemblage learns about itself by performing itself through material manipulations in time. What it takes up in perceptive touch is steeped in various environments: the musical-semantic contexts in which previous notes are played, the vibrations of those actions in the drum head, the cultural forces which contribute to the ideas of collective music-making, drums, and stages, the acoustic conditions of the space and the other vibrations which carry through the wooden floor into the ensemble's skin through their four sets of feet. The identity created by tactile interaction fundamentally integrates these environments even as it is produced by them, contributes activity to them, and resonates within them.

Scored material

The scored material of *Common* (which is to say its 'musically' semantic content of rhythm, dynamics, pitch, and so on) has several features which enable the emergent co-constitutive becoming which the previous section indicates. The rhythmic content is seemingly simple, comprising mostly crotchets, minims, and semibreves, and the phrases match their notated meter relatively tightly. *Common's* phrases have varying degrees of self-substantial shape, from the short near-repetitions of section A to the more demarcated phrases of sections B and C to the more nebulous and mostly muted material of section D. The range of definition is meant to provide opportunities for the material to interlock into conglomerates through the group interaction such that intersecting moments of less clear shape might generate an

---

230. In other words, commons are not infinite resources to draw from. Timothy Morton describes a perspective of nature as independent and eternal as grounds for the extractionist mindset that fuels climate collapse: 'Here is the field: I can plough it, sow it with this or that or nothing, farm cattle, yet it remains constantly the same. The entire system is construed as constantly present, rigidly bounded, separated from nonhuman systems.' Timothy Morton, *Ecology without Nature: Rethinking Environmental Aesthetics* (Cambridge, Mass: London, 2007), 48.

apparent figure, that counterpoint or heterophony might emerge between clearer shapes, and that additional complexity could arise through such interaction in any case.

The relatively simple rhythm is made more diverse through the open tempo modulations and repeats. Where ♩=***n*** is indicated the performers may change tempo to one of four given modulations of a base tempo of 72 BPM. The tempo modulations lightheartedly mime those characteristic of *ars subtilior*, from which *Common's* "musical" content draws inspiration.[231] My use of different tempi for repeats of the same material has precedent in Cassandra Miller's violin solo *for Mira*, and my use of misaligned repeats in Bryn Harrison's *Repetitions in Extended Time* (and has further background in the misaligned measures of Béla Bartók's string quartets).[232] Whereas my previous uses of similar modulations, such as in *Burl* mm. 132–142 and *Pith* mm. 31–36, are written-in as note durations or fixed tempo changes, their openness in *Common* generates further linear combinations of the material.

As in *Pith*, scored dynamic marking is de-emphasized to allow the overall relative volume level described in the preamble to take precedence, and for the dynamic contour to be generated by the way the material is played. The coincidence of dynamic with other musical elements is more profound in *Common.* The varying degrees and locations of tension in the drum skin tie together pitch and loudness in a common contour, like taste and smell. The indeterminacy hidden in the performance of the simple-looking materials adds further complexity to the contour. A sustained pitch marked in a 'single' area of the drum skin requires movement around that area in order for the note to be played. The shape of trail the performer's finger runs is open: it could be a figure-eight, oval, squirrelling line, or something else, each of which will generate a different sonic contour for the same notation by virtue of the changes of speed and placement involved in tracing them. The changes in tension resulting from the group interaction further amplify and

---

231. In particular I had been playing 'Helas, pitié' and 'De ma dolour' on the bass. I quote the beginning of 'Helas, pitié' in *Common*'s section B. Trebor, 'Helas, Pitié', in *Codex Chantilly*, trans. Alex Ness (IMSLP, 2017), https://imslp.org/wiki/Codex_Chantilly_(Various); de Caserta Philipoctus, 'De Ma Dolour', in *Codex Chantilly*, trans. Alex Ness (IMSLP, 2018), https://imslp.org/wiki/Codex_Chantilly_(Various).

232. Cassandra Miller, *For Mira* (Faber Music, 2012), https://www.fabermusic.com/music/4027bca9-decd-4401-bcff-dc00651a3b25; Cassandra Miller, 'For Mira', *Cassandra Miller | Composer* (blog), 4 August 2013, https://cassandramiller.wordpress.com/2013/08/03/for-mira/; *Bryn Harrison — Repetitions in Extended Time [w/ Score]*, accessed 18 November 2022, https://youtu.be/watch?v=M6sdJYhaSBQ.

animate the dynamic, pitch, and timbral contour. Despite the simplicity of the notated materials, these dynamics have the potential to create quite a variegated surface.

Improvised interaction / performance process

Common's improvisation technique extends the players' individual open approach to the scored material. Picking up at independently selected designated places in the score, the players perform through their materials as described, encountering the various emergent sonic features generated through their communing through the drum skin. They leave off independently, producing a ragged edge, then wait a moment before beginning again. Episodically carrying on through materials in this way takes inspiration from André Cormier's string quintet *Liens intimes et problématiques* (2016), and though the marked duration of *Common* is considerably shorter at 'about ten to twelve minutes', the premiere performance happily continued for nearly nineteen.[233]

The players use the open form to find and sustain moments of coherence in the quiet sonic-tactile music which they co-compose. They do this by repeating fragments or by sustaining a sound until the coherence falls apart, then continuing to play the written episode in the same way, possibly finding more opportunities to draw out cohesion or an ending. What characterizes the sought-after moments of coherence varies by ensemble, becoming a point of entry for the histories, tastes, and training of the individuals and the group. Improvising the decisions relates these backstories and embodied knowledges to the momentary entanglement of actors, affects, and material space. In this way the result of the players' decisions is both an artefact of these ongoing processes and also a resonance inasmuch as it finds reinforcement from the other players.

The improvisation technique used in *Common* relates to a technique called 'switchcraft' which I've used in other works such as ●▲ | ▬■ (2014–15), ——–——–——– (2015–16), and ‖ |‖‖‖|‖| ‖|‖‖| |‖‖‖‖‖‖|‖ |‖‖‖| |‖‖‖ (2016).[234] Switchcraft applies the Deleuzian rhizomatic ideal to musical form, allowing players to jump from any point to any other point. By asking the musicians to follow each other's jumps and musically synchronize the

233. Ensemble Sisyphe, *Liens Intimes et Problématiques* (hic et nunc collection, 2016), https://hicetnunccollection.bandcamp.com/album/liens-intimes-et-probl-matiques.

234. Dave Riedstra, ■ | ▬▲● , 2014, https://daveriedstra.com/scores/Riedstra%20-%20Triangle%20Circle%20Square%20Vertical%20Rectangle%20Horizontal%20Rectangle.pdf; Dave Riedstra, -——–——––—, 2016, https://daveriedstra.com/scores/Riedstra%20-%20------.pdf; Riedstra, ‖‖‖‖‖‖‖‖‖| ‖‖‖‖‖ |‖‖‖| ‖‖|ᴵ |‖‖‖‖ᴵᴵ|‖‖‖‖.

full part, the players are challenged with relating their knowledge of the score and the embodied skill built up in rehearsing it to their colleagues' actions. The improvisatory technique used in Common instead locates the motivation to synchronize in a shared idea of musical coherence. Similar musical-technical skill is exercised but the performers have the opportunity to inject a broader stylistic preference. In the same sense, the possibility for a synchronization to fail is presented. Both techniques call for and challenge a core musical ensemble skill of playing with others and recovering from mishaps.

Performance situation

Common's performance situation is highly characterised by its low sound level. Commissioned to be performed during one of several apparent but false windings-down of the COVID-19 pandemic, I intended quiet to engage a sensitivity to shared space as a celebration of being together and an invocation of the value of commons more broadly. All of the decisions about staging and situation were made in service of quiet, and the premise of three players performing on the shared instrument caricatures the commons the audience and players share and comprise.

The volume level is given in the performance notes as 'difficult but not impossible for the audience to hear'. It is important that this phrase describes to the performers an audience member's listening experience: the score could alternatively describe a technique for producing quiet sounds or a target volume level relative to what the performer hears.[235] Describing the loudness in terms of its empirical effect on listeners makes clear that the quiet is not for itself but for the felt relationships it can enable between the audience, performers, and environment. This framing has a number of practical benefits. It staves off the musicians' practised impulse to be plainly heard and in the same breath contradicts the familiar call to electric amplification which would make the performed sound less difficult to hear. It makes the performance adaptable to various venues and arrangements of seating (two examples are given in the performance notes), which would otherwise dramatically

---

235. The performance notes do give a description of a technique to perform quietly, but only after describing the heard experience. I think the description is useful as a way of connecting the ideal (in both senses of the word) to the concrete movement that might bring it about, as an example. 'The players' percussive articulations are played only a little more forcefully than setting down a finger.'

alter the heard loudness.[236] It provides a general point of reference for the loudness of different techniques performed in the piece.

