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Review Article

Music, Language, and Technology in More-Than-Human Sonic Cultures

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Karen Bakker, *The Sounds of Life: How Digital Technology is Bringing Us Closer to the Worlds of Animals and Plants*. Princeton University Press, 2022. x + 354 pp. ISBN 9780691206288 (hard cover); 9780691240978 (paperback); 9780691240985 (digital).

David George Haskell, *Sounds Wild and Broken*. Faber & Faber, 2023. xvi + 430 pp. ISBN 9780571362097 (paperback).

Gavin Steingo, *Interspecies Communication: Sound & Music Beyond Humanity*. Chicago, IL: University of Chicago Press, 2024. xvi + 233 pp. ISBN 9780226831336 (hard cover); 9780226831367 (paperback); 9780226831350 (digital/EPUB).

I'm sat at my office desk writing this review when I receive a notification on my phone. An alert of this kind would usually be unworthy of comment. Yet, this notification informs me of a recent BBC News article on sperm whale vocalization. Intrigued, I read the story, which explains how a team of Cetacean Translation Initiative (Ceti) researchers, led by PhD student Pratyusha Sharma at MIT, are using AI technology to analyse large bioacoustics datasets of sperm whale clicks. Their analysis shows that the combining of clicks in sperm whale communication appears to parallel the grouping of phonemes to create words in human languages. What the whales' different rhythmic sequences of clicks — called 'codas' — mean, however, is still unknown. Scientists have, so far, only caught a glimpse of the lives of sperm whales, and so it is impossible to know at this stage what information is carried by particular combinations of codas.[1]

New discoveries about the communicative capacities of different animal species — from whale to insect — now seem commonplace in news media. These animal stories, as media studies scholar Claire Molloy argues, usually constitute lighter and more entertaining reports that function as 'an antidote to hard news, which typically focuses on crime, politics, science, economics and war.'[2] In the context of such media, listening to other-than-human

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[1] Katherine Latham and Anna Bressanin, 'The Sperm Whale "Phonetic Alphabet" Revealed by AI', *BBC News*, 11 July 2024, <https://www.bbc.com/future/article/20240709-the-sperm-whale-phonetic-alphabet-revealed-by-ai> [accessed 12 July 2024].

[2] Claire Molloy, *Popular Media and Animals* (Palgrave Macmillan, 2011), p. 2.

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communication becomes a kind of escapism: when humanity is frightening, it is perhaps comforting to think of a more innocuous intelligence elsewhere; or, alternatively, when humanity seems difficult to comprehend, greater knowledge of the lives of animals may be a means to recovering some feeling of control.

Three recent book publications eschew this escapism. *The Sounds of Life* by the late geographer Karen Bakker, *Sounds Wild and Broken* by biologist David George Haskell, and *Interspecies Communication* by musicologist Gavin Steingo shed light on the entanglement of human and other-than-human beings and the sounds that knot them together. These authors recognize that human cultures are never self-contained systems but are, instead, continually shaping and being shaped by countless beings with whom humans share the planet. Moreover, they identify a pattern of inequality woven into the entangled lives of human and other-than-human beings: for instance, the devastating effects of the current climate crisis, mass extinction and industrial farming complex are borne by some lives — both human and other-than-human — more than others. This pattern of inequality is an outcome of some humans amplifying certain entanglements of threads and disentangling others for temporary personal gain. Subsequently, it has become the mission of much scholarship in the environmental humanities to examine the history and terrain of — and the networks of power that sustain — this unsustainable tying and untying of knots and to resist and propose alternatives to it. Studying 'human cultures' as 'more-than-human cultures' is therefore imperative to exploring not only how different human societies live in relation to the environment, but how the way they represent and think about themselves in relationship to other-than-human life feeds or otherwise defends against environmental collapse, destructive habitat loss and the privileging of some forms of life over others.

