The Multiphonic Fens

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Abstract

The Multiphonic Fens is a practice-based, site-specific sonic research project that generates original compositional narratives through the practice and process of field recording in the East Anglian Fens. The field recordings are transformed into unique compositions that reflect the subjective perspectives of the field recordist witnessing changes in the four traditional British seasons in the Fens.

By employing an original critical-based framework that informs the qualitative research methodology, called the 'multiphonic', the compositions reveal anthropocentric influences on the nonhuman natural world through the environment of the contemporary Fens.

The multiphonic is an original contribution to site-specific sonic study. It offers a creative and ecological lens to foster methodological and aesthetic possibilities that reposition the practice of field recording as an enmeshed artform that blurs the nature-culture divide.

Acknowledgements

I wish to sincerely thank my supervisors, Professor Angus Carlyle and Dr Mark Peter Wright, for their generous support, gracious patience and creative encouragement.

Thanks to Jon Wozencroft and Mike Harding at Touch, Taylor Deupree at 12k and Lawrence English at Room40.

I owe a debt of eternal thanks and love to my mother and father, who passed away during this candidature. Listen in Peace.

I dedicate this thesis to my daughters and future generations of sonic voyagers.

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Introduction

In 1985, the British poet Edward Storey posed a question to his readers: "Where is the musical mind to translate all these natural wonders of the Fens into sound?"[1]. This served as a provocation to me because, through the practice of field recording, I had been tracing the contours of the East Anglia Fens with a microphone for some time. Similar to Storey, I consider the Fens to be my home, as I grew up on the edge of this flat, wide and often misunderstood area. And yet, the wonders of the Fens that Storey wished to hear, and that I grew up with, are being replaced by the sonic horrors of the ecological crisis: the field recordings I gather and compose from the Fens are sonorous microcosms of the Anthropocene, a new epoch in which humans have irrevocably impacted all life on earth.

In May 2019 I performed at a live showcase in San Francisco for the British record label and publishing company Touch. During the performance, I began improvising by processing my field recordings featuring a severe storm in the Fens, which I had recently captured before flying to North America. I briefly explained, prior to the performance, the Fenland origins of my field recordings, such as its geography and its history, and spoke about what I perceived the recordings to contain: sonic narratives of ecological crisis, climate change, and audible environmental loss in the contemporary Fens environment. After the concert finished, held at a venue called The Battery, a number of the audience began speaking to me to ask why I had chosen the Fens in the United Kingdom to record with such attention. I explained that I grew up there and how I created a sonically representative long-form composition that defined the Anthropocene so emotively. This resonated with me, as they understood what I was attempting to portray through the process of composing with my field recordings. Subsequently, Touch published *Simon Scott – Live at The Battery,* as a commercially available digital download release in June 2019.

On that long flight back home to the United Kingdom, inspired by the interaction with my audience, the aims for this research project began to develop and take fruition. By the time we landed at Heathrow Airport, two research questions that I wanted to address in my research project had emerged.

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[1] Edward Storey, *Spirit of the fens: A View of Fenland Life Past and Present*, (London: Robert Hale, 1985), 216-217.

> What novel perspectives do creative sound practices, rooted in field recording, reveal about the changing seasonal soundscape of the contemporary East Anglian Fens?
>
> What type of critical practice-based framework is required for a site-based sonic study, given the inherited divisions of nature and culture from acoustic ecology?

In terms of the first question, field recording, which is my practical method of research inquiry, was chosen because I felt that this methodology, rather than researching my listening experiences, could reveal novel perspectives of recording the contemporary Fens. Across the long duration of this research, I considered that this methodology would offer me the potential to incrementally gather a broad variety of sounds that reflect and reveal new perspectives on the transitions and changes of the seasons in the contemporary East Anglian Fens and provide opportunities to more deeply investigate the narratives of the ecological crisis that I'd already begun to navigate.

The second question required that I begin developing an emergent conceptual framework that enables me to perceive the environment in a holistic manner to witness and question the nature-culture division. A site-specific study would encourage me to investigate the history of the Fens to produce an original practice-based concept that serves as a methodology for field recording to develop into the creation of compositions.

My public live performances and all my published commercial releases during my PhD also reveal the original inspirations for initiating this research project (see Appendices A, C and D). They have contributed to and influenced the development of my methodology, conceptual framework, and the final compositions presented in this research project. In 2019, I submitted my composition *"Emergency Exit"* to a proposed music festival called 'The Festival of Music & Ideas: Acoustic Ecologies', for environmentally engaged artists. It was scheduled to take place in January 2020 at the Attenborough Centre for the Creative Arts in Brighton, United Kingdom. Subsequently, they invited me to perform my composition live on Sunday, 1st February. Other artists who participated were Hildegard Westerkamp, Leah Barclay, Angus Carlyle, Stephen Feld, Jez riley French, Anja Kanngieser, and many more. After a multitude of stimulating conversations, witnessing many inspirational performances and attending enlightening workshops, I began to refine my research questions through my practice-based

research project and observe the transitions between the four traditional seasons in the contemporary Fens environment.

I resumed live performances in 2021 after the British government lifted the lockdowns imposed due to the outbreak of the deadly coronavirus. This became an excellent opportunity to use my practice as research, which informed the emerging conceptual framework that I fully reveal in Chapter Two. Performing the field recordings live, such as at Café Oto in London, allowed me to experiment with processing my recordings and present my research to listeners, which influenced the conceptual aspects of my study. Audience responses I had before and after concerts contributed to my qualitative methods of inquiry, as they helped me determine how to present my research compositionally to convey my concerns about the ecological crisis.

Venues where I have performed concerts that relate directly to my research project include 2022 in Los Angeles (North America), Latvijas Universitātes Botāniskais dārzs in Riga (Latvia), Ancienne Belgique in Brussels (Belgium), MiSo in Berlin (Germany) and notably, in January 2021, I was invited to contribute to the Coventry Biennial exhibition of sound and moving artworks called *Listening To The Anthropocene* (see Appendix C). This has allowed me to examine the work of other contemporary sound practitioners, such as Kate Carr, KMRU, and Jana Winderen, who similarly utilise field recording as their methodology for capturing and creatively documenting narratives of the Anthropocene and the climate emergency. It is worth noting that the recording labels on which I have released solo works, such as Touch, Room40, 12k, as well Flaming Pines (run by Kate Carr), Longform Editions, and Gruenrekorder, are publishing innovative contemporary sound works by artists with whom I share contextual similarities in documenting the environment, composing, and creatively representing the ecological crisis through field recording and composition.

Each chapter in this thesis begins with an ‘UnNatural’ writing section, which posits a hint of irony towards the field of ‘nature writing’ and provokes a deeper inspection of the nature-culture dichotomy, which I creatively react to and wish to deconstruct throughout this research project. UnNatural writing as a title is also inspired by British philosopher Timothy Morton’s capitalising of the first letter of the noun ‘Nature’. He comments that he adds the capitalisation, which he has done in several of his books, “to denature it, like frying an egg,

revealing its artificial constructedness and explosive wholeness"[2]. It is sardonic and serves as a gesture towards revealing the nature-culture dichotomy linked to Western post-enlightenment thinking and the rise of industrialisation since the early 19th century[3]. As Naomi Klein comments, "The dominant worldview continued to see humans as a conquering army, subduing and mechanising the natural world"[4]. This dualism, prevalent in human exceptionalism, posits the distinction and constructed separation of Nature from the human realm. Australian anthropologist Deborah Bird Rose comments, "In analysing the modern era, philosophers look to Descartes for an extreme expression of a dualism that totally separates humanity from nature… and human thought is not part of nature but rather is that which separates humans from nature"[5]. I challenge this notion of a dichotomy between the environment and humans, as I also recognise that Nature and culture are not separate. Around 1982, Bruno Latour devised the Actor Network Theory (ANT), which eradicated hierarchy in a continuously evolving network of human and non-human relationships. Feminist scholar Donna Haraway also challenged this dualism by coining the term "Natureculture" in 2003, "to describe the idea that nature and culture are so tightly interwoven that they cannot be separated"[6]. Therefore, I follow a lineage of rejection of the Nature-culture concept. This is dynamically linked to the entire research project, the research questions, and how my practice responds to this reductive viewpoint. For instance, in Chapter One: Spring, I explore the development of contemporary field recording practices concerning the separation of 'Nature' from humans. The destruction of the environment is viewed through the lens of how the Anthropocene has contributed to the collapse of the ecosystem in the Fens of East Anglia.

Disappearing Cuckoo is the first chapter's composition, which began as a field recording of an endangered bird entangled in Wicken Fen, the last remaining fragment of an ancient environment. This opening chapter is set in spring and coincides with the deadly coronavirus outbreak in 2020, during which I examine the dire consequences of the Anthropocene, such

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[2] Timothy Morton, *Humankind: Solidarity with Nonhuman People*, 2nd ed. (London: Verso, 2019), 3.
[3] Bruno Latour, *We Have Never Been Modern*, (Cambridge, Harvard University Press, 1993), 7.
[4] Naomi,Klein, *This Changes Everything*, (London: Penguin, 2015), p.184.
[5] Deborah Bird Rose, *Wild Dog Dreaming; Love and Extinction*, (Charlottesville, University of Virginia Press, 2011), 9
[6] Hannah Newell, "The Inseparability of Nature and Culture", *A Look At NatureCulture* (blog), December 7th, 2023.
https://storymaps.arcgis.com/stories/f9da47c9119c4a14ad27eb9170efdc7a

as species extinction, habitat loss, and climate change. I also reveal the history of the Fens, which is the location of this research. The development of mobile media technologies that have enabled field recording to flourish into a contemporary creative practice is examined alongside the analysis of its key historical practitioners.

The creative component of Chapter Two: Summer is the composition, *Holme Fen Posts*, portrays the subsiding cartography of the Fens through the original emergent conceptual framework that I subsequently reveal in section three. This framework is investigated as both a practical method and a way of investigating the approaches of other practitioners in the field employ. It also presents the potential to serve as an analytical tool for other creative works, such as Hildegard Westerkamp's composition *Kits Beach Soundwalk* (1986), which is discussed in this chapter.

Chapter Three: Autumn examines the potential creative possibilities of plant intelligence and the sonic associations of fungal networks in relation to the theoretical framework and portraying the Fens during this season. The methodology for creating the composition *220 Hz is* informed by the development of my critical framework in relation to the second research question. It filters the Fenland field recordings through a modular synthesiser to generate an indeterminate composition related to John Cage's work.

Chapter Four: Winter develops a practical work called *Cessation*, which investigates why the dissolution of ice, the material composition, relates to environmental catastrophe and The Fens, as a site of anthropocentric exploitation and a victim of ecological trauma. The field recording composition *Vatnajökull* (2003) by Chris Watson is analysed using the critical framework of my research project's emergent concept.

Chapter Five: No Season concludes the thesis by exploring the methodology of an original composition that combines and rerecords the four seasonal compositions from previous chapters. *Seasons Converge*, is a composition inspired by a painting, *The Four Seasons*, which visually coalesces each of the traditional four seasons. The multisensory entanglement unveils one of the key concepts of this research: the profound and devastating impact of humans on the natural world and the increasingly tangled confluence of the seasons within the post-natural global environment of the Anthropocene.

Chapter One: Spring

1.0: Part One of this chapter is a description of observations regarding the natural world in the Fens in that unique and precarious spring of 2020 during the COVID-19 pandemic.

Part Two examines The Fens and its vexed history and ecological catastrophe. As the specific site of my research, I also investigate this environment as a location of infinite creative possibilities in relation to my practice I also examine the Anthropocene and explore post-natural themes of how the epoch has transformed the conception of the natural world through the lens of Romanticism, Western post-Enlightenment thinking, and the cultural construction of a Nature-culture divide.

Part Three investigates the research origins, history, and development of sound recording. This significantly informs my practice of field recording and situates my methodology within the lineage of experimental composition. I explore the 20th century's proclivity for the extraction and exploitation of 'Nature' recordings in relation to human exceptionalism and linking media technology to symptoms of Western thought regarding the distinction and separation between humans and the natural world.

Part Four examines species extinction, deadly viruses, habitat loss, and the devastating impact of the anthropocentric belief system that humans are superior to and separate from the natural world, which includes the Fens.

Part Five investigates the methodology behind my central composition for this chapter, *Disappearing Cuckoo*. It outlines my practice as research connects its significance to my emerging concept, and addresses the research questions by revealing what the season of spring represented when a multitude of sonic events intertwined at the ancient Fenland site of Wicken Fen.

Part One: UnNatural Writing #1

1.0: Spring in the Natural world is a remarkable time of year, symbolising birth, transformation, hope, light, and new beginnings. Many considered this particular spring in Britain to be the loveliest in living memory despite being thrust into unpredictability and uncertainty during a lonely time of daily government-enforced lockdowns. The lengthening daylight hours brought blue skies and days filled with sunshine into clear focus, allowing the Natural world to flourish in Great Britain and providing a brief respite from the woes of the pandemic. Reading the Guardian newspaper on a daily basis made it seem that the population had developed a penchant for buying pets and feeding garden birds, and people even posted artwork and photographs online as if they had only just discovered that an entangled life existed outside their windows. Reaching out of their doors and immersing themselves in the Natural world led people into gardens, parks, and the countryside once again. This reconnection to Nature became a welcome solace and vital residential respite from the enclosure.

We noticed the birdsong, which began to resonate in our winter-parched ears, and a personal and collective loss from the removal of everything we'd taken for granted was, or so it seemed, consoled by Nature. This revitalisation of our connections to the Natural world and the more-than-human made everything seem to possess extra-sensory stimulation during this coronavirus spring. Butterfly species, such as the common brimstone, orange-tip, and red admiral, emerged into the warm spring air. The long-suffering Natural environment might finally glimpse recovery and relief from the pain, exploitation, and commodification imposed by humans upon Nature. Or was it merely a fleeting pause from the relentless grind that societies have been mindlessly plundering through in the name of progress and modernisation?

Part Two: History of the Fens

2.0: I explore and discuss the contemporary East Anglian environment of the Fens, the site that I have selected as my research locale. It bears emotional ties to family relationships and childhood memories, and also possesses a history of rapid industrialisation, modernisation, and extraction, revealing the post-natural traumas of human exceptionalism and the dark, uncanny symptoms of the Anthropocene. The Fens pose a question of how we might respond to a site like this in sound?

2.1: The Fens are an area of low-lying land located in the East of England, encompassing parts of Cambridgeshire, Norfolk, Suffolk, and South Lincolnshire. It is the largest plain in the British Isles, covering 300,000 acres of flat and sinking land[7]. The Fens covers an area of nearly three-quarters of a million acres, is cartographically below mean sea level, and is roughly the same size as Surrey[8]. It has been inhabited, contested, and fought over by the Beakers, Celts, Romans, Anglo-Saxons, Vikings, and Normans. Hereward the Wake (1035–1072), an Anglo-Saxon born in the Fens, once battled William the Conqueror's (1028–1087) invading Norman army during the Anglo-Saxon resistance. For centuries, the Fens had a reputation for being grim, disease-ridden (malaria), depressing, cruel, unwelcoming, bleak, and perceived as an empty wasteland, a perfect quagmire[9]. This reputation of the Fens seems to epitomise the representation of the natural world as a separate and cruel realm and a dangerously uncivilised landscape, which is at the root of why the Nature-culture distinction is opposed in my research. It was constantly threatened by flooding due to its topography, as much of the Fens is below mean sea level. Additionally, it was radically altered by a succession of failed drainage schemes that attempted to transform this dismal fen of immense size[10]. The draining of the Fens lies at the heart of much of the incalculable loss of biodiversity that has occurred in the area for many centuries. It embodies a worldview of modernisation and progress linked to Western post-

[7] *Britain's Sinking Land - Exploring the Fens*, Jim Hargan, accessed November 12, 2020, https://britishheritage.com/travel/britains-sinking-lands-exploring-fens
[8] Rex Sly, *From Punt to Plough*, (Stroud: Sutton Publishing, 2003), 9.
[9] Francis Pryor, *The Fens: Discovering England's Ancient Depths*, (Croydon: Head Of Zeus, 2019), 13.
[10] *Britain's Sinking Land - Exploring the Fens*, Jim Hargan, accessed November 12, 2020, https://britishheritage.com/travel/britains-sinking-lands-exploring-fens

enlightenment thinking, which continues to perceive humans as a conquering army, subduing, mechanising, and exploiting the natural world.

Fig. 1 - The Fens, 2023. Photograph by Simon Scott.

The Fens became separated from mainland Europe at approximately 10,000 BC. After the Ice Age ended approximately 20,000 years ago during the Upper Pleistocene, the land ice began to melt. Over the next thirteen thousand years, the sea level began to increase. Seven thousand years ago, the sea reached its current level, covering an area between the Netherlands and the British east coast. This habitat, now beneath the English Channel, is known as 'Doggerland' and is still being explored today by historians, archaeologists, anthropologists, and other scientists, despite being submerged under the North Sea[11]. In the subsequent epoch, known as the Holocene, it is broadly accepted that, on a global scale, humans began to thrive as a species.

2.2: As humans flourished, the natural world started to experience, Timothy Clarke reveals, "climate change, ocean acidification, effects of overpopulation, deforestation, soil-erosion, overfishing and the general and accelerating degradation of ecosystems"[12]. In 2007, Dutch chemist and meteorologist Paul Crutzen coined the term "'Anthropocene'….the proposed name for a geological epoch in which humans have become a major force in determining the continuing livability of the earth"[13]. It is not a term to be celebrated or viewed as "implying the

[11] Annie Proulx, *Fen, Bog & Swamp*, (London: 4th Estate, 2021), 44.
[12] Timothy Clarke, *Ecocriticism on the edge: The Anthropocene as a Threshold Concept*, 3rd ed, (London: Bloomsbury, 2019), 2.
[13] Anna Tsing, etc al. *Arts of Living on a Damaged planet: Ghosts and Monsters of the Anthropocene*, (Minneapolis: University of Minnesota Press, 2017), G1.

triumph of humans"[14]. An incalculable amount of years of ecological, geological and climatological process are being devastated by humanity. For example, "Scientists have estimated, for instance, that humans move more sediment, sand and rocks annually than rivers, erosion and other nonhuman processes"[15]. The timing of the transition into The Anthropocene is hotly debated, but some argue that this new era began in 1945 with the atomic test at Trinity, while others disagree and assert it commenced with the dawn of the Industrial Revolution in the 19th century. Train travel commenced when James Watt invented the steam engine in 1765, which accelerated perceptions of time and space, rocketing its way through the air and across the landscape. It is also debated that this epoch first began during the previous Holocene epoch, when the first hunter-gatherers of the Pleistocene contributed to the extinction of many species and introduced fauna and flora to new areas far from where they had originally evolved. Perhaps it started with the advent of extensive agriculture, or began, as Lewis and Maslin suggest, with the Orbis Spike in 1610, following Columbus's voyage across the ocean to discover the New World in 1492[16]. This event led to 50 million deaths as the extensive exchange of species between continents was first genuinely felt.

2.3: The Fens environment was once a waterlogged area full of dikes and meres, which provided food and supported traditional trades for its people. Occasionally, islands would emerge from the marshland, such as Ely, the most renowned city in the Fens, famous for its magnificent cathedral, the 'Ship of the Fens,' built in 1083 with profits from the sale of local eels. Eels are currently critically endangered in the British Isles and face significant risks of extinction, as the number of glass eels arriving in Europe has significantly declined by 95%. [17] In 1630, Francis Russell, the Earl of Bedford (1593 – 1641), commissioned a Dutch engineer named Cornelius Vermuyden (1595 - 1677) to convert the Fens into profitable arable land. The Dutchman swiftly employed seven hundred prisoners to carry out the extensive drainage scheme. Unexpectedly, due to inadequate planning by the Crown, the

[14] Anna Tsing, *The Mushroom at the End of the Word: On the Possibility of Life in Capitalist Ruins*, (New Jersey, Princeton University Press, 2015), 19.
[15] Lucas Van Der Velden & Arie Altena, *The Geological Imagination*, (Amsterdam: Sonic Acts Press, 2015), 12.
[16] Simon Lewis & Mark Maslin, *Defining The Anthropocene, Nature* 519 (2015) 174.
[17] "Why the once Common European eel is now Critically Endangered (and what can be done about it)", Helen Scales, accessed July 13th, 2022, https://www.wwt.org.uk/news-and-stories/blog/why-the-once-common-european-eel-is-now-critically-endangered-and-what-can-be-done-about-it/.

drainage led to an unlikely ecological disaster, including habitat destruction, species extinction, and irreversible land subsidence. The shrinking of the peat soil, which relies on water for its composition, began to subside, illustrating the dire consequences of capitalism and post-Enlightenment Western culture, which is grounded in a non-reciprocal relationship with nature[18]. The subordination and dominance of Nature were actively promoted during the utopian reform efforts of the period, and enthusiasm for land reclamation spread widely among international elites. King Charles I recognised that the fertile, nutrient-rich peat soil would be ideal for cultivating crops and enhancing the land's value, ultimately resulting in higher taxes for farmers. Consequently, a large-scale Fens drainage scheme took place during the late Renaissance in 1630, just before the onset of the Enlightenment, which signalled the beginnings of industrialisation and is also known as The Age of Reason (1685-1815). Acts of human superiority, commonly referred to as 'human exceptionalism', stem from a divisive belief system that regards everything on earth as existing for the benefit of the human species.

[18] Naomi Klein, *This Changes Everything*, (London: Penguin, 2015), 178.

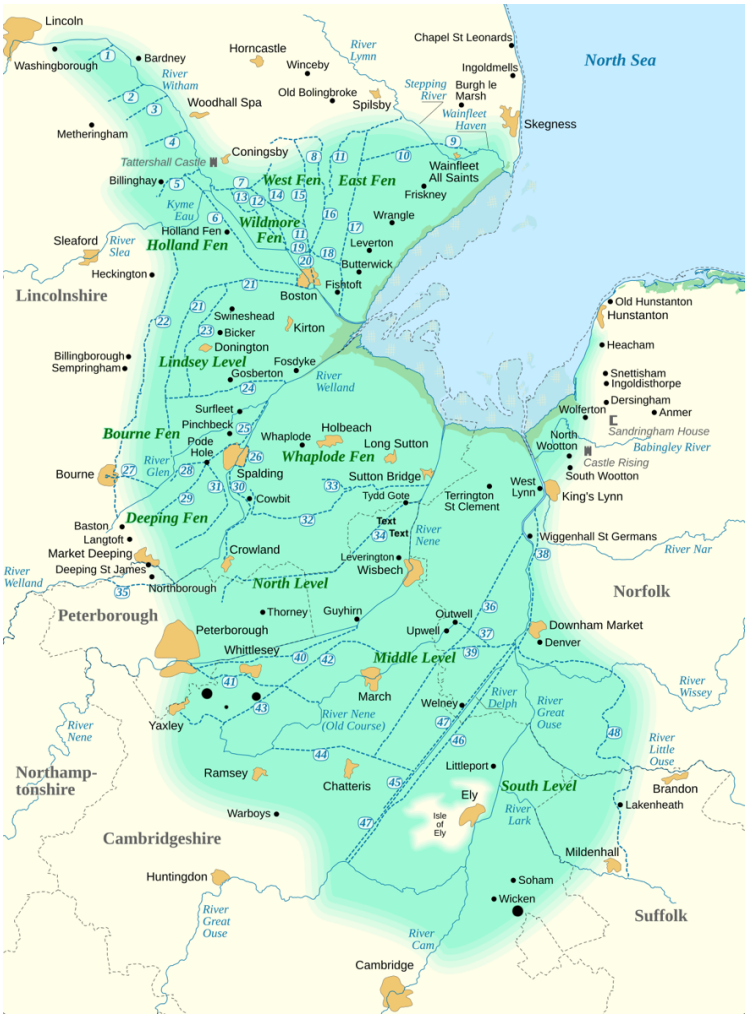

Fig.2: The green area highlights the region of the Fens and includes several locations within the Great Fen Project (Black dots locate Holme Fen, Woodwalton Fen, New Decoy and Wicken Fen where my field recordings occurred). Image Wikipedia.

2.4: Since industrialisation began around 1800, humans have increased CO_2 emissions, raising the Earth's atmospheric temperature and causing climate change. The natural history of the Earth is estimated to be 4.54 billion years old[19]. It is being radically and catastrophically altered by human activity, as emissions of carbon dioxide and methane warm the Earth's atmosphere with dire consequences. Today, in the twenty-first century, we are heading toward a sixth mass extinction due to profound climate change, and we are struggling to acknowledge environmental issues that are truly planetary in scale. Fossil fuels are the long-decayed remains

[19] Andrew Dobson, *Environmental Politics: A Very Short Introduction*, (Oxford, Oxford University Press, 2016), 6.

of deceased lifeforms, and the significant use of burning fossil fuels such as coal, whose use in human history dates back as far as 970-1279, produces toxins released into the ecosystem[20]. These by-products eventually make their way into the oceans, where they are absorbed by krill and plankton, then by fish, and then by us[21]. "The effects of climate change on us as a species are hugely complex. In this vastness, the knotty, messy complexities that lie within rarely have neat solutions either"[22]. This metaphorical dark and vast shadow of future uncertainty currently looming and gradually advancing towards us is what Albrecht describes as "eco-anxiety…a generalized worry about the future [which] is now commonplace"[23]. As a phrase, it positions climate change as something which is still approaching when in fact it is already here.

A lack of proximity to climate change creates ambiguity, as Norwegian scientist Per Espen Stoknes comments, "The years given—2050 and beyond—seem very far away"[24]. Therefore, climate change is perceived as too distant, ambiguous, and unfathomably large due to its vast temporalities, making it ungraspable for many people. In the book *Slow Violence* (2011) Rob Nixon explains that the delayed destruction of climate change is "a violence that occurs gradually and out of sight…a violence of delayed destruction that is dispersed across time and space… slowly unfolding"[25]. It is elusive, and its abstract characteristics make it easy for many individuals, particularly those not directly affected like displaced communities suffering from habitat loss, rising sea levels, and deforestation, to overlook and ignore the damage caused by climate change. It is simpler to tune it out than engage with something that demands imagination. As writer Rebecca Solnit remarks, "Climate change is neither real, vivid, visceral,

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[20] Will Steffen, Paul J. Crutzen, & John R. McNeill, "The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature", *AMBIO: A Journal of the Human Environment* 36, 8, (2007), P.261, https://bioone.org/journals/ambio-a-journal-of-the-human-environment/volume-36/issue-8/0044-7447(2007)36%5b614%3aTAAHNO%5d2.0.CO%3b2/The-Anthropocene--Are-Humans-Now-Overwhelming-the-Great-Forces/10.1579/0044-7447(2007)36[614:TAAHNO]2.0.CO;2.short.

[21] Naomi Klein, *This Changes Everything*, (London: Penguin, 2014), 176.

[22] Victoria Pratt, *Stories of Solastalgia*, (Chadwell Heath: Lawrence Wishart, 2024), 19.

[23] Glenn Albrecht, *Earth Emotions: New Words for a New World*, (New York: Cornell University Press, 2024), 76-77.

[24] Per Espen Stoknes, *What We Think about When We Try Not to Think about Global Warming: Toward a New Psychology of Climate Action*. (Vermont: Chelsea Green, 2015), 40.

[25] Rob Nixon, *Slow Violence and the Environmentalism of the Poor,* (Cambridge: Harvard University Press, 2013), 2.

or even visible to most of us".[26] However, as you will discover in the following chapters, witnessing sound events, such as storms and flooding, reveals that the Fens as a site of immediate encounters and confrontations with the sonorous narratives of the ecological crisis.

2.5: The Fens serves as a site of creative inspiration. It was the environmental backdrop for British author Graham Swift's 1983 novel *Waterland*. In the introduction to the 25th anniversary edition published in 2008, Swift noted, "If I were writing now, I'd no doubt want to highlight the microcosmic relevance to climate change – the Fens as an emblem of planetary fragility, planetary conservation"[27]. The contemporary East Anglian Fens is a site of continual and increasing 'fragility'. Greenhouse gases, carbon dioxide and methane, both stored in the peat soil of the Fens, have been released into the atmosphere, as peatlands are a natural carbon dioxide sink[28]. Both contribute to increasing global warming by trapping heat from the sun in the Earth's atmosphere. The conversion of wetlands to cropland has increased methane and CO2 emissions, and we are now locked into a global economy that seeks to convert CO2 into money as quickly as possible[29]. As someone who grew up on the outskirts of this region and has returned to live and compose here in this man-made environment once again, I concur with Swift that the Fens serve as a metaphorical microcosm of a larger problem of climate change[30].

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[26] Rebecca Solnit, *Hope In The Dark*, 2nd ed. (Edinburgh: Canongate, 2016), 130.
[27] Graham Swift, *Waterland*, 25th ed, (London: Picador, 2008) ix.
[28] "*Peat project hopes to save 4,000 tonnes of carbon".* Louise Parry, accessed June 16th, 2024, https://www.bbc.co.uk/news/articles/cv22de12wpxo?xtor=AL-72-%5Bpartner%5D-%5Bbbc.news.twitter%5D-%5Bheadline%5D-%5Bnews%5D-%5Bbizdev%5D-%5Bisapi%5D&at_ptr_name=twitter&at_link_id=C086DF12-16C4-11EF-9F75-8FF9406BB8F1&at_campaign=Social_Flow&at_link_origin=BBCNews&at_link_type=web_link&at_campaign_type=owned&at_medium=social&at_bbc_team=editorial&at_format=link.
[29] Annie Proulx, *Fen Bog & Swamp*, (London: 4th Estate, 2021), 66.
[30] "*Emergency Exit*", Simon Scott, accessed March 3rd, 2020, https://simonscott.bandcamp.com/album/emergency-exit.

Part Three – The Origins of Field Recording

3.0: In this section, I provide a brief overview of field recording, as this exploratory, reflexive, and heterogeneous practice serves as my novel method of inquiry. I also trace the evolution and development of recording media technology, which began in the mid-19th century and has continued to evolve up to the present day. This informs my methodology for the works I have composed for this research project, as well as those I publish and release commercially.

I commence by examining the origins of media technology and subsequently explore how this practice began to challenge the limitations of modern Western music, expanding beyond the objective documentation of sounds from the natural world that were deemed distinctly musical, characterised by clear harmonic or rhythmic features, such as birdsong[31].