Most importantly, it orients the work involved in the performance of the piece towards the performance's effects on its listeners, and thereby renders a responsive and collaborative working relationship between actors in the music-making process: performers, composer, producers, and technicians.[237] We generate a communal image of the goal offered experience (which is to say that we imagine that we imagine a similar thing) by mixing in various ways as we try to bring it about. We mingle concepts in discussions and planning, we mingle our musical tastes and histories by becoming closer through rehearsal, and we mingle these mixtures with the materiality of the drum, the acoustics of the venue, and the real-time unfolding of the performance.

Quiet can serve as a proxy for intending a particular character of experience. Not being able to gauge exactly the empirical outcomes of one's actions on another (much less a group of others), quiet invokes enough of shared bodily experience that one can speculate what it might do. A quiet performance can occupy a volume level that allows it to co-exist with other sounds, neither asserting its absolute priority nor bowing entirely away. A listening body's inherent noisiness is difficult to ignore in that kind of setting, particularly when the social and architectural environments privilege performed sound.[238] Settling in to being a reluctant disturbance can make a number of other performances salient: the active filtering of sounds involved in listening, the resulting orientation that deems certain perceptions worthy of aesthetic attention, the attempt to minimize offending sound and the probable realization of the impossibility of doing so. These performances are enacted and embodied negotiations of a plural commons (shared social, acoustic, material, spatial environments), each facet of which co-constitutes the others while maintaining its own concerns. Such embodied actions of embedded encounters with extended communal

---

236. From the score: 'the performance is sometimes given on a venue's stage and sometimes in closer proximity to the audience. The closer the audience is to the performers, the quieter they must play and the more difficult the performance becomes.'

237. In an important sense, the score, instrument, and venue actively collaborate as well. These objects are artefacts shaped by orientations toward particular types of sound-making and listening and carry assumptions and affordances that shape relationships using them. They are tools which shape and are shaped by the work they do, following Ahmed, and they also distribute cognitive processes through the environment, following Hayles. In this way, these seemingly inanimate objects participate in the imagining of the listening experience.

238. Martin Iddon, 'Siren Songs: Channels, Bodies, Noise', in *Noise, a Non-Ference*, ed. Alec Hall (New York: Qubit, 2013), 61–91, https://www.academia.edu/4327960/Siren_Songs_Channels_Bodies_Noise.

environments are wrapped up in my conception of the experience enabled by quiet. I aim for them first with the score as a means to bring them around to other musicians involved in the performance, then again in the work preparing the performance, and then again in the moment of the performance.

This conception of quiet has nearly become assumption in much of my sonic work and as assumption it enacts similar speculative environmental negotiations to *Common*'s other features. Assumptions, when well-considered, have the benefit of freeing up resources of conscious thought for other tasks, which can be used to expedite work, increase comfort, and allow for close and careful exploration (possibly related to the assumption). By filtering work away from conscious thought, assumption performs a similar function to that of nonconscious cognition as described by Hayles.[239] Both are processes which reduce the complexity and rate of information while connecting it to meaning before (re)presenting it to conscious thought.[240] An assumption of aiming for a particular experience of quietness does this by orienting thought towards relevant performance techniques and situations and bypassing (some of) the existential quandary of a work's motivation. Both assumption and nonconscious cognition are results of processes, and the processes they are results of are both local (within the span of the cognizing actor) and extended (performed in part by environments, and physiological and socio-cultural histories). At the same time, both have a hand in orienting the actor toward or away from certain activities. Though consciousness clearly performs choices about one's movement through the world, Hayles writes that 'conscious behaviours and goals are always already influenced by inferences that nonconscious cognition has performed beyond the ken of consciousness.'[241] Assumption behaves similarly, performing judgements out of view of a particular moment of thought. Both nonconscious cognition and assumptions are informed by the orientations they precipitate and play out in much the same way as Merleau-Ponty's

---

239. Hayles, *Unthought: The Power of the Cognitive Nonconscious*, 56 and passim.

240. Hayles describes cognition as 'a process that interprets information within contexts that connect it with meaning', later saying that 'consciousness requires nonconscious cognitive processing of information and could not function effectively without it'. Hayles, 22, 56.

241. The feedback or resonance between consciousness and nonconscious cognition also plays out on a much smaller and momentary timeframe. Citing research by Stanislas Dehaene, Hayles writes that consciousness must sustain an impulse given by neurons associated with nonconscious processes in order for the signal to survive long enough to make a conscious impression. Hayles characterizes Dehaene's proposition as 'reverberating circuits of neurons that work through a combination of bottom-up and top-down signals'. Assumptions might be understood to function in a similar way when intuition asks to consciously re-affirm them. Hayles, 52, 53–54.

habitual body.[242] Assumption, nonconscious cognition, and the habitual body are all byproducts of feedback processes which they also perform.

Quiet provides a point of agglomeration for many of *Common's* features. It enables a particular listening experience for the audience, leading to an encounter with a commons. Facilitating such an experience becomes a shared goal for the participants in music-making. In turn, both audience and musicians orient their receptive and creative activities toward their felt effects on others: felt both by the other and by the actor feeling the effects of the other feeling the actor's effects. Quiet also serves as an axiom from which I can explore particular implications.

Linguistic choices

The language of *Common's* performance notes uses a descriptive mode which reflects my ongoing turn toward artistic practice as a speculative and collaborative act. However, the original impetus was much more pragmatic, following a familiar frustration with a perceived need for completeness in scoring and in the reception of my work more broadly. I had until then assumed a prescriptive mode for the text of performance notes. Writing those instructions, however, proved logistically and creatively impractical, requiring an ungainly amount of detail in advance to create a top-down document with a false sense of absoluteness: if the performance didn't live up to the prescription, it would be an inferior or flawed performance. Composing the text in such a way as to define the performance as I thought it should go while trying to predict the conditions in the venue and other contingencies created creative mental blocks. I had encountered similar problems thinking the reception of other works, in particular *Pathside Box* relative to its appearance as a potentially dangerous autonomous technical object.

When I reviewed some of my older scores to see how I had previously approached the problem, I noticed a discrepancy: several of them began by stating that they *described* a performance but nevertheless used *prescriptive* language. For instance, the preface to *Burl* begins 'this score describes a very quiet solo contrabass performance for a small audience'

---

242. Summarizing Merleau-Ponty's *Phenomenology of Perception,* Monika Langer writes that 'the habitual body draws together a comprehensive past which it puts at the disposal of each new present, thereby already laying down the general form of a future it anticipates'. Importantly, the 'habitual body' is primarily informed by experience: 'we all carry our past with us insofar as its structures have become "sedimented in our habitual body"'. Langer, *Merleau-Ponty's Phenomenology of Perception*, 32, 33.

but the performance directions are filled with imperative phrases like '*play* the upper staff on the strings alone. *Play* the lower staff by bowing the bridge: *place* the bow underneath the strings and *contact* the bridge on the edge opposite your bowing arm. *Be sure to...'*. The draft notes to *Common* were the same way. As an experiment, I changed the linguistic mode of the draft to the descriptive.

Continuing to write the draft notes in this mode effected a change in mindset that usefully sidestepped the restrictions I had been running up against. Instead of writing a technical document, I felt as though I was imagining a performance through prose. The image of the event I was describing would become a suggestion which we as a creative team of performers, composer, and concert facilitators could then work with to create the performance, something like saying 'what if we did something like this?' The score no longer set a limit case to which the performance would tend and ultimately never reach, but rather generated a kernel around which our collective practices could gather. This kernel carried both the discrete attributes that a prescriptive document would (number of players, instrumentation, details about staging, and so on) but also allowed a greater diversity of tone and overall sense.[243]

Critically, approaching the score this way reframed the collaboration as a primarily *creative* one in that our work became to make something with the score rather than iterate tasks according to its fixed definitions. As a result, interpretative decisions were self-justifying: not deviations to be reconciled against the ultimate truth of the score, but changes that meaningfully shaped the performance by responding to the conditions it played out in. When the news came that the festival in which the performance would take place was to become livestream-only, this responsiveness allowed us to continue to approach the performance as an opportunity to offer an aesthetic experience rather than as a pastiche of how 'the piece itself' 'should have' been. By refusing extra amplification and using the overhead microphones, the broadcast of the performance was saturated with the environment of the venue, including noise floor, HVAC, and sounds of bored stagehands backstage, and the quiet of the performed sounds relative to these venue sounds conspicuously entered into new relationships with sound processes effected by the transmission hard- and soft-ware, playback media, and materiality of listening

---

243. I further experimented with the affective capacity of this feature in *Ripple*s.

environments. These 'additional' sounds foregrounded the uni-directionality of the broadcast in contrast to the feeling of in-person togetherness which I had initially intended, while also pointing to engagements with other togethernesses through simultaneous online gatherings in solidarity to ride out the pandemic, and nonetheless invoking material sensitivities to the various listening environments particular to each audience member.