Bakker, Haskell, and Steingo are united in hearing sound as a medium through which this shaping of more-than-human cultures, for better or worse, takes place. Beginning with the conception of R. Murray Schafer and his colleagues' World Soundscape Project in the late 1960s and early 1970s, acoustic ecology has explored the interconnectedness of sound, listening and the environment against a background of increasing human modification of the landscape. All three authors draw on this tradition. However, as I will discuss, there are differences in the disciplinary positioning of these books, which, collectively, are informed by research from across the fields of bioacoustics, ethology, science and technology studies, ecomusicology, ethnomusicology, zoomusicology, and critical sound studies, among others. Setting these books in conversation with one another, I map the terrain of scholarship that examines the stakes — what matters to whom — of listening to and sounding within more-than-human sonic cultures. For all three authors, it matters how technology and history (both evolutionary and cultural) shape what people hear and how they listen since what sounds are heard in contrast to, in similarity to, behind, as, through, in chorus with, or as a challenge to other sounds marks a series of sonic relationships that may rehearse categories of similarity and difference across life. Moreover, while the three authors focus on modes of listening primarily informed by scientific research into other-than-human sonic communication, they also highlight (to differing extents) the acoustemologies of many Indigenous peoples for whom other-than-human sounds and modes of listening to such sounds are central to understanding the self in relation to the world. These Indigenous acoustemologies, unique to each Indigenous culture, are largely conflated by Haskell[3] but afforded specificity by Bakker, for instance, in her reference to Iñupiat listening practices in Alaska.[4] In the case of

[3] David George Haskell, *Sounds Wild and Broken* (Faber & Faber, 2022), p. 287.
[4] Karen Bakker, *The Sounds of Life: How Digital Technology is Bringing Us Closer to the Worlds of Animals and Plants* (Princeton University Press, 2022), p. 33.

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Steingo's book, the reader is introduced to the relationship between acoustemology and power in the context of more-than-human sounding and listening among Xhosa people in South Africa and Black artists in North America. Representing scientific and Indigenous or Black acoustic knowledges side-by-side or as interpenetrating, the three authors draw out arguments for how the politics of different stakeholders may be aligned — or not, as the case may be — through more-than-human sonic cultures.

In her essay 'A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century', feminist philosopher Donna Haraway challenges the traditional boundaries between humans, animals, and machines. She argues that the distinction between nature and technology is increasingly blurred and suggests that technology does not distance humans from nature but, rather, is integral to rethinking our relationship with it.[5] Published in 2022, Bakker's book furthers Haraway's complication of the human–technology–nature trichotomy through its focus on listening. The book accessibly details the employment of digital technologies in the fields of bioacoustics and ecoacoustics and explains through a series of case studies how these technologies' mediation of sound transforms scientists' understanding of the world. Each chapter focuses on the human study of one kind of lifeform — the whale, elephant, turtle, fish, bee, bat, and the plant, respectively; together, these case studies build a picture of digital technologies' increasing role in mediating more-than-human sonic cultures. The research carried out by bio- and ecoacousticians, Bakker argues, promises to make a significant impact not only on scientific understandings of the capacities of other-than-human beings in terms of their sonic communication — and with it, the complexity of their sociality — but also on decisions about how to live in ways that benefit more-than-human communities.

Haskell's book, published in the same year, is similarly interested in how the modes through which humans listen to other-than-human sound shape human relations to the planet. He argues convincingly that our current environmental crisis is characterized not only by what some humans are doing to the land, sea, air, and forests but also by an aesthetic system that equates 'good' sounds with pleasant distractions rather than with sustainable relationships to the environment and to other-than-human beings — it is this former, impoverished mode of listening that, for Haskell, precludes interspecies kinship. As he describes in the book's preface, 'We become estranged from both the beauty and brokenness of much of the living world. This destroys the necessary sensory foundation for human ethics. The crises in which we live, then, are not just "environmental," of the environs, but perceptual.'[6] Writing for a trade publisher rather than a university academic press, Haskell's *Sounds Wild and Broken* employs a style and formatting that is closer to popular-science writing than the works by Bakker and Steingo. The author eschews conventional scholarly citations and, instead, provides a general bibliography for each of his chapters, which are organised chronologically in terms of evolutionary time and habitat. Contrasting Bakker's *The Sounds of Life*, in which each chapter is organised tightly into an individual case study about the history of a particular research or conservation problem, Haskell's book simulates the overlapping voices of the forest: one narrative sounds the story of avian sonic communication before another pulls the ear down below the river's surface and out towards the ocean. The book's celebration of the sonic and narrative vibrancy of the planet is supported by Haskell's descriptive first-person vignettes at the beginning and end of each

[5] See: Donna J. Haraway, 'A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century', in *Simians, Cyborgs, and Women: The Reinvention of Nature* (Routledge, 1991), pp. 149–82.

