

Sound Maps Matter: Expanding Cartophony

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In this article I investigate online sound mapping practices, taking cartophony – the coming together of cartographic and sonic activities – as an important contribution to emerging ways of thinking and practicing mapping. I first develop a typology of approaches to cartophony, before moving on to reveal the normative tendencies of online combinations of sound and mapping through an analysis of three platforms: Freesound; audioBoom; and Radio Aporee. Showing how in different ways each of these platforms supports an approach to sound mapping that favours pinning high fidelity, indexical audio-recordings to a seemingly neutral base layer, I question what is glossed over through this approach, while also considering how visual and sound-based strategies for communicating about places illuminate and resonate with one another. Discussing some more experimental online sound maps, I highlight the value of such projects in their current form, and argue for the continued expansion of cartophonic practice.

Keywords: sound; cartography; sound map; phonography; place

Introduction

What is a sound map and why does it matter? Though online sound mapping has been around for over 15 years, it remains something of a niche activity, not widely discussed, and outside of specialized circles, something that many people have not encountered. Yet in the way that sound maps bring together visual and sonic epistemologies and practices, they offer rich ground for exploring how representations of time and space are performed between and across the senses. In this article, I map the terrain of sound maps, not in a totalizing way, but to make contemporary practices of sound mapping and their precedents comprehensible as forms of cartophony – blends of cartographic and sonic activities. The term ‘cartophony’ operates as a near-synonym of ‘sound mapping’ with the subtle difference that whereas ‘sound mapping’ suggests a qualified mapping and already carries associations with particular practices often involving a mimetic approach to the representation of places, ‘cartophony’ is used as an attempt to speak to how practices of sound and mapping may feed into one another in a broad

array of ways.¹ Through the elucidation of practices that bring sound and mapping together the article shows why cartophony, relatively niche though it may be, presents a valuable contribution to the project of ‘rethinking the map’ (Kitchin and Dodge, 2007), examining how we create, experience, and share relationships with places through combinations of sound and cartography. This approach is in keeping with a perspective that takes maps not as static objects, but as communicative and political processes that are continually negotiated, challenging the idea of separations between representations and practices as well as between production and consumption (Kitchin and Dodge, 2007; Crampton, 2009; Del Casino and Hanna, 2006).

In the burgeoning interdisciplinary terrain known as sound studies, the importance of sound to understandings of space, place, and territory is a core area of investigation that has been approached from a wide range of perspectives, including those emphasizing architecture (Blessner and Salter, 2007; Thompson, 2002), soundscape studies and acoustic communication (Järviluoma-Mäkelä et al., 2009; Schafer, 1977; Truax, 2001), sound art (Kahn, 2001; Labelle, 2006), philosophy (Goodman, 2009; Ihde, 2007), sonic geography (Gallagher and Prior, 2013; Waterman 2002), history (Corbin, 1998; Smith 2001), music (Whiteley, Bennett, and Hawkins, 2004; Connell and Gibson 2002), anthropology and sociology (Bull 2007; Feld, 1982/2012; Hirschkind, 2009), and media and cultural studies (Gitelman 2008; Sterne, 2003), among others, often in combination. This rise of scholarship indicates the importance of also considering sound’s role in cartographic representations, especially as mapping practices are crowdsourced (Dodge and Kitchin, 2013) concurrently with the increasing accessibility and mobility of tools for recording and producing sound. Online sound mapping may be thought of as a type of ‘map mashup’, a term used to refer to the combination of a map service with data from another source. Yet initial

online sound maps pre-date the term, having been developed in the early 2000s prior to Paul Rademacher's HousingMaps (2005), the first project to be labelled as a 'map mashup'. A common approach to online sound mapping involves attaching audio files to geographic coordinates and making the files accessible through web-based maps, often using Google Maps or OpenStreetMap as a cartographic base layer. From the early 2000s to today there have been at least 100 different online sound mapping projects (Mechtley, 2013). Online sound maps are frequently collaborative, inviting anyone to make a recording and share it on the map. While many maps focus on a particular city (ex. Montreal Sound Map, Belfast Sound Map, Open Sound New Orleans, Seoul Sound Map), some cover regions (ex. Basque Country Sound Map), countries (ex. UK Sound Map, Mexico Sound Map), and even the globe (ex. Radio Aporee Sound Map, Sound Around You, AudioMobile). Extant research into online sound maps recognizes the range of different projects and the potential of sound mapping, while at the same time identifying limitations both in the morphology of the maps and in the 'recording culture' that predominates (Anderson, 2015; Carlyle, 2014; Madden, forthcoming; Ouzounian, 2014; Waldock, 2011;). [Insert Figure 1 here].