3.1: With the arrival of recording and playback devices, initially through the phonograph and, more recently, with digital recording devices, field recording became possible. The practice is defined as a human process of recording sonic events outside the confines of the traditional recording studio using media technology. Defining the 'field' is often just as important as how the recording itself has been accomplished[32]. Throughout this research, I define the field (the Fens) as a site where this flexible and comprehensive mobile practice fostering a sense of "we" instead of objectifying "them" and "they," remnants of human exceptionalism prevalent in post-Enlightenment Western thought. Recording technology and media offer listeners tools that enable us to observe the natural world holistically and deepen our attention to it, effectively grounding us in the present and entangling us within the natural world. Field recording can be creatively explored as a potential portal for amplifying the situated perception of both the micro and macroscopic levels of damage caused by global climate decline.

3.2: The evolution of recording media technology loosely began circa 1860 and has progressed through disciplines such as ethnography and anthropology into a contemporary practice that often documents, narrates, and mediates the relationship between humans and Nature. Technological advancements now enable recordists to utilise portable and affordable professional-quality equipment to creatively document places and spaces from around the

[31] Johnathan Gilmurray, *Environmental Sound Artists*, (New York: Oxford University Press, 2016), xxi.
[32] Cathy Lane & Angus Carlyle, *In the field: The art of Field Recording*, (Axminster: Uniformbooks, 2013), 9.

world. “The first actual mechanical reproduction of recorded sound took place in 1860, when the Parisian printer Édouard-Léon Scott de Martinville invented the phonautograph”[33]. This pioneering sound recording was originally meant to be read rather than listened to, as de Martinville did not believe that people would actually want to hear the recordings he made.

> “Recording of data was done by connecting the moving part of the stylus to the piece of moving paper (located on a moving drum) which was coated in thin layer of black soot [and] data that was made in this way gave Scott insight into look of human speech that was unavailable until that time. Scott de Martinville never intended to produce machine that would playback the recorded sound data”[34].

Almost two decades later, American inventor Thomas Edison was credited with creating the ‘phonograph’ alongside his often-uncredited African American assistant, Lewis H. Latimer, who played a key role in both Alexander Graham Bell’s development and patenting of the telephone and Edison’s innovations[35]. These recording and sound reproduction devices allowed field recording, or phonography, to come into being as an emblem for a dramatic shift in ideas regarding sound, aurality, and reality from that time[36]. The wax cylinders proved successful in capturing sound, which was no longer fixed geographically or temporally. Sound could be removed from its source, such as environmental sounds, as sonorous materials from one location could be reproduced in another place at a different time, a process that became known as ‘Acousmatic’[37]. The phonograph provided the removal of visual sources, and this important dislocation of sounds from their point of origin created new opportunities for exploring the possibilities of acoustic repeatability beyond musical notation.

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[33] Bernie Krause, *The Great Animal Orchestra: Finding the Origins of Music in the World’s Wild Places*, (London: Profile Books, 2012), 32.
[34] *Inventors of Sound Recording Devices: édouard-léon scott - inventor of the phonautograph*, accessed January 2nd, 2025, https://www.soundrecordinghistory.net/inventors-of-sound-recording-devices/edouard-leon-scott/.
[35] Mark Peter Wright, *Listening After Nature:*, (New York: Oxford University Press, 2022), 13.
[36] Douglas Kahn, *Noise, Water, Meat: A History of Sound in the Arts*, (Cambridge, MIT Press 1999), 70.
[37] Pierre Schaeffer, “Acousmatics”, in *Audio Culture: Readings In Modern Music*, ed. Christoph Cox & Daniel Warner, (New York: Continuum, 2007), 77.

3.3: In 1889, a German broadcaster, naturalist, and sound recordist, Ludwig Koch, became the first person to capture an animal vocalisation, possibly marking the world's first field recording. He used one of Edison's wax cylinders to record a White Humped Sharma bird when he was just eight years old. Koch subsequently recorded sonorities from the natural world throughout his life, and in 1936 and 1937, with ornithologist Edward Max Nicholson (1904-2003), they created the early multi-media projects *Songs of Wild Birds* and *More Songs of Wild Birds*. Koch had created a revolutionary concept – a sound book of British birds consisting of a box set of 10-inch 78rpm gramophone records accompanied by a text relating to the objects of the recordings and illustrations[38]. It sold widely in Britain, an idea far in advance of its time[39]. The radio series The Naturalist started in 1946, a precursor to the internationally renowned BBC Natural History Unit, and Koch's "recording of the territorial call of the curlew was chosen as the signature tune of the series "because it conjured up the atmosphere – the very spirit of wild places"[40]. However, this recording serves as a reminder of the bird's objectionable capture, exploitation, and estrangement from its sonic environment. The profitability of animal vocalisations revealed a proclivity for recordings of the natural world during the early and mid-twentieth century. Koch, in his book *Memoirs of a Birdman* (1956), revealed detailed written accounts, anecdotes, reflections and regrets about some of his many wildlife recordings during his career. He explains that the objective was to capture the organisms in their natural habitats whilst removing the context of his human involvement. These "location recordings", as Seán Street describes them, have a degree of 'production' about them as Koch sought, wherever possible in the field, to isolate the bird's voice from other extraneous sounds[41]. This dualist demarcation in field recording, "the bad taste of resource extraction that clings to the technological capture and export", is what I deem to be representative of the Nature-culture dichotomy tied to Western thinking and human exceptionalism[42]. Thus, the field, comments sound artist Mark Peter Wright, "is tethered to colonialism, industrialisation, and the great

[38] Cathy Lane & Angus Carlyle, *In the field*, (Axminster: Uniformbooks, 2013), 10.
[39] Sean Street, *The Poetry of Radio: The Colours of Sound*, (Abingdon: Routledge, 2012), 100.
[40] "*Ludwig Koch - Master of Nature's Music"* John Burton, accessed 4th January, 2025, https://www.wildlife-sound.org/resources/articles?view=article&id=181:ludwig-koch-master-of-nature-s-music&catid=44:articles.
[41] Sean Street, *The Poetry of Radio*, (Abingdon: Routledge, 2012), 100-101.
[42] Holly Watkins, *Musical Vitalities: Ventures in a Biotic Aesthetics of Music*, (Chicago: Univerity Of Chicago Press, 2018), 147.

Acceleration Period"[43]. As philosopher Michel Serres claims, "Mastery and possession: these are the master words launched by Descartes at the dawn of the scientific and technological age, when our Western reason went off to conquer the universe"[44]. Removing animal vocalisations from their natural environments is paradoxical in the intentionality of erasing all traces of human extraction and curatorial presence. The organisms are embedded within the interactive space and background noise of their locations, and the disentanglement of sounds that accompany each recording is embedded with anthropocentric extraction. The conception of noise is, therefore, important in relation to field recording. In defining noise, Christoph Cox comments, when referring to Serres's book *Genesis* (1995):

> "We tend to think of noise as something secondary or derivative… a nuisance that we wish to eliminate and that we believe can in principle be eliminated. Information theory lends scientific support to this everyday supposition, taking noise to be what interferes with the transmission of messages and signals….Yet before there were creatures to exchange signals there was noise: the crackling of cosmic radiation, the rush of solar wind, the roar of the sea, etc. As Serres puts it, noise is the background hubbub of life, the ceaseless sonic flux: the hum of fluorescent lights, the rustling of leaves or fabric, the sound of traffic, radio static – indeed all of these combined"[45].

This exploration of signal and noise, of wanted and unwanted sound, and the immaterial of recording technologies continues throughout this section, as it features strongly in the analysis of the held ideologies of the artists, which I subsequently discuss in section two of the following chapter. It is an important factor in my research concept, as my recording methodology, which pertains to the line of enquiry of my research question and includes the compositions created for this thesis, is intentionally inclusive of *all* background 'noise' and unwanted sounds.

Koch's recordings no doubt helped the public appreciate the sounds of wildlife, and the sonorous beauty of the natural world is worthy of recording. The British Library's 'Sound and Vision blog' comments that Koch's original recordings were a major source of inspiration for the French composer Olivier Messiaen, whose interest in birdsong is well known, as he

[43] Mark Peter Wright, *Listening After Nature*, (New York: Bloomsbury, 2022), 12.
[44] Michel Serres, *The Natural Contract*, (Ann Arbour: University of Michigan,1995), 31-32.
[45] Christoph Cox, *Sonic Flux: Sound, Art and Metaphysics*, (Chicago: University of Chicago Press, 2018), 114-115.

musically notated birdsong and other natural sound phenomena[46]. However, ironically, "noise is part of a mechanical chain of reproduction"[47]. Koch's use of Edison's wax cylinders, heavy tape machines and other media technology available to him at the time reveals the inauthenticity and insincerity of modern communication[48]. When working for the British Broadcasting Corporation as its wildlife sound recordist, he would often complain that the bulky mobile recording equipment was a challenge to transport as it was too heavy. Moving far and wide to locations that most people can't access, Koch, dedicated to objective sound capture, would often risk his life climbing down cliff edges to capture the vocalisations of organisms. Koch would introduce the recordings with his voice to give context and mood to the broadcast sonorities, thus revealing his presence through vocal narratives, as did his successor Eric Simms, who replaced Koch at the BBC when he retired in 1951[49]. Simms confirmed the burden of the field recordist during its early decades was, he comments, "lugging the cumbersome equipment and cables…weighing around 190lb"[50].

Field recording evolved from recording traditions, such as anthropological and ethnographic documentation of both human and non-human animals. It expanded traditional methods of anthropology and musicology by creating an archival capture and conservation of sonorous environments. 'Ethnomusicology', the contextual study of music created by cultures and societies, expanded the collection of data from traditional music notation to sound recording events, as well as the documentation and preservation of everyday (folk) songs and languages. In particular, American field recordists John and Alan Lomax, who both travelled through the states of Michigan and Wisconsin in the 1930s, recording traditional music from the regions. This early era signifies a moment when the practice of contemporary field recording commenced. Foley, wildlife sound, and bioacoustics are some of the subsequent approaches that support the gradual shifts towards the modern concept of field recording.

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[46] *Messiaen and the songs of wild birds*, Delphine Evans, accessed Sept 13th, 2022, https://blogs.bl.uk/sound-and-vision/2016/12/messiaen-and-the-songs-of-wild-birds.html.

[47] Mark Peter Wright, *Listening After Nature*, (New York: Bloomsbury, 2022), 35.
[48] Jacob Smith, *Eco-Sonic Media*, (Oakland: University Of California, 2015), 170.
[49] Ibid.
[50] *Eric Simms: Ornithologist who presented 'The Countryside Programme' on the BBC for nearly 40 year,* Peter Marren, accessed February 20th, 2021, https://www.independent.co.uk/news/obituaries/eric-simms-ornithologist-who-presented-the-countryside-programme-on-the-bbc-for-nearly-40-years-1700212.html.

3.4: The Italian composer Ottorino Respighi was, according to Johnathan Gilmurray in the introduction to the book *Environmental Sound Artists*, the first to incorporate a field recording of a nightingale into his piece, *Pini di Roma*, which translates to *Pines of Rome*, in 1924[51]. In this four-part symphonic composition, the recording of the nightingale features in the third part and is played from a phonograph alongside the softer orchestration during the outro section. This innovative compositional idea incorporates recorded animal sounds into a symphonic string orchestra, a technique that is widely embraced today. In contrast to Respighi, in 1930, Walter Ruttman composed *Wochenende* by creating an impressionistic montage of sound events and voices using the optical head of a film camera, a method that he termed 'blind cinema'[52]. The composition creatively depicts Berlin's diverse environment over a weekend and has anticipated much contemporary experimentation with sound. The piece is abstract, surreal, abrasive, and filled with abruptly edited field recordings, that might otherwise be dismissed as 'noise'. Despite the fragmented recordings, nothing feels estranged or alienated from its background sounds, and it is an early example of a highly skilled and fluidly composed collage of field recordings. This relates specifically to my central concept of this research, the 'multiphonic', as described and examined in Part Two of the following chapter. It is also one of the first compositions that uses field recordings as compositional timbres, largely without the addition of any spoken human narrative and the compositional focus lies on linking the sonic environment and the composer's creative imagination, rather than a singular emphasis on one species or a specific dominant sound.

3.5: In 1944, fourteen years after Ruttman's composition was released, an Egyptian ethnomusicologist and composer named Halim El Dabh (1921-2017) premiered *Expressions of Zaar* (*Ta'abir al-Zaar*) in a gallery in North Africa. This piece features electronically manipulated tape music (field recordings) with chanting women set against the sonorous backdrop of urban Cairo. To capture everyday sounds, Dabh used a heavy yet portable magnetic wire recorder, the precursor to the tape recorder, which he borrowed from Middle East Radio in Cairo[53]. He included recorded environmental sounds of the city, such as transportation and indistinct voices, and he has increasingly gained recognition for predating

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[51] Johnathan Gilmurray, *Environmental Sound Artists: In Their Own Words*, (New York: Oxford University Press, 2016), xxii.
[52] Seth Kim-Cohen, *In the Blink of an Ear: Toward a Non-Cochlear Sonic Art*, (New York: Continuum, 2009), 178.
[53] "*Halim El Dabh: An Alternative Genealogy of Musique Concète"*, Fair Bradley, accessed 18th January, 2025, https://www.ibraaz.org/usr/library/documents/main/halim-el-dabh.pdf.

the techniques that French studio engineer and announcer Pierre Schaeffer would later formalise as musique concrète[54], a term I unpack in the following section. His composition, reissued in 2000 on CD, bears many similarities to Schaeffer's 1948 work *Cinq Études de Bruits* (*Five Studies of Noises*) and may even have influenced the composer, despite its deep roots in Egyptian culture. Dabh employs basic editing and sound processing techniques, such as tape splicing, pitch shifting, and reversing, to create an audio montage rich in urban sounds. Unfortunately, his works are only discussed in experimental social milieux and many people are unaware of his significant contributions to the field. It's a shame that his works are largely forgotten and unheard[55]. As Christophe Cox and Daniel Warner claim, Schaeffer's work was impactful outside of classical music, for example, in early tape experiments of Les Paul, the studio manipulations of Beatles producer George Martin, the concrete pranks of Frank Zappa, the live tape-loop systems of Terry Riley and the sampling and turntablism if HipHop DJs from Grandmaster Flash to Q-Bert[56]. 'Sampling' is also part of my compositional process, and I use samples of geese vocalisations and rainfall in a forthcoming composition later on in this research project.

3.6: In 1942 Schaeffer worked for the French broadcasting company Radiodiffusion Française (RDF) and established his Studio d'Essai ("Experimental Studio"). In 1948, he created musique concrète ("concrete music" in French) and practised manipulating sounds, which he recorded on shellac discs and phonographic equipment to both playback and record. Schaeffer, recording everyday sounds from the Parisian environment, such as train whistles, spinning tops, pots and pans, canal boats, percussion instruments, and a lone piano[57]. Processing and manipulation techniques included "cutting and splicing magnetic audio tape." Though this was essentially 'field recording'—the act of recording outside the confines of a traditional recording studio—the compositions (Études) capture their local urban environments and manipulate the field recordings. Both El Dabh and Schaeffer are embedded within the recorded zones of entanglement they capture and subsequently compose. They both chose simple post-production

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[54] "*The Cosmic craft of Egyptian-American composer Halim El-Dadh"*, Christina Hazboun, accessed December 26th, 2024, https://www.newarab.com/features/cosmic-craft-egyptian-american-composer-halim-el-dabh.
[55] Ibid.
[56] Christophe Cox & Daniel Warner, *Audio Culture: Readings in Modern Music*, (New York: Continuum, 2007), 5.
[57] *Abstract Concrete: Francisco López and the ontology of sound*, Christophe Cox, accessed March 2nd, 2020, https://www.cabinetmagazine.org/issues/2/cox.php.

techniques, such as reversing sounds, to create their music due to the limitations of the technology available to them. Compared to today, when an artist-composer can easily manipulate field recordings with computer software that enhances the sonorous characteristics and narratives captured within each recording, both Schaeffer and El Dabh endured long hours of audio processing work. The similarities between Dabh and Schaeffer's music include the use of limited media technology, recording both human-produced sounds, such as voices, and urban environmental sounds. These elements provide new musical timbres to create with and represent the culture of their everyday lives. For Schaeffer, the possibilities of composing with newly recorded sounds—such as varied combinations of timbres, rhythms, instruments, voices, and harmonies—became virtually infinite.

Schaeffer was using sounds to isolate them from their original context and examine a sound "for its innate characteristics outside its normal time continuum [and] asserted that the abstraction of such events from natural sound sources to provide components for the regeneration of musical material"[58]. In concrète music, a complex sound cannot be disentangled from its connected context within the sound spectrum. It is part of its quality; nothing can be superimposed, divided, or transposed. The development of musique concrète was significant as the regeneration of a sound grew Schaeffer's interest in the creative possibilities of sonorous materials being perceived as "sound-in itself, not in sound's source, nor its semiotic capabilities, nor the implications of its status as the result of colliding material in the world"[59]. The idea, he called *reduced listening,* was to free the macro associations of origins of a sound. It allowed for micro sounds which he had recorded from macro environments in Paris, such as the railway station, to become independent compositional timbres, similar to sampling sounds used widely today. As Gilmurray comments;

> Schaeffer "adopted the Pythagorean term 'acousmatic' – meaning sounds whose source is unseen – to describe these sounds, and he named the resultant listening experience *reduced listening,* meaning listening with one's focus reduced to the sound's inherent sonic qualities"[60].

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[58] Peter Manning, *Electronic & Computer Music*, (Oxford: Oxford University press, 1985), 23.
[59] Seth Kim-Cohen, *In the Blink of an Ear: Toward A Non Cochlear Sonic Art,* (New York: Continuum, 2009), 126.
[60] Jonathan Gilmurray, *Environmental Sound artists,* (New York: Oxford University Press, 2016), xxii.

Treating the recorded material as original sonorous timbres for composition and live performance opened up new creative possibilities and became a significant counter to the strict regimes of serialism, a prominent compositional technique in the twentieth century, also known as the 'twelve-tone method'. Schaeffer also infused playfulness into his works, and the dynamic arrangements unveil expansive ambient atmospheres that shift into sharp sound attacks decaying gradually. The potential of recording reproduction technologies explored by Schaeffer and the GRMC continues to expand today. Musique Concrète's significant influence on practitioners and Schaeffer's theoretical writings on sound and technology, including his 1966 book, *Traité des Objets Musicaux (Treatise on Musical Objects)*, have inspired a loosely defined movement known as sound-art"[61].

3.7: Technological advancements enabled high-resolution sound-capture to undergo repeated examination through subsequent observation and thorough analysis of the audio. 'Amertapes', employed by the military to capture audio of both the human voice and combat during the war in the South Pacific in 1943, are a film-type format featuring sprocket holes and a series of sound grooves running down the centre film[62]. The recordings of the Marine Corps Combat Recordings were then transferred to acetate discs and subsequently digitised for archival purposes, thus allowing a sound archive to exist. After the Second World War, the emergence from magnetic wire recorder to tape-recording machines ensured that artists and the military could access discrete and portable recording technologies. In 1951, Schaeffer, alongside composer Pierre Henry, established the studio 'Groupe de Recherche de Musique Concrète' (known as GRM or GMRC), specifically designed for electroacoustic music. They emphasised that listeners should focus on the sonic qualities of the sounds themselves and treat the recorded material as sonorous texts.

Composer Eliane Radigue, originally from Nice in the south of France, served as the assistant to Schaeffer and Henry until 1957 and she worked in Paris to assist Pierre Henry at Studio d'Essai ("Experimental Studio") in 1967. She subsequently began releasing her own tape manipulation-based compositions using feedback and, later in the 1970s, with the ARP 2500 synthesiser. Decades later, due to the patriarchy inherent in the institutions of radio and

[61] Andy Hamilton, *Music & Aesthetics*, (London: Continuum, 2007), 44.
[62] *Earwitness to History: the Marine Corps Combat Recordings*, Karen Fishman, accessed May 22nd 2022, https://blogs.loc.gov/now-see-hear/2014/11/earwitness-to-history-the-marine-corps-combat-recordings/.

broadcasting, her feedback pieces (1967-1970), such as *Jouet Électronique,* featuring field recordings from the French city of Nice, were finally recognised as significant compositions. She comments, "Musique concrète was not really recognised yet, on top of that the 1950s was a time of outright chauvinists"[63].

3.8: In 1970, French composer Luc Ferrari, a founding member of GRMC, released *Presque Rien No.1, Le lever du jour au bord de la mer* (translated as *Almost Nothing No.1, Daybreak at the Seashore*), which focuses entirely on sounds recorded at dawn in a Dalmatian fishing village. Ferrari was directly inspired by American artist and composer John Cage's 1957 essay, *Experimental Music*, which, to paraphrase Cage, encouraged composers to find ways to allow sounds to exist on their own rather than serving as vehicles for constructed theories or expressions of human emotion. Ferrari attempted to do almost nothing, such as manipulate the sounds, reducing the possibilities for montage upon the completion of the long durational recording, except for editing out parts he didn't wish to include in this twenty-one-minute composition. It challenges conventional notions of composition, and Ferrari's approach was markedly different to the work of his GRM contemporaries because it refused to transform *concréte* materials. It was somewhat of an anathema to *Groupe de Recherches Musicales*, met with indignation and alterity upon its release.

As the title *Presque Rien* suggests, the site-specific recording unfolds within a given time and place (the subtitle helps locate the work), with Ferrari's self-reflexive narrative style of field recording which challenges the assumption that field recordings reveal authentic archival documents of sound, such as the recorded animal vocalisations by Koch. The composition offers a creative representation of an environment within his situated listening, mediated through his media technology. Ferrari then assembled fragments of his daily recordings into a sonic tapestry woven from the recurring rhythms of daily life[64]. One location is edited down to a long-form composition lasting approximately twenty-one minutes, and his recordings capture the overall environment. Ferrari is guiding the listener, revealing his subjective experiences of perceiving the site and transmitting this experience. The field

[63] Julia Eckhardt, *Eliane Radique: Intermediary Spaces*, 2nd ed. (Brussels: Umland Editions, 2024), 68.
[64] *How Electroacoustic Pioneer Luc Ferrari Captured the Social Life of Sound,* Nathan Geyere, accessed December 12th, 2022, https://www.frieze.com/article/how-electroacoustic-pioneer-luc-ferrari-captured-social-life-sound.

recordings are subtly and masterfully edited to provide a seamless and creative representation of a site.

This composition relates to my emergent practice framework, as it reveals the acceptance of sonic crowdedness, which capturing an environment over a long duration of time will disclose. It encompasses multiple temporalities and various species, some nonhuman and some anthropogenic, entangled as a field recording. Assemblages of sound within that specific site also correlate to my practice as research. Each sonority holds equal importance in the sound field it gathers, due to the absence of a central focus or leading sound event. All sounds emanate from Ferrari's sonic environment, and with his microphone, he serves as an intermediary between site and sound. It is an important composition in the history of contemporary field recording as it explicitly moves field recording away from the objective capture of a specific sound, into gathering the subjective experience of the artist recording in an environment, and from the timbral manipulations of Al-Dabh, Schaeffer and others. My practice is inspired by this work and I recognise this work as 'Multiphonic', which I shall begin to reveal in the next section (Methodology) and fully explore in chapter two. It informs my critical practice-based framework employed to delineate my research aims.

3.9: In this chapter section, I have examined the age of phonography, the development of media technology and the historical contexts that pertain to the practice of field recording. It is also evident that I have not yet included the work of R. Murray Schafer or the World Soundscape Project, whose contributions in Vancouver were significant to the lineage of audio ecology researches[65]. In the subsequent chapter, I discuss this notable influence, alongside another important composer from Vancouver, Hildegard Westerkamp. *Kits Beach Soundwalk*, her autotopographic sound work features contrasting field recordings, including in-the-moment orated thoughts and associations gathered while recording in the field, and explicit manipulations of sound. I dedicate a section in chapter two to this particular pioneering and inspiring work as *KBS,* which also informs and inspires the conceptual framework employed for this practice-based site-specific research.

[65] Andy Hamilton, *Aesthetics and Music*, (London: Routledge, 2007), 44.

Part Four: Extinction

4.0: In this section of the chapter, I explore species extinction and the impact of anthropocentric activities concerning the symbiotic entanglements of both human and more-than-human lives. The composition of this chapter, examined in the following section, engages with the issues of species extinction, deadly viruses, and habitat loss, and it relates pertinently to the matters discussed below.

4.1: Elizabeth Kolbert comments, "If extinction is a morbid topic, mass extinction is, well, massively so"[66]. However, extinction is nothing new; paradoxically, it is not unnatural, as 99.9% of all species that have ever lived in the history of this planet are now extinct. The Anthropos, meaning 'human' beings, are now interconnected with everything, including the Earth's natural systems. Through the assumption of exceptionalism, which dates back to the 1700s, and Cartesian reductionism which influenced Western European post-Enlightenment thought, humans are now precariously determining the ongoing livability of the Earth. In just five decades, the number of living humans on Earth has doubled from approximately three and a half billion to over seven billion worldwide. As a result of this population explosion, we've created a world determined through our own choices. These choices include extraction, such as burning fossil fuels to dangerous levels in which the carbon released and stored in the Earth's atmosphere, leading to biodiversity loss, ocean acidification, and driving other organisms into extinction. The amount of carbon released into the atmosphere has now far exceeded safe levels for the well-being of the planet. Anthropocentrism has led biologists to suggest that a sixth mass extinction may be underway, given the known species losses over the past few centuries and millennia[67]. Author David Quammen asks the reader in *The Song of the Dodo* whether they have noticed that "our voracious consumption of resources, and our large-scale transformations of landscape, are causing a cataclysm of extinctions that bodes to be the worst such event since the fall of the dinosaurs"[68]. As Timothy Clarke asserts, "We are all culpable and implicated in climate change and the catastrophic environmental problems that are truly planetary in scale"[69].

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[66] Elizabeth Kolbert. *Living in the Anthropocene: Earth in the Age of Humans*, (Washington: Smithsonian Books, 2014), 3.
[67] Barnosky, Anthony, et al. "*Has the Earth's sixth mass extinction already arrived?*." *Nature* vol. 471,7336 (2011): 51-7. https://www.nature.com/articles/nature09678.
[68] David Quammen, *The Song of the Dodo,* (London: Simon & Schuster, 1997), 12.
[69] Timothy Clark, *Ecocriticism On the Edge: The Anthropocene as a Threshold Concept*, (London: Bloomsbury, 2015), 2.

In James Hansen's book, *Storms of My Grandchildren* (2009), he considers that the acceleration of many species becoming extinct is linked to human activity. He explains that the Anthropos will "deforest large regions, replace biologically diverse grasslands and forests with monoculture crops, and introduce foreign, invasive animals and plant species"[70]. This has led to the cause of "enzootic infections" and diseases that can spread to humans, such as Ebola, HIV, Influenza, and Coronaviruses that cause severe acute respiratory syndrome (SARS-CoV-2)[71].

4.2: In 2013, in his book *Spillover: Animal Infections and the Next Human Pandemic*, David Quammen predicted the outbreak of the highly contagious and deadly Coronavirus (Covid-19) in December 2019. "COVID-19' was the official name given by the World Health Organization to a disease caused by a newly identified coronavirus. It spread rapidly, leading to a global pandemic marked by social distancing and government-enforced lockdowns implemented in many regions, including the British Isles. A vaccine was developed and distributed to the global population, yet many lives were lost due to the unprecedented scale of the pandemic. It continues in 2024 to cause fatalities daily as it spreads without a medical cure. This disease has caused over 232,000 coronavirus deaths in the UK alone, more than 704 million diagnosed cases worldwide, and has led to over 7 million global fatalities. Coronaviruses highlight a broader set of problematic relationships that we're reminded of, not only by Covid-19 but also by climate change and environmental devastation. Quammen coined the term "*zoonosis,"* referring to an animal infection transmissible to humans[72]. There are potentially devastating impacts that these viruses could have on human beings worldwide as we invade tropical forests and other wild environments which harbour so many species of animals and plants – and within those creatures, so many unknown viruses[73]. Quammen also predicts that more deadly viruses will emerge when we cut down trees, dig up plants, and kill and eat animals. The interaction of humans and non-humans is a multi-species entanglement with deadly consequences. A number of researchers today believe that it is actually humanity's destruction of biodiversity

[70] James Hansen, *Storms of my Grandchildren* (New York, Bloomsbury, 2009), 144.
[71] Dewald Schoeman & Burtram C. Fielding, *Coronavirus envelope protein: current knowledge*. Virology Journal 16, (2019). 69 http://www.gsartor.org/science/covid/Coronavirus%20envelope%20protein%20current.pdf.
[72] David Quammen, *Spillover; Animal Infections and the Next human Pandemic'*, (New York: Vintage, 2013), 1.
[73] David Quammen, *We Need Our Tropical Rainforests Than Ever*, accessed November 1st, 2024, https://foe.org/blog/we-need-our-tropical-forests-more-than-ever/.

that creates the conditions for new viruses and diseases such as Covid-19[74]. Consequently, concerns about the wider environment, including habitat and biodiversity loss, escalate due to the effects of anthropogenic activities such as globalisation, mining, road construction, logging, and hunting.

4.3: It is a devastating example of the Nature-culture dichotomy, the anthropocentric belief system that humans are superior to and separate from the natural world, serving as a poignant reminder of the lack of mutual consent between man, soil, plants, and fauna. The Fens once-diverse ecology was also home to roaming wild wolves, bears, bison, sabre-toothed tigers and even the occasional hippopotamus[75]. The Fens today bear witness to being an anthropogenic and objectified environment driven by progress, extraction and an unecological perspective of hierarchical domination. Extinction also isn't solely an issue concerning the appealing larger animals and species that humans enjoy in the countryside. The rate of insect extinction is eight times higher than that of birds and reptiles[76]. Scientists do not know the exact reason behind the decline of this dominant form of animal biomass is so high. Bee populations are also alarmingly declining and the Fens, known as 'the breadbasket of England', has patterns of falling pollinator numbers, and bee activity is vital for food production.