[6] Haskell, *Sounds Wild and Broken*, p. xiv.

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chapter, which help to transport the reader to the biologist's storied worlds of communicative sound.

Steingo's monograph takes communication itself as an object of cultural-historical study to which musicological, human–animal studies and critical studies lenses, as well as biosemiotics, are applied.[7] The book is divided into two halves: the first two chapters examine cultures of interspecies communication between humans and other-than-human animals (with most words devoted to cetaceans) while the second two chapters consider cultures of interspecies communication between humans and aliens. A key historical figure — the U.S. neuroscientist John Cunningham Lilly, 'best remembered for his attempt to break through the human/dolphin communication barrier'[8] — anchors the first chapter and returns as a refrain throughout the rest of the book. Resembling Haskell and Bakker's case studies, Lilly's story and the stories of other interspecies communicators, as told by Steingo, are examined in terms of the stakes involved vis-à-vis how sound is listened to and mediated within reverberating more-than-human ecologies. A major difference, however, is the musicologist's critical distance to the application of 'music', 'language', 'human', and even 'loving' as categories to describe sound, and much of the book is dedicated to uncovering the ideological work performed by these labels in the context of more-than-human sonic cultures. Yet, the book also seeks to delineate modes of communication — i.e., What distinguishes human language and human music from other forms of communication? How are they related, enabling interspecies communication? And how is love implicated in communication? — thereby pairing its political-ethical analyses with a semiotic approach.

Technical language is generally avoided among the three authors, and where specialist terminology is necessary, the language and concepts they denote are explained effectively for the reader. All three books are therefore suitable for a generalist audience and would enrich undergraduate-level university classes on the socio-cultural study of sound, the environment, human-animal relations and/or science and technology. Haskell's and Bakker's works draw on knowledge from biology, ecology and bio/ecoacoustics to offer general overviews of their topics, reflecting broadly on the relevance of these fields to the intersection of environmental and social justice. The chapters of Steingo's *Interspecies Communication*, on the other hand, critically analyse historical instances of more-than-human sounding in order to complicate, intervene on, and even add to the scientific study of the object that gives the book its title. In its interdisciplinarity, Steingo's research benefits multiple overlapping fields, including sound studies, musicology, science and technology studies, the environmental humanities, cultural studies, bioacoustics, and human-animal studies, and his monograph would make an excellent addition to graduate teaching in these research areas.

The three books occasionally make the same or similar references, and it is in these moments that the differing political projects of the authors are rendered most visible. For instance, both Bakker and Steingo describe guest lectures given by musician Peter Gabriel at MIT: Bakker references Gabriel's earlier TED-conference talk from 2013 (offered as part of a lecture imagining an 'Interspecies Internet') and Steingo a later talk from 2019. Despite the apparent similarity between these two lectures, the framing of the musician's performance in the two books is very different. Bakker, in her chapter 9, describes a video clip shown by Gabriel in which a bonobo named Panbanisha improvised a tune on a piano keyboard while the musician

[7] Gavin Steingo, *Interspecies Communication: Sound and Music Beyond Humanity* (Chicago University Press, 2024).
[8] Ibid., p. 22.

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provided an underlying accompaniment. In Bakker's words, 'Panbanisha tapped out a haunting melody, finding octaves and harmonies with Gabriel's chords.'[9] Gabriel's aim in showing the video was to highlight both the ability and desire of other-than-human animals to connect feelingly across species borders, and Bakker's aim in citing Gabriel is to stoke measured excitement with regard to the potential offered by AI technologies in the translation of other-than-human communicative vocalisations. However, towards the end of chapter 9, Bakker withdraws some of her initial enthusiasm, admitting that, while AI translation technologies may facilitate meaningful dialogue with other-than-human beings (and thus help to accelerate conservation efforts), they also risk greater control and manipulation of other-than-human life to anthropocentric ends.[10]