The score presented an image of an event which the various music-making participants took up into their practices, weaving them together to generate a performance. Similar to the emergent nature of the sounds generated by the group interaction on the drum skin, the performance was an emergent byproduct of these woven threads. Not a neutral disaffected shard of debris: as in the player's searches for moments of coherence while navigating the open form, the effects of broader creative acts comprising the performance (rehearsals, planning conversations, individual practice) were continually related to the imagined goal such that both goal and performance could be drawn closer. Both the actions *and the image* were modified in their interaction. Gestures were adjusted to fit the intended effect, rehearsals tread certain material more than others as the ensemble learned which they like and dislike, and decisions about the performance were informed by the materiality of the venue. Departing from the score, the image hung in the interactions among us, a shared virtuality we each enacted slightly differently, contributing to collective interactions through which we continually re-imagined it.

In this sense I consider these creative relatings as speculative actions. The performers maintain an idea of what the group's image of the performance is, a guess at the net interaction of everyone's idea, and by enacting it through interacting with the group they (in)form their idea. This feedback loop comprises speculation as an activity or process, and the image coupled with the intention to effect it might be seen as speculation's objective phase, 'a' speculation. The same dynamic plays out in the performance technique: a player guesses at what sound their gesture will make and learns about the current state of the drum head through it, using that to inform their continuation of the gesture. So too the open form process, as players continually probe the process that the ensemble as a whole will take by means of and in response to their continuing interaction. An intent is

transformed in its action by virtue of relating to environments, and these transformations are taken back up by the actor to further inform the intent.

Which characters of material the ensemble will gravitate toward, *which* sounds will be produced through the group interaction, *how* the performance will materially respond to the contingencies of the venue, festival, and pandemic: these questions can be viewed as ones of resonance. Various features of the unfolding processes and their environments interact to support some eventualities better than others, which are taken back up into the process through its active reflexivities. Resonances are supported by different features in different temporal contexts: an acoustic resonance is the prevalence of certain vibrational frequencies resulting from characteristics of a physical environment and is typically experienced on the scale of hundreds of milliseconds. The performers sustaining, for example, a particular texture is a function of intersecting cultural histories, momentary affects, social contingencies manifesting as the SALT festival, and material environments, all of which align as a resonance which lasts dozens of seconds to a few minutes. The performance was supported by similar features played out across different actors (additionally contingent on my own situation while writing the piece and the festival administrators who commissioned it). *Common* as musical composition is a resonance that still continues, supported by a cultural imaginary informed by prior tendencies towards masterworks and also by this piece of writing.

Resonances can be thought of as byproducts of processes, enabling a pivot between object and process. They allow us to understand the coalescing of contingencies into things that last, and they enable a reverse-engineering of objects. Understood as resonance, a physical object such as a table no longer carries a sense of self-given inevitability, and can instead be experienced as something supported by practices such as eating, gathering, making, and selling. When the resonance that is a particular table begins to die out, as when the join of a leg to the frame becomes loose or stains collect on its surface, it might be maintained by an environment of care for objects that prompts someone to repair the table, or its dissipation might be accelerated by a tendency to quickly dispose of inconvenient objects and purchase unproblematic replacements.

Stewing with the trouble

These various perspectives of *Common* reveal entanglement in and of various milieux and demonstrate some common features. Feedback patterns abound. Relationships between process and object are tensioned and these statuses are destabilized. Mixture is operative, and with it situation, orientation, and emergence. Orientation is a byproduct of intentions underlying many of these choices.

I find these characteristics up to the task of Haraway's call to sensitively foster connection in a thick present. I understand staying with the trouble to mean engaging effectively with entangled, complex, and troubling realities without succumbing to hopeless inaction or to idealistic detachment. These realities are environments in which one is inextricably *involved.* Words like 'embedded', 'entangled', and 'embroiled' all fall somewhat short, implying something like the stewing of an vegetable that pre-exists the broth or the weaving of a thread that pre-exists the cloth. 'Co-composition,' 'becoming-with,' or 'sympoiesis' better reflect the bilateral motion of infusion in a way that emphasizes interdependence. Haraway clarifies: 'natures, cultures, subjects, and objects do not preexist their intertwined worldings'.[244] Crucially, staying with the trouble is a continuous process, not a state. Becoming-with means to be a part of the environment to others in the environment (that are also part of it), to be composed of the environment (and those others), and to have the same *ongoing* co-constitutive relationship with others.

Common enables its participants (listeners, performers, composer) to practice staying with the trouble by attuning to their own co-constituting of environments. Gestural and vibrational interferences of the players' interactions with the drum skin evince the necessary entanglement in shared space. The improvised navigation of the score's open form performs similar refractions in material-semiotic space as the performers relate histories, tastes, and embodied perception. In each case, not to play (by repeating a rest, leaving off early, or joining late) is as much of a constitutive action as playing in any way: there is no way to remove oneself from the effects of being. The switch of *Common's* linguistic mode from prescriptive to descriptive revealed similar entangled performances across broader time spans. Considering temporal environments reveals a lateral

---

244. Haraway, *Staying with the Trouble*, 13.

embroilment which characterizes activity as speculative: drawing on past interactions in the present with intentions and guesses about the future. The process of taking up effects of the environment while continually contributing effects back to it can be understood as feedback. The effects which 'stay' as a result of feedback, such as the coherences found by the performers navigating the sore, are resonances actively supported by the environment. The object-like character of these resonances provides an opportunity for empirical encounter with the co-composition of object and process.[245]

---

245. For more on object and process, see 'About *Haptic Box*'.

About *Ripples*

Midsts

'Try as we might to gain an observer's remove, that's where we find ourselves: in the midst of it.'[246]

Ripples are momentary fluctuations generated by shifting complexes of entangled ongoing histories. Their crests and troughs are effects of interactions among a medium, between media, which are organized by previous such movements. Feigning distance from this mingling of action and context which is in itself action and context, one can find patterns like concentric circles, tone, and rhythm, and use these to guide ongoing action, creating more ripples.

While working on the construction of *Haptic Box*, I became aware that percussionist Brian Archinal would be visiting the University of Leeds shortly after I was to return and that I could work on a performance with him. The score I first thought to give to Archinal was not notation or text but rather an object. I had imagined that the object-score would be a mechanism for producing feedback on percussion instruments using some of the techniques I was using in the various feedback boxes, such as *Haptic Box*, which was in simultaneous development. The particular characteristics of the object would enable or suggest some uses and prevent others, giving the performer enough material from which to generate a performance. Sitting on the border of score and instrument, I imagined this object-score would conspicuously perform Ahmed's entangled evolution of tools, users, and

246. Massumi, *Semblance and Event*, 1.

occupations, de Certeau's politics of product usage, Heiddegger's *Zuhandenheit*, and any number of related philosophies of technical objects.[247] Ultimately, the idea didn't come to pass and I wrote *Ripples* instead.[248]

Ripples continues various explorations I began in *Common*. The most material similarity between these pieces is their shared skin-on-drum-skin playing technique, through which the players relate to their environment in a continuous tactile feedback loop, always feeling the environment's physical response to their actions in the midst of performing them. But the more generative characteristic in common is the use of the score to posit an image of a possible world in which its performance takes place, as well as a corresponding mode of collaboration which generates a performance from that image. As opposed to leaning on language and notation's symbolic potential to prescribe in various depths of detail a sequence of actions for performers to carry out, this descriptive approach to notation allowed for continuous communal work in sharing imagined possibilities, experimenting with practical implementations, and adjusting the shared concept, all without compromising any notion of integrity to the performance as a 'rendition' of the score.[249] Inasmuch as the performance is an interpretation of potential from the affordances of the score, *Ripples* is in a sense not so different from what the object-score might have been.

The aspect of this approach which fascinated me in *Common* and which became the cornerstone of *Ripples* was not the open-endedness that it afforded to music-making (though that openness is instrumental), but rather the speculative feedback loop in which the image posited by the score is rendered by its interpreters and thereby meets socio-material contingencies. Here, intentional music-making tangles with contextual roadblocks, is supported by a physicality that fills in imagination's gaps, and resonates with emergent

---

247. Ahmed, *Queer Phenomenology*; de Certeau, *The Practice of Everyday Life*; Martin Heidegger, 'On the Origin of the Work of Art', in *Poetry, Language, Thought*, trans. Albert Hofstadter, First Perennial Classics Edition (New York: Harper Perennial, 2001), 15–86.

248. *Ripples* was performed by Brian Archinal on 16 March 2022 at the University of Leeds' Clothworkers Centenary Concert Hall.