The catastrophic drainage schemes created a feedback loop of flooding and continual subsidence, causing biodiversity loss and the extinction of several indigenous flora and fauna, such as the common crane, the pool frog, and both the swallowtail and the large copper butterfly. The common cuckoo is a migratory bird that visits the Fens every springtime, and the International Union for Conservation of Nature (IUCN) confirm that this 'red-listed' bird is rapidly heading towards extinction. The bird's population since the 1980s in England has declined by 69% and the reason for the cuckoo's threatened existence is not specifically known. The British Trust for

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[74] John Vidal, *Destruction of habitat and loss of biodiversity are creating the perfect conditions for diseases like COVID-19 to emerge*, September 17th, 2020, https://ensia.com/features/covid-19-coronavirus-biodiversity-planetary-health-zoonoses/.
[75] Edward Storey, *Fen, Fire, Flood: Scenes from Fenland History*, (Cambridge: Cambridgeshire Libraries, 1986), 7.
[76] Damian Carrington, *Plummeting insect numbers 'threaten collapse of nature',* accessed June 5th 2019, https://www.theguardian.com/environment/2019/feb/10/plummeting-insect-numbers-threaten-collapse-of-nature#:~:text=The%20rate%20of%20extinction%20is,could%20vanish%20within%20a%20century.

Ornithology suggests that declines in its host's habitats, or climate-induced shifts in the timing of breeding of its hosts, could have reduced the number of nests that are available for cuckoos to parasitize[77]. Hearing this bird's call dissipating and dying across an ancient site called Wicken Fen inspired me to compose a piece of music called *Disappearing Cuckoo*, which features one field recording of cuckoo vocalisations recorded from dawn until dusk. This particular recording was also re-composed to create a piece of music for the *Listening To The Anthropocene* exhibition in Coventry in 2021, as discussed in my introduction. The perspectives of recording in the Fens, my practice-led research, which pertains to the research questions, is explored in the next section of this chapter.

[77] David Douglas, et al. "How important are climate-induced changes in host availability for population processes in an obligate brood parasite, the European cuckoo?" *OIKOS*, 119, 1834-1840, https://nsojournals.onlinelibrary.wiley.com/doi/10.1111/j.1600-0706.2010.18388.x.

Part Five: Methodology – *Disappearing Cuckoo*

5.0: In this fifth section I describe the technological means I developed to facilitate the composition *Disappearing Cuckoo* (2020). I begin to reveal my emergent concept of the multiphonic as a practice-as-research methodology, which, when employed as a practical tool for field recording, unveils the Fens as a location of multifarious sonic events. I also consider how the relationship between the cuckoo and the site it is recorded in becomes a sonic metaphor for extinction and the passing of a close family member.

Listen to the composition *Disappearing Cuckoo* with studio speakers or professional quality headphones, if possible, here:
https://drive.google.com/drive/folders/1NH26upSK8n4yeiKcMoxL81b1Eg5YWg6G?usp=share_link

5.1: Emotionally distraught from my father's passing, my young daughter and I visited the ancient waterways of Wicken Fen Nature Reserve for solace. Located approximately fifteen kilometres northeast of the rapidly expanding city Cambridge, it has been owned by the National Trust since Charles Rothschild gifted it to them in 1899. Wicken Fen serves as a memorial to the 98% of Fens which have been erased through modernisation, and it "has survived over the last 100 years an island in a sea of intensive agriculture"[78]. It is also one of the most intensively studied Nature reserves in the British Isles, and it is the closest representation of the ancient marshland ecosystem that once covered the Fens[79]. Today, natural history enthusiasts come here to discover traditional ecologically friendly lifestyles, such as sedge-thatching, eel fishing, willow weaving, and wildfowl hunting[80]. Written in the nearby city of Cambridge, John Milton's *Sonnet To the Nightingale*, written in 1629, ominously foretells bad luck if the cuckoo, which was once known as a harbinger of spring, is heard in spring before a nightingale.

[78] Ian Rotherham, *The Lost Fens: England's Greatest Ecological Disaster*, (Port Stroud: The History Press, 2013), 188.
[79] Laurie Friday and Basil Harley, *Checklist of the Flora and Fauna of Wicken Fen,* (Colchester: Harley Books, 2000), xx.
[80] Francis Pryor, *The Fens: Discovering England's Ancient Depths*, (London: Head Of Zeus, 2019), 232.

5.2: The ghosts of the Fens' past are the spectres of traditional and pre-drainage Fenland life found in this restored ancient reserve. It is an appropriate site for my daughter and me to wander in the aftermath of losing a close family member. As we pass long rows of reeds filled with warblers along the riverbank, we encounter the two-note ostinato call of a cuckoo. This onomatopoeia, was once described by William Wordsworth in his poem *To The Cuckoo* "as twofold shout[81]. I know this call and this Fen from visiting it with my father as a young child. It serves as a harbinger of spring and has a haunting timbre. Temporalities distort, as I am in an ancient site, listening to an endangered bird that is tragically indicative of habitat loss, and I can't quite grasp if the sound is real or an imaginative product of my grief. My daughter points in the direction of the repetitive call, and I realise we are both perceiving it in our listening. In a momentary reaction to hearing the cuckoo, and with the desire to capture my listening experience, I place two mono DPA 4061 miniature omni-directional microphones (to record in stereo) onto the riverbank and tie them securely to two wooden posts. Also in my backpack are headphones, as I always carry portable media technology on excursions.

5.3: Peter Szendy, in his book *Listen: A History of our Ears* (2008) asked two pertinent questions; "Can one make a listening listened to…[and] can I transmit my hearing as unique as it is?"[82]. I chose the DPA omnidirectional microphones to use for this research as they are mobile, lightweight, versatile and allow for excellent professional-standard audio quality when I play the recordings back. They capture the plurality of what I perceive when I am in the recording, and the microphones offer the potential to capture far-off sounds at equal volume from all sides of the microphone. Therefore, they are useful for capturing the more-than-human, post-natural world in which we are entangled and offer me, as a composer, the opportunity to convey what I subjectively perceive: I believe that they let future listeners listen to my listening. These microphones have also received high praise from BAFTA-winning British composer Chris Watson, who is affiliated with the Touch record and publishing label and has recorded sound for various BBC programmes, including Blue Planet and Life on Earth. The microphones provide professional sound quality, ensuring that recordings remain largely unaffected by the microphone's character while also maintaining a very low 'noise floor' (hiss). Their size, mobility, and recording adaptability enable them to be effectively utilised for a range of extensive

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[81] William Wordsworth, *Poems*, (London: Longman Hurst, Rees, Orme & Brown, 1815), 213.

[82] Peter Szendy, *Listen; A History of our Ears*, (New York, Fordham University Press, 2008), 5.

(macro) environmental field recordings, in which both distant and closely-focused (micro) sound events and sonic horizons can be adequately addressed. For example, sounds heard in the final composition, *Disappearing Cuckoo,* between 02:21 and 2:45, where the cuckoo is captured at a distance of twenty metres, alongside water splashes recorded near my microphones by swans, fish, and passing humans (as I recorded it from a very low bridge passing over the waterway of the Great River Ouse in the Fens). This flexibility is critical to the creation of works in this research, as the environment typically presents an entangled soundscape encompassing both macro and micro horizons of audition.

The microphones are amplified by a Tascam DR-860 multitrack recorder with the aid of the built-in 48V phantom power to record sound. For storage, I added a 2GB SD card to the device to capture longer recording times of almost two hours and set it to record in 24-bit resolution at a 48 kHz sample rate, which is the professional standard. The SD card can be easily placed into my Digital Audio Workstation (DAW), which is music software technology, where I can see the waveform, play it back, and edit and manipulate each field recording. I chose these pieces of technology because of their affordability, ease of use, and favourable reviews from associates and online website reviews from other users. I also used a small recording device known as an Edirol R09, which allowed me to capture my listening experience from a distance. It is small enough to be safely left in discreet places and record the entire (macro) Nature reserve with spatial depth and perspective. For instance, I placed the Edirol R09 in the car park near the Holme Fen posts to transmit a piece of piano music I had previously recorded, titled *Apart* (see Appendix B), playing through my car speakers to add an ephemeral moment to the field recordings. This sound event can be heard at 01:05 in *Disappearing Cuckoo*.

The sound of *Apart* resonating in the Fens highlights my presence and its audibility is crucial to my research as it reveals the human influences interwoven within a site's soundscape. I also incorporated an Edirol recording of a young child screaming as he played with his parents, which can be heard at 02:50. I believed this child's cry could metaphorically reflect the uncertainty of the future for children born into this ecological crisis and it was entangled in the surrounding environment. A composer may opt to record something that leans towards objectivity, such as capturing an organism without any surrounding ambience, as Koch did, which I discussed earlier in this chapter. However, I consciously choose to adopt a different approach in my practice. From my experience with field recording in the Fens, I perceive a vast sonic entanglement that challenges the Nature-culture dichotomy, which can be implicated in the 98% habitat loss of the

traditional East Anglian Fens, the impending extinction of the cuckoo and many other organisms, and possibly contributes to the emergence of the deadly COVID-19 virus that took my father's life.

5.4: In post-production in my studio, after recording approximately twelve hours of field recordings, I edited the recordings down to seven minutes to create the composition. I am privileged that advancements in media technology have provided me with such a wide range of microphones, mobile recording devices, and studio equipment. The creative choices of which sonorous material I use depend on what resonates emotionally as I listen back to the recordings in my studio where I am listening to my previous listenings. In this instance, I used sections of the recordings that held a poignant connection to me, including the cuckoo call at 0:55, the piano composition *Apart*, and the sound of a passing train gradually fading away, which triggered episodic memories and enriched the emotional resonance of the composition. Sounds used are subjectively selected, as are the various processing effects. A reverb effects plug-in called 'Forever Reverb,' created by a commercial software company called Valhalla DSP, extended the final decaying sonorous texture of the sounds. The transient and fading sound events act as a metaphor for the cuckoo teetering on the brink of extinction, representing a powerful sonority related to the state of ceasing to exist as the composition fades and the cuckoo gradually disappears. Furthermore, without intending to overextend the metaphor, it serves as an elegy for my father and the loss of traditional Fenland environments. Thus, *Disappearing Cuckoo* is a personal and creative assemblage that reflects the irreversible human destruction of the environment.

5.5: My conceptual framework, 'multiphonic', relates to polyphony, a term I respect and often use, but the ambiguity of this word also limits it. The prefix 'poly' means 'many' and 'phony' means 'sound', so polyphonic (many sounds) may describe the contemporary soundscape. However, what I intend to listen to, and record for my compositional material, is a vast interconnection of sonic multiplicity and magnitude. This infinite multiplicity is beyond the 'many' sounds of polyphonic, which is generally employed to describe musical phenomena involving more than one sound, such as a duet or duo of independently melodic sounds. It is also referred to as contrapuntal, a term that does not pertain to my practice-based research. Philip Ball remarks in his book *The Music Instinct*, "Polyphony is a word which is a slightly

ambiguous term with more than one connotation"[83]. I have purchased musical instruments such as a polyphonic synthesizer, to create music and this is an example of how the term polyphonic disconnects and limits the plurality of any sonorous environmental associations that I perceive in the Fens. Furthermore, polyphony is connected to music composition and evolved centuries ago, particularly during the Renaissance period. According to Canadian poet and author Robert Bringhurst "Though it surrounds us all, many people living now have evidently never listened to polyphony".[84] So why is polyphony often described as harmonic and has the limitations of perceiving only a handful of sounds? Henry David Thoreau's disposition for listening to the environment (as music) can be read in his writings. Dominic Pettman comments, in relation to a particular passage regarding polyphony being a duet of sounds, in Thoreau's book *Walden* (1854), "Thoreau is describing a polyphonic refrain between bronze and timbre, a harmonic duet that dissolves the traditional boundary between human and nature"[85]. Despite advocating for the dissolution of any Nature-culture boundary and the aesthetic enjoyment of listening to all sounds as music, I find myself underwhelmed and perplexed by this mention of a duo of sounds described as polyphonic. This again reinforces my argument that the term polyphonic restricts the range of vast sounds it represents. The usage of 'harmonic' is also limiting and overlooks the wide variety of discordant sounds produced by modernity.

A Nature reserve, the countryside, the park, a car park and a sports stadium are no exception to sites where humans add their sonic imprint to the soundscape. To expand polyphonic to something bigger, such as the cosmopolitan sites of cities, or to consider the vast ocean on Earth as sonically multifarious is to push the boundaries and restrictions of this term. This idea of expanding 'poly' to 'multi', a sonic derestriction, to recalibrate one's perception, expands my research as a conceptual framework that respects the term 'polyphonic', but engages with the multiplicity of the contemporary Fens at 'Earth magnitude', an expansive term coined by Douglas Kahn[86]. This, as Timothy Morton offers, "is human thinking that is as 'large' as the aurora"[87]. I will develop the multiphonic further throughout the thesis as I trace the subsequent

[83] Philip Ball, *The Music Instinct: How Music Works and Why We Can't Do Without It*, (London: Vintage, 2011), 145.
[84] Robert Bringhurst, "Singing with the Frogs," Contemporary Poetics, 115, (1997), 115 https://canlit.ca/issues/back-issues/full-issue/?issue=155.
[85] Dominic Pettman, 2017, *Sonic Intimacy: Voices, Species, Technics*, (Stanford: Stanford University Press, 2017), 67.
[86] Douglas Kahn, *Earth Sound Earth Signal: Energies and Earth Magnitude in the Arts,* (Berkeley: University of California Press, 2013), 3.
[87] Ibid.

seasons and respond to the research questions that have propelled me into the contemporary Fens to facilitate the ideas I formulated on that long flight home from San Francisco after performing at The Battery.

5.6: To conclude this chapter, I wish to address my first research question: What novel perspectives do creative sound practices, rooted in field recording, reveal about the changing seasonal soundscape of the contemporary East Anglian Fens? Spring has disclosed that many migratory visitors which rely on the Fens as a habitat for breeding and food are struggling to survive. Wicken Fen is one of the few remaining sites that resemble the Fens as they were before industrial farming transformed this environment. Therefore, the Fens serve as a metaphor for habitat loss, and the cuckoo symbolises species extinction. I also wish to address the second research question following the creation of *Disappearing Cuckoo*. It asks what type of critical practice-based framework is required for a site-based sonic study, given the inherited divisions of Nature and culture in acoustic ecology. In the introduction of this thesis, I state my previous experiences of detecting the Nature-culture dichotomy in my field recordings. The way humans exploit and extract the resources of the Fens is a fragment of a much larger and global situation. In Western post-enlightenment thinking, the dualism prevalent in human exceptionalism separates nonhuman beings from humans. The ecological crisis is the result. Therefore, at Wicken Fen, I began to implement my conceptual framework to reverse this dualist perspective and to unify and reconnect the contemporary Fens soundscape in my audition. I heard a multitude of entanglements that I wish to present compositionally in *Disappearing Cuckoo*. The cuckoo's call, my daughter chattering beside me, indeterminate noises and environmental sounds surrounding us were all equally important in my practice as research. I intentionally chose to record these coalescing sounds as one entangled field recording, and the intermingling presented the novel perspectives that my research question posed.

Chapter Two: Summer

Part One of this chapter features a brief multisensory account of the summer season at the site of Holme Fen.

Part Two critiques the ideologies of the World Soundscape Project and its significant influence on field recording, particularly regarding the ideas promoted by its co-founder, R. Murray Schafer. I also examine the triptych of phonic categories by Bernie Krause, who also estranges and separates areas of sounds.

Part three presents my proposed concept, known as multiphonic, which reconnects Krause's triptych of phonic concepts and reconstructs the soundscape ecology components of R. Murray Schafer.

Part 4 of this chapter explores the methodology and creation of the composition *Holme Fen Posts* through the multiphonic practice-based framework. Holme Fen Nature Reserve has a history that explicitly displays, through its cartography, how the drainage of the Fens has devastated the local ecology. The Fens invites inquiry into why the posts are a key indicator of human exceptionalism in this context environment.

Part Five explores Hildegard Westerkamp's seminal composition *Kits Beach Soundwalk* (1989), seen as a significant influence on this research project, through the analytical lens of the multiphonic.

Part One: UnNatural Writing #2

1.0: At the climax of an enthralling spring, the summer season begins with glorious sunshine and the high-pitched sound of swifts soaring above the lush Great Fen Nature reserve in North Cambridgeshire. We are captivated by the sensory richness of so much life and Nature contained within this small, meticulously tended area of the Fens in East Anglia. With my microphone in my hand, as I gaze across the expansive, flat cultivated Fens—a sunken landscape that sometimes lies below mean sea level—we feel a strong connection to this place, having all this Nature on our doorstep. It is late in the afternoon, and we see dragonflies, hoverflies, and damselflies darting around the unfurled ferns. Breathing in the sweet aroma of fresh honeysuckle and the perfume of hawthorn blossom is a wonderful way to connect to Nature. Swallows and other migratory visitors to the British Isles flit through the expansive sky alongside the melodious avian song of a skylark, mingled with the sounds of aircraft drones from the nearby airfield just a mile to the south of here. My microphone captures the familiar sound of the York to London train rumbling over the railway crossing until it fades away to reveal the sounds of buzzing of insects and birds. Will my young daughter be able to perceive the seasons change when she is an elderly woman?

The long, straight drainage board ditches cut through the middle of this Natural environment, drawing water from the farmland that surrounds us. As we read posters and the tourism notice boards, on either side of us are stalks of wilting bluebells drooping into the bare soil beside the silver birch wood. I inhale the faint aroma of decaying onions amid the ubiquitous sounds of agricultural machinery and local transport. The sky darkens as we make our way to a bridge with rusty iron railings that create a resonance I wish to record. As night falls, we head towards the car park and notice discarded bottles of alcohol and fast food littering the path. I start the car, plug in my iPhone to access my favourite playlist while inhaling the scent of an artificial lavender air freshener that fills the vehicle, and drive to the nearest supermarket on the way home.

Part Two: R. Murray Schafer & Bernie Krause

2.0: In this section, I start by exploring the concept of the soundscape and its significant impact on the ideologies of the World Soundscape Project and R. Murray Schafer's conservative and reductive politics of listening. I will also investigate American composer and sound recordist Bernie Krause's influential concepts, which inspired me to entangle and connect these individually defined aural niches and develop a new concept which reconnects estranged sonorities to reveal a universal soundscape, and to enable the perception of *all* sounds, including noise.

2.1: A 'soundscape' is the conceptual and practical interpretation of an acoustic environment, and any sonorous environment can be a soundscape[88]. The suffix relates to 'landscape'**,** and the term "soundscape", meaning the human perception of a sonorous environment, was originally coined by Michael Southworth, who used it in his PhD in 1969[89]. The concept of the relationship between humans and the sounding environment was adopted by Canadian composer R. Murray Schafer, who established the World Soundscape Project at Simon Fraser University in Vancouver in the late 1960s. The members of the WSP, which included associates such as Hildegard Westerkamp, Barry Truax, John Oswald, Bruce Davies, and Howard Broomfield, opened up the historiography of sound by reflecting on and presenting the changes in the Western soundscape that occurred since the Industrial Revolution. The *WSP* formulated a programme for the conservation of sounds threatened by extinction and expounded the intention of the listener[90]. The collective concerns about invasive industrial human 'noise' in both 'natural' and urban environments inspired Schafer to write the 1977 book *The Soundscape: Our Environment And The Tuning of the World*, which has become a foundational text for environmental sound recording and was also influential in the rapidly developing discipline of soundscape studies and soon coalesced into the new discipline of *acoustic ecology*[91]. "Schafer's influential work on "acoustic ecology" encompassed both natural and

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[88] Jenny Gottschalk, *Experimental music since 1970*, (London: Bloomsbury, 2018), 233.
[89] Michael Southworth, **"***The sonic environment of cities"*, (PhD Diss, Massachusetts Institute of Technology, 1969)**,** 49–70.
[90] François Bonnet, *The Order of Sounds A Sonorous Archipelago,* (Falmouth: Urbanomic, 2016)**,** 57.
[91] Jonathan Gilmurray, *Environmental Sound Artists*, (New York: Oxford University Press, 2016), xxi.

human soundscapes and drew inspiration from the environmental sound movement of the 1970s"[92].

According to the sound artist Francisco Lopez, Schafer's 'Tuning', from the title of Schafer's book, is fundamentally a reductive and conservative "'silencing', as if 'noisy' pertains to being an evil condition in itself and an exclusive feature of post-industrial human-influenced world"[93]. Nature is placed on a hypothetical, idealised and pedestal, while the city soundscape is disparaged by Schafer as being awash with "sound sewage"[94]. His ideology promotes the estrangement of soundscapes which undermines a holistic appreciation of all sounding environments that have ubiquitous anthropocentric entanglements contributing to them, which is key to my own proposed concept of the multiphonic. Investigated in the next section, the concept is used as an analytical tool and reveals that Schafer's ideologies struggle to acknowledge that 'noise' has been a feature of every environment on Earth since the beginning of human evolution. One can easily encounter loud and noisy settings in the countryside or natural landscapes, which he views as Edenic and describes as rich in tranquillity. Created by natural phenomena, sounds such as the ocean, storms, thunder, and rainfall can also be considered as 'noise'. Lopez points out that Schafer paradoxically criticized many natural soundscapes that could be deemed noisy: waterfalls, seashores, and certain tropical jungles[95].

2.2: Early on in his book *The New Soundscape: A Handbook for the Modern Music Teacher* (1969) he explicitly comments, "Throughout this book, I am going to treat the world as a macrocosmic musical composition"[96]. Macroscopic is a comprehensive and holistic all-inclusive term that focuses on global perspectives of audition, which, according to the Oxford English Dictionary, means "the whole of a complex structure"[97]. Schafer declares:

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[92] Jacob Smith, Eco-Sonic media, (Oakland: University of California, 2015), 3.
[93] Ibid.
[94] Schafer, R. Murray. *The New Soundscape: A Handbook for the Modern Music Teacher*, (Ontario: Don Mills: BMI Canada Limited, 1969), 18-19.
[95] Francisco Lopez, *Schizophonia versus Le'Object Sonore: Soundscapes and Artistic Freedom,* accessed June 4th 2023, http://www.franciscolopez.net/schizo.html.
[96] R. Murray Schafer, *The Tuning Of the World: Our Sonic Environment and the Tuning of the World,* 2nd ed. (Vermont: Destiny Books, 1994), 5.
[97] Sara Hawker, Oxford English Dictionary, 2nd ed. (Oxford: Oxford University Press, 2008) no page.

> "Today, all sounds belong to a continuous field of possibilities lying within the comprehensive dominion of music. Behold the new orchestra: the sonic universe! And the musicians: anyone and anything that sounds!"[98].

In the above example, he urges his readers to behold everything sonic in the world's soundscape, which is something I am inspired by in relation to my research project. However, Schafer's statement raises questions about why he subsequently excludes anthropocentric sonorities from his subjective and politicised listening. It is paradoxical when Schafer presupposes that noise, or "lo-fi" sounds, are an exclusive feature of the post-industrial human-influenced world[99]. Morton comments, "Don't so-called prehistoric, pretechnological societies hold the key to our salvation? No"[100]. My research has already revealed the vast anthropogenic influence on the contemporary East Anglian Fens environment. Hence, my research so far responds to the infusion of anthropocentric sounds entangling within the soundscape. Thus, the ecological crisis we face is deeply intertwined in both the local and the global soundscape. As sound artist and author Mark Peter Wright states, the frictionless wilderness, devoid of human intervention, never existed in the first place[101]. Schafer's preference for a bygone rural landscape of pastoral life, which he calls a "Hi-Fi" soundscape[102], has inspired a vision of a pastoral and idyllic perception of wilderness. However, "the wilderness is cultivated by human beings and is not a landscape you visit; it is all around you, wherever you are"[103]. However, Schafer's ideology has spilt over into soundscape studies and acoustic ecology pedagogy.

2.3: Krause began recording the acoustic fabric of natural habitats in 1968. His work often produces a narrative of extinction that documents ecological loss in habitats worldwide, recording long segments of wild sound. In his 2002 book, *Wild Soundscapes,* he discusses his experiences of how we are gradually losing our natural soundscapes. He comments, "One in

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[98] R. Murray Schafer, *The Tuning Of the World, ,2nd ed.* (Vermont: Destiny Books, 1994), 5.
[99] Francisco Lopez, *Schizophonia versus Le'Object Sonore: Soundscapes and Artistic Freedom,* accessed June 4th 2023, http://www.franciscolopez.net/schizo.html.
[100] Timothy Morton, *The Ecological Thought*, (Cambridge: Harvard University Press, 2010), 25.
[101] Mark Peter Wright, *Listening After Nature: Field Recording, Ecology, Critical Practice*, (New York: Bloomsbury, 2022), 2.
[102] R. Murray Schafer, *The Tuning Of the World, ,2nd ed.* (Vermont: Destiny Books, 1994), 43.
[103] Paul Shepheard, *The Cultivated Wilderness: Or What Is Landscape?* (Cambridge: MIT Press, 1997), 1.

four of every wild soundscape I have archived in my collection of thousands of habitats is no longer in existence"[104]. The symptoms of the Anthropocene, such as modernization, are gradually silencing today's soundscape. Noise acts as an entropic force that pulls the ordered signal towards randomness, disrupting and disturbing an initial state of calm. Human activities, including intensive agriculture, industrialisation, and urbanisation, are significant factors, as previously discussed in Part Two of Chapter One.

Krause categorises human-produced sound as Anthrophony and positions this concept within his ideology as the antithesis of healthy 'natural', biological, geological, or 'wild'. He asserts that it undermines the natural world's auditory framework and he attaches significant, critical attention to human-made sounds, such as machinery, airplanes, trains and cars[105]. Krause shares commonalities with Schafer, both of whom perceive noise as a cacophony of unpleasant and harsh sounds created by humans. However, ubiquitously existing in the background of our infinite perception, and entangled within the macrocosmic ambient flux of our unconscious sonority, is 'noise'. French philosopher Michel Serres comments, "Noise is metaphysical… one hears it huffing and soughing on the high seas"[106]. Indeed, the modern soundscape is fundamentally an entanglement of both natural and artificial sounds, representing a confluence of desirable and undesirable sonorities. However, Krause is quick to dismiss any subjectively 'unpleasant,' unwanted, or noisy sounds within a soundscape. Krause's subjective musical taste, which he expresses in his book *The Great Animal Orchestra* (2012) by stating his preference for Mozart's *Symphony No. 41 in C Major*, is also restrictive and disparaging as he openly dismisses the specific music genre of "Heavy Metal"[107].

2.4: Krause's segregated concepts and differentiated categorisations of individually defined aural niches unnecessarily separate the macroscopic, interconnected, and multifaceted ontology of a soundscape, which encompasses both human and more-than-human sounds. He organises his trio of mutually exclusive areas of phonic categorization into a hierarchy of sounds pulled away from each other. This triptych, which my emergent concept of the

[104] Bernie Krause, *Wild Soundscapes: Discovering the Voice of the Natural World,* (Berkeley: Wilderness Press, 2002), 35.
[105] Ibid, 4.
[106] Michael Serres, *The Natural Contract*, (Ann Arbour: University of Michigan,1995), p.13.
[107] Bernie Krause, *The Great Animal Orchestra: Finding the Origins of Music in the World's Wild Places,* (London, Profile Books, 2012), 158.

multiphonic opposes, features prominently in many of his books, sound art installations, and research on acoustic ecology. A 'biophony' refers, according to Krause, to the exclusive sonority of living organisms ('bio') within a habitat ('biome'). Examples of biophony include birdsong, insect sounds, and organisms, such as barnacles feeding. This phenomenon is also referred to as 'bioacoustics', which is the study of the sounds produced by animals. *In The Great Animal Orchestra* (2012), Krause opens his book with a Prelude which claims that a biophony existed "sixteen thousand years ago… and humans haven't arrived in North America yet" [108]. Krause idealistically claims that bioacoustic voices filled the soundscape with an infinite tapestry of their sounds, merging into an intense and collective symphony free from any human influence. However, researchers from the U.S.Geological Survey (USGS) reveal that "Footprints preserved in mud in New Mexico were made by humans thousands of years before any people were thought to be in the Americas"[109]. This highlights how human-produced sounds are an integral and interconnected aspect of the natural world, a notion that both Krause and Schafer resist.

Krause describes this biophony occurring against the backdrop of non-biological and geological sonorities, which he refers to as the 'geophony' - the "non-creature sounds of the earth" [110]. For instance, the sounds of natural phenomena, such as the howling wind during a severe storm, a clap of thunder, and the rumble of an erupting volcano. The third distinct realm of sounds is 'Anthrophony,' a term that combines human (Anthropos) and sound (phony). Very early in his book *The Great Animal Orchestra* (2012), he outlines the distinction between biological and non-biological aspects of the acoustic signature of the soundscape, even while acknowledging the contradiction when he describes the Earth's sonic fabric as a "collective voice" [111]. Krause also describes the soundscape as a symphonic orchestra of 'bioacoustic' vocalizations, performing a musical composition in which each species contributes an intricate part to a highly evolved, naturally crafted masterpiece. He then briefly examines how human beings have evolved and inspired by their integration and entanglement with the natural world in which the Anthropos are developing, how they imitate their acoustic environment while

[108] Ibid, 3.
[109] Robert Sanders, *Tests confirm humans tramped around North America more than 20,000 years ago*, UC Berkely News, Accessed 27/12/24. (2023), https://news.berkeley.edu/2023/10/05/tests-confirm-humans-tramped-around-north-america-more-than-20-000-years-ago/
[110] Bernie Krause, *Wild Soundscapes,* (Berkeley: Wilderness Press, 2002), xii.
[111] Bernie Krause, *The Great Animal Orchestra,* (London: Profile Books, 2012), 10.

coexisting with Nature as they hunt and develop linguistics[112]. This acknowledgement of a corresponding multi-species relationship challenges the complex distinctions underlying Krause's categorisations. It is also noteworthy that Krause's book includes a dedication to Schafer at the start.

2.5: Acoustic ecology research helps identify organisms, ecosystems, and habitats under environmental strain. This is truly worthwhile and resonates deeply with my research project, as the contemporary East Anglian Fens is the site of ecological catastrophe. While I do not wish to dismiss or undervalue this crucial ecological work, I would like to critique Krause's overly scientific and fragmented approach to analysing soundscapes. The 'Niche Hypothesis' is a theoretical framework in which every species has its sonic niche, visualised in a 'spectrogram'. He delineates the acoustic voices of organisms within a hierarchical soundscape, assigning them a specific position in the frequency spectrum based on the pitch of their vocalisation or sonority. What is evident and paradoxical is that one can observe the entanglements in any habitat, and human sounds are excluded in this framework. Krause's hypothesis, as noted by writer David George Haskell in his book *Sounds Wild and Broken* (2022), "is hard to test…[as] in many cases, species do in fact overlap with one another"[113]. The Niche hypothesis is acknowledged as an effective method for assessing the health of marine and terrestrial ecosystems globally. A spectrogram visually and temporally illustrates the position of each organism within the spectrum, charting their pitch (vertically) and amplitude. Over many years, Krause has generated field recordings of various environments, complemented by visual imagery, which have become vital to the growing field of acoustic ecology research since the 1970s. The spectrogram reveals the dark lines as visualisations of the vocalisations of insect voices[114]. However, one must be aware that each organism's voice is entangled within the complex holistic soundscape of any habitat or environment; therefore, a spectrogram does not necessarily reflect widespread anthropogenic disruption and again human sounds are excluded. Claiming that the spectrogram is merely a habitat biophony set against the backdrop of the geophony once more rejects, alienates, and isolates against anthropogenic sound in its analytical aims.