Contrasting Bakker's account of Gabriel's first video is Steingo's description of Gabriel's second video, which, instead, featured an unnamed chimpanzee performing on a piano: 'the chimp hits a bunch of white notes on a piano that sometimes seem to make musical sense with Gabriel's ethereal C major synth backing. (To anyone who knows anything about music, it's obvious that there's no way this effect could *not* happen.)'[11] While, for Bakker, Panbanisha *finds* notes that make musical sense with Gabriel's chords, Steingo's chimp-pianist *hits* the instrument's keys without much discrimination. Steingo cites this video as an example of how gaps in knowledge regarding the nature of interspecies communication are sometimes painted over musically for the sake of performing interspecies kinship: the chimp and Gabriel's music sounds an apparently predetermined, harmonious fit between chimpanzee and human minds, but does not actually reveal anything about the strategies used by the two individuals to coordinate and synchronize their actions since any note the chimpanzee plays will harmonise with Gabriel's synths. Indeed, the inherent human–chimpanzee connection is staged. Therefore, unlike Bakker, who accepts the musical duet between Gabriel and Panbanisha as meaningful dialogue and the beauty of this moment as evidencing the ostensible worthwhileness of the continued study of interspecies communication, the musicologist hears only curation and illusion in the human–chimpanzee duet, whose function is, again, to justify repeated 'communion' with other-than-human beings.[12]

This curation of interspecies communication is explored early in Steingo's chapter 1. The author notes that both music and water have a history of being instrumentalized as homogenizing mediums, rendering immersed objects 'as one'. These media serve this purpose again in the context of whale song's reception since the 1970s, performing 'as a kind of metaphysical force allowing for frictionless connection or even communication between different beings and environments.'[13] In the resonating, aquatic church of whale song, humans find deliverance from their exploitation of the planet, washed clean by the waves of sound and water. Nevertheless, while recognizing the political power of this figuration of human love for the singing whales during the environmentalism of the 1970s, Steingo is unconvinced by the continued reference to whales' sonic communication as 'song'. He argues 'that [the word 'song'] is too freighted with metaphysics to be helpful any longer'[14] and that, although sometimes innocuous, the label still produces 'terminological havoc' among scientists, creating

[9] Bakker, *The Sounds of Life*, p. 159.
[10] Ibid., p. 174.
[11] Steingo, *Interspecies Communication*, pp. 10–11.
[12] Ibid., pp. 10-11.
[13] Ibid., p. 46.
[14] Ibid., p. 49.

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a barrier to productive conversations regarding the specificities of the processes through which whales communicate.[15]

Haskell, on the other hand, has faith in the musical nature of other-than-human sonic communication, including whale song; for the biologist, other-than-human sonic communication *is* music. His book revisits Henry Wadsworth Longfellow's often-quoted postulation that 'music is the universal language of mankind' and, pushing this idea further, celebrates Longfellow's insight as 'an embryological and evolutionary truth that far transcends the bounds of "mankind"'.[16] Haskell's thoughts are later tempered, however, with a more relativistic approach to the concept of music so that, depending on how one defines music, its origins may be identified with the emergence of various forms of life through evolutionary time. Each paragraph begins, 'If music is' followed by a new definition and a new origin. The first of these paragraphs hears music in the earliest communication between cells.[17] The penultimate paragraph of the passage identifies a connection between vocal learners, including birds, whales, and humans, and a capacity for music.[18] The final paragraph then lands on a definition of music that would set its limits as an exclusively human form of expression: 'If music is sound produced through modification of materials to make instruments and performance spaces in which to listen, then humans are nearly unique.'[19] Cards on the table, Haskell argues that music is, in fact, all of these things, meaning that the 'special form of music in the human species' is 'an art form emerging from and living in relationship with the diversity of music in other species.'[20]

The exclusivity of language to humankind is likewise denied by Bakker and Haskell. Bakker points to bioacousticians' digital technologies as revealing previously unheard cultures of complex sonic communication; these findings 'challenge the claim that humanity, alone, uniquely possesses language.'[21] Similarly, anticipating his argument about multiple musics, Haskell proposes that other-than-human languages are likely to exist with alternative kinds of grammar to those of human languages due to the differing perceptual orientations of other-than-human beings.[22] In her chapter on interspecies communication and AI translation technologies, Bakker reflects further on the relationship between perception and language. Here, she repeats scientists' cautions that, despite evidence of language existing amongst some other-than-human species, translation into human language may not be possible. This is because the differences in the way that we perceive and make intelligible the world around us — between human and other-than-human *Umwelten*[23] — differently shape the meaningful concepts represented in the verbal communication nurtured between beings of the same species, potentially rendering key concepts untranslatable.[24]

