A Sonic Anthropocene. Sound Practices in a Changing Environment

Ivo Louro, Margarida Mendes, Daniel Paiva and Iñigo Sánchez-Fuarros[1]

The introduction to this double issue entitled "A Sonic Anthropocene: Sound Practices in a Changing Environment" explores some of the concepts and methodological issues that inform our understanding of what we call the "Sonic Anthropocene". We argue that incorporating practices of listening and aural documentation that register the transformations in the acoustic landscape creates a space of potential for examining the increasing impact of human activity on the environment. This introduction is divided into six sections. First, we provide an overview of the notion of the Anthropocene. Secondly, we explore the relationship between sound, environment and perception as cultivated by different strands of scholarship. Thirdly, we discuss the capacity of ethnography to generate new insights into the conditions of life in the Anthropocene. With this in mind, we highlight various examples of collaboration between environmental sound artists, researchers, and activists. Lastly, we introduce the essays included in this first volume. Ultimately, this double issue seeks to contribute toward sounding the Anthropocene by placing sound at the centre of an interdisciplinary conversation about the economic, social, cultural, political and ecological processes that underlie the currently ongoing planetary transformations.

Keywords: anthropocene, environment, soundscape, sound art

The idea of organizing this double issue for Cadernos de Arte e Antropologia took shape around a seminar we were invited to convene for the Anthropocene Campus Lisboa: Parallax, a weeklong educational event that took place in Lisbon (Portugal) between 6 and 11 January

1 The authors contributed equally to this work. Authors' affiliations: Ivo Louro (Interuniversity Centre for the History of Science and Technology (CIUHCT), NOVA School of Science and Technology, ivomlouro@fct.unl.pt); Margarida Mendes (Centre for Research Architecture, Goldsmiths University of London, mnune001@gold.ac.uk); Daniel Paiva (Centre for Geographical Studies, Institute of Geography and Spatial Planning, Universidade de Lisboa, daniel.paiva@campus.ul.pt); Iñigo Sánchez-Fuarros (Institute of Heritage Sciences (Incipit), Spanish National Research Council (CSIC), inigo.sanchez-fuarros@incipit.csic.es).

2020 as part of the Anthropocene Curriculum. For two intense days, we gathered a heterogenous group of international participants in a large room at the conference venue to reflect on and produce some original sound works about the impact of tourism and urban renewal on Lisbon's sonic ecology. On the first day, we led an exploratory walk around Lisbon's main attractions to discuss in situ how the rising tourism had impacted local ecosystems—from changes in the livelihood of the city's traditional neighbourhoods to the pollution arising from tourist activities on the Tagus river—, only to find ourselves engulfed by the very same practices we were critically observing. On that particular day—a sunny day in the month of January—the city thronged with visitors and our field trip quickly blended in with the many guided tourist tours walking up and down the hills that dominate the Portuguese capital's topography.

At the time, nothing foretold that, as we write this introduction a year later, a pandemic of global proportions would bring major tourist destinations like Lisbon to a halt. Where once crowds of tourists thronged, we now find empty streets and an unnerving silence. The otherwise busy tourist districts are like ghost towns today. One year after the first lockdown, the prospect of a major economic, social and health crisis following the pandemic looms over the immediate future. In her book *Au temps des catastrophes. Résister à la barbarie qui vient* (2013), Isabelle Stengers argues that contemporary catastrophes are an occasion for radical thinking and the COVID-19 pandemic seems to be no exception. There is little doubt that the crisis provoked by the spread of the virus has reached catastrophic proportions, with unequal effects felt in different regions and countries. At the same time, the pandemic has urged us to question the limits of capitalism as well as to reflect on the effects of climate change and the destruction of natural habitats, the vulnerabilities of globalization, or the increasing biosecuritization of our societies in a response to the pandemic, without any radical changes in sight in the short to medium term. For all those interested in the sonic world(s), the pandemic has offered us a unique opportunity to listen to our surroundings in novel and unprecedented ways (Sánchez-Fuarros and Paiva forthcoming).

Although this special issue is undergoing publication while we are still weathering the repeated waves of the COVID-19 pandemic, this collection of articles was not originally conceived as a direct response to this crisis. It is difficult, however, not to read them in the light of the current situation as the pandemic has permeated every aspect of our lives. Despite how much the world has changed over the last year, the question that inspires this issue remains: How can practices of listening and aural documentation further the capacity of registering the transient space that the Anthropocene occupies in the material domain while opening up the space for an extended sensitivity that accounts for transformations across different scales? This edited collection aims to be an invitation to critically listen to the fault lines of the so-called era of the Anthropocene—the current COVID-19 crisis representing just the latest example of the "great acceleration" that it fuels.

The introduction to this double special issue entitled "A Sonic Anthropocene: Sound Practices in a Changing Environment" explores some of the concepts and methodological issues that inform our understating of what we call the "sonic Anthropocene". The first and second sections provide an overview of the very notion of the Anthropocene, highlighting the legacies and controversies around such a contested term. We argue that incorporating practices of listening and aural documentation to register the transformations in the acoustic landscapes would create a space of potential for examining the increasing impact of human activity on the environment: a sonic Anthropocene. The next section explores the relationship between sound,

environment and perception as cultivated by different strands of scholarship over the twentieth and twenty-first centuries. Although sonic and listening practices have often been elevated as powerful mediums to connect humans with nature and the environment, we call for the cultivation of a critical stance as aural awareness does not automatically generate a more involving, sustainable relationship with nature and the environment. The fourth section offers a brief overview of the capacity of ethnography to generate new insights into the conditions of life in the Anthropocene. Among the new forms of collaboration emerging under the interpretative umbrella of the Anthropocene, those involving anthropologists and artists are particularly revealing. For this reason, the following section discusses various examples of sound artists, researchers, and activists who have been directing their attention towards sound as a medium to explore the present ecological crisis. Finally, this introduction provides a brief overview of the contributions to the first issue which address these questions from a variety of theoretical and methodological standpoints.