249. The notion of a score as material from which to generate a performance is, of course, not new. Christian Wolff is perhaps emblematic of a practice in which scores operate primarily as catalysts for musical activity without prescribing the details of the sounds that activity produces, stating in 1971 that 'a composition (score) is only material for performance … no sound, noise, interval, et cetera as such is preferable to any other sound'. To varying degrees and at different moments in time, similar attitudes might be identified in composers of Wolff's New York and AMM circles. Musical practices which centre on improvising a performance from a fixed kernel, such as bebop, bluegrass, or Carnatic music, might be thought of as even earlier precedents. Christian Wolff, … '… Let the Listeners Be Just as Free as the Players: Fragments to Make up an Interview', in *Cues: Writings and Conversations*, ed. Gisela Gronemeyer and Reinhard Oehlschlägel (Cologne: MusikTexte, 1998), 86.

situational affordances and sympathetic actors. Adapting to these fluctuating circumstances, interpreters continually modify their tactic and approach, transducing between hard and soft, in moments and scales of immediate tactile engagement, collective responsive improvising, and performance preparation.

Image, imagining

It's difficult to freeze the complex feedback process of imagining to isolate 'an' image, but nonetheless, that is an aspect of what imagining does. An image is an abstraction from the real, an assemblage of impressions derived from the imaginer's lived experience. When I imagine a performance, as when preparing for *Ripples*, my image is informed by my past experiences of performances, of aesthetic qualities I would like the performance to have, and of being in the world in general. The image is fundamentally incomplete because of this abstracting tendency. Abstraction is a process of reducing the overwhelming particularity and unending change of the real, of freezing Zeno's arrow so that its position, speed, and trajectory can be extracted as attributes rather than emergent momentary effects of the process of its movement.[250] An image made of these lossy memories must itself compound these losses.

But this abstract removal from the material contingency that fuelled its components also gives the image an impossible depth. Gaston Bachelard writes that images have an 'infinite quality' because they are 'not subject to verification by reality'.[251] This infinitude might also be understood as sufficiency: the imaginer combines in whatever degree of impossibility all the details necessary *to them* in conjuring the image, which is to say that while the image is impossible in the real it has exactly what is needed to constitute itself as an image, and the parts that are missing and the combination's degree of practical feasibility are inconsequential. Yet the losses found in this sufficiency and groundlessness are accompanied, even countered, by the image's productive capacity to posit newness and change. The unlikely and impossible mixtures of impressions in the mind of the imaginer, enabled by their detachment from reality, suggest a world in which they might be possible.

---

250. This understanding of abstraction draws on Bergson's description of analysis as breaking the continuous flow of *durée* into discrete states which are in turn understood by reference to other states. *An Introduction to Metaphysics*.

251. Gaston Bachelard, *The Poetics of Space*, Second edition. (Boston: Beacon, 1994), 86.

This possible world resounds all the more thanks to its inspiration, no matter how far removed or fragmented, by reality.

The worldly inspiration of imagining is ongoing and enacted. The image is not merely a visual freeze-frame in the mind of its beholder, but incorporates all the faculties in a virtual experience of what a different world might be like. Temporally immanent, this virtual experience is what Massumi describes as abstractly lived pure potential, 'never actual but always in some way in-act'.[252] Accompanying experience as 'a coincident dimension of every event's occurrence', the image guides action in the world.[253]

Furthermore, the abstracting engine of imagination continually supplies detail to its loss and doubts its impossibilities. The chaotic aspect of the real is what Grosz describes as 'both matter and its conditions for being otherwise'.[254] Through experience, imagining draws up this potential for newness as the particularity and firmness that forms, informs, and de- or re-forms the image, embedding even within its certainties the possibility that they might change. Similarly but in the inverse direction, imagination as force driving action towards idealistic possible futures lends its productive capacity to the real, a way in which the 'pure potential' of the virtual makes '*surprise* a universal, constitutive force in the world's becoming'.[255] So while Bergson describes a unidirectional abstraction that draws on intuition but cannot affect the real in the inverse direction, the surprising connections fostered by imagination suggests a feedback loop in which the virtual and the real continually shape and surprise each other.[256] Therefore it can't be true that 'to verify images kills them', as Bachelard opines, when it is through contact with the real that imagination derives its foundation, has its end, and supplies its images with the detail and the challenges that enable their continued renewal.[257] Just as images suggest ways in which the world might be different and drive action towards that change, the world supplies its chaotic energy to images, giving them something firm to be rooted in and surprising them with unpredictable novelty.

---

252. Massumi, *Semblance and Event*, 19.
253. Massumi, 18; while I use terms like 'image' and 'idea' throughout, it's worth considering that the virtual abstraction is not necessarily conscious. For more, see Hayles, *Unthought: The Power of the Cognitive Nonconscious*.
254. Grosz, *Chaos, Territory, Art*, 5.
255. Massumi, *Semblance and Event*, 16.
256. 'But the error consists in believing that we can reconstruct the real with these diagrams. … from intuition one can pass to analysis, but not from analysis to intuition.' Bergson, *An Introduction to Metaphysics*, 48.
257. Bachelard, *The Poetics of Space*, 88.

Carrying on

I gathered impressions into an image of a solo performance by Brian Archinal. Carrying on from *Common*, I followed my interest in quiet and sustained percussion sound with continual physical interaction. My tendency toward quiet performance situations discovered a different affective character in this solo application: less rubbing up against an audience etiquette that motivates restriction of movement and gathers members into a tense macro-organism, more inspired by sincere interest in the experimental and unknown outcomes of an improbable undertaking and a communal investment in the ongoing aesthetic experience. This accrued mood from past experiences of participating in house concerts of folk music. To an extent I knew this quality of intimacy would not be possible in the context of the performance Archinal was to give at the University of Leeds's Clothworkers Hall, a venue more oriented toward the non-participatory and single-sense-modality of latter-millennium European concert traditions than the multi-sensory familiarity of hearing and watching a friend perform in a different friend's living room between bites of curry and sips of wine, sitting on a couch or on a cushion on the floor, rubbing shoulders with friends-of-friends.[258] Negotiating the improbable conflation of imagined and prescribed performance situations would be a challenge when preparing to realize the performance.

The task that Brian was to perform needed to have a similar quality of possibly-impossible. A feeling for this quality was partly inspired by social and political commentaries which discuss or demand the impossible. The implicit hopelessness of Mark Fisher's by now well-known insistence that 'it is easier to imagine the end of the world than the end of capitalism' should be taken, I think, not as an excuse not to try but rather as an imperative to do so through creative, incremental, and real change.[259] I take Ursula Le Guin's reminder that the divine rights of kings was once understood as natural law as a direct comment on Fisher's work, a reminder that unimaginable ideals might not actually

---

258. For a critique of these and other features of European concert music in the context of paradigmatic Western art, see Saito, *Everyday Aesthetics*, 18–28.

259. 'Watching *Children of Men,* we are inevitably reminded of the phrase attributed to Fredric Jameson and Slavoj Žižek, that it is easier to imagine the end of the world than it is to imagine the end of capitalism. That slogan captures precisely what I mean by "capitalist realism": the widespread sense that not only is capitalism the only viable political and economic system, but also that it is now impossible even to *imagine* a coherent alternative to it.' Mark Fisher, *Capitalist Realism: Is There No Alternative?* (Ropley: Zero, 2009), 2.

be unattainable.[260] The incremental change I read in Fisher resonates with Haraway's imperative to focus on present material-semiotic entanglements without succumbing to despair or relying on the hope of divine or technical panacea.[261] Just as 'the catastrophe … is neither waiting down the road, nor has it already happened … it is being lived through', so too must the response be.[262] It is through continued renewal of an imagined alternative in its contact with the chaos of the ongoing real that its details get ironed out and it becomes 'both more serious and more lively', becomes a *real* alternative.[263] Through responsive inter- and intra-action with the complexities of its own unfolding, this open feedback loop can encounter a plurality of unknown possibilities much like Voegelin's 'echography of the inaudible', a practice which 'resounds the how of power and actuality and makes their limits audible' by exploring 'the unseen reverb of reflection where plural causes become visible and their consequences thinkable'.[264] Paying curious attention to the unforeseeable results of the image's contact with the real is a way to move beyond an assumed natural order and discover a plurality of possibilities. It's with this energy that *Ripples*'s performer should carry out their task.

Knowing that even a convincing dramatic performance of a feigned-impossible task would still register as a dramatization, I needed a task with the actual property of possibly-impossible for Brian to perform. The task also needed to fit with both the intimate and communal character of mood I wanted
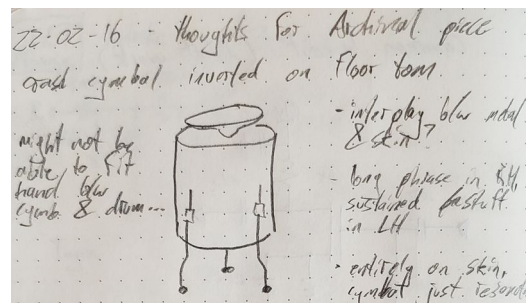
Figure 12. A sketch for *Ripples*

the performance to generate (not a strength of solo percussion) as well as the concert program it was to co-compose in Clothworkers Hall. Again drawing on *Common*, I wondered whether and what kinds of resonances were possible to manually articulate and sustain using 'unpitched' percussion instruments. Cymbals sound apparently noisy but their noise contains a multitude of resonant modes which can be heard when they are bowed, made to

---

260. Ursula Le Guin, 'Ursula K Le Guin's Speech at National Book Awards: "Books Aren't Just Commodities"', *The Guardian*, 20 November 2014, sec. Books, https://www.theguardian.com/books/2014/nov/20/ursula-k-le-guin-national-book-awards-speech.