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[112] Ibid, 31.
[113] David George Haskell, *Sounds Wild and Broken: Sonic Marvels, Evolution's Creativity and the crisis of Sensory Extinction*, (London: Faber & Faber, 2022), 107.
[114] Krause, Bernie. (2002). *Wild Soundscapes in the National Parks: An Educational Program Guide to Listening and Recording,* 2nd ed. (Berkeley: Wilderness Press, 2004), 26.

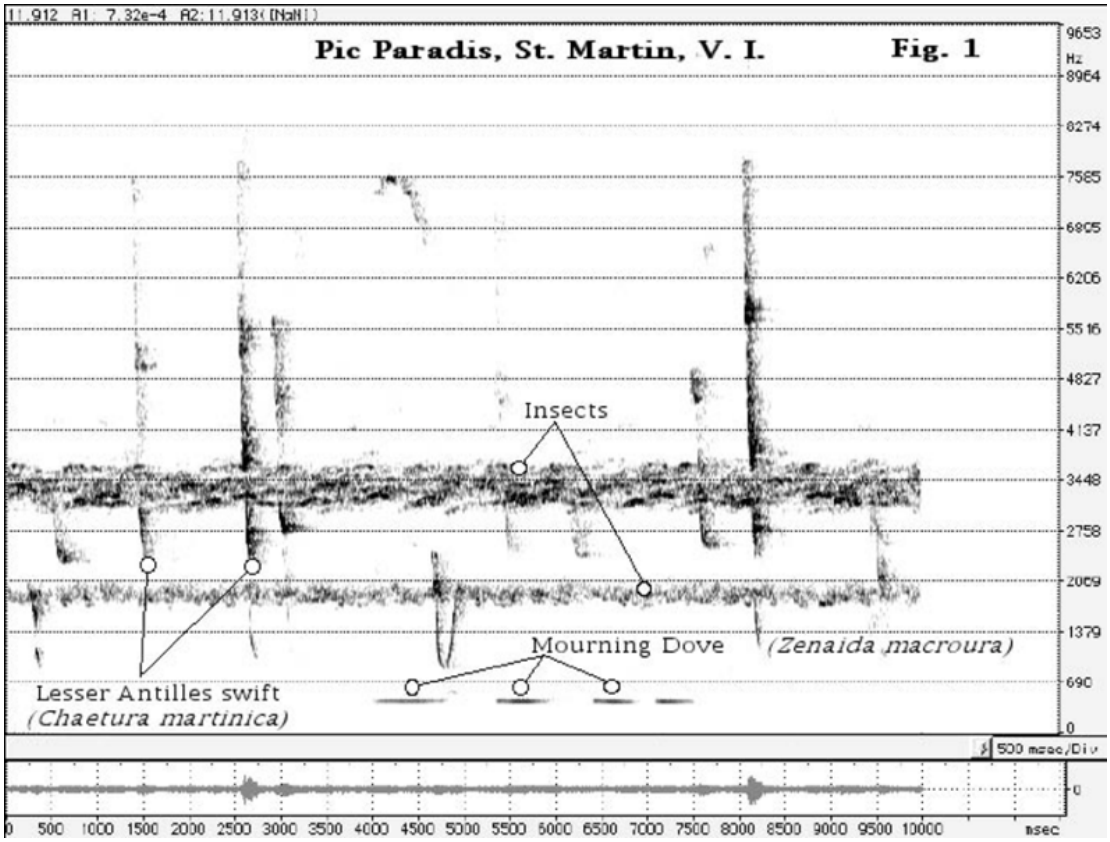

Fig.3: A Spectrogram displaying a biophony- (Photo by Bernie Krause)

A spectrogram could play a crucial role in saving species at risk of extinction, especially when assessed annually to detect a declining number of organisms, and this is indisputable. I also understand and agree with Krause's concern for the environment, which Australian ethnographer Deborah Bird Rose describes as a "kinship standpoint about our relationship with animals in this time of extinctions"[115].

2.6: It is startling that much of Krause's archive, "All my recording equipment, and my guitar", has been lost to wildfires, he believes, due to symptoms of climate change in California[116]. It is shocking to read that "Almost 70% of my archive comes from habitats that have

[115] Deborah Bird Rose, *Wild Dog Dreaming: Love and Extinction*, (Charlottesville: University of Virginia Press, 2013), 11.
[116] "Bernie Krause loses equipment in California wildfires", Bernie Krause, *The Wire*, October 23rd, 2017, https://www.thewire.co.uk/news/48590/bernie-krause-loses-equipment-and-more-in-california-wildfires.

disappeared"[117]. Anthropogenic sonorities are entangled in sonorous relationships within the systemic perspective of the soundscape, and human actions cause this loss of recordings. My intention is not to dismiss all aspects of the work of both the WSP and Krause, but to encourage a more interconnected perception of the soundscape that moves beyond the Nature-culture distinction. The advantage of the entanglement of sounds lies in the reconnection to the environment at a time when ignoring manifestations of climate change amounts to passively tuning away from (rather than tuning into) anthropogenic stress on the planet. Therefore, as readers listen to the composition *Holme Fen Posts*, and the previously described *Disappearing Cuckoo*, they can experience compositions that reveal the vitality of complex and multiple relationships within the sonic assemblage. In section five, I discuss the methodology of creating *Holme Fen Posts* in relation to my research questions, the changing seasonal soundscape of the Fens and how I engage with the practice-based framework of the multiphonic, in the next section of this chapter.

[117] Bernie Krause, "The sound ecologist capturing a disappearing world: '70% of habitats I recorded are gone", *The Guardian*, June 14th 2023, https://www.theguardian.com/artanddesign/2023/jun/14/bernie-krause-sound-ecologist-disappearing-world.

Part Three: The Multiphonic

3.0: In this section, inspired and provoked by discovering the reductive ideology of Schafer and also examining Krause's triptych of displaced phonic categories, I introduce and explore the concept I am calling 'multiphonic'. The term builds on the 'polyphonic' it critique in Chapter One. It becomes a critical practice-based research conceptual framework that facilitates my creation of field recording compositions. It embraces the idea that a democracy of sonorities can serve as an ethical parliament of environmental sensibilities.

3.1: As previously discussed, in Schafer's *Our Sonic Environment and the Tuning of the World*, he addresses the increasing noise levels of the twentieth century by referring to it as "noise pollution". Undesired 'noise', such as the sonority of a cosmopolitan city soundscape, is referred to by Schafer as a "Lo-fi soundscape"[118]. He sought to subjugate and eliminate it with noise abatement procedures. Compared to the noise and destructive sounds of modernity and urbanisation, he explicitly describes and endorses a utopian and bucolic "Hi-Fi Soundscape" posited with a nostalgic tranquillity that is at variance with my experiences when field recording in the contemporary East Anglian Fens. Provoked by Schafer's authoritative denunciation of anthropocentric sounds, I also discovered that Krause agrees with Schafer's strong views on unwanted sound and 'noise'. Krause states that "noise is the cacophony of unpleasant and harsh sounds human beings have created, thus masking more aesthetically pleasing and resonant sounds"[119]. These reductionist ideologies inspired a creative response that inspired the development and application of the 'multiphonic', a conceptual framework for wishing to address the research questions posed in the introduction.

My concept of the multiphonic initially began as 'Triphonic' the term coined to amalgamate Krause's trio of mutually exclusive sonic components—a triptych of soundscape separations previously examined in Part Two. Each phonic category is a restricted and reduced monophonic soundscape by Krause, with only one signal as the uninterrupted musical centre. To split what is sonorously entangled perpetuates a scientific divisional distinction that contradicts the ecological confluence and cooperation of the complex aural territories within a soundscape. However, a disadvantage of the prefix 'tri' is that it further reduces the soundscape

[118] R. Murray Schafer, *The Tuning Of the World, 2nd ed.* (Vermont: Destiny Books, 1994), 71.
[119] Bernie Krause, *Wild Soundscapes,* (Berkeley: Wilderness Press, 2002), 5.

to just three components. The multiplicity of sounds coalescing in the Fens determined that 'tri' should become 'multi'. Therefore, the multiphonic is a theoretical framework for me to experience the converging sonic assemblages that elide and transcend the reductionist tripartite of Krause's concepts.

3.2: Nixon raises two important questions in his book *Slow Violence* (2013) that I wish to address, which are pivotal to my emergent 'multiphonic' concept: "How can we turn the emergencies of slow violence into stories dramatic enough to rouse public sentiment?"[120]. In addition to addressing the general inattention given to climate emergencies that sonorously resonate through sounding environments, Nixon also enquires, "How can we convert into image and narrative the disasters that are slow-moving and long in the making, disasters that are anonymous and that star nobody, disasters that are attritional?"[121]. This question has partly inspired the development of multiphonic to facilitate practice as research in the Fens, alongside Storey's enquiry in the introduction of this thesis, asking "Where is the musical mind to translate all these natural wonders of the Fens into sound?"[122]. Field recording and composing in the Fens, the creative practice of this project's research, highlights the vast range of environmental sounds which suggest that the ecological crisis is embedded in our surrounding environments and is deeply connected to our daily lives. Nixon wants these narratives to be transmitted. Media technology provides the key, as the conceptual framework can be expanded into allowing the technology to enter the conceptual frame and become part of the entanglements because multiphonic field recording embraces *all* sounds. This includes the technological means of production, the phenomenological perception of the field recordist, and it encourages attentive listening to sounds of the environment aesthetically. The multiphonic serves not only as a methodological tool for my practice as research and is useful to dissolve the Nature-culture binaries inherent in the praxis. However, it is often hard to grasp the evasiveness of the ecological crisis. For example, global climate change is an elusive concept that we find ourselves within. As Stoknes comments, "it cannot be seen, felt or touched"[123].

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[120] Rob Nixon, *Slow Violence and the Environmentalism of the Poor*, (Cambridge: Harvard University Press, 2013), 5.
[121] ibid, 5.
[122] Edward Storey, *Spirit of the Fens*, (London: Robert Hale, 1985), 216-217.
[123] Stoknes, P. Espen**.** *What We Think about When We Try Not to Think about Global Warming: Toward a New Psychology of Climate Action*. (Vermont: Chelsea Green, 2015), 40.

3.3: Sigmund Freud, in his 1919 essay *The Uncanny*, explains that the word for this in his native German is 'Unheimlich,' which roughly translates to 'unhomely' and 'not home-like'; however, uncanny refers to something that is both fearful and lurking unseen. Morton also frequently uses Freud's term 'uncanny' in relation to climate change and global warming. "It's uncanny: there is something there, and there isn't"[124]. It is evident that severe flooding, flash fires, violent storms, and hostile droughts are significant problems, not just in the Fens but globally; however, they seem to slip from the psyche of our collective consciousness, particularly in countries and regions that are not directly affected by experiences of land trauma, land change, land severance and environmental changes[125]. Albrecht's notion of 'solastalgia' brings the ecological crisis closer to home. He comments, "I defined "Solastalgia" as an emplaced or existential melancholia experienced with the negative transformation (desolation) of a loved home environment"[126]. In his book *Dark Ecology* (2016), Morton comments that ecological awareness is "dark-depressing…ecological awareness is also dark-uncanny"[127]. Again, uncanny is pertinent as a term for perceiving the prospect of a mass sixth extinction, which is both apocalyptic and existentially distressing when we contemplate the possibility of ecological annihilation. And so many people distance themselves from what they are actually a contributing part of to avoid the feeling of global dread asserts itself as the planet heats and our climate gets more hostile and unpredictable[128]. This results in impoverished thinking, resistance to truth, subjective dismissal, and restrictive thoughts. Therefore, to counter and respond to this elusive perception of climate change, the multiphonic, as a practice-based research concept, enables and encourages me to capture and document these distressing and disturbing perceptions through field recording. By gathering these sonic narratives of 'slow violence', I can subsequently respond to Nixon with my compositions. I can then perform or commercially release this work to the public to potentially rouse the public's consciousness and provoke an emotional response.

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[124] Timothy Morton, *The Ecological Thought*, (Cambridge: Harvard University Press, 2012), 53.
[125] Victoria Pratt, *Stories of Solastalgia*, (Chadwell Heath: Lawrence Wishart, 2024), 18.
[126] Glenn Albrecht, *The Age of Solastalgia*, *The Conversation,* August 7th, 2012, https://theconversation.com/the-age-of-solastalgia-8337.
[127] Timothy Moton, *Dark Ecology: For a Logic of Future Coexistence*, (New York: Columbia University Press, 2016), 6.
[128] *The Age of Solastalgia,* Glenn Albrecht, accessed December 19th, 2019, https://theconversation.com/the-age-of-solastalgia-8337.

3.4: An advantage of employing a multiphonic lens to inspect my practice is that it facilitates a shift from estrangement to non-hierarchical entanglements and engagement. The cuckoo call in *Disappearing Cuckoo* is no more significant in that composition than the vague drone of agricultural machinery, the piano melody, or the human voices that coalesce. The concept opens a willing creative enquiry during a time when monumental action is required to slow the violence of climate change. Canadian composer Hildegard Westerkamp, who has a composition analysed in the next section of this chapter, tells us she is "Facing the Monster" in her composition *Kits Beach Soundwalk* (1989)[129]. This provocation of the noise from the industrial landscape she experiences reveals how she fully engages with the environmental disturbances of modernity, and she becomes empowered by this confrontation. She states,

> "It is high time that we, as soundscape composers, acoustic ecologists, and soundscape designers, implement our own listening skills and sound design knowledge to speak back to the forces that have assumed the authority to silence us, to place us as passive receivers"[130].

Thus, multiphonic, therefore, acts as a critical practice-based method to confront the challenges, tensions, and restrictive boundaries posed by the sonorous narratives of the Anthropocene and the Nature-culture dichotomy. By engaging, we perceive it and then we can respond and be proactive, not remain as 'passive receivers' and, as Donna Haraway suggests, 'staying with the trouble',[131]. Turning towards with the ecological crisis, observing it through the mediation of media technology and staying focused on our environment is to take notice and engage with the world. Morton proclaims, "Facing it is one of the profound tasks to which the ecological thought summons us"[132]. 'Us', or 'we', is not limited to sentient beings. He considers 'we' should include the multiplicity of other entities in the universe – whether animal, vegetable, or

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129 Hildegard Westerkamp, *Kits Beach Soundwalk*, (Montreal: Empreintes DIGITALes, 1989), CD.

130 Hildegard Westerkamp, *Speaking from Inside the Soundscape*, In *The Book of Music and Nature,* edited by D. Rothenberg & M. Ulvaeus, (Newark: Terra Nova, 2009) 147.

131Haraway, Donna, *Staying with the Trouble*: *Making Kin in the Chthulucene,*(Durham: Duke University Press, 2016), xii.

132 Timothy Morton, *The Ecological Thought*, (Cambridge: Harvard University Press, 2010), 4.

mineral[133]. The multiphonic encourages listeners to pay attention to the multi-species entanglements, or as Morton calls it, 'the mesh'. He explains, "The mesh of interconnected things is vast, perhaps immeasurably so ... Nothing exists all by itself, and so nothing is fully 'itself'"[134]. Therefore, the multiphonic correlates with Morton's concept, which rejects the Nature-culture dichotomy, or rather, it deconstructs 'Nature', which Haraway terms 'culturenature interactions'[135]. It also correlates with his notion of 'The Ecological Thought', Morton characterises our understanding of this principle as 'thinking the ecological thought':

> "The ecological crisis we face is so obvious that it becomes easy – for some, strangely or frighteningly easy – to join the dots and see that everything is interconnected. This is *the ecological thought*. And the more we consider it, the more our world opens up… The mesh of interconnected things is vast, perhaps immeasurably so ... Nothing exists all by itself, and so nothing is fully 'itself' [and] each being in the mesh interacts with others. The mesh isn't static. We can't rigidly specify anything as irrelevant"[136].

3.5: Morton's ideology, when compared with Schafer and Krause's ideologies, reveals vastly contrasting viewpoints. In relation to my research questions and field recording in the contemporary East Anglian Fens, the notion of interconnected ecologies is brought to the fore by conceptually perceiving the sonorous Fens as an entanglement through the multiphonic lens of inspection. Stocknes is not wrong, nor is Morton, because global climate change and the contemporary ecological crisis are elusive, ambiguous, hard to detect, and so ginormous that they are difficult to comprehend. This is why I require the multiphonic to help me navigate this limited sensorial perception through its conceptual lens, as it becomes a strategy that enables me to extend my perception towards the infinite. Morton's concept of 'Hyperobjects' is also related to the practice of this research, as it expands my thinking into the vastness of what is beyond our immediate perception so that nonlocal phenomena such as climate change, can be

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[133] Timothy Morton, *A reckoning for our species: the philosopher prophet of the Anthropocene*, The Guardian, June 15th, 2017. https://www.theguardian.com/world/2017/jun/15/timothy-morton-anthropocene-philosopher.
[134] Timothy Morton, *The Ecological Thought*, (Cambridge: Harvard University Press, 2010), 15.
[135] Cynthia Huff and Margaretta Jolly, *Engaging Donna Haraway: Lives in the Natureculture Web*, (Abingdon: Routledge, 2023), 7.
[136] Timothy Morton, *The Ecological Thought*, (Cambridge: Harvard University Press, 2010), 29-30.

perceived and experienced through the theoretical framework of the multiphonic. These vast nonhuman entities, he states, "are massively distributed in time and space relative to humans"[137]. The microphone captures the materiality of nonhuman phenomena, forming proximate and detectable narratives of ecological crisis for composition. Therefore, if one were to reject all anthropocentric sounds as unwanted, as Schafer and Krause do, then the soundscape would be thrust into the dualist and reductive grasp of human exceptionalism. To finish this section, we can move towards the artistic and proactive perception of listening with Westerkamp's, as Anderson and Rennie comment, "now-classic soundscape repertoire work *Kits Beach Soundwalk* (1989)"[138].

[137] Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World*, (Minneapolis: University of Minnesota Press, 2013), 1.
[138] Isobel Anderson and Tullis Rennie*, "Thoughts in the field: 'Self-reflexive narrative' in field recording". Organised Sound*, 21, 3, (2016), 227.

Part Four – *Kits Beach Soundwalk*

4.0: Following the exploration of the origins of recording technology, and the methodology of creating this chapter's composition entitled *Holme Fen Posts*, I move into an analysis of the seminal work *Kits Beach Soundwalk* (1989) by Hildegard Westerkamp. This examination highlights the confrontational gestures within this composition. It also pertains to my original critical practice-based framework, which I term the 'multiphonic', encompassing all sounds and manipulating field recordings of a holistic soundscape.

4.1: Like Anderson and Rennie, David Kolber (2002), Brandon LaBelle (2009), Salomé Voegelin (2010), and Lane & Carlyle (2013) have identified Westerkamp's *Kits Beach Soundwalk* (*KBS*), released in 1989, as a critical soundscape composition[139]. *KBS* involves using field recordings that are manipulated to encourage listeners to actively engage with the presented soundscape. Westerkamp is an acoustic ecologist, composer, and radio artist who was also a member of the World Soundscape Project. Westerkamp explores noise, crucially not discriminating against "unwanted sound", as some of her colleagues at WSP had. By including, rather than ignoring or excluding, the industrial "noise" in her composition, she actively uses this "monstrous" part of the soundscape to highlight the message she portends to convey, which Westerkamp states is to "face the monster" [140]. Kolber states, "For Westerkamp, *Kits Beach Soundwalk* is a way to reclaim her voice as an individual".[141] In the end, finding one's voice is not about passively turning away from the whining and belches of traffic; it is not about passive-aggressive attempts to mask the roar of the city with noise bylaws or tranquillity CDs. Finding one's inner voice and regaining balance come down to actively and playfully engaging with the beast of sound surrounding us. As she states at the end of her composition, to "play with the monster, then I can face the monster'[142]. It is evident to see a

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[139] Joanna Demers, *Listening Through The Noise*, (New York: Oxford University Press, 2010), 175.
[140] Hildegard Westerkamp, *Kits Beach Soundwalk*, (Montreal: Empreintes DIGITALes, 1989), CD.
[141] David Kolber, "Hildegard Westerkamp's Kits Beach Soundwalk: shifting perspectives in real world music", *Organised Sound*, 7, (2002), 41-43. https://www.cambridge.org/core/journals/organised-sound/article/abs/hildegard-westerkamps-kits-beach-soundwalk-shifting-perspectives-in-real-world-music/49A433DBAC44B92593E64E7C043443C2.
[142] Hildegard Westerkamp, *Kits Beach Soundwalk*, (Montreal: Empreintes DIGITALes, 1989), CD.

correlation to notions put forward by both Morton and Haraway of “facing it” and “staying with the trouble”. My emerging conceptual framework of the multiphonic can serve as a lens of enquiry to analyse the works of other artists, such as *KBS*. I can also utilise this framework as a practice to document the Fens. Perceiving ‘the trouble’, confronting the ‘slow violence’, and investigating the unpredictability of the seasons helps me confront the monstrous anthropogenic damage caused by the ecological crisis.

4.2: *KBS* begins as Westerkamp takes the listener onto Kitsilano Beach, which is located in the centre of Vancouver and colloquially known as Kits Beach, on a sound walk. She explains that a soundwalk is “any excursion whose main purpose is listening to the environment.” The opening twenty seconds consist of a field recording of the ambience of the beach, which she shares with the listener. She plays on the recognition and appreciation of the familiar sonorities, drawing the listeners' attention with her vocal narration, such as the ducks floating quietly on the calm Pacific Ocean. Westerkamp’s commentary describes the effects of her subjective experience within these surroundings, what she visually experiences, and even discusses the serene weather conditions so that the audience shares her felt knowledge—a sensed experience. A description, through the use of her voice and sound recordings of feeding barnacles, which create tiny sounds (micro) as they merge with the sounds of the water on the shoreline (macro), creates intimacy with the natural world and sets up the evolution of the piece into a city-encroached soundscape. Westerkamp begins to draw the listener’s attention to the invasive sounds of the city, transforming the natural world into an industrial and mechanised soundscape. She describes how she can compositionally fool the listener by adjusting the amplitude of the city ‘noise’ by manipulating and processing the recorded audio in a post-production studio—a compositional reflexive approach. She subsequently demonstrates by revealing bandpass filters and equalisation the reduction of the invasive city.

Thus, the sonic environment of Kits Beach is, as Truax explains, “preserved, enhanced, and exploited by the composer.” At three minutes and twenty-three seconds into the composition, *KBS* transitions into an intensely sibilant soundscape with explicit technological manipulation of the field recordings, which leads the listener into the realm of the voices of Nature and Westerkamp’s seductive and emotive dreams through her commentary. Accompanying her words are the high-frequency sounds of insects and birds, streams trickling, and technologically manipulated sounds transposed up into the upper registers of frequencies. It is a multiphonic

sonic convergence that coalesces the triptych of phonic areas of sonorities that Krause splits apart and separates: Biophony, Geophony, and Anthrophony.

4.3: Westerkamp's composition includes a homage to composer Wolfgang Amadeus Mozart and another, more explicitly, to architect, music theorist and composer Iannis Xenakis. His piece *Concret PH* (1958), which she states she has sampled for inclusion in *KBS*, features granular synthesis techniques, the splitting of recordings of burning charcoal into microscopic grains of sound for compositional manipulation, to create, she explicitly states, high-pitched sounds. The small fragments of audio are sonically positioned within the upper-frequency registers of the human hearing range. Westerkamp states that these frequencies, from 2000 cycles per second (Hz) up to 20,000 cycles per second (kHz) and above the human hearing range, help her subsequently regain the equilibrium of audition and to "heal" after exposure to the urban noise. The juxtaposition of fierce low-frequency city noise is in stark contrast to the high pitches of granular sounds that coalesce and interact with her soft-spoken human voice. Both contrasting areas of the frequency spectrum, if perceiving this composition through, and in relation to the multiphonic as an analytical tool, reveal the sonic entanglements that occur.

4.4: The piece fades out with Westerkamp in a confrontational and jovial mood as she tells the listener that she is deliberately confronting 'the monster' to face the "undesirable encroachment of noise on the city of Vancouver"[143]. She is in total technological control of her acoustic horizon and this entanglement of technology she has used to create the piece, in conjunction with the holistic perception of both wanted and unwanted sonorities, does bring it into the realm of the 'multiphonic' . We hear Westerkamp's voice telling the listener that she is fighting the metaphorically destructive force, entangled with it and as if in combat with it, and to reclaim her voice as an individual and "staying with the trouble"[144]. As discussed in the previous section of this chapter, this relates to the multiphonic by enabling the listener to 'face' and embrace the manifestations of the ecological crisis, and to directly address the significant gap situated in centre of the Nature-culture divide. Also, *KBS* is one of the very few compositions that can be analysed as a multiphonic synthesis of place, space, and varying temporalities, which explicitly includes both wanted and unwanted sonorous entanglements. The composition

[143] Demers Joanna. *Listening Through The Noise*, New York: (Oxford University Press, 2010), 210.
[144]Haraway, Donna, *Staying with the Trouble*: *Making Kin in the Chthulucene,*(Durham: Duke University Press, 2016), xii.

not only reveals the soundscape of Kits Beach, but it is also about the city captured, embraced, and composed by the artist and how it entangles in her creative process of holistic depiction. Also, it builds on the themes that *Presque Rien* opened up[145]. The field recordings and commentary present an ecologically technological interpretation of the sonorous confluence of place (Vancouver) and space (the beach), with Westerkamp within it all. It is an example of a composition that reveals her own subjective inner world of listening and encourages listeners to listen and "re-evaluate our acoustic soundscape"[146]. This coalescence of all sonorities, is a clear example of multiphonic entanglement, and of the holistic framework that also reveals how aesthetic experiences (art) place both the creator (field recording) and the audience in a sonic space (site) where they can deepen their understanding of the world by gaining insight into when and where we find ourselves socially, politically, and environmentally. Morton suggests that studying art forms enables a connection to perceive the interconnected world around us. "Art forms have something to tell us about the environment, because they can make us question reality ... Reframing our world".[147] The multiphonic is sonic glue that reconnects the natural world to culture. It enables me to stick it back together and perceive it as one glorious sonic entanglement.

The act of gathering sonorous materials that reveal the ecological crisis confronts us with the need to perceive sounds which are often overlooked and ignored, deemed unwanted, or unheard by the human ear without technology's mediation. Technology enables me to connect with the world and reintegrate myself into the contemporary Fens, bringing together Nature and culture to eliminate that culturally constructed separation and perceive the soundscape as one holistic entanglement. As Gina Gibney remarks, "For me, creating art brings things back together"[148]. This method of amalgamation will become useful to future practitioners who are undertaking site-specific studies, and to field recordists in general. It posits the multiphonic as a sonic glue for perception and creativity, eradicating any doubts that humans are separate to the rest of the planet.

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[145] Isobel Anderson and Tullis Rennie, *"*Thoughts in the field: 'Self-reflexive narrative' in field recording*". Organised Sound*, 21, 3, (2016), 227.
[146] Elizabeth Kolber, *Living in the Anthropocene: Earth in the Age of Humans*, (Washington: Smithsonian Books, 2014), 4.
[147] Timothy Morton, *The Ecological Thought*, (Cambridge: Harvard University Press, 2010), 8-9.
[148] "*Why We Make Art",* Gibney, Gina, accessed May 23rd, 2021, https://greatergood.berkeley.edu/article/item/why_we_make_art.

The following final section expands on the gathering of sound materials as I progress to the methodology of creating this chapter's composition.

Part Five: Methodology - *Holme Fen Posts*

5.0: The final part of this chapter explores the methodology behind this summer-themed composition, *Holme Fen Posts*. The intention is to record not only the sonorities of the cast iron posts, but also the entire Nature reserve and surrounding environment—the 'multiphonic' soundscape—creating a metaphorical sonority of subsidence and a compositional symbolisation of the human subordination of the natural world.

Listen to the composition *Holme Fen Posts* with studio speakers or professional quality headphones, if possible, here:
https://drive.google.com/drive/folders/1NH26upSK8n4yeiKcMoxL81b1Eg5YWg6G?usp=share_link

5.1: Holme Fen Nature reserve is located six kilometres south of Peterborough in North Cambridgeshire. Its 666 acres of sinking land are managed by the Great Fen Project, which is part of a restoration initiative by The Wildlife Trust aimed at returning several sites to their original Fenland state. Today, this site is cartographically nine feet below sea level, making it the lowest point anywhere in Britain[149]. The land at the base of the two vertical cast-iron posts, which were brought here in 1848 from Crystal Palace by local landowner William Wells, is set into the underlying clay to illustrate the significant subsidence that has occurred here following several drainage schemes. Dated metal placards on the four-meter-high posts reveal where the surface of the ground was situated (in 1870, 1875, 1892) and a second post ('B') was erected here in the 1950s. For some time, I have relished the prospect of recording this cartographically low-lying site as it has never been, to my knowledge, captured by a field recordist. I have wanted to create a composition that could reflect the multiplicity of slow cartographical temporality of the post's subsidence. By representing its slow collapse into the black soil it sonically discloses the subsidence of this area of the Cambridgeshire Fens that informs us about ground levels changing over time via the dated placards. I also felt that a novel perspective of field recording and composing the posts was the disclosure of the ecological catastrophe that is unique to the Fens which, again, has never been depicted as audio compositions from field recordings before. The posts are also a popular tourist attraction that is visually showcasing

[149] Francis Pryor, *The Fens: Discovering England's Ancient Depths*, (Croydon: Head Of Zeus, 2019), 339.

how the Fens' draining has devastated this ecosystem. These events have created a man-made, fragile, and mutable sinking Fenland environment of one million acres[150].

Fig. 4: Holme Fen Posts - Photograph by Simon Scott (July 2021).