Sounding out the concept of Anthropocene

The Anthropocene concept has experienced an intermittent history ever since the late 18th century (Trischler 2016). However, it has flourished with new impacts since being recoined by the Nobel laureate and atmosphere chemist Paul Crutzen[2] and the limnologist Eugene Stoermer in the early 2000s as a wake-up call to the increasingly widespread damages of human activities on the planet through suggesting the beginning of a new geological epoch (Crutzen and Stoermer 2000; Crutzen 2002). The concept has since gained momentum to endow scientific and cultural credence and urgency on interrelated global ecological crises, such as climate change and the sixth mass extinction which can spell a future of deep bio-cultural impoverishment if left unattended. The latest UN development report emphasizes how the Anthropocene poses a significant challenge for human development (United Nations Development Programme 2020).

For geologists and Earth Systems scientists, the question is determining the "when," i.e., the location of the Anthropocene's onset in geological time. Such a procedure implies identifying specific stratigraphic signals that show no precedent in the Earth's past geological history as a whole (Waters et al. 2014). A diverse set of hypotheses has been put forward, with some challenging stratigraphic conventions. Such proposals range from the Neolithic (Ruddiman 2003), the "Colombian Exchange" of the 1600s (Lewis and Maslin 2015), the industrial revolution, to the post-war "great acceleration" in industrial expansion and radioactive fallout from nuclear experiments (Zalasiewicz et al. 2015; Anthropocene Working Group 2019). No consensus yet exists in this issue, and validating any hypothesis will be a slow process (Carruthers 2019).

In the extended debate—also named the cultural Anthropocene (Trischler 2016)—the main controversy revolves around the "who." The grand narrative of the geophysical sciences has been criticized for flattening history by only incorporating an undifferentiated human species as the responsible offender (Malm and Hornborg 2014). Therefore, scholars in the social sciences and humanities point out how the concept of the Anthropocene fails to report on the

2 We also wish to pay our respects to Paul Crutzen, who left us a few days before we started writing this editorial.

various cultural and political circumstances that marked how this epoch became both possible and destructive. A host of critiques and counter-narratives, many of which present their own counter-coinings (e.g., Capitalocene, Chthulucene, Plantationocene), have come forward to foreground other historical dynamics and responsibilities. These focus more on the linkages between environmental destruction and structural violence and the modern world view, the development of capitalism, colonialism, extractivist and neoliberal policies, and neo-colonial globalization (Moore 2015; Yusoff 2018; Bonneuil and Fressoz 2016; Parrika 2014). Others draw attention to the giddiness of proponents of the grand narrative to geoengineer the whole planet, side-tracking many civic and popular initiatives (Hamilton 2014; Bonneuil and Fressoz 2016; Hamilton, Bonneuil, and Gemenne 2015). These power, ecological and social justice questions have also been entwined with discussions around agency, scale, and the nature-culture divide. Many have criticized the inherent anthropocentrism of the terms, which masks how agency sprouts from the in-betweenness of enmeshed relations amongst humans, technologies, and non-human entities (Latour 2014; Haraway 2016). Additionally, some have denounced the Anthropocene grand narrative as an apocalyptic tale that sinks hope and marks the deed as done (Moore 2017; Haraway 2016). Telling stories that do away with notions of nature as something apart from human societies and an object to be researched and dominated by technoscientific subjects; that integrate agency as distributed among actants within multiple temporal and geographical scales, have all been argued as ways of bridging the natural history of the planet with human history (Chakrabarty 2009)—or *geostories* in the coinage of Bruno Latour (2014)—as well as for inciting hope in a future of multispecies flourishing and recuperation (Haraway 2016).

As such, in the last decade, the cultural Anthropocene has furthered a new space of experimentation, activism, and pedagogy for arts and sciences with widespread conferences on the topic, exhibitions, and novel curricula (e.g., the Anthropocene Curriculum). This double issue provides a further contribution to these debates. Alongside a prolific visual culture that also posits the Anthropocene as an aesthetic event (Franke and Diederichsen 2013; Matless 2017), the present socio-ecological changes equally require practices of listening and aural documentation that register the transformations in the acoustic landscapes of cities and natural environments as well as sounding out that which escapes sensorial immediacy and consciousness.

The sonic in the Anthropocene

As the Anthropocene signals a moment of the planet where human activities are ever-present, critiques about the fundamental ephemerality of sound (Gautier 2014: 33) have gained new dimensions: the continuous and ubiquitous vibrations of industrialized societies in the ocean are considered a significant stressor for marine life (Duarte et al. 2021); the spectral signature of the Earth has changed due to anthropogenic electromagnetic fields to such a degree that the planet now "advertise[s] itself splendid to the universe" (Sullivan 1981); the recent slowing down in activity brought about by the Covid-19 pandemic (Rutz et al. 2020) not only made populations and the media become suddenly attentive to soundscapes and birdsongs but also led to the longest quiet period of anthropogenic seismic noise on record, giving seismologists everywhere a chance to study subtle seismic phenomena (Lecocq et al. 2020). However, such examples still denote a tendency in the natural sciences to understand the sonic in the Anthropocene almost exclusively through human noise and interference. In a recent art instal-

lation, Vinciane Despret calls for a Phonocene (a term she borrows from Donna Haraway). In a very Schafer-esque tone (Schafer, 1994 [1977]), for Despret the Phonocene

> means trusting the musicality of the world (including its rumbles) and try to learn from it. And it also means leaving the sphere where the logos of the Anthropos owns all privileges to renew a link to languages other-than-human ones (Despret 2020).