261. 'Alone, in our separate kinds of expertise and experience, we know both too much and too little, and so we succumb to despair or to hope, and neither is a sensible attitude. Neither despair nor hope is tuned to the senses, to mindful matter, to material semiotics, to mortal earthlings in thick copresence.' Haraway, *Staying with the Trouble*, 4.

262. Fisher, *Capitalist Realism*, 2.

263. Haraway, *Staying with the Trouble*, 4.

264. Voegelin here refers to Frances Dyson's description of the natural harmony of the monochord and a divine refrain which affirms the order and leaves no room for the possibility of difference. Voegelin, *The Political Possibility of Sound: Fragments of Listening*, 21; Dyson, *The Tone of Our Times*.

screech with a drum stick, or sympathetically resonated with sine tones.[265] Stretched-skin drums are even more pitched and have an appreciable degree of give which can be tuned. I imagined pendulum-like movements between these two objects, a cymbal inverted on a drum skin, launched into cycles of constructive interference by a performer's sensitive and familiar touch. Manually drawing out a variety of tones from these noisy instruments, the performance would demonstrate the immense plurality of possibility available in noise's chaos, 'understood not as absolute disorder but rather as a plethora of orders, forms, wills'.[266] The limit case would be to build the resonances between these objects into a self-sustaining standing wave that required no more input from the performer, a complex perpetual motion machine. I imagined that the vibrations that might resonate in this complex system would be of a low frequency, and the generated sound would likely be quiet and rich in overtones, accompanied by the incidental noise of movement by the percussion instruments and performer.

Giving a sense

In order to work effectively together with others in a collaborative arrangement, as when making music, intentions should have some degree of alignment and the collaborators should share an image of their work. This sharing performs similar functions to imagining itself. The image cannot be completely communicated between parties because its infinitude subsists in an individual's imagination and is informed by that person's past experience. Sharing an image necessarily loses detail about the image in its transduction from thought and affect to language and act, but this process is also generative, putting the image in contact with the multiplicity of interpretations, perspectives, and values held by the various participants. The image refracts through the participants in its communication, who contribute through loss and addition. Certain commonalities accrue, and a group image emerges as a resonance, shared in the group's unique and situated communal experience. Hanging in the air amidst those who co-compose it, the shared image accrues even more vitality through this entangled communication. The gravity of veracity and the unpredictable possibility that reality contributes to the image as individually imagined are

---

265. Scott McLaughlin, 'Resonant Systems: Multiphonic Resonance Complexes in Sine-Wave Excited Cymbal Clusters', Scott McLaughlin, Composer, n.d., https://www.lutins.co.uk/ResonantSystems.html.

266. Grosz, *Chaos, Territory, Art*, 5.

multiplied in communication by the meaning and novelty supplied by other participants: what registers for them in terms of their individual and collective hopes and concerns.

Some of this behaviour of the image in communication resonates in my mind with the description of sense in the first few series of *Logic of Sense*.[267] Both the image and sense enjoy and proliferate possibility in their detachment from the laws of reality. Sense is unaffected by the direction of its proposition's denotation, 'indifferent to affirmation and negation'.[268] The sense of statements like 'I am becoming older' includes the entire spectrum of their motion, including the absurd inversion 'I am becoming younger'. Sense unites these impossible inversions by being 'the articulation of the difference' between 'the two terms of the duality which contrasts things and propositions'.[269] In this way, 'sense is always a double sense' and, like the image, suggests the possibility that a state of affairs might be otherwise.[270] For the image, the ability to posit the impossible comes from its ambiguity and incompleteness: the possibility of change is enabled by a departure from the real that might filled in by imagination or by the chaos of the real. This fluidity and infinitude is in a way shared by sense's 'extra-being' and its inherence in proposition. As Deleuze points out, while one can refer to the sense of other propositions, it's not possible to state the sense of the same proposition that carries the sense. Sense's being floats between the proposition and the state of affairs it refers to, generated by but distinct from both.

This leads to the main distinction: that whereas sense inheres in a proposition and subsists in that difference between the proposition and its referents, the image includes references, referents, propositions, and even a sense of its own.[271] Similarly, while it is possible to 'give a sense' in a proposition (though without pointing to the sense of the proposition directly), it is impossible to 'give' an image completely due to its infinitude. The practical implication is that if one wants to share as much of their image as possible with someone else, they should try also to give a sense of the image, which can carry some of the quality of the image's infinitude, if not the infinitude itself. Because sense can be referred to

---

267. Gilles Deleuze, *Logic of Sense*, trans. Constantin V. Boundas, Mark Lester, and Charles J. Stivale (Athlone, 1990; London: Bloomsbury Academic, 2019).
268. Deleuze, 35.
269. Deleuze, 31.
270. Deleuze, 35.
271. Referents in the sense of C.S. Peirce's infinitely recursive signification: 'the thing to which the sign refers is thus contained within the *lived experience* of the sign's users.' Jean-Jacques Nattiez, *Music and Discourse: Toward a Semiology of Music*, trans. Carolyn Abbate (Princeton: Princeton University Press, 1990), 6–7.

but not stated, the only effective way of sharing sense must not be to describe it but to actually *give* it, to perform or enact it.

This realization added a new dimension to my movement towards a score that does not prescribe some actions for performance but rather describes the performance. What the score describes would not exactly be the image or its sense, but in its description the score would give a sense of the image while also denoting enough concrete referents to enable pragmatic work. The ambiguities between these referents, what many composers are trained to extinguish as much as possible, would in this case allow the productive accruing of veracity and possibility through the image's co-composition by other participants and contingencies of the situation. These gaps also meaningfully contribute to the sense of the image. Giving neither beginning nor end, the text of *Ripples* occupies the moment of the performer's highly intentional, ongoing, unfinished relating to the chaotic and possibly-impossible task at hand.

As an object that is meant to share the image of a possible world in which its performance takes place, the score is a diagram. Naturally I don't mean a schematic replete with detailed measurements and instructions, but more simply something that informs and interacts with reality's continued becoming. 'Diagramming', writes Massumi,

> is the procedure of abstraction when it is not concerned with reducing the world to an aggregate of objects but, quite the opposite, when it is attending to their genesis. To abstract in this fuller sense is a technique of extracting the relational-qualitative arc of one occasion of experience—its subjective form—and systematically depositing it in the world for the next occasion to find, and to potentially take up into its own formation.[272]

A diagram takes the gaps in its constitution resulting from its abstractive origin and makes them generative of newness, first in imagining, then in its continued re-uptake in the world. The active aspect of 'giving a sense' demonstrates that the way in which diagrams function is not as an instruction set but as objects or events that ripple out into the experience of others. Therefore the diagram is not limited to the score but also includes other music-making activities: emailing, in-person work, conversations with advisors,

---

272. Massumi, *Semblance and Event*, 14–15.

musical instrument practice, attending house concerts, all of which gather meaning into the image.

Ongoing, incomplete, entangled, diagramming is much like Haraway's SF: 'science fiction, speculative fabulation, string figures, speculative feminism, science fact, so far'.[273] This complex polymodal figure is an icon for intentional situated becoming-with that respects discrete facts as well as the ambiguities of sense and image. Haraway outlines three aspects of SF as string figuring, each relevant to Massumi's Peircian-Deleuzian diagramming. Just as abstraction reduces the real to finite concepts which then contribute back as diagrams, 'SF is a method of tracing, of following a thread in the dark' that finds 'tangles and patterns crucial for staying with the trouble'.[274] The object-like nature of the diagram rejoining the real is also reflected in SF, which 'is not the tracking, but rather the actual thing, the pattern and assembly that solicits response, the thing that is not oneself but with which one must go on'.[275] Finally, diagramming's participatory, in-process unfolding is shared by SF's 'passing on and receiving, making and unmaking, picking up threads and dropping them'.[276]

Haraway's SF brings out the intentionality of diagrams through her emphasis on the tangles of interconnected and situated meaning from which they arise, which they navigate, and to which they contribute. Like the mist of midst from which we cannot extricate our perspective, 'natures, cultures, subjects, and objects do not preexist their intertwined worldings': meaning is immanent in the world, in material as much as in thought.[277] Haraway's concatenations 'naturalcultural' and 'material-semiotic' reiterate the point, keeping her discourse rooted in the intra-saturation of meaning and material. SF understood as diagramming reckons with this meaning by selectively taking it up into its imagining and redistributing it into the world. The direction that this ongoing process of selection takes is the trajectory of intention, shaping the diagram that it produces, which becomes an artefact of its makers' values and intentions.