5.2: I had previously placed my DPA microphones closely beside the posts in an attempt to capture their vibrational sounds, but their sonorous characteristics remained elusive to me on that particular day. This was also before I considered this chapter's composition, and I wasn't trying to answer my research questions. Today I inquire: would the posts reveal any novel perspectives if I employed a different method of sound capture? This would be the first time I had placed the contact microphones into the gap at the back of metal placards, where they met the circular post, which indicated the specific date of when the top of the post was at ground level. Over a twelve-hour day of wet summer weather, I listened experientially to initially perceive the pressure of the wind producing very low resonant aeolian pitches of 30-120 hertz, just above the lowest (20 hertz) threshold of human hearing. Allowing the sound events unfold chronologically and without interruption into my recording device, I began to perceive a rising and falling undulation of sound at 55 hertz. This low tone was clearly a vibratory presence of

[150] Ibid, xii.

the posts, something I attributed to the wind blowing against them, stimulating resonance. As the wind strengthened and passed through tiny holes or small gaps between the contact microphones and the post placards, it triggered vibrational energy that created oscillations, producing high-frequency whistling tones (as heard in the fourth minute). Listen closely at 04:25 when my knee accidentally sets off a new sonority captured in the recording. In a moment of phenomenological perception, the entire compositional proceedings became a coalescing of site, harmonics, dissonance, and a multiplicity of relational sonorous entities, resulting in a complex interaction with multiple temporalities entangling in, on, and around the posts. I step back from the posts, feel the rain and wind hit the back of my coat, and become fully attuned to the possibilities of my conceptual framework: the multiphonic.

5.3: The rain began to fall (heard growing in intensity at 04:05), and perceived it striking the post placards with increasing ferocity (audible from 04:05). The subtle but steady throbbing aeolian drones in the background of the recordings then subside to reveal the random and aggressive notes of the falling raindrops, which hit and resonate against the metal post placards to which my microphones are connected. The increasingly random rainfall slowly reveals percussive-like tapping rhythms that are in the upper registers of frequencies between 700 hertz and 14kHz (rising in amplitude at 04:50). The rain begins to fall harder, clashing with the passing train sonority (heard at 05:15), a low throb of 70hz remains, alongside other higher frequencies when the rain strikes the placards. The mixture of these sounds draws me in as I listen with agency. Human voices and a domestic animal coalesce at 07:10, intertwined with birds and passing traffic (07:42). As the rain begins to ease, I detect a distant siren caught within an aeolian sound blowing across the Fenland waterways and the aeolian sounds are gathered by my microphones (heard until the piece fades out at 07:30).

Fig. 5: Holme Fen Post A connected to two contact microphones (with Zoom H6 recording device in the backpack at the bottom of the post) - Photograph by Simon Scott (July 2021).

5.4: Having enough recorded material on my Zoom H6 recorder to satisfy my creative desires as a field recordist, I put away my equipment and leave the sodden site toward the A1 road to drive back to my studio. I once again reflect on the written works of Krause and Schafer, discussed earlier in this chapter, which contradict my personal experiences of recording a soundscape. If field recording is defined as a multiphonic methodology for gathering sonic materials, I am sure that today I would have enough to prove, through the composition I am about to edit and create, that both Krause and Schafer have no right to alienate the soundscape. In the studio, during post-production, I opt to layer the sound recordings, which result from

over ten hours of field recordings of the posts. The aim of composing this work was to create a multiphonic assemblage of what was captured by my microphones within the posts and also surrounding the posts. There is no objectification of the posts or of the rainfall that produced indeterminate rhythms on my microphones. My practice represents both the audible soundscape of Holme Fen entangled with the unheard ecology of everyday vibrations brought within the range of hearing.

I used transparent editing techniques, such as reducing some very obtrusive low-end frequencies in theQ3 plugin so that the sounds pitched in the upper registers of the frequency spectrum could be heard with better clarity. These simple manipulations of recorded audio allow me to follow the sequence of recorded events, as previously stated, to keep the chronological sequence of events the same in the final composition. Perhaps *Holme Fen Posts* could also be considered a homage or tribute to Luc Ferrari's *Presque Rien No.1*, as discussed in Chapter One, because of the longitudinal Nature of recording in one place all day long and the transparent edits where I reduce the field recording events down to just over eight minutes, with minimal processing. A longer version of this composition was commercially released in January 2023 on CD and digital download by Australian label Room40 (see Appendix D).

Fig.6: Photo of a tourism poster in Holme Fen – taken by Simon Scott (2020)

5.5: To conclude this seasonally themed summer chapter, I witnessed the cartographical trauma of human-induced abuse at Holme Fen Posts in many contrasting climatic conditions. The depiction of the season of summer, often associated with long, hot and sunshine filled halcyon days, was replaced with strong wind, occasional rainfall and then bursts of unpredictable sunshine. "Climate change is a lived experience: one that merges abstract knowledge with the sensory and emotional power of ecological disruptions, like unseasonal weather"[151]. To know that the draining of the Fens, as discussed in the previous chapter, has resulted in the area sinking below mean sea level exacerbates the risk of ongoing flooding and soil erosion. This long-term ecological trauma of the surface of the Fens seems metaphorical to me: we are living on borrowed time. The posts being a tourist attraction seems paradoxical. As visitors stare and contemplate the ecological crisis that is leading us into a mass sixth extinction, does this provoke a reaction, or realisation, of just how prevalent the Nature-culture dichotomy is in the contemporary Fens? *Holme Fen Posts*, my novel portrayal of this particular day spent recording, creatively discloses how the slow disappearance of the Fens is an inherited division of Nature and culture. The multiphonic serves as both a practical tool to create a composition to delineate this representation, but also is employed as an analytical framework to view and confront the monstrosity of the ecological crisis in the contemporary East Anglian Fens. Will the forthcoming autumn, explored in the following chapter, remain a reassuringly neatly quartered man-made construction that behaves in a consistent pattern and follows the calendar? Or will autumn emerge as another unstable season that is unforgiving in its unpredictable meteorological events and resit its invented categorisation?

[151] Alder Keleman Saxena, "Unseasonal Weather", in *Field Guide to the Anthropocene: The New Nature*, ed Anna Tsing et al, (Stanford: Stanford University Press, 2024), 84.

Chapter Three: Autumn

This autumn-themed fourth chapter opens with a multisensory depiction of the early arrival of migrating geese in skeins. A Fenland eel fisherman also shares his insights regarding his trade and how the disruption and displacement of our traditional four seasons remind us that environmental catastrophes, such as climate change, are ever-present in the Anthropocene.

Part Two of this chapter explores more-than-human entanglements in relation to the complex communications beneath our feet within the soil. This section also draws on plant intelligence and explores the ideologies, creative ideas, and theoretical knowledge of Peter Wohlleben, Merlin Sheldrake, and Anna Tsing through the conceptual lens of the multiphonic.

Part Three examines the methodology of crafting a composition at 220Hz, which is an indeterminate modular synthesiser 'patch' reflecting autumnal ecological perspectives. It further delves into the creative possibilities of using the multiphonic concept, encouraging the composer to perceive the entanglements of the natural world and anthropocentric influences as creative convergences.

In Part Four, I reflect on the American composer, artist, and mycologist John Cage and explore his creative observations and inspirations of indeterminacy, polyphony, and listening in relation to the research questions. Cage's interests in fungi, composition and ecology are key to multiphonic perceptions and the environmental sensibilities discussed within this research project.

Part One: UnNatural Writing #3

1.0: As a child, the season of autumn would begin every year with a large chevron of geese passing noisily over my home and then descending into the wide Fenland sky to spend winter with us. I would shiver in delight as I heard the ringing, chiming, honking clatter of geese arriving from the harsh northern temperatures of Greenland, Iceland, and the Arctic. Serving as a harbinger of the autumn, the turbulent cries of geese as they fly over us, singing Scandinavian goose-themed sagas, represent one of the many metaphorical needles that stitch together the seasons. Yet, their early autumnal arrival falls out of synchronicity with what is familiar, and the seasons are untangling. I can relate this to sitting in a muddy ditch in Tick Fen in the rain. I am caught in the rain, shivering from the cold, whilst immersed in Nature, listening to the dissipating echoes of the skein's vocalisations that resonate in a mournful manner.

Autumn has made a remarkably swift transition from late summer to the arrival of autumn, and the geese are arriving unusually early. The weather is bright and mild, and the leaves on the trees have not yet fallen, maintaining their vivid transformation into glowing swells of brilliant orange, yellow, and red. The regularity and security once offered to me by the seasonal cycles are slowly transitioning into something chaotic, uncertain, and unfamiliar. My daughter collects conkers, the colour of milk chocolate, from Horse Chestnut trees that line the canal bank in Upwell. I am there to visit an eel fisherman called Peter Carter. His little shop opposite the graveyard, full of noisy corvids preparing for the cold spell, has baskets and fishing nets scattered everywhere. His ancestors, including his great-grandfather's father, were waterfowl hunters and eel fishermen. Today, eels are nearly extinct in the rivers and canals, and there is little demand for shooting wildfowl. As a result, Carter has turned to willow weaving and teaching this craft to earn a living. I mention that I'm creating music by recording the contemporary East Anglian Fens, and he looks at me blankly. Before I leave his small shop, he tells me that next year in early spring he will know when to set his eel traps: "when the willow begins to bud the eels come out of the mud". As I get up to leave I ask him if he has noticed if the seasons have changed since he was learning his trade as a boy in the Fens with his father. He nods and replies, "Yes, loads".

Part Two: Plant Intelligence

2.0: In this second section, I examine how plants and fungi behave as entangled and borderless communities. They can be perceived as metaphors for the multiphonic soundscape and encourage multi-sensual engagement. Fungi coexist in dense mutual underground networks, connected by hyphae into vast assemblages known as mycelium offers conceptual opportunities that metaphorically relate to my emergent concept.

2.1: In his book *Entangled Life*: *How Fungi Make Our Worlds, Change Our Minds and Shape Our Futures* (2020), Sheldrake describes a listening encounter to a recorded composition by American musicologist Louis Sarno, entitled '*Women Gathering Mushrooms'.* In the recording, he discovers the multiple melodic vocal lines sung by the singers from the Central African Republic, wandering amongst the animals of the forest collecting mushrooms. He comments, "Many songs coalesce to make one song that doesn't exist in any one of the voices alone"[152]. Sheldrake then relates this metaphor to the behaviour of fungal networks beneath the soil. Each of the women's voices can't be seen as separate from the others because they form a sonic entanglement similar metaphorically to a fungal network called mycelium. He comments that mycelium is "polyphony in bodily form"[153]. Collective sonorities, such as multi-species assemblages, create a universally inclusive zone of sonic democracy and entanglement. The multiphonic, in alliance with the term polyphonic, can be applied as an analytical framework to think beyond the compositional elements of a composition and perceive the entire sonic network of the recorded work by Sarno. Beyond the female voices, the forest, and the animals, one can listen and perceive the technological aspects of the recording, the recordist and the external influences that are at play, such as the interchange with the rest of animate life. This experience can subsequently be applied to any listening experience if the multiphonic lens is employed. It has the advantage of moving our listening attention to both the external influences (meteorological, seasonal, electromagnetic, etc.) and internal perceptions (phenomenology) of the recordist. The multiphonic expands our observations about, to borrow the phrase from David Abram, the 'more than human' and Sheldrake heard polyphony as an entanglement with the forest floor. Abram claims, "There were all too few terms by which to speak of the outrageously multiform exuberance of Nature – to acknowledge the upwelling and

[152] Merlin Sheldrake, *Entangled Life*: *How Fungi Make Our Worlds, Change Our Minds and Shape Our Futures*, (London: Penguin, 2020), 61.
[153] Ibid.

many-voices creativity that steadily surges all around us and even through us as we go about our days"[154]. Abram even uses 'multiform', with its prefix of 'multi' in this example of expanding on the useful but ambiguous term polyphonic. Shifting from polyphonic to the multiphonic, the field recordist becomes connected and participatory in their practice, situated in context, with the soundscape, to the recording technology that mediates their listening, and as a lens of holistic perception, the multiphonic becomes just as important as the women who are singing, the animals, the mushrooms and the forest.

2.2: Tsing observes, in her book *Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, that polyphony occurs when "each melody carries its own rhythm, and the whole is in listening across the engagements and interruptions of the varied melodies" [155]. We find Tsing using the term polyphony as deeply embedded in musical tradition. This example clearly shows that Tsing connects it to melody. She states:

> "In Western music, the madrigal and the fugue are examples of polyphony. These forms seem archaic and strange to many modern listeners because they were superseded by music in which a unified rhythm and melody"[156].

One of the key differences between a multiphonic methodology and polyphonic music lies in the expansion of traditional music forms. Concepts of melody and harmony are entangled with dissonance and sonic detritus of the Anthropocene when multiphonic is a methodology. To bring Schafer and Krause back into the conceptual multiphonic frame, an accommodation of *noise* is enabled. Douglas Kahn claims that it was "first formalised in Italian Futurist Luigi Russolo's *Art Of Noises* manifesto from 1913 and echoed in John Cage's call in "*For More New Sounds*" in 1942"[157]. Multiphonic, as both a practice and an analytical tool, transcends traditional musical theory distinctions; it embraces *all* sounds and removes any restrictive borders of genre or reductive classifications. The methodology of the multiphonic encompasses

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[154] Dave Abram, *More Than Human Rights: An Ecology Of Law, And Narrative For Earthly Flourishing*, César Rodríguez-Garavito ed. (New York, NYU Law, 2024),341-345 https://mothrights.org/wp-content/themes/nyu-moth/assets/images/book/pdfs/ripped/15-More-Than-Human-Rights_Book-On-the-Origin-of-the-Phrase-More-Than-Human.pdf.

[155] Anna L. Tsing, *The Mushroom At The End of the World: On the Possibility of a Capitalist Life in Ruins*, (New Jersey: Princeton University Press, 2015), 686.

[156] Anna L. Tsing, *The Mushroom At The End of the World,* (New Jersey: Princeton University Press, 2015), 23.

[157] Douglas Kahn, *Earth Sound Earth Signal: Energies and Earth Magnitude in the Arts*, (London: University of California Press, 2013), 6.

the technological means of production, setting it apart from others' observations, such as Tsing and Sheldrake. I am employing technology as a process to perceive the entanglements and sonic narratives to create competitions that reveal the 'crowdedness' of multiple humans and non-human beings with natural phenomena, the phenomenological perception that I experience as the field recordist, the meteorological events at the site where the recording occurs, and whatever else my microphones can gather. Therefore, the multiphonic, as a practice, encourages an aesthetic appreciation of the holistic surroundings as an evolving mutual interaction that blurs the Nature-culture binaries, and presents my novel perspectives as compositions. Tsing is expansive by encouraging others to creatively perceive all environments as "a site of cosmopolitan transactions"[158]. She comments:

> "Next time you walk through a forest, look down. A city lies under your feet. If you were to descend into the earth, you would find yourself surrounded by the city's architecture of webs… this city is a lively scene of action and interaction… Reach down and smell a clot of earth; it smells like the underground city of fungi"[159].

Tsing multi-sensorially weaves together a multitude of network associations, connecting together fungi, decay, and the natural subterranean architecture of the soil. Thus, to consider the forest floor as a perceptive, communicative, interactive and cooperative ecosystem of multiplicities, similar to an urban city, allows us to shift and expand on Tsing and Sheldrake's polyphonic metaphors and add multiphonic to apply a multi-sensual element to the concept of multiphonic, that encourages us to perceive entangled human and more-than-human networks[160].

2.3: *Beneath the Forest Floor* (1992) by Hildegard Westerkamp is a profoundly inspiring composition I first heard at the Acoustic Ecologies festival in February 2020. It is an encapsulation of anthropogenic sounds coalescing with the sounds gathered from forests on Vancouver Island. Just as I was formulating my research, as discussed in this thesis introduction, this seventeen-minute piece of field recording composition inspired me when listening to the presentation of her composition through high-quality stereo speakers at

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[158] Anna Tsing, *Arts of Inclusion, or How to Love a Mushroom*. *Manoa* 22, no. 2 (2010): 191–203. http://www.jstor.org/stable/41479491.
[159] Ibid.
[160] Christophe Cox, *Sonic Flux: Sound, Art, and Metaphysics*, (London: University of Chicago Press, 2018, 116.

'Acoustic Ecologies' festival (2020); I began perceiving both human and more-than-human entanglements in her composed layered sounds and it has no separation between sound sources or a central musical voice, such as the objective capture of a specific bird or chainsaw. It is also explicitly processed by audible processing and filtering methods, distinctly heard from 07:17. At this festival, it was one of the first occasions I'd considered entangling *all* sounds of my field recordings together, rather than mixing together separate field recordings , and editing out anything that may relate to my employment of technology, to achieve a composition that connect desired sound with, to use Schafer's term, "unwanted sound"[161]. I subsequently performed *Emergency Exit* (2019) in the middle of the same room and without any concern for revealing my audible anthropocentric presence in the field recordings to the audience.

I shall continue this chapter's autumnal theme by delving deeper into the vibrational ontology on and beneath the ground, exploring the intelligence and creative possibilities of plants and fungi. Can the roots of plants, trees, and underground fungal networks communicate, perceive, and interact creatively? What stories might this network tell of the Fens?

2.4: "Phonotropism" is a term coined by Stefano Mancuso and Alessandra Viola, who comment that in 2012 in Italy a research discovery was made. The name is taken from the Greek *phono*s, 'sound", and *trepein*, "turn"…the roots, too, hear and are capable of distinguishing sound frequencies"[162]. Indeed, the discovery unveils potentially new scenarios and possibilities in plant communication pathways. The term describes how plants respond to external stimuli, such as sound, by receptively conducting vibrational information and distinguishing frequencies. It also brings to light that plants, as American journalist Michael Pollan comments, "are considerably less passive than they appear, and are in fact wily protagonists in the drama of their own lives – and ours"[163]. This begs the question of whether music and multiphonic communication are occurring underground and if artists and composers can tap into this 'bioacoustic' resource. In an interview, Peter Wohlleben, the author of the book *The Hidden Life of Trees* (2016), was asked if plants can hear and he confidently remarked that they can communicate through sound. He refers to a statement made by Monica Gagliano,

[161] R. Murray Schafer, *The Tuning Of the World: Our Sonic Environment and the Tuning of the World,2nd ed.* (Vermont: Destiny Books, 1994), 182.
[162] Ibid, 76.
[163] Michael Pollan, *Brilliant Green*, (Bologna: Island Press, 2013), xi.

a plant physiologist and postdoctoral research fellow at the University of Western Australia. He pronounces:

> "I can answer without hesitation in the affirmative. This was tested years ago with Arabidopsis, a genus of rockcress beloved of scientists. Beloved because it grows well, it reproduces rapidly, and it's easy to keep track of its genes….Arabidopsis, then, can hear, and this makes perfect sense"[164].

Wohlleben also commented that scientists discovered that the roots of the *Arabidopsis* oriented themselves towards clicks of the frequency of 220 Hz, and he states how seedling roots can be detected making sounds which are crackling quietly at a frequency of 220 hertz[165]. Gagliano confirms these claims. She has gathered evidence in her research that some plants detect sound frequencies and has also identified that plants make their own sounds, the obvious purpose of sound might be to communicate with, "in particular, a crackling noise in the roots at a frequency of 220 hertz"[166]. In her experiment, which encountered much resistance from scientists since publishing her paper, she discovered that plants detect sound as they orientate their tips in the direction of where a sound was coming from when exposed to acoustic tones in the range of 200 to 400 Hz[167]. However, despite raising questions about its legitimacy, and the vocabulary Gagliano chose to reveal her findings, her results were approved for publication by independent reviewers[168].

2.5: Plant intelligence, or 'Phonotropism', proves that roots can perceive sound and move to follow it or away from the sound source if it is perceived as a threat. Roots listen and are capable of distinguishing sound frequencies[169]. However, plants (and trees and fungi) do not use conventional auditory pathways, such as physical organs like ears, to perceive and receive sound. A line of inquiry began in the creative period of the early 1970s. It was an era when

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[164] Peter Wohlleben, "Branching out: is communication possible between trees and people?" *The Guardian,*May 28th, 2021, https://www.theguardian.com/books/2021/may/28/branching-out-is-communication-possible-between-trees-and-people.
[165] Peter Wohlleben, *The Hidden Life of Trees: What They Feel, How They Communicate—Discoveries from A Secret World*, (Vancouver: Greystone, 2016), 13.
[166] Diàna Markosian, "Do Trees Talk to Each Other?" *Smithsonian Magazine*, March, 2018, https://www.smithsonianmag.com/science-nature/the-whispering-trees-180968084/.
[167] Karen Bakker, *The Sounds of Life: How Digital Technology Is Bringing Us Closer to the Worlds of Animals and Plants,* (Princeton: Princeton University Press, 2022), 106.
[168] Ibid.
[169] Stefano Mancuso & Alessandra Viola, *Brilliant Green*, (Bologna: Island Press, 2013), 76.

experiments exploring how humans could listen to organisms, such as fungi, plants, and tree roots, hypothetically performing bio-acoustic symphonies of the soil also commenced. In 1973 Peter Tompkins and Christopher Bird's book *The Secret Life Of Plants* first encouraged the general public to consider plants in ways we never had before. This movement began in 1970 with the release of Dr. George Milstein's album *Music to Grow Plants*. It developed further in 1973 with *Plantasia* by Canadian composer Mort Garson, a classic album that continues to be re-pressed and manufactured for commercial release. This work conceptually explored the communication between music and plants using his Moog synthesiser. Interest and experiments exploring music that supports plant growth, such as Molly Roth's *Plant Talk* (1976), gained popularity and evolved over the decade. American composer Stevie Wonder also scored a flora-based project titled *The Secret Life Of Plants* in 1979, and American composer, artist, and mycologist John Cage famously used plants as musical instruments during the 1970s. Cage's *Branches* (1976) deploys amplified cactus and other plant materials to produce music[170]. Many other seminal artists were inspired to create plant-related music, such as the artist Annea Lockwood, who in *Piano Garden* (1969-1970), explored the effects of plant growth on musical instruments by abandoning pianos in outdoor fields and gardens[171]. All the examples above demonstrate how artists encourage and employ entanglements with plants to dissolve the boundaries between culture and Nature and relate to the research project, where the multiphonic may be employed as an analytical tool to interpret the work of others.

2.6: As explained in Part Two, Gagliano has identified a sound emission frequency of 220 Hz. My creative approach was metaphorical rather than literal; for instance, I utilized electric signals of the same frequency that a plant uses to communicate in order to create a composition that I will discuss the methodology of creating in part four of this chapter. In tandem with the research results of Gagliano and Wohlleben in 1997, Suzanne Simard, a Canadian forest ecologist, discovered that the Douglas Fir and Paper Birch trees in British Columbia were communicating and sharing resources within a forest ecosystem. Simard noted that the older

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[170] Alastair, Macaulay, "Review: John Cage's Historical Niche, a Legacy in Letters", *New York Times*, July 20th 2016, https://www.nytimes.com/2016/07/21/books/review-john-cages-historical-niche-a-legacy-in-letters.html.

[171] "Sounding Out!", Carlo Patrão, accessed October 13th 2023, https://soundstudiesblog.com/2018/02/26/botanical-rhythms-a-field-guide-to-plant-music/#:~:text=Artists%20like%20Annea%20Lockwood%20(Piano,tune%20in%20to%20plant%2Dtime.

trees nurture and mother their children, referring to them as "the Mother trees".[172] This 'unearthing' of the truth, as Simard explains in her book *The Mother Tree* (2021), reveals a discovery of interdependency along with the communication and cooperation occurring within the soil, facilitated by the mycorrhizal network. Viewing the soil as a community of interacting intelligences and frequencies counters any anthropocentric bias and the superiority inherent in the Nature-culture dichotomy. The Fens serve as a testament to this, as the ecological collapse is sonically transmittable. The multiphonic framework encourages the ecological exploration of these unexpected sonorous worlds which offers creative possibilities to me as a composer who wishes to reveal just how interconnected everything is. Under our feet, there are multiplicities which we should explore, learn from, and creatively embrace. As Pauline Oliveros said, in '*Poem For Change'* "Listen! Not with your ears with your feet" [173]. As previously explored, the Holme Fen posts are sinking into the ground beneath them. The area is below mean sea level and this correlates with the ecological crisis that the multiphonic examines. The contemporary East Anglian Fens is a pertinent example of the premise that beneath our feet, the soil offers a multitude of creative possibilities and draws the multiphonic concept into considering the consequences of extraction and further exploitation.

2.7: Lynn Margulis, a University Professor in the Department of Geosciences at the University of Massachusetts at Amherst, received the National Medal of Science in 1999 from President Bill Clinton of the United States. She comments that "we are symbionts on a symbiotic planet, and if we care to we can find symbiosis everywhere"[174]. Multicellular organisms engage in ecological symbiotic relationships characterized by cooperation, interaction, and clustering in response to the precarious conditions of climate change and biodiversity loss, forming a multi-species and multiphonic assemblage. It sensorially dismantles the superiority of the modern individual whose Anthropocentric view is that we are individual organisms in a hierarchy of power[175]. Through interacting and sharing this complex prevalent underground network, the entire forest gains an awareness, perception, consciousness, and 'many-voicedness' of its own symbiosis. Thus, a question can be posed if one can conceptualise the non-human intelligence

[172] Susan Simard, *The Mother Tree: Uncovering the Wisdom and Intelligence of the Forest*, (London: Allen Lane, 2021), 5.
[173] Pauline Oliveros, *The Book Of music And Nature*, eds. Rothenberg & Ulvaeus, (Middletown: Wesleyan Uni Press 2001), 247.
[174] Lynn Margulis, *Symbiotic Planet*, (New York: Basic books, 1999), 5.
[175] "The Best Of End Times: A Conversation with Anna Tsing", Charles Carlin, accessed February 12th 2020, https://edgeeffects.net/anna-tsing/.

of the forest, its communication and expression, in a language other than one the human brain can understand. If so, this 'mesh', to borrow Morton's term or Simard's notion of the 'weave', represents a symbiotic relationship of entangled and woven associations of sound emissions in which technological resources may amplify, capture and disclose[176]. Therefore, if one employs a microphone to observe, notice and participate within a soundscape the sonorous assemblages of multiplicity, or 'multiphonic', one can tune into both the macro and micro sonorous zones of subjectivity enabled by listening and noticing. To attune to the multiphonic is an aesthetic experience which provides creative inspiration to many who cross disciplines of academic or artistic fields of enquiry. In autumn this ecological and creative multifariousness and indeterminacy leads me to an investigation of the work of John Cage.

[176] Susan Simard, *The Mother Tree: Uncovering the Wisdom and Intelligence of the Forest*, (London: Allen Lane, 2021), 221.

Part Three: John Cage & The Murmuring Cosmos

3.0: This third chapter section, I delve into the inspirations and reflections of American composer, artist, and mycologist John Cage regarding the seasons, indeterminacy, and his listening practices. His work—such as attentiveness to the natural world, environmentalism, and the incorporation of non-traditional musical sounds into his compositions—undoubtedly influences my site-specific practice and the holistic capabilities and creative possibilities of the multiphonic.

3.1: Cage composed The Seasons in the 1940s, featuring all four distinct seasons creatively depicted as the subjects of four major movements, along with four preludes and a reprise. In 1947 the performance, which predates his explorations into indeterminacy, was choreographed by Merce Cunningham, marking Cage's first piece for orchestra. He portrayed autumn as a season associated with the concept of violent destruction, reflecting his preoccupation with how humanity is disconnected from the natural world and brings the environment close to total destruction. It provokes a very powerful message and is closely related to the key points in this research. Cage responded to the environment and the natural world around him by being responsive, creative and taking notice with an environmental sensibility, which is central to this thesis.

Cage commented, "I have come to the conclusion that much can be learned about music by devoting oneself to the mushroom[177]. For Cage, mushroom foraging provided clarity of thought and, as Kingston Trinder claims, "Cage frequently heard and conducted while wandering, deeply introspective yet intently observant[178]. For Cage, discovering mushrooms and how one encounters them while foraging became crucial to his creative practice. As Tsing comments, mushrooms are both unpredictable and inspiring: they help one listen and pay attention[179]. The act of paying attention is crucial to the multiphonic and a means to perceive beyond polyphonic and into an expansive sensorial engagement. Cage moved out of New York and lived in the town of Stoney Point. His frequent visits to the woods inspired him, and his music, through

[177] John Cage, *Silence: Lectures and Writings*, 9th ed, (London: Marion Boyars, 2009), 274.
[178] Kingston Trinder, *A Mycological Foray Variations On Mushrooms*, (Los Angeles: Atelier Éditions, 2020), 15.
[179] Anna Tsing, "Arts of Inclusion, or How to Love a Mushroom", *Mānoa* ,Vol. 22, No. 2, (2010), 191-203. http://www.jstor.org/stable/41479491.

repeat visits, as the repetitive noticing of a place, such as the Fens, begins to transform one's work into a site-specific sound exploration. The specifics of locality play an essential role in this sonic research, as does the process of observing the incremental changes of the seasons in both familiar and unfamiliar ways.

3.2: In the early 1950s Cage began using chance operations, also known in Europe as aleatory music, to inform his musical creativity alongside Indian philosophy and Zen Buddhism. Cage consulted the *I Ching*, or *Book of Changes*, a Chinese book of ancient text, which enabled him to leave open compositional choices, such as sound events, durations, pitch, tempo, and dynamics, to create segments of music. For Cage, the desire was to attain freedom from the repetition of sameness, the constraints of fixed Nature, and the strict predetermined notational rules of classical music that composers and musicians have traditionally followed. As a result, his work embraces universal sonorities that are not limited by categorisation or predetermined structural classification. My composition *220 Hz*, which is discussed next in this chapter, is also full of indeterminacy and chance procedures (including a synthesiser module) called 'Chance', inspired by Cage. In the 1950s, he also released a collection of brief performances entitled *Indeterminacy*, many of which celebrated his encounters with mushrooms from his iterative visits to the woods. Executive chef, mycologist, and Cage enthusiast David Rose explains:

> "Mycology for Cage became as indispensable an oracle as the *I Ching* in exploring possibilities for musical composition. The murmuring cosmos of the fungi concealed for him the secret of silence throughout the rhizosphere and the deep woods, and the process of encountering mushrooms helped to spark the realization that silence is ambient sound. Cage positioned mushroom hunting as a Para musical phenomenon – the perfect enterprise for appreciating silence and engaging with chance"[180].