Still, one should be cautious about incorporating sound into geostories to bring closer that which has supposedly become detached by a "view from nowhere" (Nagel 1986) that stands at the edifice of modern science and notions of objectivity. Such arguments resonate with essentialist notions enumerated by the audio-visual litany that Jonathan Stern (2003) warns against in which vision is the more static, detaching, distancing, perspectivist and spatial sense, that which "tends towards objectivity"; and hearing (and sound) is the more ephemeral, immersing, connective and temporal sense, that which "tends towards subjectivity". As regards this matter, listening has often figured as a deeply affective practice that breaks with the conceptual divides that underpin modern rationalities, such as those between nature and culture or between subject and object (Latour 1993). However, we need to be careful about exaggerating the affective potential of sound so that we do not risk either erasing that of the other senses, including vision, or downplaying the potential of engaging in rational and objective thinking through sonic practices (Sterne 2012; Bijsterveld 2019, Supper 2014, Paiva 2020).

Hence, to reflect and to act on the Anthropocene sonically involves engaging with another modality of experience that "brings into the world novel relations, (…) shifts paradigms and builds new formations" (Kanngieser 2015). Anja Kanngieser takes these potentialities of sound as a method to incite political thought about the Anthropocene while still accommodating a way to de-center the human and open up space to that which defies perception and cognizance. She takes inspiration in its transversality as a mode of inquiry particularly useful for assessing relations, both within as well as between the human and non-human worlds, and to tune in to their structural powers and epistemic imbalances and imperceptibility. As we find below, there is both an established tradition as well as a growing community of practitioners that work precisely with these affordances.

To complement Kanngieser's proposals on sound's relationality, we should be attentive to sound's standing "in the in-between point of culture and nature" (Sterne 2003: 10) and their contingent histories as what makes them come to be events for different interlocutors. This means thinking in terms of its *acoustic assemblages* (Gautier 2014: 21-23), i.e., the manifold historical situated human and non-human formations where the materiality of sound, its epistemological and ontological dimensions mutually constitute each other through the "interaction[s] between entities that produce/hear sounds".

Sound, environment and perception

While the Anthropocene invites novel perspectives on the relationships between sound, the environment, and society, the implicancy of sound in environmental perception has been acknowledged for some time. Nineteenth and twentieth-century science and culture were marked by a profound ocularcentrism (Crary 1990; Levin 1993), and listening remained a recurrent, if marginal, epistemological practice (Erlmann 2010, Bijsterveld 2019).

Sound as a mediator between the body and the living environment was the object of significant scholarship during the twentieth century. Environmental and psychological studies on the effects of environmental sound on humans did however privilege a quantitative understanding of this relationship, in which sound is mostly reduced to the matter of noise (e.g. Kryter [1950] 1970). Nevertheless, the scientific acknowledgement of the affectivity of environmental sound gave way to a series of practices that deploy sound as a medium to control the behaviour of crowds. This is most evident in the proliferation of ambient sounds and music in commercial, ludic and work spaces throughout the twentieth century (García Quiñones, Kassabian and Boschi 2013). In shopping malls, airports and offices, sounds have been used to tune individuals to the rhythm and mood of specific practices (LaBelle 2010). In what has been called atmospheric design, soothing sounds provide tranquillity and favour relaxation and concentration, while energetic music pump up workers and consumers to keep going in busy places (Wissmann 2014). However, the affectivity of sound has also been modulated in violent and disruptive ways. Goodman (2010) details a wide range of sonic warfare practices including bombings, torture, propaganda, interferences and sonic booms deployed in recent geopolitical conflicts. Goodman's work argues that sound has been a crucial tool in the geopolitical shift from the paradigm of violence aimed at the human body, towards the paradigm of violence aimed at the environment in which the human body dwells (Sloterdijk 2009). In different ways, these examples manifest how sound was also a tool for the implementation of the capitalist consumer society that propelled the "great acceleration".

Alongside these events, other ways of engaging the environment through sound have also mushroomed. As environmentalist movements were emerging in the 1960s in the wake of the ecological degradation caused by the advancing consumer society, a group of scholars based at the Simon Fraser University in Vancouver became concerned with acoustic ecology, the study of the sounds of local environments . Among them was Murray Schafer, (1977) whose formulation of the soundscape became a widely popular concept that inspired both scientific and artistic imaginations. Since then, bioacoustics and soundscape ecology have taken up sound as a tool for detecting biodiversity and the impact of environmental change on local habitats (Farina 2013). Concurrently, soundscape composition and soundwalks have generated intense interest among artists seeking to engage in discussions about nature experiences, environmental change, and conservation efforts. Such practices have always been entangled with environmental activism in many ways (Ritts 2017). Underpinning such entanglements is the idea that deep or careful listening allows one to connect to nature and environmental change by becoming aware of the micro-events of life that surround us and yet seem to always pass by unnoticed. However, if we can learn anything from the history of atmospheric design, it is that sound can also be a medium to further detach people from nature and seduce them into artificially controlled environments. For this reason, in dealing with sounds and environments, we must cultivate a critical stance. We are not alone in stating this. A growing number of works has amplified the role sound can play in intersecting environmental and social issues, such as racism, colonialism, gender disparities or poverty (Galloway 2020). Aural awareness does not automatically generate a more involving, sustainable relationship with nature and the environment. Sonic practices for changing the dire trends of the Anthropocene must therefore carefully envision the outcomes of such practices, and in which ways they mobilize and divert subjectivities and imaginations.