---

273. Haraway, *Staying with the Trouble*, 2.
274. Haraway, 3.
275. Haraway, 3.
276. Haraway, 3.
277. Haraway, 13.

SF-diagramming maintains a balance between its generative possibility and the intentional image of the possible world that it posits. This balance is performed in a feedback loop with the world and others in it as the effects of the diagram's tracing and figuring ripple out, refract back, and are taken up to selectively inform the image's continued conception. The chaotic newness offered by the world prevents this loop from closing into an endless repetition of the same. The results of the image's ongoing instantiation in the real return to it, coloured by their refraction in the unpredictable tangle of the world, presenting their implications even as the image is being imagined. This difference becomes incorporated into the diagram through a negotiation that shapes its core terms: which differences challenge the possible world enough to require a change to what it is (for instance, because they reveal an incompatibility between its various elements or a pragmatic impossibility), or inversely, what of the possible world is important enough to withstand the challenge and require change in the real in order to bring it about. This process of adapting the figure to the world even as its figuring affects the world is one of active, agile, opinionated response to the continual change of entangled becoming-with others that perpetuates the image and allows it to 'stay with the trouble'.

In practice

Responding to the contingencies of music-making with a score is to bring into contact the abstract image generated by reading the score and the particularity of the world in which it will be implemented. This can require leaving behind some aspects of the score's image in order to stay with others, and in the case of *Ripples'* performance, departures came sooner and more profoundly than expected. Many of these were results of the physical apparatus behaving differently than imagined, despite my best efforts to ensure the setup would work. None of the combinations of available cymbals and floor toms resulted in a configuration in which the cymbal rested on its bell while leaving enough clearance for Archinal's hands to manipulate the drum head.[278] Having no rim, a nearby timpani made a suitable substitute for the floor tom, but we soon discovered that the cymbal and drum head were not coupled tightly enough for their vibrations to interact and the cymbal simply bounced above the ringing out of the skin. We used a piece of double-sided tape (apparently a drummer's best

---

278. I had run this idea by a drummer friend who confirmed it would work and checked again on a drum set at my partner's parents' house.

friend) to stick the two together. Then we realized that while the cymbal and drum head did create complex resonances, they had little to do with any movement resulting from the sustained contact of hand and drum skin and were instead almost entirely activated by the removal of finger from drum. This contingency was a result of the physics of the cymbal-timpani assemblage as well as of Archinal's performance history, which led him to cultivate a technique for plucking drum skins that generated a clear pitch suitable for quick re-tuning during performances. Since they were unfit for their purpose, we replaced the preparatory sustained vibrations with the plucked articulations. This had the effect of removing a feeling of sculpted interaction, changing the terms of engagement from temporal shaping to precision of location and touch, so to further increase the complexity of the field of play, we increased the number of cymbals on the timpani from one to three.

These challenges characterized the ongoing renewal of the image in our workshopping towards the performance. More profound than leaving a surface scar or tattoo and less discrete than a veil, these contingencies fundamentally shaped the manifestation of the image in its performance as well as in its ongoing virtual renewal in our individual and collective imaginations.[279] Similarly, the way we responded was informed by and to some extent intentionally explored the situation of our work. The brick walls of Clothworkers Hall, the tenuous steps towards post-pandemic live performance, Brian's broad and variegated new and experimental music performance experience, and my jetlag were all thus also players in our string figure game called *Ripples*. Like the acoustic and tonal characteristics of Alvin Lucier's room and voice, Oliveros's Expanded Instrument System, and Jaap Vink's ring modulated tape feedback systems, the situation and its terms of interaction contributed to the image of the piece to the point of becoming a constitutive element of it.[280]

The resulting configuration used in the performance—Brian plucking a timpani with three inverted cymbals while audience members stood in a semicircle a few metres in

---

279. Serres' tattoos and veils figure the body and the world's mingling in terms colourful but all too atomic, as though one could isolate a particular veil or scar that co-composes the skin and relate it to a single body-world encounter. While once this onion-skin layered image worked well for me, I don't think it fits with the feedback eternal-return metaphysics I'm developing, which has no room for the implied essential kernel that remains underneath the scars and veils. Michel Serres, *The Five Senses: A Philosophy of Mingled Bodies (I)*, trans. Margaret Sankey and Peter Cowley (London: Continuum, 2008).

280. Migone, *Sonic Somatic: Performances of the Unsound Body*; Rodgers, *Pink Noises: Women on Electronic Music and Sound*; *Ring-Modulated Feedback in BEA5* (Analogue Studio BEA5 at the Institute of Sonology, den Haag, 2021), https://youtu.be/watch?v=X_Bcr_HS9XM.

diameter—was some distance away from the image I had had in mind before arriving in Leeds to work on the piece and from what is described in the score. Represented in this distance is the co-evolution (or, better, involution) of the real with the image as they adopt the difference contained within the other. Within this difference is unpredictable novelty, the revealing of which is part of the point of artistic work at all: why make something if its eventualities are known in advance and available in imagination?[281] Rather, art allows a sensual encounter with hidden possibilities, 'the opening up of the universe to becoming-other'.[282] Listening and responding to the emergence of this novelty counters ideas of inevitability and locked-in dualities, proliferating possibility. Among other things, this is a way, per Voegelin, 'to hear the condition of a singular actuality, in order to listen out for alternative conditions that exist not apart from it, that are not its fictional parallel world, but that are real alternatives that sound a present polyphony, even when they are not listened to or heard'.[283] Selectively taking up the differences that these alternative conditions offered enabled our speculative fabulation to stay, maintaining its idea through responsive transmutation, and continue to offer alternative possibilities in artistic experience.

The things that return, the resonances refracting in diagramming's ripples, can reveal characteristics of the system in which their change vibrates. For instance, the staying power of the score as the 'authoritative' aspect of the piece can be understood as a reflection of Western academic music practice's well-known biases towards textual, archivable expressions of individual genius, as well as the efficiency of working with stable, paper-like documents afforded by electronic tools like email, web pages, and printers.[284] The contribution of these cultural and technical forces to the return of the object reveals diagramming to be a distributed activity, a process performed not by a single actor (even if situated) but as an entangled system in relation to itself. Where diagramming imagines

---

281. I am wary of the implications that the word 'creating' brings to this SF process of imagining with the world. 'Creating' implies a generating of something from nothing that ignores the pre-existence of its material and thus also the situation of its work, and so it is counter to the entangled becoming-with that underlies everything I'm talking about here. 'Making' feels more in tune with gathering and working (with) material to bring out the possibilities already contained therein. Art as excess is explicitly laid out by Grosz in *Chaos, Territory, Art*; see also Simondon's conception of individuation as an excess of pre-individual being in Combes, *Gilbert Simondon and the Philosophy of the Transindividual*.

282. Grosz is referring here to the experience of taking in art, but this opening-up is also a function of *making* art. *Chaos, Territory, Art*, 23.

283. Voegelin, *The Political Possibility of Sound: Fragments of Listening*, 19.

284. See for instance Lydia Goehr, *The Imaginary Museum of Musical Works: An Essay in the Philosophy of Music*, rev. ed. (New York: Oxford University Press, 2007), as well as the 'paradigmatic Western art' Saito describes in *Everyday Aesthetics*.

change to the behaviour of some of its contributing actors or contexts, it needs to hold to its image more than it adapts to the contingencies of the real, but it also must respond to those contingencies. The return of artefacts generated earlier in its process helps diagramming to do both, enabling a mingling of experimental changes to the image and fragments of its earlier forms. The image once imagined with this debris is now refracted through the experience of trying to bring it about: even if the attempt went 'well' and was met with little resistance, the flesh that reality put on the bones of the intention fills in gaps in the image, generating new references from which other infinite possibilities can be imagined. The function and experience of these artefacts are both dynamic and stable, helping the image hold to its possibly-impossible elements, those which reality puts up a fight against, by bringing them back in other forms.

The score is one of these artefacts. Notes, sketches, emails, chat messages, and recordings are other object-like versions, and transient experiences like discussions, rehearsals, and performances also return, giving their worldly timbre to the image in time-limited interactions. Each of these can be taken as a diagram that allows imagining and collectively working towards a possible world imagined by others: artists, tool-makers, past selves, even other species and inter-species assemblages.[285] Departing from the score's objective capture of part of the diagram was a way for us to respond to urgent contingencies; returning to its speculation will be a way to incorporate their outcomes into the continued conception of the piece.[286] Our procedure of attending to the genesis of real change selected what it took as its diagrams, further distributing the role: *Ripples* as an image of a possible world in which its performance exists isn't contained in one draft of its text or in its performance but in the ongoing work of imagining it and trying to bring it about.[287]

---

285. 'You build a tool to create a universe in which that tool exists.' Martel and Ford, 'Art in the Age of Artifice'.