For John Cage, the environment is full of music, and he had no significant distinction between music and ambient sound[181]. Cage wished for his audience to listen to their surroundings so that the Earth might be saved, to take notice, and to unite with Nature in its working manner.

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[180] David Rose, "Notes from Underground, Cage : Two (Diary and Letters)". *FUNGI*, Volume 10:1 (2017): 8-15, https://www.johncage.org/blog/rose.pdf.
[181] Andy Hamilton, *Aesthetics & Music*. (London: Continuum, 2007), 46.

Written in 1952, his composition *4'33"* is deliberately environmental, as its four-and-a-half minutes of silence was written for an open-air amphitheatre[182]. Also known as "*Silent Piece"*[183], this could be considered the ultimate experiment in encouraging the listener to observe the environment around them. Apart from indicating the three movements by opening and closing the piano lid, it lacks intentional sound creation or musical performance. Cage frequently, when performing the piece in indoor performance spaces, would open the venue's doors and windows to enable the audience to listen to and experience the holistic environment and its endless soundscape. It is also an inspiration for me as a performer to consider the venue or centre space, and audience, as participants in the event. In this instance, Cage inspired me to open my car windows and play the piano piece I recorded and composed for *Apart* (see Appendix B), letting it resonate out into the Fens. I used this particular field recording for Chapter One's composition *Disappearing Cuckoo*. Cage's attunement to the natural world is holistic, demonstrating acute environmental awareness that links his work to this research project. David Rothenberg, a philosopher in animal sounds and musicology, claims that Cage "made music into a way of perceiving the world, an openness to the happenings around that would tell us how to live"[184]. It encourages phenomenological perception and receptivity to *all* sounds. This embodies the essence of the multiphonic, using holistic perception as a compositional method and as a way to analyse others' work critically.

3.3: The works referenced above by Cage, such as '*4'33*'and his explorations into indeterminacy, have been analysed more thoroughly than I intend to in this thesis, in publications such as *Electronic and Experimental Music: Pioneers in Technology and Composition* (2002) by Thom Holmes, *Background Noise: Perspectives on Sound Art* (2008) by Brandon LaBelle, and *Sonic Flux: Sound, Art, and Metaphysics* by Christoph Cox (2018). As Labelle aptly comments, "Given the extraordinary breadth of materials written on and about John Cage, not to mention his own writings and extensive creative projects spanning his long life, to begin my own undertaking with him is to confront a mass of material, opinions, bibliographies, references and anecdotes"[185]. However, his compositional entanglements with

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[182] . Timothy Morton. *The Ecological Thought*. (Cambridge: Harvard University Press, 2010), 108.
[183] John Cage. *Silence: Lectures and Writings*. (London: Marion Boyars Publishers, 2009), 276.
[184] David Rothenberg, "Get Out of Whatever Cage: Avant-Garde in the Natural World", *Musicworks,* 58, (1994): http://aeinews.org/aeiarchive/writings/roth-cage.html.
[185] Brandon LaBelle, *Background Noise: Perspectives on Sound Art*, (New York: Continuum, 2008), 3.

chance, noise, the seasons, and his ecological sensibility serve as a fitting connection with my practice. The multiphonic also connects to his environmental aesthetic of noticing the ecology of every entanglement, the seasons changing, and not discriminating against certain areas of sounds, such as noise or dissonant timbres, leading to new interpretations and discoveries of ecological entanglements that exist not only around and above us but also beneath our feet.

Part Four: Methodology of *220 Hz*

4.0: In this fourth section, I discuss the creation of this chapter's composition *220hz* that draws inspiration from a frequency that is produced by a plant, by the indeterminate processes of fungi, and the human influence on the natural world. It is facilitated by using modular synthesizers and field recordings to create a metaphorical underground (mycorrhizal) network of music. It exemplifies a holistic approach to listening to the natural world (via the multiphonic mode of perception) and our interaction with media technology to closely observe and create from it.

Listen to the composition *220 Hz* with studio speakers or professional quality headphones, if possible, here:
https://drive.google.com/drive/folders/1NH26upSK8n4yeiKcMoxL81b1Eg5YWg6G?usp=share_link

4.1: The soil can be a potential site of sonorous activities that may inspire the creation of new novel perceptions that inspire creative possibilities that relate to my research questions. Therefore, as a composer, my intention for this autumn-themed chapter was to craft a piece that metaphorically represents an underground network, or plant communication, that is associated with the Fens but perhaps removes any borders and restrictions of strictly just creating a field recording composition. Therefore, based on Gagliano's claim that 220 Hz is the frequency of 'bioacoustic' communication within the realms of flora and mycorrhizal systems, I began to develop ideas for this composition. However, it has been argued that "a crackling noise in the roots at a frequency of 220 hertz, [is] inaudible to humans"[186]. If I can't detect the sound and record it, I must focus my creative attention and attention elsewhere.

4.2: As a child, I'd lay in bed in October and November and hear the skeins of geese arrive from Northern territories, and I'd be assured that it was a harbinger of colder days to come. The word skein has an etymology from the old French word 'escaige', meaning amounts of yarn, which is a length of interwoven yarn, such as wool. In Stephen Rutt's book *Wintering: A Season with Geese* (2019), he comments "Although it is the only use of skein that does not

[186] "Do Trees Talk to Each Other?", Diàna Markosian, accessed April 12th, 2022, https://www.smithsonianmag.com/science-nature/the-whispering-trees-180968084/.

have a textile meaning, I like the way it suggests threads"[187]. Since childhood, I think of the skein as a woven tapestry of sound, threads slowly unravelling, loosening, and moving out of synchronicity. Such as the seasons in the Fens, which I perceive as embodied knowledge via perceiving and recording the natural world. American philosopher Abrams describes Nature "as a realm of interwoven relationships"[188]. I like the interwoven description of the natural world, as it unites the seasons, the geese, and the Fens with anthropocentric influences, such as the ecological crisis, which are often separated in post-western enlightenment thinking. As British writer Robert MacFarlane observes, "The first law of ecology is that everything is connected to everything else – woven – with images of weaving and interconnection"[189].

Simard says that the underground networks of communication between plants and trees are what she calls "the weave"[190]. Interwoven is an apt way to describe how emergent sounds entangle within an environment to reveal an indeterminate holistic mass of sounds which coalesce into what can be described as music when composed. Mushrooms emerge from rapidly inflated hyphae, which is why they must absorb water from their surroundings; the reason that mushrooms tend to appear after rain. Rainfall is also related to Simard's statement that after rainfall, "the mushrooms had sprung out of the dense network of branching fungal threads running deep through the forest floor"[191]. Consequently, I created field recordings of the rain, imported them into music processing software called Logic Pro X for editing, and then transferred them to the Tiptop 'One' sample playback module for playback and processing within my modular system. The field recordings of geese vocalisations are vital to the defined autumnal theme of my research, as they evoke the onset of autumn in my episodic memories, while the early morning sounds of skeins flying overhead metaphorically represent the year's gradual passing. I repeated this process to import the field recording into my Tiptop 'One' sample playback module.

4.3: A modular system allows a user to carefully choose the individual compositional timbres and textures to create and modify sounds[192]. Users can often 'patch' them together in any order

[187] Stephen Rutt, *Wintering: A Season With Geese*, (London: Elliott & Thompson, 2019), 19.
[188] David Abram, *The Spell of the Sensuous: Perception and Language in a More-Than-Human World*, 2nd ed. (New York: Vintage Books, 2017), 85.
[189] Robert MacFarlane, *The Living Mountain*, (Edinburgh: Canongate, 2014), xxii.
[190] Susan Simard, *The Mother Tree*, (London: Allen Lane, 2021), p.221.
[191] Ibid, 13.
[192] Bjørn, Kim. & Meyer, Chris. Patch & Tweak: Exploring Modular Synthesis, (Copenhagen: Bjooks, 2018), 12.

they desire, as I do in my modular set-up. When the rain or geese samples are triggered from the Tiptop One module, connected via patch leads to other modules, it triggers corresponding aural responses based on the collection of modules you've assembled. I consider this as a musical environment. As a composer, I view modular 'Eurorack' format synthesisers as ecological and flexible. It is a very interactive, tactile system that produces predetermined and indeterminate sound synthesis. In relation to my practical research, I am a field recording composer using geese vocalisation and rainfall sonorities to represent the anthropogenic influence on the environment. In this composition, the environment is both the modular synthesiser and the Fens coalescing.

I next found the frequency of 220 hertz, inspired by Gagliano's discovery, by downloading a free application on my iPhone called *Sonic* to generate the same pitch. It is subsequently replicated as a tuned sinewave in the module called *New Timbral Oscillator* (NTO), made by SERGE Random Noise. With this equipment set-up, I can start to compose with the field recordings triggered from the Tip Top module, as previously mentioned. I have also used this when performing live concerts, and it is a very responsive and easy-to-use device which enables me to process field recordings through the 'Eurorack' modules I have gathered and 'patched' together in my system.

The NTO module is based on the vintage oscillator that French electronic designer Serge Tcherepnin developed in the 1970s at The California Institute of the Arts. Coincidently, Eliane Radique used a Serge synthesiser on her final electronic work *L'Île re-sonante* (2000). I sent a triangle waveform into a second module, called Dual Universal Slope Generator (DUSG), also made by SERGE Random Noise. On the DUSG the 'Rise and Fall' function times are voltage controllable (CV), and this adds further audio modulation possibilities when connected to a random voltage module such as 'Chance', made by the American manufacturer Qu-Bit. It is inspired by Cage's use of the Chinese divination text *I Ching*. 'Chance' generates random voltages in response to a digitally generated coin toss. I 'patch', meaning to connect,, this module into two random voltage inputs on the DUSG to produce indeterminate modulations that release variable indeterminate sounds. It is a very creative way to enable indeterminacy to manipulate sounds of the natural world and represents just how large the human fingerprint, meaning our profound influence, is on the environment.

I subsequently recorded this composition, into a fourth module called a 'Morphogene', made by a North American company based in North Carolina called Make Noise. It loops the sounds for continuous playback, which aligns with the influence of Schaeffer, and the 'Morphogene' is directly inspired by Schaeffer's Phonogene and Morphogene looper devices, which I explored in Origins of Phonography in Chapter One: *Spring*[193].

Fig.7: 'Morphogene' by Make Noise in the modular system that created *220 Hz*. Photograph by Simon Scott (2022).

This looping produces a meshwork of coalescing and overlapping sonorities that symbolically resemble "a mycelial mat, which matures, gathering nutrients"[194]. This module also receives two additional random voltages from 'Chance' to further generate indeterminate sounds. This

[193] "A guide to Pierre Schaeffer: The Godfather of Sampling", Johnathan Patrick, accessed January 1st 2025, https://thevinylfactory.com/features/introduction-to-pierre-schaeffer/
[194] Paul Stamets, *Mycelium Running: How Mushrooms Can Help Save the World,* (Berkeley: Ten Speed Press, 2005), 12.

promotes the random selection of audio segments within the module, aligning with the indeterminate processes which influence mushrooms appearing in the autumn. The Morphogene records two combined incoming signals (of 220 Hz) from both the NTO and DUSG, subsequently splicing them into microscopic granular segments of audio outputs, or metaphorical 'spores' of microscopic hyphae growth within a mycorrhizal root system. Paul Stamets, an American mycologist, comments, "hyphae fuse to form one mycelium, the resulting cellular network, called a dikaryon, is invigorated, binucleate, and capable of producing descendant fertile mushrooms with spore-bearing ability"[195].

4.4: This conceptual mycorrhizal network continuously evolves as indeterminate processes unfolding within this system, representing the season of autumn, which entangles everything in phonic mutualisms to create a metaphorical autumnal composition. It comprises multiphonic assemblages, some from natural phenomena via field recordings such as the rainfall that begins the composition, bird vocalisations heard at one minute, and also electronically produced sounds, such as the sine wave tuned to 220 hertz that enters the composition at 01:25. At 02:20. Aeolian field recordings emerge, and at around the 04:00 minute mark, rainfall reappears coalescing with a low frequency of 50 hertz. The track fades out around 05:30 minutes, and the sounds of organisms diminish. It is abstract and ambiguous, and even I, the field recordist, do not recall exactly what I recorded all of the time. The microphone captures so much that we can't see or detect it using our senses when being creative. As Morton comments:

> "Arts' ambiguous, vague realities will help us think things that remain difficult to put into words. Reading Poetry won't save the world. Sound science and progressive social policies will do that. But art can allow us to glimpse beings that exist beyond or between our normal categories"[196].

Morton's phrase "to glimpse" is significant. I hear glimpses of things, a multiplicity of sonorities coalescing when I am in the multiphonic mode of perception that I employ through my embedded practice. As I listen and compose in the field, I detect the "ambiguous, vague realities" and the "beyond and between categories" that Morton suggests in the above quote.

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[195] Ibid, 17.
[196] Timothy Morton, *The ecological Thought*, (Cambridge: Harvard University press, 2010), 60.

Therefore, the multiphonic enables my phenomenological experience of the Fens to experience sound in a perceptual state of flux.

Morton also comments that ecological art is an aesthetic experience heard through the lens of an environmental sensibility (the multiphonic framework), without any romantic depictions of picturesque or sublime countryside, or uplifting accounts of charismatic animals in Nature. "A more ecological art would linger in the shadow world of irony and difference…Ugliness and horror are important because they compel our compassionate coexistence to go beyond condescending pity[197]. Of course, any romanticism of 'Nature' creates a constructed natural world, part of the Nature-culture dichotomy, which acts as an obstacle to perceiving the environment and allowing us to "join the dots and see that everything is interconnected"[198]. *220 Hz* creates an uncomfortable, ambiguous, and even unsettling listening experience. The more I direct the microphone towards the natural world, the more I perceive the human fingerprint and its profound influence. It hypothetically embodies and portrays the composer as an active part of the environment, a human among the geese vocalisations discussed at this chapter's beginning. These can be heard at 01:00 and again at 06:00, accompanied by faint human voices, while birdsong and geese vocalisations blend in as the piece fades out. I mixed and mastered the composition with transparency and only subtle equalisation.

The entanglement of natural phenomena, anthropocentric sounds, and my manipulation in post-production combine to reveal the creative and technological possibilities that relate to my research questions. The audio features sections of the composition that include music technology under human control (the modular synths) as well as some unintended 'natural world' sounds, such as the murder of corvids flying past the microphone. This metaphorically reflects the intersection of humans and the natural world, of which they are an intrinsic part. The final recorded composition has been deliberately mixed down in post-production to a 24-bit resolution and a 48-kilohertz sample rate, ensuring professional quality audio.

4.5: To conclude, I have created a manufactured musical 'multiphonic' environment, or metaphorical ecosystem, in my modular synthesiser to produce *220 Hz.* Using the multiphonic as a practical and conceptual filter, this critical practice-based framework encouraged me to try

[197] Ibid, 17.
[198] Ibid, 1.

different approaches to using media technology. In previous examples, such as *Disappearing Cuckoo* in Chapter One and *Holme Fen Posts* in Chapter Two, I employed several types of microphones to gather my materials and experiment with different software effects to alter the field recordings, which reflected my novel perspectives of spring and summer in the Fens. For *220 Hz,* I found a successful way to incorporate the inspiration of Cage by allowing the modular system to trigger indeterminate musical actions by using the 'Chance' module and to overlook the limitations of being unable to perceive the sound of mushrooms and other organisms beneath the soil.

In my chapter discoveries, I was able to represent my multiphonic observations of human agency in the Fens within nonhuman systems. By intentionally activating the field recordings of geese' vocalisations and rainfall sounds stored in the TipTop One module, I metaphorically illustrated the human impact on the environment. The multiphonic is a method to address the entanglements creatively by building a technological system to produce music. This was my own individual way to investigate these human and nonhuman entanglements away from others who, as Mark Peter Wright comments, "Were troubling Nature from perspectives within political ecology, feminist philosophy, and postcolonial studies"[199]. The multiphonic provided my own creative framework where I could use it to gather my novel creative perspectives of autumn, and to analyse Cage, Tsing, Sheldrake and Simard, who have all been discussed in this chapter.

[199] Mark Peter Wright, "Post-Natural Sound Arts", *Journal of Sonic Studies*, 14, (2017), https://www.researchcatalogue.net/view/292319/292320/0/0.

Chapter Four: Winter

This chapter explores the season of winter; through my practice it creates a representation of what I discover in relation to this season and begins with a description of a domestic listening entanglement, a qualitative event of encountering a storm within the intimate surroundings of my home in the Fens. It discloses climate change as a sonorous and proximate narrative that is deemed distant, grand and imperceptible.

Part Two is a contextual detour through the season Winter in the Fens, a season of much activity and is built on local traditions, such as ice-skating, which are now under threat due to the advancement of climate change. It continues from Chapter One's historical analysis of the Fens, and it begins to inform this chapter's central composition entitled *Cessation*.

Part Three examines another artistic work where ice dissolution, anthropogenic activities, and influences of the weather inspire compositional creation. Watson's composition *Vatjaknöjull*, a field recording composition of a slowly dissipating glacier, shares similarities with some of the compositions in this research project

Part Four of this chapter explores the methodology for the accompanying musical composition, which opens an emotional portal to engage with the plurality of the environment and perceive climate turmoil that is affecting the seasons in the Fens. The composition provides an aesthetic experience for listeners that fosters further emotional engagement with planetary environmental issues.

Part One: UnNatural Writing #4

1.0: I am sitting in a room on the evening of December 26th, reading a book describing a particularly intense and immersive experience where the author is standing on Barry Beach during a heavy storm. The language evocatively conveys the encounter with a hostile wall of noise, which isolates and engulfs her in its deafening roar. I am captivated by the written portrayal of listening to her experience. I envision the Natural setting of the beach and the sound of the wind roaring across the surface of the waves.

I remain unaware of the growing intensity of a storm raging across the Fens outside my home. 'Storm Bella', named by the World Meteorological Organization, is gradually intensifying and disrupting everything in its icy path tonight. Lowering the book, I begin to listen intently. Is this sonic fact or fiction? I sit enraptured by the disturbing noise of the wind scraping against the surface of my chimney. The private and secure world inside my home has been breached by the distant geographies of the hostile storm. As it increases in its Natural intensity, I detect vibrational forces in motion emanating from the tumultuous journey southwards, from the Arctic Circle and Scandinavia, across the liminal space of the North Sea, and into the Fens.
Bella carries within its bluster the slow temporalities of glacial origins and ice displacement. I realise that in this moment of sensorial awareness, the external becomes internal. I sense Bella's invasive closeness, prompting me to take notice of the messages and truths that the Natural world is conveying.

Amidst the tinsel, Christmas tree lights, mince pies, boxes of chocolates and torn boxes of gifts, Storm Bella serves as a connective portal into the ecological peril facing our planet as it grapples with the environment, which is being radically, brutally, and catastrophically impacted by human activity.

Part Two: The Fens in Winter

2.0: In this section, following the season of winter, I will explore how anthropogenic activity is transforming the winters in the Fens and halting traditional sports such as ice skating.

2.1: The Fens once produced award-winning British ice skaters after establishing the National Skating Association in 1827. The ice drew communities of Fen folk to places like Whittlesea, Welney, and Mepal to skate, create slides, play ice hockey, pull sledges, and ride bicycles. It offered numerous winter sporting activities, and British ice-skating traditions began here when the cold weather halted farming. British writer and naturalist Roger Deakin wrote that in 1963, he and his Cambridge University friends shared a passion for ice skating, and someone recklessly drove their Mini along the frozen Ouse from Ely to Littleport—something that today, sixty years later, would be impossible due to the increasingly mild temperatures[200]. The Fen ice-skating championships were a vulnerable amateur sport, at the mercy of the elements, and have not been held since the final competition in the winter of 1996-97. Thus, ice's arrival gradually diminishes in regularity as time passes, and climate change is on our doorstep, affecting our lives. In 2013 Stoknes gave a seminar at the Norwegian Business School when a farmer union participant declared that interest in climate change for Farmers in Norway surged after repeated flooding made it impossible for tractors to be used on their fields. Often perceived as invisible and abstract, this event, Stoknes comments, "brought climate change to their doorstep"[201]. The Fens, as previously discussed, are also prone to severe flooding and are witness to the symptoms of global climate decline. Deakin mournfully comments, "Fenland skating has been quite used to an intermittent flowering, taking its chance with the weather, but the new warming of our world may pose a serious threat to its survival than the odd mild winter from now on"[202].

2.2: Sound phenomena moves distinctly through the air across the expansive Fens. The high amplitudes of sounds perceived are due to the specific flat topography and low elevation. Aviation, urbanisation, industrial farming, and transportation noises are ubiquitous all year

[200] Roger Deakin, *Waterlog*, (London: Vintage Books, 2000), 62.
[201] Per Espen Stocknes. *What We Think about When We Try Not to Think about Global Warming: Toward a New Psychology of Climate Action*, (Vermont: Chelsea Green, 2015), 41.
[202] Roger Deakin, *Waterlog*, (London: Vintage Books, 2000), 97.

round. If there were hills or mountains in this area, the characteristics of sound would differ due to geographical obstacles. However, most of the time, the flooded Fens, when frozen, quickly thaw and return to meltwater, which trickles in a soft whisper. When one steps on the ice it slowly groans or snaps, as explored in the forthcoming methodology section, as if to reveal its fragility and vulnerability as a natural resource. Therefore, recording the ice may be akin to archiving the Fens in winter before an ice recording becomes a eulogy for a future day when no ice forms.

Embedded within my listening experiences in this landscape are narratives of its changing environment, linked to distant memories of visiting this transitional wetland decades ago. I vividly recall standing in a fen with my daughter several years ago, perceiving all the sounds through an environmental sensibility as a unified auditory scene. The ice falling from the trees, illuminated by the light, splashed into pools of melt-water on the damp, sodden ground below, creating a multi-sensual multiphonic experience. On that mild winter day, there was meltwater, the sonorities of dissolution, and the cessation of ice, carrying the warning bells and narratives of climate change ringing in our ears. Are we listening?

Part Three: *Vatnajökull*

3.0: In this third section, I focus on discussing several pieces of music inspired by climate change that use the materiality of ice to highlight environmental and ecological concerns. One composition in particular, *Vatnajökull* (2003) by Watson, is examined because it confronts the listener with a powerful ecological message and features human and non-human entanglements, and slow geologic time that operate on different temporal scales.

3.1: Today, hardly a week goes by without glaciers or ice sheets making prominent appearances in The New York Times, The Guardian, the BBC, CNN, or other major North American and European news sources. However, they are more than just symbols of global warming. Indeed, glaciers have become an endangered species[203]. "As glaciers retreat sea ice thins, and ice shelves crumble, while melting ice becomes a symbol of rapidity and an apt chronometer for our current moment[204]. In 1986, American writer Barry Lopez wrote about the Arctic rapidly melting away with alarming intensity in his book *Arctic Dreams: Desire in a Northern Landscape*, "They have been wastelands for us; historically, we have not cared at all what happened in them or to them…I am inclined to think, however, that their value will one day prove to be inestimable to us"[205]. Almost forty years later, the impact of the ice continues to melt, causing sea levels to rise dangerously, and clearly it pertains to the ignorance and abuse of the idea of Nature in Western thought, which perceives it as a thing of some kind, "over yonder", called Nature[206]. It is an ecological catastrophe. The Fens, as examined in chapter two, have also been contemptuously perceived as tracts of wet, lonely, inhospitable landscape[207]. The Metro newspaper states, "Even if the world follows a low greenhouse gas pathway, by the year 2100, global sea levels are likely to rise at least 12 inches above what they were in the year 2000"[208]. Global

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[203] Mark Carey, *The History of Ice: How Glaciers Became an Endangered Species*, *Environmental History*, Vol. 12, No. 3 (2007), 498.
[204] Ibid.
[205] Barry Lopez, *Arctic Dreams: Desire in a Northern Landscape*, 2nd ed. (London: Vintage, 2014), p.12.
[206] Timothy Morton, *The Ecological Thought*, (Cambridge: Harvard University Press, 2010), 3.
[207] Francis Pryor, *The Fens: Discovering England's Ancient Depths*, (London: Vintage, 2019), 231.
[208] Anugraha Sundaravelu, "What parts of the UK will be underwater if sea levels keep rising?", *Metro*, November 2nd, 2021, https://metro.co.uk/2021/11/02/what-parts-of-the-uk-will-be-underwater-if-sea-levels-keep-rising-15525633/.

temperatures are also rising due to the concentration of greenhouse gases trapped in the Earth's atmosphere, and storms unleash ferocious ocean waves on fragile coastlines. The Fens are a low-lying environment that continually faces many challenges due to its geographical location and the industrialised cultivation of its soil. Lopez also challenges the commonly idealised and Edenic perception of the Arctic, which many people from temperate climates are culturally conditioned to believe, owing to the Nature-culture dichotomy.

Today, Arctic ice continuously melts due to the trapped concentrations of greenhouse gases, including methane and carbon dioxide, within the Earth's atmosphere, as discussed in Chapter One. The polar landscape and Arctic oceans reveal fragile ecosystems that falter due to anthropocentrism as they increasingly warm up and sea levels rise at least 12 inches above what they were in the year 2000[209]. In 2009, the theorist, architect, and writer Geoff Manaugh inquired whether one day "we'll eavesdrop on breaking glaciers from within"[210]. He did not realize that the gradual audible transmission of the glacier's "death throes," which he envisioned, had already been achieved six years earlier by Watson[211].

3.2: *Vatnajökull,* a composition taken from Watson's 2003 album *Weather Report*, reveals a recognition of the glacier as imbued with human agency. It is a musical composition that incorporates ethical considerations alongside a strong ecological message, highlighting various human and non-human entanglements operating on different temporal scales. This significant work questions the implications of human actions. Vatnajökull is Iceland's largest glacier, a massive river of ice formed between mountains in the remote central uplands, which is sonically represented through his close sonic encounter with the 10,000-year-old ice sheet as he follows its sonorous journey from the summit near Kverkfjöll to its cessation of ice. He comments that he is "putting his microphone where our ears cannot go and listening to and recording the sounds of air that has been trapped in the ice for

[209] Ibid.
[210] Manaugh, Geoff, *Bldgblog Book: Architectural Conjecture, Urban Speculation, Landscape Futures,* (San Fransico: Chronicle Books, 2009), 163.
[211] Geoff, Manaugh, "When landscapes sing: or, London Instrument", *BLDGBOG,*(blog), December 6th, 2005, https://www.bldgblog.com/2005/12/when-landscapes-sing-or-london-instrument/.

10,000 years being re-released back into the atmosphere[212]. He makes audible the narratives of climate change, which are revealed in how the fact that the notion of its dissolution is emblematic of humanity's impact on the planet[213]. In his book *The Spell of the Sensuous*, Abram states that listening tells us about the interior substance of things[214]. Watson's composition provides exactly that audition. In just eighteen minutes, the listener can engage with the glacier's cracks, groans, and creaking ice shifts and experience the dripping ice melting into the Norwegian Sea. His synthesis of the glacier's vast 10,000-year-old history compositionally cultivates particular ways of knowing and attentiveness towards things that are distant in space and time, similar to Morton's concept of the 'hyperobject'. The impressive compositional framing of rethinking time to human scale by editing lengthy field recordings creates an illusion of temporalities, similar to Luc Ferrari's *Presque Rien No.1* and my composition *Emergency Exit*. His compositional compression of place, which, when describing John Muir's Arctic writings in *The Cruise of the Corwin* (1917), Jacob Smith calls "planet-time: a spatio-temporal dynamic in which place is experienced in relation to a scale that extends beyond the human, and spatial immobility coincides with a present moment that expands to include the distant past or the distant future"[215]. The spatio-temporal dynamic can be part of a subjective multiphonic perception. When I record the Fens, I capture the audible sonorities of the present while also reflecting on the past of the Fenlands, as informed by this, alongside distant future narratives, all woven into a scaled-down and edited composition, such as Chapter Two's *Holme Fen Posts*. *Cessation*, which is central to this chapter, attempts a reduction of the vast temporal nonhuman scales of experience brought into human time.

3.3: Watson comments that to compose is like filmmaking; "it's not reality"[216]. Thus, we are listening to a representation of the glacier, framed by Watson's human experience of listening, to convey the sounds of a transitional and fragile landscape to listeners through an

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[212] *A life spent Listening: Chris Watson on the hidden music of our world,* Chris Watson, accessed December 1st, 2022, https://musictech.com/features/interviews/chris-watson-life-spent-listening-field-recording-foley-david-attenborough/.
[213] "Ice", Alexis Rider, accessed December 27th, 2019, https://culanth.org/fieldsights/ice.
[214] David Abram, *Spell Of The Sensuous*, 1996, 128.
[215] Jacob Smith, *Eco-Sonic Media*, (Oakland: University Of California, 2015), 118.
[216] "A life spent Listening: Chris Watson on the hidden music of our world", Chris Watson, accessed December 1st, 2022, https://musictech.com/features/interviews/chris-watson-life-spent-listening-field-recording-foley-david-attenborough/.

environmental aesthetic. Sound is visceral, and it connects to our hearts and imagination in a very direct way. The impermanence and dissolution of the glacier compel the listener to confront and reflect on human-caused environmental changes that will make our lives increasingly difficult. Therefore, this composition brings the distance and the uncanny threat of global warming into close and uncomfortable proximity, prompting us to confront and consider how intertwined human beings are with the natural world. *Vatnajökull* serves as a tangible piece of sonic art[217]. It is important to emphasise the irony that the glacier, situated in a national park, serves as a hotspot for Icelandic tourism. This parallels the Holme Fen posts, emblematic of the temporal subsidence of the Fens, which sink into the Fenland soil yet attract tourists and visitors from around the globe. The paradoxical perception of the natural world, encompassing both the glacier and the Fens, as distant and separate from humans reflects the Nature-culture dichotomy. Both the glacier and the Fens are multi-sensory and multi-temporal, the scales of which are difficult for humans to witness. However, with the aid of microphones, we can indeed position ourselves as recordists and subsequent listeners within these spaces and sites, allowing us to gather materials to compose our subjective and creative representations.

[217] Ibid.

Part Four: Methodology of *Cessation*

4.0: In this section I will explore the methodology of creating the accompanying composition entitled *Cessation*. In an attempt to document Storm Bella, described in Part One of this chapter, I aimed to encompass every plurality that the microphone captured and also bring the sonic narratives of ecological crisis into close and personal proximity. The multiphonic connections to the distant territories of the Arctic, associated with the confluence of sounds propagating from my chimney breast, aspire to provoke empathy and engagement for the environment and the realisation that global climate change is tangible. In this chapter section I also trace the Fens to gather recordings of ice, which proved elusive due to the season being milder than expected, and employ hydrophones to gather improvised sonic sounds for composing music that represents the seasonal occurrences of winter.