Ethnographic entanglements in the Anthropocene

It is no coincidence that a collection of this nature should appear in a journal that explores the crossovers between art and anthropology as debates on the Anthropocene have often proven a fruitful terrain for collaborations between artists and ethnographers (and both, in turn, with natural scientists, historians, or climate activists). The Anthropocene resonates with central themes in the history of anthropology, specifically human experience as a world-transforming process. Recent anthropological engagements with the Anthropocene are reshaping the boundaries of the discipline in significant ways (see Chua and Fair 2019; Moore 2015). In Andrew S. Mathews' words, "the Anthropocene is a problem that is pulling anthropologists into new forms of noticing and analysis, and into experiments and collaborations beyond anthropology" (Mathews 2000: 77). In a similar vein, Bauer and Bhan highlight how anthropology's tradition of describing people and cultures using detailed observation and prolonged firsthand participation places the field in an advantageous position to intervene in current debates about anthropogenic change:

> How could anthropology, with its deep commitment to historical understanding and social and political justice, use the experiences of people to build a politics that is mindful of large-scale climatic shifts while also being attentive to the ways people engage with houses, cars, soil, sand, sediments, mountains, trees, animals, and glaciers? (Bauer and Bhan 2018: xii).

The pioneering works of Anna Tsing (2004, 2015) and Eduardo Kohn (2013) are good examples of the potential of anthropology and the ethnographic method to open up "imaginative horizons" (Crapazano 2004) as opportunities for speculation and experimentation on the frenzied living conditions and complex entanglements of human cultures, the environment and non-human worlds under the Great Acceleration (for a critical view, see Hornborg 2017). Moreover, ethnographic approaches to "anthropogenic life" (Tsing, Mathews and Bubandt 2019: 187) constitute a fertile ground to challenge the aforementioned Anthropocene narratives that assert the idea of a singular humanity as well as an opportunity to move beyond the nature/culture divide. Ethnographic research on the Anthropocene has traditionally examined its social and cultural dimensions, focusing on particular local settings affected by climate change (Crate and Nutall 2009). Moore (2015) describes other realities of global anthropogenic change that have aroused the interest of anthropologists recently, such as biodiversity loss, environmental degradation or climate ethnography, among others. Krauss (2015), meanwhile, deploys the ethnographic method to explore the global research agenda on climate change and sustainable development.

Ethnography not only reflects a way of *viewing the world*—holistically and naturalistically—but it can also be understood as a way of *being in the world* as an involved participant (Ellis 2004: 26; our emphasis). In fact, approaching the Anthropocene ethnographically would engender new possibilities for thinking and living in this new geological era. Take, for example, the genre of multispecies ethnography (Kirksey and Helmreich 2010), an emerging subfield that explores the "contact zones where lines separating nature from culture have broken down, where encounters between *Homo sapiens* and other beings generate mutual ecologies and coproduced niches" (Fuentes 2010). How can or should anthropologists engage ethnographically with nonhuman others?

Collaborations between anthropologists and artists often challenge the boundaries between academia and advocacy, prompting questions of reflexivity and representation. These

collaborations should also force us to reconceptualise our public engagement as well as envisioning a truly interdisciplinary research agenda within and beyond the academy. The scope and variety of articles included in this double issue demonstrates the diversity and strength of these collaborations in practice.

Sound Practices in a Changing Environment

Sonic practices introduce useful methodologies to environmentally sense ecosystems and register transient power relations inherent to the Anthropocene before they get inscribed into the geological strata. A wide range of sound artists, researchers, and activists have been directing their attention towards sound as a medium to explore the present climate crisis. Sound's omnidirectional quality trespasses all matter, leaving rippled traces, while destabilizing spatiotemporal causal effects and, as such, problematizes ideas of containment and jurisdiction. The characteristics of the medium, along with the methodologies they offer, suggest novel, intersectional ways to register an ecosystem while constituting evidence that destabilizes the primacy of the visual as generative of proof (Schuppli, Ganchrow).[3] Operating on a minute scale, equivalent to the invisibility of toxic regimes, sound allows for the surfacing of power dynamics already taking place, working on diffused spatiotemporal scales that, however invisible, already provoke ecosystem transformation (Mendes 2021).

Environmental art's long tradition has had many movements, stemming from the exponential growth of land art in the 1960s, with its sculptural, performative, and pedagogical strands; to the capture of atmospheric phenomena by romantic conceptualists, or the most recent development of research based practices that intersect investigative art forms with community-based art and socially-engaged practices. The late twentieth-century proliferation of recording technologies allowed for the dissemination of field recording practices in parallel with the development of soundwalk methodologies and listening exercises, having had a considerable impact on how soundscapes can be interpreted (Gallagher 2015).

While field recordings are considerably the most common approach to ecosystem documentation, many artists have resorted to the practice of sonification—translating data into sound waves in order to convey information (Krammer 1994, Walker and Nees 2011)—sensing the invisible and making the natural world audible. Lichens, fungi, microbes have been given centre stage in multiple audio works, with the aid of biosensors, contact microphone (Krabbe, Policarpo), probe microscopes (Roosth 2009), and audio editing and computation programs (Helmreich 2015, Ertl-Shirley, Mangan). Furthermore, atmospheric and planetary phenomena, such as the weather, the magnetosphere or seismic activity have also been registered by artists, approaching them often through deploying sonification techniques that unveil spectrum events occurring at a distance or on frequencies beyond the thresholds of human audition (Ganchrow; Luz; French, 2014; Polli 2005, 2006; Kubisch).