286. A notable parallel is the verbal notation practice famously used by Éliane Radigue and lately also Cassandra Miller and Luke Nickel, in which a composition is transmitted (and often also developed) verbally between composer and performer. The performer then becomes the caretaker of the piece, which grows with their practice. In these cases, the embodied terms of diagramming (what returns is memory rather than notation or text) embed a higher degree of particularity to the material conditions of the performer, resulting in a different set of tendencies for what the diagram artefact brings back. For more, see Cassandra Miller, 'Transformative Mimicry: Composition as Embodied Practice in Recent Works' (PhD thesis, University of Huddersfield, 2018), https://eprints.hud.ac.uk/id/eprint/34998; Luke Nickel, 'Scores in Bloom: Some Recent Orally Transmitted Experimental Music', *Tempo* 74, no. 293 (July 2020): 54–69.

287. That work includes the writing of the present text, an exercise which creates artefacts ossifying certain aspects of the image of the piece, allowing them to return.

Bibliography

Ahmed, Sara. *Queer Phenomenology: Orientations, Objects, Others*. Durham, NC: Duke University Press, 2006.

Alexander, Christopher. *A Pattern Language: Towns, Buildings, Construction*. Center for Environmental Structure. New York: Oxford University Press, 1977.

Arnold, Martin. 'Listening on the Edge: After Rudolf Komorous'. *Musicworks*, Spring 2004.

Averill, Charles. 'A Brief Analysis of the Apollo Guidance Computer'. arXiv, 6 January 2022. https://doi.org/10.48550/arXiv.2201.08230.

Bachelard, Gaston. *The Poetics of Space*. Second edition. Boston: Beacon, 1994.

Barad, Karen. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham, NC: Duke University Press, 2007.

Barrett, G. Douglas. *After Sound: Toward a Critical Music*. London: Bloomsbury, 2016.

Batchelor, Peter. 'Lowercase Strategies in Public Sound Art: Celebrating the Transient Audience'. *Organised Sound* 18, no. 1 (April 2013): 14–21. https://doi.org/10.1017/S1355771812000209.

Baulch, Helen, Colin Whitfield, Jared Wolfe, Nandita Basu, Angela Bedard-Haughn, Kenneth Belcher, Robert Clark, et al. 'Synthesis of Science: Findings on Canadian Prairie Wetland Drainage'. *Canadian Water Resources Journal / Revue Canadienne Des Ressources Hydriques* 46, no. 4 (2 October 2021): 229–41.

Bergson, Henri. *An Introduction to Metaphysics*. Translated by T. E. Hulme. London: Macmillan, 1913.

Bonnell, Jennifer L. *Reclaiming the Don: An Environmental History of Toronto's Don River Valley*. Toronto: University of Toronto Press, 2014.

Cage, John. 'History of Experimental Music in the United States'. In *Silence: Lectures and Writings by John Cage*, 50th Anniversary Edition., 67–75. Middletown, CT: Wesleyan University Press, 1973.

Cassidy, Aaron. 'Performative Physicality and Choreography as Morphological Determinants'. In *Musical Morphology*, edited by Claus-Steffen Mahnkopf, Frank Cox, and Wolfram Schurig, 2:34–51. Hofheim: Wolke Verlag, 2004.

Certeau, Michel de. *The Practice of Everyday Life*. Berkeley: University of California Press, 1984.

Chun, Wendy Hui Kyong. 'On "Sourcery," or Code as Fetish'. *Configurations* 16, no. 3 (2008): 299–324. https://doi.org/10.1353/con.0.0064.

———. 'The Enduring Ephemeral, or the Future Is a Memory'. *Critical Inquiry* 35, no. 1 (Autumn 2008): 148–71. https://doi.org/10.1086/595632.

Combes, Muriel. *Gilbert Simondon and the Philosophy of the Transindividual*. Technologies of Lived Abstraction. Cambridge, MA: MIT Press, 2013.

Connor, Steven, and Michel Serres. 'Introduction'. In *The Five Senses: A Philosophy of Mingled Bodies (I)*, translated by Peter Cowley and Margaret Sankey, 1–16. London: Continuum, 2008.

Cumming, Naomi. *The Sonic Self: Musical Subjectivity and Signification*. Bloomington: Indiana University Press, 2001.

De Little, Alexander Paul. 'Spatial Listening'. PhD thesis, University of Leeds, 2018. http://etheses.whiterose.ac.uk/23981/.

De Souza, Jonathan. *Music at Hand: Instruments, Bodies, and Cognition*. Oxford Studies in Music Theory. New York: Oxford University Press, 2017.

Deleuze, Gilles. *Difference and Repetition*. Translated by Paul Patton. 2nd ed. London: Continuum, 1994.

———. *Logic of Sense*. Translated by Constantin V. Boundas, Mark Lester, and Charles J. Stivale. Athlone, 1990. Reprint, London: Bloomsbury Academic, 2019.

———. 'Mathesis, Science, and Philosophy'. *Collapse* 3 (2007): 140–55.

Deleuze, Gilles, and Felix Guattari. *A Thousand Plateaus: Capitalism and Schizophrenia*. Translated by Brian Massumi. 2nd ed. Minneapolis: University of Minnesota Press, 1987.

Dietz, Bill. *Nuvole Detail Prototype with Holiday Vignettes*. 2013. https://www.lateraladdition.org/?page=5#9.

Dunn, David. *Purposeful Listening in Complex States of Time*. 98 1997. https://static1.1.sqspcdn.com/static/f/288545/5477319/1264209903233/Plicsot.pdf%3Ftoken%3DSPX5LGQDjV7rGvTggs3sIqpLyE8%253D.

Dyson, Frances. *Sounding New Media: Immersion and Embodiment in the Arts and Culture*. Berkeley: University of California Press, 2009.

———. *The Tone of Our Times: Sound, Sense, Economy, and Ecology*. Edited by Roger F. Malina and Sean Cubitt. Cambridge, MA: MIT Press, 2014.

Eldridge, Alice. 'Ecosystemics and Ecoacoustics: Creative Coding for Speculative Faction & (Re)Sensoring Empiricism'. Presented at CeReNeM Electric Spring 2019, Huddersfield, 2019. https://www.youtube.com/watch?v=eNCqoNxzY3Y.

Eldridge, Alice, and Alan Dorin. 'Filterscape: Energy Recycling in a Creative Ecosystem'. In *Applications of Evolutionary Computing*, 508–17. Lecture Notes in Computer Science. Berlin, Heidelberg: Springer Berlin Heidelberg, n.d. https://doi.org/10.1007/978-3-642-01129-0_57.

Ensemble Sisyphe. *Liens Intimes et Problématiques*. hic et nunc collection, 2016. https://hicetnunccollection.bandcamp.com/album/liens-intimes-et-probl-matiques.

Fisher, Mark. *Capitalist Realism: Is There No Alternative?* Ropley: Zero, 2009.

Goehr, Lydia. *The Imaginary Museum of Musical Works: An Essay in the Philosophy of Music*. Rev. ed. New York: Oxford University Press, 2007.

Grosz, Elizabeth. *Chaos, Territory, Art: Deleuze and the Framing of the Earth*. New York: Columbia University Press, 2008.

Guthrie, Andy. *Brass Orchids*. CD. Cincinnati: Students of Decay, 2018. SOD119LP.

Hamann, Judith. *Hinterhof*. CD. Sydney, Australia: Longform Editions, 2021. LE075.

Haraway, Donna J. 'A Cyborg Manifesto'. In *Manifestly Haraway*. University of Minnesota Press, 2016.

———. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham, NC: Duke University Press, 2016.

Hayles, N. Katherine. *Unthought: The Power of the Cognitive Nonconscious*. Chicago: University of Chicago Press, 2017.

Heidegger, Martin. 'On the Origin of the Work of Art'. In *Poetry, Language, Thought*, translated by Albert Hofstadter, First Perennial Classics Edition., 15–86. New York: Harper Perennial, 2001.

———. *Poetry, Language, and Thought*. Translated by Albert Hofstadter. New York: HarperCollins, 1975.

Hespèrion XX. *Fantasias for the Viols 1680*. CD. Vanves: Auvidis, 1995. E 8536.

Hofmann, Aljoscha. 'Peter Ablinger: Listening Piece in 2 Parts', 18 August 2006. https://ablinger.mur.at/ww15_2parts.html.

Horowitz, Paul, and Hill Winfield. *The Art of Electronics*. 3rd ed. New York: Cambridge University Press, 2016.

Iddon, Martin. 'Siren Songs: Channels, Bodies, Noise'. In *Noise, a Non-Ference*, edited by Alec Hall, 61–91. New York: Qubit, 2013. https://www.academia.edu/4327960/Siren_Songs_Channels_Bodies_Noise.

Kozak, Mariusz. *Enacting Musical Time: The Bodily Experience of New Music*. Oxford Studies in Music Theory. New York: Oxford University Press, 2020.