Listen to the composition *Cessation* with studio speakers or professional quality headphones, if possible, here:
https://drive.google.com/drive/folders/1NH26upSK8n4yeiKcMoxL81b1Eg5YWg6G?usp=share_link

4.1: Omnidirectional microphones excel in capturing holistic recordings as they effectively gather the ambient sound of a location along with the noises of the objects within it. Hence, I positioned my pair of DPA 6061 at the bottom of my chimney, one metre apart, to offer the stereophonic breadth of sound from my fireplace. This setup enables me to record some of the room's ambience, my presence in the recording, and the fierce natural elements. I proceed cautiously into this foray of aeolian (wind sonority) field recording, as wind noise can compromise a recording by inducing low-frequency vibrations that can rapidly escalate in amplitude, leading to substantial distortion during the recording process. I then add a protective windshield to each microphone to prevent any further unwanted signal distortion from the storm. I carefully listen for amplitude levels to ensure that what I hear closely matches my listening experience while adjusting the microphone input levels of the Zoom H6 digital recorder to -6 decibels, as sound “peaks” and distorts at zero decibels.

I listen through technological meditation using prosthetics such as my digital recorder, microphones, and headphones, which enhance my listening awareness of ‘Bella’. My ears eagerly encounter new discoveries within this technological listening realm, including sounds

beyond my home, such as traffic and human voices. I focus my audition on the more prominent lower frequencies of 70 to 413 hertz and then detect high pitches emerging in the auditory spectrum around 6 kHz. A neighbour crashes something into the other side of the adjoining wall of my home. I sneeze and watch the peak meters jump into the red area on the Zoom H6 digital recorder, indicating I am dangerously close to zero decibels. When creating field recordings and using the multiphonic concept to allow me to gather *all* sounds, every action, such as my choice and positioning of the microphones, adds a human element of the presence of the field recordist to the process. I consider these creative choices part of the multiphonic practice which connects my immersion in experiencing the sonorous storm with the low tones and indeterminate sonorous interactions which I record. Occasional rhythmic tapping and knocking of mid-range frequencies up to 413 hertz are initially quite noticeable. The continuous lower tones assist in perceiving unexpected higher frequencies (6.3 kHz and 14 kHz) that are typically filtered out by the resonant structure of the chimney breast through which the sound of the storm propagates. As I listened, recording sonorities that depict a winter season, I pondered the temporalities of this storm's journey to the Fens from the Arctic or Greenland. Is climate change actually distant, invisible, and inconspicuous?

4.2: Several days later, with the aim of recording seasonal ice, my daughter and I ventured over to Burnham Mere to examine the semi-frozen lake. Last week's temperatures were below freezing, but today, the sun was shining, and the temperature was above freezing point, as indicated by the thermometer in my garden. On arrival at the thawing lake, I tossed my hydrophones, which are underwater microphones, onto the frozen ice. As I began to listen, I found very little detectable sound on the surface, until my daughter started gently throwing stones onto the thin ice, heard from 02.20 to 03.09 in the composition. Through my headphones, captured through the mediation of my hydrophones, was revealed a multiphonic occurrence: the combination of technology, natural phenomena, temporality, seasonality, geography, and my phenomenological experience captured as a field recording. This indeterminate act was her improvisation with the ice, which provided me with a rich sound source that was not a predetermined creative action.

Fig.8: Hydrophones on' Burnham Mere. Photo by Simon Scott, (December 2020).

After several hours of recording we walk to a nearby road called Long Drove. The four-day-old ice in the holes in the road was quite thin and brittle. The air temperature had gradually risen and was no longer at freezing point. After I wind my small DPA microphones around an

old coat hanger to achieve stereo separation, I slowly walk onto the ice while recording. As I cautiously stepped onto a patch of ice covering a small hole in the road, the ice emitted waves of pressure and tension. I gradually imposed myself onto the ice, pressing my weight down through my legs and feet. Under the strain of my body weight, the ice produced a variety of intriguing sounds, including squeaking, hissing, and groaning, as well as soft clicks and buzzes heard at 02:35. Suddenly, the ice splinters and fractures, forming crystalline formations and producing cracking sounds, allowing me to capture violent sonorities that metaphorically illustrate anthropocentric damage to the environment. We then proceeded to a section of road covered in a thick layer of ice and recorded for several hours, trying various combinations of microphones before heading to the studio for a close inspection of the gathered recordings.

Fig.9: Standing on thin ice, recording with DPA microphones attached to a coat hanger. Photo by Simon Scott (2020).

4.3: In post-production, after the recording sessions have occurred, I play back the various field recordings from the SD card and examine them, much like a photographer choosing which shot and which crop, all within the confines of the recording studio, a hybrid of a laboratory and an artist's studio. The results vary, but there are numerous segments of the recordings that I can

edit together. I selected a comprehensive recording of Storm Bella, edited for brevity, to serve as the backdrop during the introductory fade-in of my composition, *Cessation*. I believed it would effectively initiate the piece, as it provides a sonic narrative of the imperceptible becoming perceptible, which reflects what I experienced on 26th December in my home. This demonstrates how the symptoms and narratives of climate change can become immediate and relatable to humans and, ideally, influence their indifference and inertia. The recording of Storm Bella, featuring the low aeolian tones merging with the structure of the chimney breast and fireplace, is audible from the outset until 2:02 minutes and highlights two prominent frequencies of 154 kHz and 281 kHz. The sound of frozen fragments of water and ice begins to emerge in the track from 1:10. Initially, there is cracking and clanking until higher frequencies of meltwater surface at 1:55. I incorporate Burnham mere and New Long Drove recordings of ice, which I have pressed with my body weight, making the piece metaphorically resemble a larger body of ice straining under anthropocentric pressure at 02.32 minutes. Passing agricultural machinery and aeolian sounds enter the composition at 03:20, and an unknown voice is heard through the composite mix of melting ice. I deliberately choose to represent ominous associations with sea level rise and extinction. As the piece dissipates, a corvid draws the listener's ear into the open soundscape of the Fens, and the piece slowly fades to silence.

4.4: After compiling many hours' worth of recordings and mixing them together to create this composition, I can observe the composition visually in my PRO-Q3 software. The track has a prominent low frequency of around 19 hertz, with increasingly noticeable higher frequency peaks at 413 Hz, 921 Hz, 3.50 kHz, and 10 kHz. I am able to adjust and manipulate these peaks and areas that I wish to subdue or emphasise. The abrasive, sonorous characteristics that highlight the qualities of the ice recordings I can access, such as clicking, popping, and cracking sounds, can serve as useful compositional tools to represent the ecological crisis.

Why employ the FabFilter PRO-Q3software for this research? I choose this equaliser software because it visually identifies, with accuracy and detail, the frequencies I hear, and I appreciate visualising what I intend to compose. The multiphonic concept encourages a multisensory perception of the Fens. Regardless of the software I select, the PRO-Q3 offers a wide range of creative options, such as adding or subtracting specific sound areas. This enables me to compose using field recordings as compositional materials and carefully select sections of audio that emotionally resonate with me, revealing my novel perspectives of the East Anglian Fens in winter as a listening experience at the time of the recording.

My research involves inductive reasoning, as part of developing the multiphonic framework was not to commit to any preconceived theory. Iterative field recording trips allowed new creative and theoretical ideas to form and emerge through my explorations with my microphones. Practising field recording in winter is challenging as the temperatures are, of course, low, but it wasn't cold in the Fens for long enough to bring any limitations to this chapter's practice-based work.

4.5: Before I reach the final chapter, my creative portrayal of a melting environment *Cessation* sonically presents the Fens as a microcosm for the larger planetary issue of a warming atmosphere caused by climate change. The multi-sensorial and ecologically sensitive lens of the multiphonic enabled me to successfully employ my media technology to situate me centrally in my practice as an embodied witness, to perceive meteorological influences and irregular transitioning of the seasons. Various types of microphones and their placements allowed me to sensorially observe and experience the human abuse affecting the climate. When I eventually discovered ice, which was scarce and difficult to find, I heard sonically rich, glistening tones in the higher frequency registers that my technology enabled me to detect and collect. The high frequencies in the sonorities provided me with materials that allowed me to sonically sculpt a composition reflecting my findings. Editing software facilitated the compositional framing of rethinking time to human scale by editing field recordings to create an illusion of temporalities. *Vatnajökull* seems a fitting work to sit beside *Cessation*, to reflect multi-sensory and multi-temporal scales that humans find hard to perceive. A thermometer can reveal the increasingly milder winters in the Fens, but this coincided with my discovery that the ice-skating association cancelled the championships in the winter of 1996-97, as the unseasonable weather brought milder conditions in late December and January. The multiphonic also enabled me to perceive my human relationship, the long narrative of a site-specific study, within the Fens. It also encouraged me to dwell on the discernible temporalities of the seasons, and how different they are now from when I was a child. In a short space of time the ecological crisis is causing vast ruptures, which will affect my daughter's future experiences no doubt.

I also feel that the multiphonic will prove useful to future practitioners creating site-specific sonic studies as it attunes the sensory capabilities to anthropogenic abuse and ecological crisis.

Chapter Five: No Season

The final chapter of this thesis presents my practice, which has been developed over the four previous chapters, *Spring*, *Summer*, *Autumn* and *Winter*, to reveal the cumulative ideas and the emergent concept of the 'multiphonic' over six years of PhD part-time research. As seasons collide both conceptually and compositionally, an original multi-seasonal work emerges.

Part One of this conclusion acts as an introduction to witnessing the convergence of seasons, which leads to the inspiration to create a new accompanying composition.

Part Two explores the work of American artist Charles Burchfield, particularly his painting *The Four Seasons*. The weather and seasons significantly influence the conceptual framework of the multiphonic, and Burchfield's visually sonorous portrayals of environments connect his work to the concept of the multiphonic.

Part three explores the methodology behind creating a fifth composition titled "Seasons Converge," which emerged from the playback and re-recording of all four previous chapters' compositions. It literally places the human within the man-made nature reserve of the Fens to provoke a question: Can the Nature-culture divisions evident at Holme Fens Posts be woven into a sonic narrative that successfully represents multiphonic entanglements?

Part Four examines what is not being disclosed in the ideologies and methodologies of many field recordists, such as the uncanny motivations to silence and erase themselves. Paradoxically, this is often created by documenting an ecologically fragile environment using media technologies[218].

[218] Mark Peter Wright, *Listening After Nature: Field Recording, Ecology, Critical Practice*, (New York: Bloomsbury, 2022), 117.

Part One: UnNatural Writing #5

1.0: On a cloudy August morning, as I sip black coffee the same colour as the 'black gold' peat soil of the Fens, I learn from a daily national newspaper that heat-stressed plants lost their leaves early and have turned red or brown this summer, creating autumn before summer is over. The seasons are slipping out of familiar cyclical patterns and Naturally feel out-of-sync. In March, it felt like mid-winter, and last week, August temperatures reached a record-breaking high of over 40 degrees Celsius (104 degrees Fahrenheit) in the United Kingdom. I feel uneasy, insecure, and afraid about what my daughter's generation will face as they grow older as we witness UnNatural behaviour. We begin walking between the waterways, admiring the broad horizontal views across the flat fields of the Fens. The buzz and whirr of agricultural activities drift across the Natural landscape, spreading pollen that irritates our nasal cavities. At the same time, a gentle breeze causes the long, thin reed beds to shimmer in an aeolian breeze across the terrain.

As we stroll through a site recently cleared of the unruly and invasive Rhododendron evergreen bush, we unexpectedly discover a puffball mushroom that has appeared in an early autumn-like manner. My daughter points to the mushroom and asks, "Is this here because of climate change?" We then come across a fallen silver birch tree lying horizontally across the damp ground, which we observe with bewilderment as 'spring-like' new growth reaches into the air. I half-joke that it may soon snow, despite the surrounding noise of vociferous summer migrant birds and the strong fragrance of honeysuckle. This paradoxical jumble of seasonal occurrences reminds me of the American painter Charles Burchfield's watercolour painting *The Four Seasons* (1949-60), which depicts the seasons suddenly converging in unison at one particular moment. Today, the environment seems filled with contradictions, unpredictability, and a lack of familiarity despite our family having visited this Natural woodland for decades. The transitions between the changing seasons slowly blend into one another and increasingly move out of sync. Unseasonal weather prevails.

Part Two: Burchfield & The Four Seasons

2.0: In this section of the chapter, I examine artworks by Charles Burchfield, which inspired me to create a musical composition that involves the conversing entangling seasons in the Fens into a multiphonic artwork.

Fig. 10: *The Four Seasons* (1949-1960) by Charles Burchfield (Burchfield Arts Centre – online).

2.1: In one of American painter Charles Ephraim Burchfield's numerous journals, which number over sixty and are available online through the Burchfield Penney Art Center at Buffalo State College, an entry from 1916 reveals that he sketched an idea for a painting he titled *The Four Seasons*. Burchfield affirms, "a tree showing winter at the bottom, spring in the lower branches, summer in the upper with Autumn crowning the top with fruit"[219]. Burchfield's convergence of the seasons embodies an environmental sensibility that reflects concern for climate and weather. This connects the multiphonic to a convergence of seasons to create a multi-seasonal confluence. I can analyse Burchfield through my lens of inquiry to examine his exploratory watercolours in relation to how I perceive the sonic Fens. He represents a multitude of sonorous, sensual, and seasonal entanglements of peculiar and imaginative assemblages. Hierarchy is abandoned; each seasonal influence entangles with others, there is no fixed central point, and having more than one season converge conveys the abandonment of the man-made concept of the seasons altogether. This is central to my concept of the multiphonic, as it conveys the abandonment of any Nature-culture divide and mastery of the natural world that the Anthropocene has revealed. Thus, when I am attuned to the environment when field recording, the multiphonic eradicates any notion of dominance in my sensory perception, such as drawing my attention to one particular superior sound, which encourages me to move my perception past singular sounds and to witness sonic plurality and infinite entanglements.

2.2: Burchfield had an unconventional perception of the chronology of the seasons and believed that the attributes of seasons can be detected in previous and subsequent seasonal occurrences[220]. He posited seven phases of seasonal change. This also underlines his special reverence for winter: (1) Winter giving way to Spring; (2) Spring; (3) Summer; (4) Autumn; (5) Autumn giving way to Winter; (6) the depths of Winter; (7) Winter waning yet retaining its grip[221]. He may, as a provocation to the romantic notion of the traditional four seasons, prophetically reflect the shifting rhythms and cycles of the changing seasons I experience today through engaging with the soundscape of the Fens. As explored in part one, I experienced this confluence, wherein the symptoms of anthropogenic climate change resonate sensorially in the

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[219] Charles E. Burchfield, *Charles E. Burchfield, Journals, September 10th, 1916,* https://burchfieldpenney.org/about/news/article:09-10-2016-12-01am-charles-e-burchfield-em-journals-em-vol-29a-september-10-1916/.

[220] David Rose, *Notes from Underground, Cage: Two (Diary and Letters)*. FUNGI, Volume 10:1 (2017): 8-15 https://www.johncage.org/blog/rose.pdf.

[221] Nannette Maciejunes & Michael Hall. *The Paintings of Charles Burchfield: North by Midwest* (New York: Harry N. Abrams, 1997).

Fens and shake the man-made construct of the seasons up. Different cultures recognise the seasons in various ways, such as the 72 micro-seasons observed in ancient Japan and the Sámi people of Scandinavia and Northern Russia, who acknowledge eight distinct seasons. The seasons are an arbitrary collective yearning to erect fragile scaffolding around the year[222].

In the Georgian era, a book called *The Seasons* (1730) by Scottish poet James Thomson "tapped into a nascent public consciousness…The book was extraordinarily influential on a whole generation of artists and writers"[223]. English Romantic poets of the day—such as John Constable, Samuel Taylor Coleridge, John Clare, and William Wordsworth—were both impressed and inspired by the book's lost pastoral pleasures. Much has changed as the Anthropocene has progressed. The multiphonic composition reveals how the seasons have twisted out of synchronisation from what was once considered stable and predictable, which was neatly dissected into quarters like a piece of fruit. Eliot Lovegood Grant Watson's popular work, *What to Look For,* was published by Ladybird in the late 1950s and early 1960s. "They convey a sense of post-war certainty that we are masters of our own environment and the world will always be so"[224]. The concept of a season becomes questionable, as does the anthropocentric notion of mastery over Nature (the Nature-culture dichotomy). The Fens bear witness to this uncertainty, as illustrated in the compositions developed from this research. It is ironic that the human-made constructs of both Nature and the seasons are precisely what anthropogenic actions are destroying and cannot control.

2.3: On 21st January 1942, Burchfield wrote in a notebook entry, "To me, the artist, interested chiefly in weather, all weather is beautiful and full of powerful emotion"[225]. As anthropologist Tim Ingold states, the weather is "fundamental to perception"[226]. The weather attuned Burchfield to the natural world, just as it does for my microphones. With a propensity for auditory perception and a sharp ear for acute perception of the natural world, developed from a young age while growing up in Cambridgeshire, I was attuned to the Fens through all kinds of weather. During the numerous visits with my father, following him into fields to measure the plots of land for his work as a structural surveyor, I developed an emotional attachment to

[222] Joe Shute, *Forecast: A Diary of the Lost Seasons*, (London: Bloomsbury, 2021), 47.
[223] Ibid, 62.
[224] Joe Shute, *Forecast: A Diary of the Lost Seasons*, (London: Bloomsbury, 2021), 44.
[225] Guy Davenport, *Charles Burchfield's Seasons*, (Portland: Pomegranate,1994), xiii.
[226] Tim Ingold, *The Perception of The Environment: Essays on Livelihood Dwelling and Skill*, 2nd ed. (Abingdon: Routledge, 2007), 12.

the natural world. The term ‘Biophilia’ was first used by the German psychologist Erich Fromm in 1964. It is derived from the Greek word ‘philia,’ meaning love of life or living things, and its prefix ‘bio,’ which signifies ‘life’. It was later adopted by the American composer and sound recordist Krause, whose ideologies and work I have discussed throughout this thesis which has significantly impacted this research. The weather, the seasons, and the more-than-human and multi-species entanglements have shaped some of my most intense and creative experiences, many of which are included in this research. But by recognising ‘what is there’, and that there is Nature, and that Nature is man-made, my microphone confronts what I find myself sonically entangled in: multiphonic.

Part Three: Methodology – Seasons Converge

3.0: In response to the Burchfield watercolour, I created a new composition by bearing witness to a dramatic seasonal convergence and entanglement and overlapping of the constructed four seasons in the Fens.

Listen to the composition *Seasons Converge* with studio speakers or professional quality headphones, if possible, here:
https://drive.google.com/drive/folders/1NH26upSK8n4yeiKcMoxL81b1Eg5YWg6G

Figure 11. The Teenage Engineering synthesiser OP-1 in front of the Holme Fen Posts (photo by Simon Scott)

3.1: Inspired by Burchfield's painting The Four Seasons, I created a new composition lasting eight minutes and forty seconds to represent and reflect the interconnected entanglements of the seasons that Burchfield once visually depicted. To achieve this, I played each of my four seasonal compositions—*Spring, Summer, Autumn, and Winter*—one by one out into Holme Fen and rerecorded the result. I attached a pair of DPA 6061 microphones between two wooden posts on either side of the bridge that crosses the long, straight drainage canal in front of Holme Fen Posts to record the results. These microphones, as noted in previous sections of the

methodological chapter, capture sound omnidirectionally, embracing the entire surrounding environment and everything that occurs within it, including my anthropocentric presence. This is crucial to the composition, as I aim to create a new musical entanglement that critiques the environmental impact of anthropocentrism, which has traumatized not only the Fens but also the broader environment.

3.2: I began recording on my Zoom H6 'Handy Recorder' by playing each of my four seasonal compositions one by one into the Fen, using my 'Op-1 Portable Synthesizer'. Designed and manufactured by the Swedish company Teenage Engineering, it was chosen for its functionality and portability. The built-in 4-Track tape feature allows me to load each track with one seasonal composition. I can then play these at will as I stand at the foot of the Holme Fen posts, blending them into the surrounding environment, and the small speaker is more than suitable for the desired amplitude. In addition to the OP-1, I am recording this event in stereo onto my Zoom H6, recorder which is stored inside my backpack, and the audio is stored on a SanDisk 32 GB SD card inserted within the Zoom.

As I fade up in volume *Disappearing Cuckoo*, the track gradually emerges from the OP-1 speakers and into the surrounding environment, entangling with the sounds in and around Holme Fen posts. I am immediately approached by a stranger who converses with me, a conversation audible at the beginning of the piece at 0:38 seconds. I fade up *Cessation* and feedback then appears at 01:00, which announces a new compositional element; the exposure of the media technology I am using to capture this moment. My human imprint, my presence as a field recordist, is neither a separate sonorous entity nor a hidden spectre within the recorded sonic ensemble. Indeed, I am a willing and active participant in this sonic assemblage of the human and the more-than-human. As I introduce *220 Hz* at 3:30, others pass by, birds vocalise, and trains and traffic move past me while the speaker of the OP-1 gradually allows *Summer* to emerge in the composition, adding rhythmic dynamics to the playback at 02:45 minutes. As I slowly fade down 'Disappearing Cuckoo', improvising with levels and swells of feedback (heard at 04:03 and 04:45) and capture the sounds of passing agricultural machinery used in this industrialised landscape, as well as car doors slamming by visitors to the reserve in the car park (heard at around 05:05). I am hesitant to untangle any of the complex sonic assemblages I am capturing; my main concern is that feedback does not become too dominant or increase in volume excessively, disrupting the flow of the composition. I also intend to record this

composition in one continuous take, mirroring the long, straight drainage channels, known as drains, of the Fens. As the composition finishes, more feedback begins to ring out into the Fen at 07:30 minutes, leaving only feedback and the sounds of the Fens to fade out over one minute.

3.3: At ten seconds into *Seasons Converge,* an aircraft overhead, possibly from the nearby Connington Airfield, merges with the sonority of conversing strangers nearby. The composition *Summer* is heard by the rhythmic pulse that is subsequently joined by the drone of Autumn as birds sing around the posts and *Disappearing Cuckoo* announces itself by the vocalisation of the male cuckoo call and a child's screaming from Chapter One. The icy tones of Chapter Four's *Cessation* and the cuckoo mix with the North Eastern train passing by the reserve. All four seasons coalesce, contributing to the existing multiphonic soundscape of Holme Fen and its Nature-culture entanglement. At 5:00, the resonance of the posts' metal placards being plucked and triggered into sound by the rain (from a wet day when I recorded the posts in the summer of 2021) blends sonically with the wildfowl from nearby Burnham Mere at 6:30. The autumn drone of *220 Hz* from Chapter Three reappears as the ice melting from winter resonates. Feedback permeates the entire recording, accentuating my human presence and the technology I am using to create and capture this unique and improvised assemblage. This becomes an act of dissolution, a creative act of reintroducing myself into a new composition that resuscitates my anthropocentric presence. It is a guilty admission and acknowledgement of being implicated and responsible for climate change, as all human beings are, and accountable for environmental loss, becoming the noisy interference that leaves an undeniable footprint. As the piece fades out, my voice intertwines with the sonic assemblage, serving as homage to Westerkamp's *Kits Beach Soundwalk* (discussed in Chapter Two), where I am purposefully detectable, audible, and confrontational in my use of feedback (as harsh noise) in this composition.

3.4: The feedback in *Seasons Converge* is an auditory phenomenon that occurs when the sound of amplification ghosts its way back into the signal, introducing a loop. The OP-1's portable speaker and the microphone are positioned too closely together. Sonic entanglements merge, mutate, and distort into one another, brutally announcing my human presence in the surrounding Holme Fen environment and intertwining with the more-than-human. The subjective sensory perception of an environment depends on a complex system of holistic relationships rather than isolated entities; these connections are often unplanned and act as collaborations with the environment. Consequently, multiple sonorous voices, or a multitude

of entangled and contradictory sounds that coalesce and interact, create a unified sonic and holistic whole of multiphonic.

Feedback is also often perceived as noise, a mistake, the unwanted, and is inclusively invited into the practical research that the multiphonic encourages. It is also is linked to the ideology of Schafer which I explored in chapter Two. However, it is compositionally deliberate, for the reasons previously stated, and is particularly noticeable at 01:00, 01:45, 02:20, 04:00 and 06:00 minutes into the composition playback. The feedback is both literal and metaphorical, as it pertains to the Fenland's environmental and ecological catastrophe resulting from its ill-fated drainage scheme, which created a feedback loop of flooding and ongoing subsidence that continues today. In the book *Storms of My Grandchildren*, the author James Hansen asserts that feedback is also a factor in climate change.

> "Urgency derives from the nearness of climate tipping points, beyond which climate dynamics can cause rapid changes out of humanity's control. Tipping points occur because of amplifying feedbacks - as when a microphone is placed too close to a speaker - which amplifies any little sound picked up by the speaker, until very quickly the noise becomes unbearable. Climate-related feedbacks include loss of Arctic Sea ice, melting ice sheets and glaciers, and release of frozen methane as tundra melts"[227]

Thus, subsidence functions as ecological feedback and wreaks havoc on the topography of the sinking Fens as the topsoil dries and is blown away, a phenomenon colloquially known as a 'Fen Blow', while the ground erodes. This process perpetuates a feedback loop of ecological devastation due to human impact. As discussed in Chapter One, when the Fens were drained, the peat soil, which relies on water, dried out, fell below mean sea level, and the Fens required continuous pumping of water (from windmills, steam engines, and later, electricity-generated pumping stations). It is also no coincidence that I am recording at a site which the Royal Geographical Society and many more claim is 2.75 meters below sea level, the lowest place in

[227] James Hansen, *Storms of My Grandchildren: The Truth about the Coming Climate Catastrophe and Our Last Chance to Save Humanity*, (New York, Bloomsbury, 2009), ix.

the UK[228]. This serves as a metaphor that the Fens is a dismal microcosmic emblem of global environmental catastrophe and planetary ecological trauma.

3.5: Feedback used in music creates sustain, which occurs when the signal captured from the microphone is amplified when the two are in close proximity. It is a useful timbre to glue field recording together, which may lack any continuity or elongated frequencies. When recording, enshrouded with feedback, I am immersed in listening at its core, and I become both the amplifier (microphone) and the amplified. This forms 'feedback', which has been used as musical content in other compositions such as John Cage's *Cartridge Music* (1960), as the introduction to The Beatles song *I Feel Fine* (1964), Robert Ashley's *The Wolfman* (1964) and Steve Reich's composition *Pendulum Music* (1968). French composer Eliane Radigue uses feedback in *Elemental I* (1967), which also includes field recordings of water sounds captured on a 'Stellavox' reel-to-reel magnetic tape recorder, creating manipulated and evolving feedback loops. *Voyage* (1968) by Pierre Henry, a key work of musique concrète, coincidentally inspired Radigue when she was his studio assistant between 1967 and 1968[229].

In 1982, composer Robert Ashley told music historian Thom Holmes that feedback "was the only sound intrinsic to electronic music"[230]. New Yorker David Lee Myers created music using only feedback loops from feeding electronic circuits back into themselves. Similarly, Japanese artist Toshimaru Nakamura also primarily uses feedback loops from his mixing board, as the outputs are inserted into the inputs, an instrument he calls his "no-input mixing board"[231]. The technology becomes the music and the music is the technology being used in an unorthodox manner of altering the acoustic space. This is multiphonic as it metaphorically exposes how anthropocentric influences have created unresolvable subsidence and ecological loss in the Fens.

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[228] Niamh Dann, "The nature reserve with the lowest point in the UK and a lost lake", *Cambridge News*, April 20th, 2024, https://www.cambridge-news.co.uk/whats-on/whats-on-news/nature-reserve-lowest-point-uk-29007102.

[229] Rob Fitzpatrick, "The 101 strangest records on Spotify: Pierre Henry - Le Voyage", *The Guardian***,** May 7th, 2014, https://www.theguardian.com/music/musicblog/2014/may/07/101-strangest-records-on-spotify-pierre-henry-le-voyage.

[230] Thom Holmes, *Electronic and Experimental Music: Pioneers in Technology and Composition*. 2nded. (New York: Routledge,2002), 27.

[231] *A Guide to Toshimaru Nakamura's No-Input Mixing Board,* Matthew Blackwell, December 20th, 2022, https://daily.bandcamp.com/lists/toshimaru-nakamura-discography-list.

3.6: To summarise, *Seasons Converge* is a process of re-entangling the composed field recordings to offer the possibility of new practical methods for researchers and artists. It deliberately draws attention, as *Kits Beach Soundwalk* compositionally foreshadowed, to the undesired or "unmusical sound" to engage and face the hypothetical monster of a changing climate. Engaging with the 'noise' and the 'unwanted' highlights a focus on the symptoms of environmental damage and this sonically combats both Schafer and Krause's exclusion of 'unwanted sound'. *Seasons Converge* is, therefore, a composition that gives voice to what is unspeakable[232]. It encourages and enables the listener to perceive the complex ecological narratives of what the environment is telling us if we adopt the multiphonic as a kaleidoscopic lens through which to closely listen. The sound works are often not pleasing on the ear and contain forms of 'noise' as part of a braided, not separatist approach to my ecologically engaged sound practice.

[232] Timothy Morton, *The Ecological Thought*, (Cambridge: Harvard University Press, 2010), 12.

Part Four: Self-Erasure

4.0: This fourth section of the final chapter examines the consequences and possibilities of reintroducing my four previous field recording compositions into the Fens environment. Reusing sonic materials promotes an inquiry into field recording that could evolve into a sustainable and intertwined methodology. I also underline how the recordist's presence in the practice of field recording reveals the Nature-culture dichotomy.