A concern for elemental media has been present in most sonic practices (Peters 2015). This has connected sound art's discursivity to a medium meta-analysis as practitioners became

3 We have chosen not to refer to specific works by the artists mentioned in this introduction in order to avoid, on the one hand, the temptation of an overly curatorial approach to the subject at hand and, on the other, as an invitation for readers to themselves explore their oeuvres and trajectories.

conscious of how sonic infrastructures filter reality. Moreover, this material consciousness has also connected sound to the primal elemental mediums of its expression—air or water (Parikka 2015). As a result, a plurality of practitioners across the world have developed sonic practices in aquatic spaces, documenting transformations in rivers, lagoons, oceans and various parts of the hydrocycle (Watson; Lockwood; Barclay; Vasquez; Petrucci), while most oceanographic research has developed and evolved along with the emergence of new sonic technologies, often in tandem with their instrumental application in military and geopolitical affairs (Camprubí and Robinson 2016; Camprubí, 2017). Transduction has played an important role here, as data, inaudible frequencies and energy expressions are translated to audio or visual media. Wind is yet another medium of immense curiosity for eco-conscious sonic artists. Multiple practitioners developed kinetic sculptures or other aeolian devices to be activated by air turbulence, playing with the transductions of this element and the reverberations of climatic expressions (Eastley; Luz; Faravelli; Wang).

Bioacoustics is another important field of sonic practice inquiry, both developed by artists and scientists alike. The attention towards other-than-human forms of audition has been on the agenda for many decades now, from early biofeedback experiments during the first wave cybernetics movement to more recent experiments in plant sentience and insect audition (Mhatre; Appel and Cocroft 2014). Aural diversity has recently emerged as an awareness-raising field of study where multiple ways of listening are surveyed, leading to a complexification of acoustic politics and sensing hierarchies (Drever 2019). This proposes the investigation of the diversity of hearing organs across nature, and how composite ways of sensing might address other parts of the spectrum outside of our hearing thresholds. At the same time, this speculates about how different species have evolved and adapted to their ecosystem's needs.

Environmental sonic practices have thus developed methodological tools and techniques of interpretation adopting a plurality of forms, from the investigative dimension, such as the radio diary documental format, to the more analytical and cross-scalar forensic approach, touching upon legal issues (Cusack; Schuppli; Hamdan). Other forms of sonic practice involve more poetic methods, such as storytelling and sonic fictioning. These employ a wide range of media, including narrative compositions and mixed media sound or audiovisual installations, via the use of sonifications, improvisation, and other poetic devices. They often address dimensions of the spectrum that fall beyond the human hearing range while alluring us to sense how other-than-human entities and diverse modes of existence might hear (Miguel with Dalt 2015; Pereira 2019; Westerkamp 1989).

These plural expressions of eco-conscious sonic practices take different means to act towards similar goals, which pertain to conservation, awareness-raising, or pedagogical ends. Whereas in some cases, they direct us towards achieving renewed consciousness about particular zones of the biosphere or develop empathy towards species that we have never contacted, in other cases they appeal to practices of attunement and documentation of particular ecosystems and soundscapes (Barclay; Winderen; Hall; Reveil). In most cases sound is an operative tool for ecopedagogy as listening allows for the emergence of ephemeral acoustic communities in which different sensibilities merge in an intersubjective space of fruition. Various artists and curatorial inquiry projects have explored listening formats and moments of collective audition as spaces for political activation that allow for a broadened ecological consciousness. Temporary acoustic communities can aid us in understanding the continuity between bodies and the environment and connect to geotrauma in a restorative manner by disentangling our situated and embodied

stories while connecting to places under distress. The present moment of turbulent climatic upheaval has also led practitioners to constitute voice archives that register citizen vulnerabilities to extractive impacts and the imminence of climate change while addressing questions of unregistrability, silencing and extinction (Kanngieser; CapeFarewell; Alarcón; Sanz; Krause). This has once again reiterated the crucial role of sonic researchers as capable of challenging modes of political attunement while acting as catalysts for other possible sonic futures.

A Sonic Anthropocene: The essays

This double issue includes articles and soundworks by a variety of contributors whose common denominator is a certain aspiration to broaden the points of connection between artistic practice and scholarly reflection. This is clear from this first issue, which contains contributions by Henry Adam Svec, Nuno da Luz, Mark Peter Wright and Angus Carlyle, Lou Terry, and the artist duo knowbotiq.

In his article, Henry Adam Svec offers a personal account of changing soundscapes under late capitalism. Drawing on autoethnography, field recording and his own affective and emotional experience of returning to his family's farm, Svec constructs an evocative audio-essay that speaks of the swarm as a space of cross-pollination between economic systems, property regimes and a personal sense of nostalgia and loss.

Nuno da Luz's essay harnesses the power of sound and listening as a vehicle to fuse together the post-natural, the post-colonial and the post-human strands of thought. Taking exotic birds in cities as his object of study, the author explores the relations of power and domination that arise between human and non-human invasive species (such as parakeets) in urban ecosystems through the politics of soundscapes.

Mark Peter Wright and Angus Carlyle's contribution questions the possibility of fabricating a sonic Anthropocene through the practice of Foley. They discuss their soundwork *Decoy* (2018) as an example of how sonic fabulation and performativity can help us to critically engage with the material histories of the Anthropocene and their aesthetics outlets.

Lou Terry's "Feral Robotic Birds" explores ATN theory and multispecies storytelling to inform environmental change. His research-led practice, which in this case adopts the form of small robotic birds endowed with the ability to "adapt" to the surrounding environment and to interact with "other" birds", poses relevant questions about bird habitat loss and the effects of human interference in such habitats.

Finally, knowbotiq presents the results of a collective project on the ecologies of Scottish Highland peat bogs. In this mixed-media essay, poetry, sound and song combine to produce different temporal entanglements and narratives around these wetland areas, which are deeply embedded in the history of capitalism.

Altogether, these five essays—along with those to be included in the next volume—contribute to sounding the Anthropocene by placing sound at the centre of an interdisciplinary

conversation about the economic, social, cultural, political and ecological processes that underlie the currently ongoing planetary transformations.