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15 Ibid., p. 53.
16 Haskell, *Sounds Wild and Broken*, p. 16.
17 Ibid., p. 253.
18 Ibid., p. 255.
19 Ibid., p. 256.
20 Ibid., p. 256.
21 Bakker, *The Sounds of Life*, p. 3.
22 Haskell, *Sounds Wild and Broken*, p. 168.
23 The plural form of the German word for 'environment', *Umwelten*, is a concept introduced by Baltic-German biologist Jakob Johann von Uexküll (1864–1944) to describe the different subjective worlds in which organisms of different species exist. His work emphasizes that reality is not a single objective entity but is sensed and perceived differently by each organism based on its biological makeup.
24 Bakker, *The Sounds of Life*, p. 171.

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Moreover, Haskell's book hears both human and other-than-human communicative utterances, musical and linguistic, as conjuring an evolutionary tree: one whose branches connect humans to all other forms of life. Haskell even ties forms of more-than-human vocal learning — e.g., when lyrebirds copy whipbird songs and when Sibelius imitates bird calls — to the anarchic passing of genetic material between early single-cell bacteria.[25] 'Cultural evolution', Haskell proposes, 'samples, remixes, and connects, reclaiming a little of the evolutionary nimbleness of our bacterial ancestors.'[26] Here, and in the other examples above, I am reminded of ethnomusicologist Tyler Yamin and anthropologist Alice Rudge's critique of what they refer to as 'origins listening' in which audible resemblances across species — for instance, humans and whales both singing *songs* — are heard as repetitions of the same genetic code being passed down shared evolutionary lineages.[27] Hearing such resemblances is a 'redemptive' move made by listeners who seek to reconnect with transspecies connection,[28] with sonic resemblance offering a metaphorical bridge over which reconnection might be achieved. However, as Yamin and Rudge argue, when a species's value is measured by how well its sonic culture resembles human sonic culture, reconnection through resemblance perpetuates the organization of life into evolutionary hierarchies.[29] When Haskell's ear hears resemblances between lyrebirds, Sibelius, and early bacteria, an epistemological violence is enacted (even as such radical similarity between humans and bacteria is claimed) since the 'same–different' scale against which all life is to be measured — a scale that underpins racist, colonial and imperial enterprises — remains firmly in place and valorized as a strategy of reconnection.

A similar uneasiness with regard to hearing other-than-human sonic cultures as music or language characterizes Steingo's book. As already noted, the book unpacks the metaphysical baggage of music and its mysticizing of marine mammals. In Steingo's introductory chapter, he also critiques feminist philosophy — namely, Haraway's work — and social science research that deals with interspecies communication. While acknowledging the importance of the latter for its rich questioning with regard to what it means to love across a species boundary and its exploration of the ethics of more-than-human communicative encounters, in the author's words, 'the social science literature on human/animal communication typically leaves me wanting, in large part because communication itself remains somewhat elusive and undertheorized'.[30] Steingo's book takes up this theorization, drawing on biosemiotics — and other humanities scholars who apply it to their research, such as anthropologist Eduardo Kohn — to explain why it is an oversimplification to speak of whale *song* or even bird *song* as music. Although the problem is introduced in the introduction and in chapter 1, much of the analysis actually takes place in the book's appendix, titled 'A Summary Excursion into Biosemiotics'. Here, Steingo employs philosopher Charles Peirce's delineation between icons, indexes, and symbols to distinguish human language — which uses symbolic signs — from other forms of communication based on the two former types. '[H]uman music and language', he argues, 'find their evolutionary basis in *gesture-calls*, those partly involuntary and largely emotive expressions shared widely across mammals […] Gesture-calls are always indexical, pointing either to an

[25] Haskell, *Sounds Wild and Broken*, p. 165.
[26] Ibid., p. 165.
[27] Tyler Yamin and Alice Rudge, '"Sounds Like" Redemption? On the Musicality of Species and the Species of Musicality', *Bucknell Digital Commons* (2024), pp. 1–21 (p. 5), <https://digitalcommons.bucknell.edu/cgi/viewcontent.cgi?article=3157&context=fac_journ> [accessed 15 July 2024].
[28] Ibid., p. 2.
[29] Ibid., p. 14.
[30] Steingo, *Interspecies Communication*, p. 13.