LaBelle, Brandon. *Background Noise: Perspectives on Sound Art*. New York; Continuum, 2006.

Langer, Monika M. *Merleau-Ponty's Phenomenology of Perception: A Guide and Commentary*. Basingstoke: Macmillan, 1989.

Manning, Erin, and Brian Massumi. *Thought in the Act: Passages in the Ecology of Experience*. Minneapolis: University of Minnesota Press, 2014.

Martel, J. F., and Phil Ford. 'Art in the Age of Artifice'. Weird Studies, 28 April 2021. https://www.weirdstudies.com/97.

———. 'Notes on Hyperstition'. Weird Studies. Accessed 13 April 2020. http://www.weirdstudies.com/articles/hyperstition.

Massumi, Brian. *Semblance and Event: Activist Philosophy and the Occurrent Arts*. Edited by Erin Manning. Cambridge, MA: MIT Press, 2011.

Matsuzaki, Tetsuya, and Masahiro Nakagawa. 'A Bipolar Logistic Chaos Neuron and Its Hardware Implementation'. *Electronics & Communications in Japan* 86, no. 11 (2003): 46–56.

Mellamphy, Dan, and Nandita Biswas Mellamphy. 'An Algorʰythmic Agartha or the Underworᴸd of UnderᵀOnes'. Presented at Tuning Speculation II, Toronto, 7 November 2014. http://vimeo.com/117054449.

Michel, Alexandra. 'Cognition and Perception: Is There Really a Distinction?' *APS Observer* 33 (29 January 2020). https://www.psychologicalscience.org/observer/cognition-and-perception-is-there-really-a-distinction.

Migone, Christof. *Sonic Somatic: Performances of the Unsound Body*. Los Angeles: Errant Bodies Press, 2012.

Miller, Cassandra. *For Mira*. Faber Music, 2012. https://www.fabermusic.com/music/4027bca9-decd-4401-bcff-dc00651a3b25.

———. 'Transformative Mimicry: Composition as Embodied Practice in Recent Works'. PhD thesis, University of Huddersfield, 2018. https://eprints.hud.ac.uk/id/eprint/34998.

Morton, Timothy. *Dark Ecology: For a Logic of Future Coexistence*. New York: Columbia University Press, 2016.

———. *Ecology without Nature: Rethinking Environmental Aesthetics*. Cambridge, Mass: London, 2007.

Munster, Anna. *An Aesthesia of Networks: Conjunctive Experience in Art and Technology*. Edited by Brian Massumi and Erin Manning. Cambridge, MA: MIT Press, 2013.

Nakai, You. *Reminded by the Instruments: David Tudor's Music*. Oxford, New York: Oxford University Press, 2021.

National Gallery of Canada. 'With Hidden Noise'. Accessed 14 September 2023. https://www.gallery.ca/collection/artwork/with-hidden-noise.

Nattiez, Jean-Jacques. *Music and Discourse: Toward a Semiology of Music*. Translated by Carolyn Abbate. Princeton: Princeton University Press, 1990.

Neuhaus, Max. 'A Conversation Between Max Neuhaus and Ulrich Loock: Milan, March 25, 1990', 25 March 1990. https://web.archive.org/web/20080520021507/www.max-neuhaus.info/bibliography/ConversationwithUlrichLoock.htm.

Nickel, Luke. 'Scores in Bloom: Some Recent Orally Transmitted Experimental Music'. *Tempo* 74, no. 293 (July 2020): 54–69.

Oliveros, Pauline. *Sonic Meditations*. Sharon, VT: Smith, 1971.

Philipoctus, de Caserta. 'De Ma Dolour'. In *Codex Chantilly*, translated by Alex Ness. IMSLP, 2018. https://imslp.org/wiki/Codex_Chantilly_(Various).

Piekut, Benjamin. 'Chance and Certainty: John Cage's Politics of Nature'. *Cultural Critique* 84, no. 1 (17 August 2013): 134–63.

Pisaro, Michael, Greg Stuart, Joe Panzner, Toshiya Tsunoda, and Patrick Farmer. *Continuum Unbound*. CD. US: Gravity Wave, 2014. Gw 011-013.

Priest, eldritch. *Boring Formless Nonsense: Experimental Music and The Aesthetics of Failure*. New York: Continuum, 2013.

Priest, Eldritch. 'Felt as Thought (or, Musical Abstraction and the Semblance of Affect)'. In *Sound, Music, Affect: Theorizing Sonic Experience*, edited by Marie Thompson and Ian Biddle, 45–63. New York: Bloomsbury Academic, 2013.

Quatuor Bozzini. *Aberrare*. CD. Montréal: Collection QB, 2011. CQB 1112.

Riedstra, Dave.]   [, 2016. https://daveriedstra.com/scores/Riedstra%20-%20%5d%20%5b.pdf.

———. -—–--—----–, 2016. https://daveriedstra.com/scores/Riedstra%20-%20------.pdf.

———. ‖‖‖‖‖‖‖‖‖ꟷ‖‖‖‖‖‖‖‖ꟷ‖‖‖‖‖ꟷ‖‖‖ꟷ'ꟷ‖‖‖‖Ⅱꟷ‖ꟷ‖‖‖‖‖, 2016. https://daveriedstra.com/scores/Riedstra%20-%20%7c%7c%7c%7c%7c%7c%7c.pdf.

———. ■ꟷ▬▲●, 2014. https://daveriedstra.com/scores/Riedstra%20-%20Triangle%20Circle%20Square%20Vertical%20Rectangle%20Horizontal%20Rectangle.pdf.

———. *802.11*. 9 March 2018. Sound installation. https://daveriedstra.com/works/802-11/.

———. '2022-11-24'. *Debris | Dave Riedstra* (blog), 24 November 2022. https://daveriedstra.com/debris#2022-11-24.

———. *Burl*, 2018. https://daveriedstra.com/works/burl/.

———. 'Mathesis and Technicity in ꟷ■▲▬●', March 2015. https://www.academia.edu/12007070/Mathesis_and_Technicity_in_.

———. *Spalting*, 2018. https://daveriedstra.com/works/spalting/.

———. *Trombone Solo*, 2015. https://daveriedstra.com/works/trombone-solo/.

Roads, Curtis. *Microsound*. Cambridge, MA: MIT Press, 2004.

Robinson, Dylan. *Hungry Listening: Resonant Theory for Indigenous Sound Studies*. Minneapolis: University of Minnesota Press, 2020.

Rodgers, Tara. *Pink Noises: Women on Electronic Music and Sound*. Durham, NC: Duke University Press, 2010.

Saito, Yuriko. *Everyday Aesthetics*. New York: Oxford University Press, 2007.

Schiavio, Andrea. 'Music in (En)Action. Sense-Making and Neurophenomenology of Musical Experience'. PhD thesis, University of Sheffield, 2014. http://etheses.whiterose.ac.uk/6256.

Serres, Michel. *The Five Senses: A Philosophy of Mingled Bodies (I)*. Translated by Margaret Sankey and Peter Cowley. London: Continuum, 2008.

———. *Variations on the Body*. Translated by Randolph Burks. Minneapolis: Univocal, 2012.

Strange, Allen. *Electronic Music: Systems, Techniques, and Controls*. 2nd ed. Toronto: Responsive Ecologies Lab, 2022.

Strathern, Marilyn. *The Gender of the Gift: Problems with Women and Problems with Society in Melanesia*. Berkeley: University of California Press, 1990.

Trebor. 'Helas, Pitié'. In *Codex Chantilly*, translated by Alex Ness. IMSLP, 2017. https://imslp.org/wiki/Codex_Chantilly_(Various).

Tsing, Anna Lowenhaupt, Heather Anne Swanson, Elaine Gan, and Nils Bubandt, eds. *Arts of Living on a Damaged Planet: Ghosts and Monsters of the Anthropocene*. Minneapolis: University Of Minnesota Press, 2017.

Tsunoda, Toshiya, Koichi Yusa, Sachie Hoshi, and Teppei Soutome. *The Temple Recording*. CD. Japan: edition.t, 2013. E.03.

Voegelin, Salomé. *Sonic Possible Worlds: Hearing the Continuum of Sound*. New York: Bloomsbury Academic, 2014.

———. *The Political Possibility of Sound: Fragments of Listening*. New York: Bloomsbury Academic, 2019.

Walshe, Jennifer. *THIS IS WHY PEOPLE O.D. ON PILLS*. 2004. Solo performer. https://www.cmc.ie/music/why-people-od-pillsand-jump-golden-gate-bridge.

Werder, Manfred. *2005/1*. 2005. http://placetime.blogspot.com/.

Wolff, Christian. '… Let the Listeners Be Just as Free as the Players: Fragments to Make up an Interview'. In *Cues: Writings and Conversations*, edited by Gisela Gronemeyer and Reinhard Oehlschlägel, 86. Cologne: MusikTexte, 1998.