Acknowledgements

Our thanks go first and foremost to the editors of *Cadernos de Arte e Antropologia*, Peter Anton Zoettl and Ricardo Campos, who supported the idea of this dossier from the very beginning and were extremely patient during the long process of reviewing the texts. We would like to extend our thanks to all the authors who responded to our call for papers. Unfortunately, we were only able to select a small number of articles that we believe appropriately represent the scope we wanted to bestow on this dossier. We are extremely grateful to the anonymous reviewers whose generous work and valuable comments improved the original manuscripts. Finally, this work has been supported by various project grants and scholarships from the Portuguese Fundaçao para a Ciência e a Tecnologia (FCT): SR&TD FCT Project Grants "Sounds of Tourism" (PTDC/ART-PER/32417/2017), "Anthropolands" (PTDC/IVC-HFC/6789/2014), and "Experiences of synanthropic life in the city" (CEECIND/03528/2018 / UIDP/00295/2020 / UIDB/00295/2020 / LA/P/0092/2020).

References

Anthropocene Working Group. 2019. "Results of Binding Vote by AWG Released 21st May 2019." *Anthropocene Working Group*. Retrieved March 10, 2021 <http://quaternary.stratigraphy.org/working-groups/anthropocene/>.

Appel, H.M. and Cocroft, R.B. 2014. "Plants respond to leaf vibrations caused by insect herbivore chewing." *Oecologia* 175: 1257–1266.

Barclay, L. 2019. "Acoustic Ecology and Ecological Sound Art: Listening to Changing Ecosystems." Pp. 153-177 in *Sound, Media, Ecology*, edited by Milena Droumeva and Randolph Jordan. Cham: Palgrave Macmillan.

Bauer, A. M., and M. Bhan. 2018. *Climate without Nature: a Critical Anthropology of the Anthropocene.* Cambridge: Cambridge University Press.

Bijsterveld, K. 2019. *Sonic Skills - Listening for Knowledge in Science, Medicine and Engineering (1920s-Present).* London: Palgrave Macmillan.

Bonneuil, C., and J.-B. Fressoz. 2016. T*he Shock of the Anthropocene: The Earth, History and Us.* London: Verso Books.

Camprubí, L. 2017. "The Strait in the Cold War—Deep Science and Global Geopolitics in the Mediterranean." Retrieved March 15, 2021. <https://www.mpiwg-berlin.mpg.de/content/strait-cold-war%E2%80%94deep-science-and-global-geopolitics-mediterranean>

Camprubí, L., and S. Robinson. 2016. "A Gateway to Ocean Circulation: Surveillance and Sovereignty at Gibraltar." *Historical Studies in the Natural Sciences* 46 (4): 429–59.

Carruthers, J. 2019. "The Anthropocene." *South African Journal of Science* 115 (7–8): 1–1.

Chakrabarty, D. 2009. "The Climate of History: Four Theses." *Critical Inquiry* 35 (2): 197–222.

Chua, L., and H. Fair. 2019. "Anthropocene". *The Cambridge Encyclopedia of Anthropology*, edited by F. Stein, S. Lazar, M. Candea, H. Diemberger, J. Robbins, A. Sanchez and R. Stasch. Retrieved March 15, 2021. <http://doi.org/10.29164/19anthro>

Crapanzano, V. 2004. *Imaginative Horizons: An Essay in Literary-philosophical Anthropology*. Chicago, IL: University of Chicago Press.
Crary, J. 1990. *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*. Cambridge, MA: MIT Press.
Crate, S. A. and M. Nuttall. 2009. *Anthropology and Climate Change: From Encounters to Actions*. Walnut Creek: Left Coast Press.
Crutzen, P. 2002. "Geology of Mankind." *Nature* 415 (6867): 23–23.
Crutzen, P., and E. F. Stoermer. 2000. "The 'Anthropocene.'" *Global Change Newsletter* 41: 17–18.
Davis, H., and E. Turpin. 2015. *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies*. London: anexact.
Despret, V. 2020. "'Phonocene': Bird-Singing in a Multispecies World." Retrieved March 10, 2021 <https://www.youtube.com/watch?v=U90M8rhQI6c>
Drever, J. 2019. "'Primacy of the Ear' – But Whose Ear?: The case for aural diversity in sonic arts practice and discourse." *Organised Sound* 24(1): 85-95.
Duarte, C., L. Chapuis, S. Collin, D. Costa, R. Devassy, V. Eguiluz, C. Erbe, T. Gordon, B. Halpern, H. Harding, M. Havlik, M. Meekan, N. Merchant, J. Miksis-Olds, M. Parsons, M. Predragovic, A. Radford, C. Radford, S. Simpson, H. Slabbekoorn, E. Staaterman, I. Opzeeland, J. Winderen, X. Zhang, F. Juanes. 2021. "The Soundscape of the Anthropocene Ocean." *Science* 371 (6529). Available at <https://doi.org/10.1126/science.aba4658>
Erlmann, V. 2010. *Reason and Resonance: A History of Modern Aurality*. Brooklyn, NY: Zone Books.
Ellis, C. 2004. *The Ethnographic I: A Methodological Novel about Autoethnography*. Walnut Creek: Rowman Altamira.
Farina, A. 2013. *Soundscape Ecology. Principles, Patterns, Methods and Applications*. Dordrecht: Springer.
French, J. R. 2014. "(Resonances) Leigh Woods." Available at: <https://engravedglass.bandcamp.com/album/resonances-leigh-woods>
Franke, A. and D. Diederichsen. 2013. *The Whole Earth - California and the Disappearance of the Outside*. Berlin: Sternberg press and Haus der Kulturen der Welt.
Fuentes, A. 2010. "Natural-cultural encounters in Bali: Monkeys, temples, tourists, and ethnoprimatology". *Cultural Anthropology* 25(4), 600-624.
Gallagher, M. 2015. "Field recording and the sounding of spaces." *Environment and Planning D: Society and Space* 33(3): 560–576.
Galloway, K. 2020. "Listening to Indigenous Knowledge of the Land in Two Contemporary Sound Art Installations." *Feminist Media Histories* 6 (2): 176–206.
García Quiñones, M., A. Kassabian and E. Boschi. 2013. *Ubiquitous Musics: The Everyday Sounds That We Don't Always Notice*. London: Ashgate.
Gautier, A. 2014. *Aurality: Listening and Knowledge in Nineteenth-Century Colombia*. Durham, NC: Duke University Press Books.
Goodman, S. 2010. *Sonic Warfare. Sound, Affect, and the Ecology of Fear*. Cambridge, MA: MIT Press.
Hamilton, C. 2014. *Earthmasters: The Dawn of the Age of Climate Engineering*. New Haven, CT: Yale University Press.
Hamilton, C., C. Bonneuil, and F. Gemenne. 2015. *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch*. London: Routledge.