4.1: The reintroduction of the previous compositions, which are played back into the Fens using portable speakers with mobile media technology, is a deliberate creative act. This approach may be analogous to Walter Murch's sound design concept of playing back sounds and re-recording them which he terms as 'worldizing'[233]. However, field recording is a relational creative practice that today confronts the challenge of pervasive self-silencing, which encourages a tendency toward the recordist's self-erasure and transparency. This contradicts the entangled concept of the multiphonic, necessitating an urgent reevaluation. It is a reaction of the self-erased recordist, which Mark Peter Wright calls the "Noisy-Nonselves"[234]. Rather than hiding, silencing, erasing oneself, or concealing behind new media woven into everything captured by the microphone's plurality, I assert that I am present in the recording. For instance, in the accompanying composition of this chapter *Seasons Converge*, my influence is unmistakably apparent as the feedback reveals both the human element and the media technology, which are an integral, but equal, part of the multiphonic. The interplay among humans, machines, and the environment highlights how the practice of field recording acknowledges and announces our presence in our recordings. Processing field recordings and creatively manipulating sonorities through the use of technology to create compositions and live performances also reveals how the recordist's presence is a prominent part of creative sound practices. Humans are not separate from the Natural world or their compositions, but rather entangled in the plurality of practice.

4.2: Recording locally in the Fens significantly reduces my footprint. However, I do not wish to be a hypocrite, as I have indeed performed my work at various venues around the world

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[233] *Worldizing,* Charles Maynes, Accessed December 16th, 2023, http://www.filmsound.org/terminology/worldizing.htm.
[234] Mark Peter Wright. *Listening After Nature: Field Recording, Ecology, Critical Practice*, (New York: Bloomsbury, 2022), 41.

before and during the years I have begun this research project. This includes Café Oto in London, 2220 Arts Venue in Los Angeles, and MiSo in Berlin, as discussed briefly in the introduction. Nevertheless, during 2020, I was compelled to stay local due to the Coronavirus pandemic, and no live shows took place for almost one year. The performances that happened after the lockdown restrictions were lifted utilised the field recordings I captured in the Fens during my time working on this research project. These solo performances inspired many of the creative ideas found in the accompanying portfolio of compositions and some of the critical analyses. The research questions whose formulation began on that long-haul flight from San Francisco to London aspired to encourage a holistic non-dualistic and non-restrictive listening perception when field recording. This framework of inclusivity and borderless listening (and practice) is designed to inculcate an invitation to engage, making it ideal for live performance. For instance, the audience's physical presence at the venue, their conscious or unconscious influences—such as coughing or clapping—and their personal interpretations of the recordings play a crucial role in the performance and shared experience. Furthermore, since the Fens serve as a locational frame, it presents an anthropogenic representation of the Fens to audiences who might never have experienced the East Anglian environment first-hand.

I shall conclude by noting my awareness of my eco-sonic footprint. This consciousness enhances the experience of listening to the environment from a multiphonic perspective, acknowledging our culpability and responsibility as we tune in to the future. Regional site-specific practice as research challenges the trend of documenting increasingly endangered environments suffering from neglect and catastrophe by utilising aviation and other unsustainable methods to capture sonic materials in the field. I chose the Fens as my sonic palette, similar to how a painter selects their colours to work with. This has taught me that local long-duration (longitudinal) studies often reveal patterns that one might miss by travelling and taking snapshot recordings in unfamiliar sonic territories abroad. As I grew up in this environment, I can reflect on a lifetime's worth of knowledge from closely engaging with and observing this transitional place. Recording sounds in the Fens is my deeply personal creative method of understanding my life and navigating the changes that my family and I perceive in this vulnerable landscape as each year passes in the Fens.

Conclusion

In the introduction of this research project, local poet and writer Edward Storey's plea provoked me to respond to his romantic notion of "translating the natural wonders of the Fens" and turning them "into sound". His "wonders" are environmental sounds and natural phenomena that he has separated, as Nature, from humans, despite the indisputable anthropogenic influences in this man-made environment. For example, Storey's invocation of "the wind through ripening corn…the flow of a river in summer; the mysterious diminuendo of pylons into the distance" are sonorities related to the Anthropocene. I was personally drawn to the Fens as a means to escape the daily anthropogenic influences that bombarded me, and as a place to visit with my children where the natural world was more evident than in the urbanised area we lived in.

Before developing questions for this research, my experiences of field recording in the East Anglian Fens were based on gathering compositional material (of the Natural world) to create original compositions for use in live performances, as discussed in my introduction. While it is not a completely binary situation, the sound, whose summary is now positioned in the appendix on page 142, can, to a certain extent, be considered to represent the 'before' thinking that led to a particular approach to field recording and composition. In post-production, my field recordings often remained relatively raw and unprocessed, staying referential to the natural world as I compiled, edited, and mixed them in my studio. However, as I began investigating and implementing my research questions, I gradually experienced personal and philosophical shifts that contradicted and invalidated the culturally constructed view of nature as a separate realm distinct from human culture. The politics of my listening became attuned to the narratives of the climate emergencies I perceived, which in turn inspired the development of my methodology. This dramatically altered the trajectory of my practical investigations, and every field, dyke, drove, mere, and woodland recording became connected to its creation by humans. Each site in the Fens has become a devastated elegy to the ancient Fenland environment that endured rural trauma through intense industrial agricultural development, modernisation, and urbanisation. Tracing the seasons —an artificial construct—with my microphones was an epiphany for me, as I could sensorially perceive the proximity of climate change, habitat loss, species extinction, and other detrimental effects. The research arc has been presented in my original practice-based contributions as compositions.

The multiphonic is a conceptual framework developed during this research that unites numerous perceivable sounds captured during field recordings and the composition of a site-specific study. It is a practice-based concept that does not exclude, alienate, or discriminate against any sonorities. Sounds such as anthropogenic “noise” or other “unwanted sounds" are welcomed into the creative framework. The concept challenges the ideologies of influential practitioners such as Krause and Schafer, which can be critically analysed through a multiphonic lens as reductive and hierarchical. These divisive ideologies lurk in the shadows of soundscape studies and acoustic ecology, reinforcing human exceptionalism and the Nature-culture dichotomy. The multiphonic challenges these entrenched views and seeks to bridge the vast chasm between Western post-Enlightenment thinking and the natural world that is being destroyed. The multiphonic expands on the term polyphonic and enlarges it to sonically encompass a multitude of coalescing sound sources entangling into ‘multiphonic assemblages’ through the site-specific study in the Fens. Polyphony is an ally, as discussed in the thesis, but I wanted to create my own way to navigate the ecological crisis that was unique to my practice and the site of the Fens. The technological aspects of gathering materials from the Fens with a microphone, using processing techniques that require software and a computer, and the multi-sensorial aspects of field recording inform the phenomenological experience of perceiving a holistic soundscape. Throughout the research project, ‘multiphonic’ developed as a critical practice-based framework to include multi-temporalities, multi-species, and multi-sensorial perceptions. It was also applied as an analytical tool to investigate existing works, including other multiphonic compositions such as *Presque Rien No.1*, *Vatnajökull*, and *Kits Beach Soundwalk*.

Chapter One marked my exploration of the four man-made British seasons with a poignant springtime visit to Wicken Fen, one of the few remaining sites that resembled the ancient waterlogged Fens before industrial farming altered this landscape. The East Anglian Fens became a significant metaphor for habitat loss when, intertwined with my field recording and listening experiences of the migratory IUCN ‘red-listed’ common cuckoo appeared, its call echoing across the environment. This illuminated how closely connected the ecological crisis is to the contemporary Fens environment and how Western post-Enlightenment thinking—the dualism prevalent in human exceptionalism that separates non-human beings from humans—is paradoxical. Through the process of recording the vocalisation of an organism on the brink of extinction in a sonic site that was struggling to survive, I began to perceive the world through a filter of loss—a holistic soundscape entanglement where nothing could be disentangled amid

its crowdedness. It was a multiple and overlapping sonic epiphany that inspired me to develop an original critical practice-based framework to reveal a site-specific study which uncovers what the ecological crisis means for me, as a composer, and for my family, who share close connections and bonds with this environment, as the Fens as a microcosm of a macroscopic ecological catastrophe. The spring season resembled an almost hyper-spring due to its notable absence of human sounds, such as aviation transportation, agriculture, and other sonic signs of modernisation. COVID-19 revealed what less human impact would have on the planet.

Chapter Two examined Schafer and Krause's restrictive and divisional ideologies, which reflect the human exceptionalism that has lingered in the shadows of soundscape studies for decades. I also noted, while recording the composition for Chapter Two, the confluences at the Holme Fen Posts site that contradicted the ideologies of Schafer and Krause. In contrast to the culling of pervasive noise and disapproval of dissonant sounds of modernity and urbanisation, both Schafer and Krause explicitly describe and advocate for a utopian and pastoral soundscape characterised by a naïve, nostalgic tranquillity and a rejection of "lo-fi" sounds. This starkly contrasts my subjective experiences while field recording in the contemporary East Anglian Fens. At the Holme Fen Nature Reserve, I recorded a man-made structure within a cultivated (man-made) environment that, through my contact microphones, revealed a constant vibratory motion where everything existed in sonic unison. Consequently, I created the 'multiphonic', an ally to polyphonic, as a methodology that broadens my immediate perception into infinite creative possibilities and viewpoints when field recording. This approach exposed the human-nonhuman entanglements and enabled all nonlocal phenomena, such as climate change, habitat loss, deforestation, pollution, urbanisation, extreme storms, and deadly viruses, to be perceived and experienced through the lens of the microphone via the multiphonic.

The borderless concept of listening technology became part of this multifarious idea to replicate my experiences of perceiving everything that occurred during field recording trips for this research to contradict the views that anthropogenic sounds are to be discredited and disregarded. The framework of the multiphonic encouraged the use and experimentation with various technologies, including contact microphones and music software plug-ins, to highlight the narratives I discerned in my cartographic tracking of the seasons in the Fens. I was also able to perform live late that summer using some of the Fens field recordings I had gathered at the Holme Fen Posts. This proved invaluable for me to start my process of determining what material to use and how to share this compositional process with an audience who participated

in what I perceived as a multiphonic performance. I began to consider the performance venue space as collaborative, and I felt that multiphonic as a practical concept began to expand further when I returned to the Fens to continue field recording and even into multi-channel live performance.

Chapter Three captured summer's transition into autumn that began at the moment when the skeins of geese migrated into the East Anglian Fens from their Northern territories. The more I directed my microphones towards the natural world, the more I perceived the invasive human impact and its profound influence on it. The seasons are man-made, Nature is illusory, and human impact is entangled within my meteorological and climatological observations. I discovered multi-temporal perceptions while recording the sounds of geese. As mentioned previously, I heard these skeins as a child. The episodic memories intertwine across multiple time scales: of my childhood, my own child beside me, and the subsequent listening to my field recordings, which emotionally trigger me to ponder whether when she reaches my age, the skeins will still arrive in autumn to come to the British Isles and, as Stephen Rutt comments, "winter with us"?

Frustrations and creative roadblocks foster creative inspiration to seek alternatives, and the research conducted by Gagliano, Tsing, Sheldrake, and Simard piqued my interest in fenland soil as a source of musical possibilities. Although my experiments found the soil to be rather devoid of sounds to collect, realising the significance of the frequency 220 hertz was revelatory as I could build a modular synthesiser system to replicate what these authors had described as an underground network of entangled sounds. Inspired by John Cage, the indeterminate proceedings were a creative way to trigger the modules into producing music that incorporated my geese and rainfall field recordings. It is dissonant, confusing, noisy and disconcerting, but so is the Anthropocene. *220 Hz* is an expansion of Chapters One and Two's field recording compositions, and this filters the collected field recordings through a modular system that metaphorically acts as an ecological entanglement related to the autumnal soil where everything is interconnected. Often I process a field recording in post-production after I have recorded them. However, they are processed within the system during the moment they are triggered (from the TipTop One module). I set out to create a seasonal composition that achieves the representation of the contemporary Fens (in autumn) given the constraints of the Nature-culture dichotomy. I found that I had, as the season was considerably warmer than I

expected, I could create a metaphorical system that represented the season based on the theoretical discoveries of my autumn chapter.

Chapter Four's composition, "Cessation," was recorded in late December, when temperatures in the Fens finally fell below freezing after a mild October and November. However, the ice was continually in a state of cessation; consequently, meltwater plays a significant role in the composition, illustrating how global climate change fosters a fragility of phenomena that we can perceive through the multi-sensory lens of the multiphonic. I experimented much more with microphone placement in the field to draw out the sonorities that seemed elusive. Stepping on the brittle and sparse patches of ice, with my microphones dangling at my feet, released the sounds of my body crashing through the ice. The gestures towards the ice, as I hung over them as a literal presentation of human dominance. The throwing of rocks onto the mere forced a sonic rupture that successfully captures how I perceive the ecological crisis.
The Fens is a liminal space and has not been a stranger to human exploitation. This manipulation of the ice extended into the studio where I could edit together and manipulate the recordings to present my interpretation of the Fens in winter and its anthropocentric influences. Manipulation is an apt word, as it metaphorically exposes the ecological crisis and it exposes my technological representation of Nature. I can, as Westerkamp does in *Kits beach Soundwalk*, accentuate the noise and destructive sounds of human influence such as the ice being literally broken by human weight. I can play with the groaning and moaning of the ice in the field and then push this to the fore of the mix in post-production to present the trouble that humans have caused in the nonhuman world. It not only faces and plays with the trouble but antagonises it and forces it to reveal the brutal impact that I witness in the Fens.

Chapter Five traced all four traditional seasons in the Fens. I discovered through my practice that the seasons are irregular and changing due to the ecological crisis. This contradicts popular notions that depict the seasons as neatly dissected pieces of fruit and how they once conveyed a sense of being masters of our own environment. Today, the four seasons have twisted out of synchronisation from what was once considered stable and predictable. The concept of a season, man-made construction of a relatively recent invention and not necessarily shared by Indigenous peoples, becomes dubious, just as the anthropocentric idea of mastery over Nature and the environment of the Fens is witness to this uncertainty, as depicted in the compositions developed from this research. It seems ironic that the man-made construct of both Nature and the seasons is exactly what mankind is destroying. When the Fens were drained, the peat soil,

which relies on water, dried out and fell below mean sea level, necessitating continuous pumping of water from the fields into the drainage canals to prevent flooding. This ecological 'noise', the irreversible influence of anthropocentrism, is always present in the Fens. I sought to introduce my own 'noise' into the environment through the process of 'worldising', encouraged by the multiphonic methodology. This experiment is combative when considering Schafer and Krause's ideologies, that I examined in chapter two. I learnt through playing with the feeding back I become a participant in the all-encompassing soundscape, and that this creative act negates any metaphorical divide which keeps Nature a separate cultural construction from society. *Seasons Converge* is relatable to *Kits Beach Soundwalk*, as Westerkamp adopts a similar confrontational and playful strategy in the compositional processes. The role of technology was important to deepen my sensorial engagement with the environment and further my awareness of the Fens so that I could gather my novel perspectives and observe the seasons behave in defiance of being given man-made narratives that expose the Nature-culture dichotomy. Both pieces employ post-production to expose and highlight the juxtaposition between 'noise' and 'harmonious' sounds in our field recordings, while also suppressing the act of participating in the soundscape. This allows me to creatively 'play' with my own metaphorical monster of modernisation, the man-made environment of the Fens, as Westerkamp did with her local environment of Kitsilano Beach.

Musically, I have been collecting field recordings, entangled with my novel perspectives, to compose with. I am presenting my results compositionally as a means to respond to my research questions. On a personal level, I am deeply saddened by this highly man-made and traumatised environment, which will be lost because of the anthropocentric actions and activities which created the ecological crisis. The East Anglian Fens will likely be one of the first areas of the United Kingdom to be submerged, according to the World Climate Research Programme website, when sea levels reach their predicted levels in the forthcoming centuries.

On that long-haul flight from San Francisco, my research question developed:

> What novel perspectives do creative sound practices, rooted in field recording, reveal about the changing seasonal soundscape of the contemporary East Anglian Fens?

In response to my first research question, I successfully employed field recording as a practice-based research strategy through qualitative research methods to reveal my novel and subjective perspectives on following the seasons in the Fens with my microphones. Four original field recording compositions, each linked to a season and corresponding to a chapter, along with an additional fifth piece titled *Seasons Converge*, present the results and discoveries. The seasons do not adhere to their traditional patterns but instead transition and change out of sync due to the profound human impact on the climate. A seasonal tracing of the Fens has yet to be undertaken as a site-specific sonic study of the contemporary Fens.

A second research question asked:

> What type of critical practice-based framework is required for a site-based sonic study given the inherited divisions of Nature and culture from acoustic ecology?

I addressed the second question, which required a critical framework to reveal the Nature-culture dichotomy in a site-specific research field recording project, by developing my own original and successful concept, which I call the 'multiphonic'. This conceptual framework facilitates the perception of embracing *all* perceived sounds, disclosing the contemporary Fens environment as a complex and man-made site of significant anthropogenic disturbance and exploitation. It does not exclude, estrange, or discriminate against *any* sonorities, such as anthropogenic "noise" or other "unwanted sounds". As a composer and performer, this is liberating and has inspired the creation of five original works. The ideologies of others, such as Schafer and Krause, can be critically analysed and deconstructed through a multiphonic lens. This can deconstruct any reductive and hierarchical opinions which have been lurking in the shadows of soundscape studies and acoustic ecology, pertaining to the ecological crisis. Thus, the multiphonic refutes these opinions and is an original contribution to knowledge that fills the gap between human exceptionalism, the natural world, and the environment.

It seems fitting to conclude with a coda. The Fens is a microcosmic coda of a macroscopic situation. Many possible endings are explored in 'The Multiphonic Fens' research project, including extinction, soil erosion, deadly viruses, biodiversity loss, cessation of glaciers and ice, land subsidence, deforestation, climate change and a sixth mass extinction. However, an ending may also inspire a reaction, and I have responded with five original compositions and a framework that is creative, multi-sensory, and analytical, which can even advance the

knowledge of others. Coda serves as a multiphonic manifesto and is a set of provocations that inspires my future work.

Claims and contributions to knowledge: Coda

The multiphonic provides an innovative way of analysing existing compositional works.

A seasonal tracing of the Fens has never been undertaken as a site-specific sonic study of the contemporary Fens.

The multiphonic provides an innovative way of analysing existing theoretical frameworks.

The multiphonic also provides future practitioners with the means to undertake site-based studies.

The multiphonic closes the gap which exists in the Nature-culture dichotomy.

The multiphonic can facilitate future site-specific climate change research that pertains to the ecological crisis.

The multiphonic proposes interdisciplinary collaborations in environmental research and site-based sonic studies.

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Appendices

Appendix A:

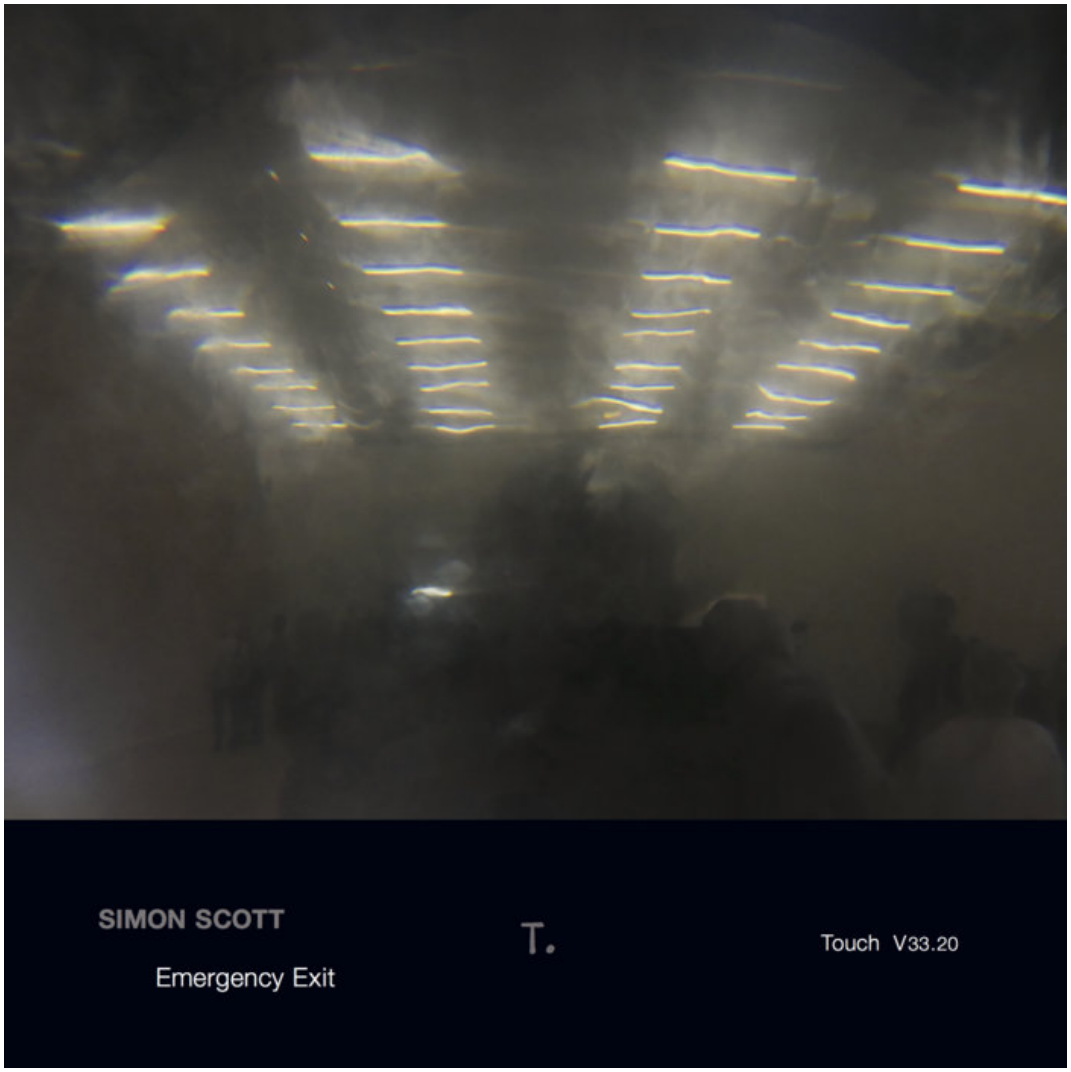

Fig.12: *Emergency Exit* – Photo by Jon Wozencroft (December 2019)

Emergency Exit was released on 26th December 2019, as a commercially available digital download. This is another composition published and released by the United Kingdom arts organisation and record label Touch. I mixed and mastered the composition that autumn before it was released. It was inspired when a flash fire started in the Fens, and I quickly began recording the burning embers (of wood and dried onion skins) to create a piece that showcased how the Fens were being affected by global climate change. I had just learned that Australia

and Northern California were also experiencing severe fires from increasing global temperatures. It surprised me that the autumn was warm enough for there to be fires, especially in the Fens, where the likelihood of flooding is a multi-seasonal occurrence. Why are the seasons moving out of synchronicity from the familiar cycles I'd observed as a child?

Emergency Exit, a field recording composition, is split into two compositional sections. The first piece, *Emergency*, lasts just over ten minutes, and the second piece, *Exit,* is around nine minutes in length. I had gathered around twelve long field recordings that consisted of the coalescing environment. As I edited them together, I did not want to cut them up too much or place them compositionally out of synchronicity. I finally mastered the two pieces to bring them up to professional audio standards for commercial release, and I noticed how the aggressive natural phenomena I had recorded, my audible presence as a field recordist, and the audio atmospheres of what I called the coalescing environment were actually complex to distinguish from each other. However, I lacked an apt term to describe this sonic entanglement, which catalysed the further development of my methodology and theoretical approach to my research.

Listen to the composition *Emergency Exit* with studio speakers or professional quality headphones, if possible, here: https://drive.google.com/drive/folders/10VJRxk6K7zEcMxKB0uN7bZ3FG4WM-LFn.

Appendix B:

Apart (2020) is a commercially released album, on the North American label 12k, that corresponds with the timeframe of undertaking this research. Both the material for *Disappearing Cuckoo*, the composition which informs Chapter One, and the field recordings for *Apart* were gathered around the time of my father's death in April 2020.

Fig. 13: *Apart* – Artwork by Taylor Deupree & photo by Simon Scott (2020)

Apart is an album of field recording compositions recorded in April 2020 at New Decoy in the Fens. The album consists of one continuous field recording, which I edited into eight tracks. It informs my research as the practical recording process was integral in perceiving the Fens as a corresponding sonorous whole. Through the qualitative process of recording *Apart*, it became evident to me that I was just as integral to each field recording as an anthropocentric influence, as were the organisms and natural phenomena captured in the recordings I gathered. I searched for a term to describe this infinite sonorous entanglement, but I could only think of 'polyphony', a word I always associated with both classical music and synthesisers with more than one monophonic voice. This frustration prompted another idea, which became key to the theoretical aspect of this thesis: can I expand on this term so that I can match the expansiveness of perception. It would take a while before I decided on that expanded term, which eventually became part of the title of the thesis you are now reading. Can it inform my practice of field recording (my practice as research) which leads this enquiry?

A segment of a pre-recorded piano melody that I had written and recorded as an elegy for my late father became one of the sound timbres I used for both *Apart* and Chapter One's composition *Disappearing Cuckoo*. During the final stages of editing *Apart* in my studio, I divided the lengthy recordings into eight compositions, each named alphabetically from A to

H. Since then, two additional tracks have been published and are available digitally, although they are not included on the original cassette release. A North American label, 12k, released Apart on cassette and digital download on December 18th, 2020.

Listen to the composition *Apart* with studio speakers or professional quality headphones, if possible, here:
https://drive.google.com/drive/folders/10VJRxk6K7zEcMxKB0uN7bZ3FG4WM-LFn.

Appendix C:

In January 2021, I was invited to contribute to the Coventry Biennial exhibition of sound and moving artworks called *Listening To The Anthropocene* . The Arts Council England sponsored it, and I was delighted to present a composition inspired by the Fens and the effects of climate change called *Fen Dawn, dusk*. This twelve-hour-long field recording, that I then processed and edited into an original composition for the exhibition, was published by Touch. The sound sources were taken from field recordings gathered in Wicken Fen. I used one of my field recordings that appears in *Disappearing Cuckoo*, which is the composition created for Chapter One, as it contained the capture of sonorous materials at both dawn and dusk, where the title of the song is taken from. Other artists contributing compositions to the exhibition were Jana Winderen, Kate Carr, and KMRU. I also had the pleasure of mastering all the artist's music for the vinyl release and digital download, which was made commercially available. Bob Katz comments that "Mastering is the last creative step in the audio production process, the bridge between mixing and replication (or distribution)"[235].
Listen to the composition *Fen dawn, dusk – Listening to the Anthropocene* with studio speakers or professional quality headphones, if possible, here:
https://drive.google.com/drive/folders/10VJRxk6K7zEcMxKB0uN7bZ3FG4WM-LFn.

[235] Bob Katz, *Mastering Audio: the art and the science*. 2nd ed. (Burlington: Focal Press, 2007), 12.

Fig. 14 – *Listening to the Anthropocene* – (Photos by Simon Scott)

Appendix D:

In January 2023, my album, *Long Drove,* was released commercially in 2023 on an Australian label called Room40. The six site-specific compositions feature field recordings that were captured during the summer of 2021 from vibratory objects along a road in the Fens that sonorously interact with natural phenomena, such as telephone wires, a resonant metal bridge, and fences and metal posts in that location of the Fens. *Holme Fen Posts*, the composition that forms Chapter Two: Summer, was further developed and included in this album release, although it was extended and split into three tracks for publication on this album. As noted earlier, both *Emergency Exit* (2019) and *Apart* (2020) represented my personal transition away from an objective desire to capture sounds from the natural world, such as rivers and birdsong, and instead embraced all sonorities as compositional materials, prompting an examination of the Nature-culture distinction. In *Long Drove*, I clearly focused on listening to and documenting the many prevalent human influences on this environment, including my own. This qualitative compositional process, along with my live performances, which I consider

practice as research, and the theoretical analysis of other works, shaped the ambitions of this research project.

Listen to the composition *Long Drove* with studio speakers or professional quality headphones, if possible, here: https://drive.google.com/drive/folders/10VJRxk6K7zEcMxKB0uN7bZ3FG4WM-LFn.

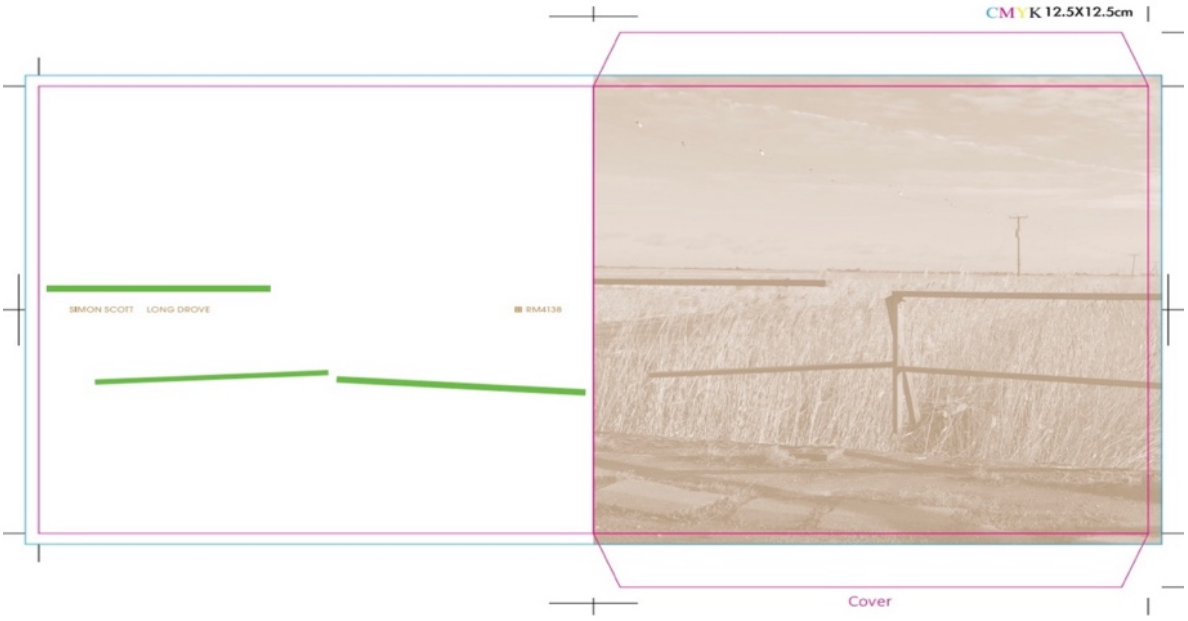

Fig.15: *Long Drove* – Design by Lawrence English & Photo by Simon Scott (2022)