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external referent (an intruder, a falling branch, a desired foodstuff) or an inward state (fear, hunger).'[31]

Haskell, like Steingo, believes that music and language are likely to have developed out of forms of sonic communication employed by humans' hominid ancestors.[32] Yet, whereas Haskell sees separating what counts as music and what counts as speech as a complicated task fraught with exceptions,[33] Steingo, agreeing with musicologist Gary Tomlinson, contends that music emerged with the evolutionary transformation of gesture calls into discrete pitch systems where discrete pitches could be deployed in varying combinations.[34] Language, on the other hand, emerged with the transformation of gesture calls into phonemes that, in turn, could be placed in combination to produce symbolic signification.[35] The songs of birds and whales are, for Steingo, neither of these things. Instead, they are 'abstracted, patterned gesture calls',[36] a definition that is attractively tidy — indeed, perhaps too tidy, for to claim, as he does, that 'Neither birds nor whales […] deploy discrete pitches in their "songs"'[37] is rather sweeping and risks overlooking the potential diversity of pitch discreteness across avian species.[38]

The materiality of communication is central to all three authors' thinking about the role more-than-human sonic cultures have played and might continue to play in fostering connection, care, and even love across species boundaries. Steingo's study of Lilly's laboratory reveals both how sound's materiality, including its bodily production, appeared to Lilly to limit human–dolphin communication and how violence and torture were carried out in the pursuit of transspecies connection. Haskell's book, on the other hand, seeks to nurture its readers' affiliations to other-than-human beings by modelling an acoustemology in which sounds index the evolutionary ancestry of the bodies that produce and/or perceive them. In one example, Haskell describes new spatial-aural technologies that enable performers to sound low-frequency pitches directly and dynamically across different parts of their bodies and, thus, to further blur the boundary between human perceptions of sound and movement. He frames the emergence of these technologies not as a cultural invention of some humans within a particular place and time but as an expression of an inherent evolutionary truth shared between vertebrate animals. As he writes, 'This [technology] builds on the link established hundreds of millions of years ago when our fish ancestors first evolved inner ears that detect both motion and sound, a design that we and all other vertebrates have now inherited.'[39] In another example, Haskell listens through a hydrophone to the busyness of underwater life in the salt marshes of Georgia, U.S., and perceives the sounds of his own biology of hearing in a 'curious loop' that ties humans to fish across evolutionary time.[40] The snapping of shrimp in this underwater world leads to transspecies identification: he is 'a fish talking in air, strutting and breathing on land, yet experiencing the sea through trembling hair cells in coiled watery tubes in [his] ears.'[41] Kinship,

[31] Ibid., p. 180.
[32] Haskell, *Sounds Wild and Broken*, p. 200.
[33] Ibid., p. 254.
[34] Steingo, *Interspecies Communication*, p. 181.
[35] Ibid., p. 181.
[36] Ibid., p. 184.
[37] Ibid., p. 184.
[38] For instance, Ozaki et al. have shown that the Kauai O'o bird's song displays high pitch discreteness. See: Yuto Ozaki et al., 'Automatic acoustic analyses quantify variation in pitch structure within and between human music, speech, and bird song', *PsyArXiv*, 13 July 2020, doi:10.31234/osf.io/7ywxm.
[39] Haskell, *Sounds Wild and Broken*, p. 234.
[40] Ibid., p. 16.
[41] Ibid., p. 16.

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Haskell's writing suggests, is to be heard through the shared evolutionary ancestry of material bodies that communicate.

Bakker's book continues to apply materiality as a lens — or, rather, as an acoustic — through which to listen more closely to the stakes of more-than-human sonic cultures. Throughout *The Sounds of Life*, a case is made for the use of digital technologies as a means to better foster transspecies care. These technologies, Bakker argues, facilitate greater knowledge of other-than-human sonic communication, which, in turn, 'create[s] new possibilities for both environmental conservation and interspecies communication.'[42] A principal aim connecting Bakker's case studies is to show how the limits of a (White European) human capacity for hearing delimit (White European) imaginings of what certain animals are capable of and who those animals *are* in relation to the human societies alongside whom they live, as well as how mutual flourishing might be nurtured. Examining this relationship in reverse, Bakker identifies how the limits of the imagination can also constitute the limits of hearing: in chapter 4, for instance, examining the sonic communication of river turtles, the author paints a picture of colonial expansion and extraction in the Amazon, showing how a view of river turtles as no more than meat to be harvested shaped a long-lasting perception in the biological sciences of the turtles as deaf and mute.[43] She also highlights how the practicality of transporting certain audio equipment to marine environments, such as rivers and reefs, restricts or makes possible the kind of listening — and therefore the kind of transspecies relating — biologists are able to practise.[44] In its final pages, Bakker's book compares the paradigm shift in listening to (and imagining) the world that digital technologies promise to facilitate to the kind of paradigm shift in seeing (and imagining) the world that microscopes ushered in with the research of seventeenth-century microbiologist Antonie van Leeuwenhoek.[45] It is through these technologies' expansion of what can be heard, who can communicate with whom and what they can communicate together that, for Bakker, opportunities to imagine and nurture more-than-human wellbeing are won.