Hankins, Thomas L., and Robert J. Silverman. 1995. "The Aeolian Harp and the Romantic Quest of Nature." Pp. 86-112 In *Instruments and the Imagination*. Princeton, N.J.: Princeton University Press.
Hann, C. 2017. "The Anthropocene and anthropology: micro and macro perspectives". *European Journal of Social Theory* 20(1): 183-196.
Haraway, D. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham, NC: Duke University Press.
Helmreich, S. 2015. *Sounding the Limits of Life: Essays in the Anthropology of Biology and Beyond*. Princeton: Princeton University Press.
Hornborg, A. 2017. "Dithering while the planet burns: Anthropologists' approaches to the Anthropocene". *Reviews in Anthropology* 46 (2-3): 61-77.
Kanngieser, A. 2015. "Geopolitics and the Anthropocene: Five Propositions for Sound." *GeoHumanities* 1 (1): 80–85.
Kirksey, S. E., & Helmreich, S. 2010. "The emergence of multispecies ethnography". *Cultural Anthropology* 25(4): 545-576.
Kohn, E. 2013. *How Forests Think: Toward an Anthropology Beyond the Human*. Berkeley, CA: University of California Press.
Kramer, Gregory. 1994. *Auditory Display: Sonification, Audification, and Auditory Interfaces*. Reading, MA: CRC Press.
Krauss, W. 2015. "Anthropology in the Anthropocene: sustainable development, climate change and interdisciplinary research." Pp. 59-76 in *Grounding Global Climate Change*, edited by H. M. Greschke and J. Tischler. Dordrecht: Springer.
Kryter, K. [1950] 1970. *The Effects of Noise on Man*. New York, NY: Academic Press.
Kubisch, Christina. n.d. "ELECTRICAL WALKS Electromagnetic Investigations in the City." Retrieved March 15, 2021 <http://www.christinakubisch.de/en/works/electrical_walks>
LaBelle, B. 2010. *Acoustic Territories. Sound Culture and Everyday Life*. London: Bloomsbury.
Latour, B. 1993. *We Have Never Been Modern*. Cambridge, MA: Harvard University Press.
_____. 2014. "Agency at the Time of the Anthropocene." *New Literary History* 45 (1): 1–18.
_____. 2017. "Anthropology at the time of the Anthropocene: a personal view of what is to be studied." Pp. 35-49 in *The Anthropology of Sustainability*, edited by M. Brightman and J. Lewis. New York, NY: Palgrave Macmillan.
Lecocq, T., S. Hicks, K. Van Noten, K. van Wijk, P. Koelemeijer, R. De Plaen, F. Massin, et al. 2020. "Global Quieting of High-Frequency Seismic Noise Due to COVID-19 Pandemic Lockdown Measures." *Science* 369 (6509): 1338–43.
Levin, D. 1993. *Modernity and the Hegemony of Vision*. Berkeley, CA: University of California Press.
Lewis, S., and M. Maslin. 2015. "Defining the Anthropocene." *Nature* 519 (7542): 171–180.
Lockwood, A. 2010. "A Sound Map of the Housatonic River. 4-channel sound installation." Retrieved March 15, 2021 <http://www.annealockwood.com/compositions/a-sound-map-of-the-housatonic-river/>
Malet Calvo, D., and M.J. Ramos. 2018. "Suddenly last summer: how the tourist tsunami hit Lisbon". *Revista Andaluza de Antropología* 15: 47-73.
Malm, A., and A. Hornborg. 2014. "The Geology of Mankind? A Critique of the Anthropocene Narrative." *The Anthropocene Review* 1 (1): 62–69.
Mathews, A. S. 2020. "Anthropology and the Anthropocene: Criticisms, Experiments, and Collaborations." *Annual Review of Anthropology* 49: 67-82.