The conversation is shifted by Steingo from more-than-human wellbeing and care to interspecies love: 'What are the ways to love a non-human?' he asks. 'What kind of material or earthly form might this love take? Is there an ethics of human/animal love? Is there a politics?'[46] Chapter 2 of his book offers a poignant exploration of answers to these questions that takes the reader from the town of Hermanus in South Africa, with its whale callers and criers, to the laboratory of U.S. scientist Irene Pepperberg and her research with Alex, an African Grey parrot. After thinking through both the possibilities and impossibilities of different kinds and understandings of loving other-than-human animals, the author considers what it means to say, 'I love you', whether to an animal or to another human being. For Steingo, these words are said as an entryway into more-than-human utterance.[47] Further still, communication *itself* — including linguistic and non-linguistic communication — 'is eros with semiosis' and, as Steingo reiterates, 'attraction and repulsion along with interpretation.'[48] Interspecies communication is, therefore, also partly constituted by love.

Finally, I wish to underline all three authors' sensitivity towards the colonial histories and Whiteness of the institutions in which they conduct their research. Haskell and Bakker, for

[42] Bakker, *The Sounds of Life*, p. 6.
[43] Ibid., pp. 67–70.
[44] Ibid., p. 84.
[45] Ibid., pp. 201–03.
[46] Steingo, *Interspecies Communication*, p. 57.
[47] Ibid., p. 84.
[48] Ibid., p. 87.

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instance, agree that bioacoustics research and technologies implicating more-than-human sonic cultures where Indigenous people live can only have value when they learn from Indigenous communities' modes of listening and sounding — modes that form an essential part of these more-than-human sonic cultures. Bakker regularly cites Potawatomi plant ecologist and author Robin Wall Kimmerer, whose scientific research shapes and is shaped by Potawatomi ecological knowledge and knowledge about living well on the land. A number of Bakker's case studies highlight the positive overlapping of bioacoustics researchers and traditional community members: these include the Iñupiat people's fight for the right to continue hunting bowhead whales, which is the subject of Bakker's first chapter, and the installation of beehive fences around farms in Kenya, informed by Maasai knowledge of elephants' responses to the sounds of bees,[49] among other examples. The author also stresses the importance of 'deep listening' — a practice she credits to traditional communities — which, unlike digital listening, 'an enhanced form of eavesdropping',[50] constitutes an interpretation of sounds vis-à-vis their place-based meanings rather than merely as abstract sonic forms.[51]

Previous scholarship has argued that listening to forests merely as places of reconnection to nature, appreciated for their apparent absence of humankind, is no longer viable when lives and lifeways are at stake.[52] Haskell underscores these arguments, attributing the 'separation between our senses and the consequences of our actions' to 'the dislocating power of fossil fuels'.[53] Imperialist extractivism, he claims, continues to be fuelled by a 'sensory alienation' in which the objects around us and the things we find beautiful seem to fly in and out of the world, disconnected from the bodies that consume them.[54] Admittedly, and despite the clarity with which he writes on sensory alienation, Haskell's own sensitivity to oppressed voices occasionally wavers, for example, in Part III, section 4, when he references what sound like rather cruel experiments performed on other-than-human animals without further comment[55] or when his ear passes over an encampment of unhoused people to listen instead to the white-crowned sparrow nearby[56] — how might members of this encampment have heard the bird? Nonetheless, like Bakker, Haskell writes compellingly on the benefits of a bioacoustics centred on emplaced listening — a practice that, in Haskell's book, tunes in to the unequal burden of sound pollution[57] and to the voices of Indigenous people on whose land bioacoustics research takes place.[58] 'To listen in tropical forests', he writes, 'is to hear the need for justice.'[59] Indeed, justice for forest-dwelling Indigenous communities means securing control over land that is rightfully theirs,[60] and, as Bakker notes, in the future, this sovereignty may make Indigenous-centred research protocols necessary for bioacoustics research taking place on these