Matless, D. 2017. "The Anthroposcenic." *Transactions of the Institute of British Geographers* 42 (3): 363-376.
Mendes, M. 2021. "Sounding the Mississippi". In *Radical Sympathy*. Berlin / Bergen: Errant Bodies Press / University of Bergen.
Moore, A. 2015. "Anthropocene anthropology: reconceptualizing contemporary global change." *Journal of the Royal Anthropological Institute* 22 (1): 27-46.
Moore, J. 2015. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. New York, NY: Verso.
_____. 2017. "Confronting the Popular Anthropocene: Toward an Ecology of Hope." *New Geographies* 9: 186–91.
Nagel, T. 1986. *The View from Nowhere*. New York, NY: Oxford University Press.
Paiva, D. 2018. "Dissonance: scientific paradigms underpinning the study of sound in Geography." *Fennia - International Journal of Geography*, 196 (1), 77-87.
_____. 2020. "Poetry as a resonant method for multi-sensory research." *Emotion, Space and Society*, 34, 100655.
Parrika, J. 2014. *The Anthrobscene*. Minneapolis, MN: University of Minnesota Press.
_____. 2015. *A Geology of Media*. Minneapolis: University of Minnesota Press.
Pereira, G. 2019. "Ex-Humus. Performance at Sharjah Architecture Triennial." Retrieved March 15, 2021 <https://rfgen.net/en/performance/ex-humus-by-godofredo-pereira>
Peters, J. D. 2015 *The Marvelous Clouds Toward a Philosophy of Elemental Media.* Chicago, IL: University of Chicago Press.
Polli, A. 2005. "Atmospherics/Weather Works: A Spatialized Meteorological Data Sonification Project." *Leonardo* 38 (1): 31–36.
_____. 2006. "Heat and the Heartbeat of the City: Sonifying Data Describing Climate Change." *Leonardo Music Journal* 16: 44–45.
Ritts, M. 2017. "Environmentalists abide: listening to whale music – 1965-1985." *Environment and Planning D: Society and Space* 35(6): 1096-1114.
Roosth S. 2009. "Screaming yeast: Sonocytology, cytoplascmic milieus, and cellular subjectivities." *Critical Inquiry* 35(2): 332–350.
Ruddiman, W. 2003. "The Anthropogenic Greenhouse Era Began Thousands of Years Ago." *Climatic Change* 61 (3): 261–93.
Rutz, C., M. Loretto, A. Bates, S. Davidson, C. Duarte, W. Jetz, M. Johnson, A. Kato, R. Kays, T. Mueller, R. Primack, Y. Ropert-Coudert, M. Tucker, M. Wikelski, and F. Cagnacci. 2020. "COVID-19 lockdown allows researchers to quantify the effects of human activity on wildlife." *Nature Ecology and Evolution* 4: 1156– 1159.
Sánchez-Fuarros, I. and D. Paiva. 2022. "Postales sonoras de una ciudad turística confinada: Lisboa y la resonancia del turismo como hiperobjeto." In *'Sé lo que Hicisteis el Último Verano'. Crisis, Covid-19 y Turismo*, edited by Jorge Sequera. Barcelona: Bellaterra.
Schafer, R. M. 1977. *The Tuning of the World*. New York, NY: Random House.
Schuppli, S. 2020, *Material Witness: Media, Forensics, Evidence*. Cambridge, MA: MIT Press.
Sloterdijk, P. 2009. *Terror from the Air*. no location: Semiotext(e) / Foreign Agents.
Stengers, I. 2013. *Au Temps des Catastrophes : Résister à la Barbarie Qui Vient*. Paris : La découverte.
Sterne, J. 2003. *The Audible Past: Cultural Origins of Sound Reproduction*. Durham, NC: Duke University Press.
_____. 2012. "Sonic imaginations." Pp. 1-17 in *The Sound Studies Reader*, edited by J. Sterne. Abingdon: Routledge.

Sullivan, W. T. 1981. "Eavesdropping Mode and Radio Leakage from Earth." Pp. 377-390 in *Proceedings of the Conference on Life in the Universe*, edited by J. Billingham. Cambridge, MA: MIT Press.

Supper, A. 2016. "Lobbying for the Ear, Listening with the Whole Body: The (Anti-)Visual Culture of Sonification." *Sound Studies* 2 (1): 69–80.

_____. 2014. "Sublime Frequencies: The Construction of Sublime Listening Experiences in the Sonification of Scientific Data." *Social Studies of Science* 44 (1): 34–58.

Trischler, H. 2016. "The Anthropocene: A Challenge for the History of Science, Technology, and the Environment." *NTM Zeitschrift für Geschichte der Wissenschaften, Technik und Medizin* 24: 309-335.

Tsing, A. L. 2004. *Friction: A Global Ethnography of Connection*. New Jersey, NJ: Princeton University Press.

_____. 2015. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. New Jersey, NJ: Princeton University Press.

Tsing, A. L., A. S. Mathews, and N. Bubandt. 2019. "Patchy Anthropocene: landscape structure, multispecies history, and the retooling of anthropology: an introduction to supplement 20". *Current Anthropology* 60(20): 186-197.

United Nations Development Programme. 2020. *Human Development Report 2020. The next Frontier—Human Development and the Anthropocene*. New York, NY: United Nations Development Programme.

Walker, Bruce N., and Michael E. Nees. 2011. "Theory of Sonification." Pp 9-39 in *The Sonification Handbook*, edited by T. Hermann, A. Hunt, and J. G. Neuhoff. Berlin: Logos.

Waters, C. N., J. Zalasiewicz, M. Williams, M. Ellis, and A. Snelling. 2014. "A Stratigraphical Basis for the Anthropocene?" *Geological Society, London, Special Publications* 395 (1): 1–21.

Westerkamp, H. 1989. *Kits Beach Soundwalk*. For spoken voice and 2-channel audio. Duration 9:32:00.

Wissmann, T. 2014. *Geographies of Urban Sound*. London: Ashgate.

Yusoff, K. 2018. *A Billion Black Anthropocenes or None*. Minneapolis, MN: University of Minnesota Press.

Zalasiewicz, J., C. Waters, M. Williams, A. Barnosky, A. Cearreta, P. Crutzen, E. Ellis, et al. 2015. "When Did the Anthropocene Begin? A Mid-Twentieth Century Boundary Level Is Stratigraphically Optimal." *Quaternary International, The Quaternary System and its Formal Subdivision*, 383 (October): 196–203.