[49] Bakker, *The Sounds of Life*, p. 56.
[50] Ibid., p. 77.
[51] Ibid., p. 201.
[52] See: Jody Berland, '"That Old Familiar Tweet Tweet Tweet": Birdsong, Music, Affect, Extinction', in *Virtual Menageries: Animals as Mediators in Network Cultures* (MIT Press, 2019), pp. 175–200; Rachel Mundy, 'The Rose Garden', *Animal Musicalities: Birds, Beasts and Evolutionary Listening* (Wesleyan University Press, 2018), pp. 146–67.
[53] Haskell, *Sounds Wild and Broken*, p. 141.
[54] Ibid., p. 290.
[55] Ibid., pp. 153, 155.
[56] Ibid., p. 148.
[57] Ibid., pp. 339–40.
[58] Ibid., p. 284.
[59] Ibid., p. 288.
[60] Ibid., p. 284.

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lands, including 'consistent safeguards over harvesting, storing, and sharing digital acoustic data.'[61]

Steingo's book goes the furthest in decentring Western scientific acoustemologies as they relate to the study of more-than-human sonic cultures. In chapter 3, the author focuses on another kind of other-than-human, the alien, both as it emerges within Enlightenment discourses on the animal and as it plays out in the search for life beyond Earth. This search, Steingo observes, is constituted largely through listening and is characterized — both literally and metaphorically — by persistent radio silence. Chapter 4 then turns from the alien's silence to its sounding. In this final chapter, Steingo examines the affordances the alien offers as a basis for an identity that rejects the Whiteness and colonial legacy of humanism. Informed by Black critical theory, he problematizes the human as a taken-for-granted category within discourses of interspecies communication through his analysis of the life and work of U.S. composer and musician Sun Ra and the Canadian artist Kapwani Kiwanga's performance artwork *The Deep Space Scrolls*. Listening to the former's heady afrohumanism and the latter's disorienting imbrication of science, myth, anthropology and conspiracy theory leads Steingo to conclude that, as alien performers, Sun Ra and Kiwanga are intentionally incoherent and unfamiliar, 'twisting and cracking the world of sound and images from within'.[62] As cosmic visitors penetrating human history from the outside, they throw neat categories and hierarchies, including categories of human and animal, into deep disarray.

Returning to the article on sperm whale communication that began this review, I wonder what will happen if and when Ceti researchers learn what they need to learn about the lives of sperm whales — including, presumably, what sperm whales experience and feel as embodied beings adapted to the depths of the ocean — in order to crack the code of sperm whale codas and produce their own clicks in response. What would these researchers ask sperm whales, and what would sperm whales want them to know? Would the whales be interested at all in communicating with the researchers, and, perhaps most importantly, if dialogue *was* achieved, would it change anything? Would the lives of sperm whales and other ocean-dwelling beings begin to matter more to those humans who have the power to protect them? Perhaps the true challenge lies not in decoding other-than-human communication but in learning how to let other perspectives and lives expressed through sound — whether language, music, or something else entirely — transform us.

Bakker, Haskell and Steingo ask what language and music have to do with living with — or, more pessimistically, without — other-than-human beings. These categories of sound are inevitably caught up in matters of listening and responding well, being almost synonymous with good sounds or experiences: for instance, in English, the idioms 'music to my ears' and 'it speaks to me' describe positive affirmations achieved through speech and art, respectively. How, then, do such *a priori* categories of sound affect what counts as listening and responding well to sperm whales as well as other animals? Contrariwise, how might listening well shape these categories anew? What counts as listening and sonically responding well within a more-than-human world of sound — and to whom? Where, and when? The books examined in this review article help us to think through these questions and what it means to be transformed. They encourage us to be open-eared and to 'stay with the trouble' — as Haraway would say[63] — of listening.

[61] Ibid., pp. 175–76.
[62] Steingo, *Interspecies Communication*, p. 162.
[63] Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Duke University Press, 2016).

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