Building on this work, I begin with further contextualization of online sound mapping through a brief typology of cartophony, outlining ways in which sounds and maps have come into dialogue prior to, and in some cases concurrent with, contemporary online sound maps. I then focus on three online platforms notable for their relatively large numbers of users and for the diverse ways that they bring sound and mapping together: the audio repository, Freesound; the spoken-word oriented audioBoom (previously Audioboo); and the artist research project Radio Aporee. My review and analysis of online cartophony is part of an investigation that included collaborative and creative engagements using these three platforms to create audio

compositions as a way of questioning sound mapping practices.² In this article, I show how analyses of these three very different platforms reveals a normative approach to combining sound and mapping that places the greatest value on high-fidelity, indexical field recordings pinned to a base layer. While this default ‘this-was-recorded-here-and-this-is-how-it-sounds-here’ approach prompts a rethinking of cartographic practice – so often preoccupied with the visual – by delving into aural information and experience, it also risks delimiting the range of sonic geographies that can find their way into maps by making the connection between audio file and base layer seem too self-evident. Central to the development of online cartophony is a tension between an idea of ‘phonography’ as a particular approach to field recording that prioritizes high-fidelity reproduction and representation, and the search for expansive, inclusive phonographic practice that involves a wide array of types of sound and approaches to sound production.

Considering Gallagher and Prior’s (2013) three conceptual filters for understanding different kinds of phonographic practice – reproduction, representation, and performance – many online sound maps have some way to go in attending to their own potential for performance and performativity. One type of sound practice is not inherently preferable to another, but exploring a range of approaches that supplement and raise questions about current norms of sound mapping will foster new insights and further possibilities for participation in both cartographic and phonographic practices, contributing to new cartophonies.

After showing the predominant tendencies of online sound mapping, the analysis turns to some more experimental projects. Maps need not only provide documentary approaches to sound, but can be considered in the ways they contribute to the circulation and transformation of sounds, revealing and performing relationships between people and places through listening, recording, and sound production. The idea

of maps as objective documents has been thoroughly deconstructed through critical cartography (Crampton, 2008, 2009; Crampton and Krygier, 2006; Harley, 1989), which shows the situated processes that go into producing maps. Counter-mapping and artistic mappings (Nold, 2009; O'Rourke, 2013; Wood, 2006) have also attended to the blurring of objectivity and subjectivity, and the processual nature of cartography, while extending the repertoire of practices. The combination of cartography with an expanded set of phonographic practices – different ways of recording and producing sound – resonates with these approaches and offers productive avenues for sound mapping in two ways. Firstly, it provides opportunities for a rethinking of mapping through sound and listening, and secondly, through the expansion of practice, it offers possibilities for a wider engagement with cartophony by more people for more diverse purposes. This wider engagement has the potential to be generative of further ways into thinking and theorizing mapping differently, which in turn can inform practice, such that theory and practice loop into one another (Thulin, 2015).

In the following section, I outline five types of combination between sound and cartography that have come before, exist alongside, and/or have become embedded in, online sound mapping. This variety of cartophonic approaches sets the stage for analysis of specific online platforms, which shows both the prevalence of one of the five types in online cartophony and the emergence of projects that more thoroughly engage with, and blend together, other types.

Typology of Cartophony

First, there is the idea of *sound-as-map*. Such sonic cartography is based on the richness of spatial and locational information that can be attained through listening, and approaches visual representation as secondary or, in some cases, unnecessary to the mapping of sounds spaces. Practices of echolocation may be thought of as part of the

sound-as-map category, as they provide spatial orientation according to sonic information. There are artistic projects that follow the *sound-as-map* approach as well, such as Annea Lockwood's *Sound Map of the Hudson River* (1982), which presents sound recordings from 15 locations along the river, with the intention of communicating the trajectory of the waterway through sound. Other examples include soundscape compositions from artists such as Hildegard Westerkamp, Barry Truax, and Andra McCartney. These works do not explicitly present themselves as maps, but resonate with the idea of *sound-as-map* through their thorough engagement with acoustic aspects of places, often exploring an aurally-oriented 'deep mapping' (Pearson and Shanks, 2001) that layers multiple aspects of place and moves between real and imagined sonic geographies. Artists have also experimented with arranging collections of sound recordings in space, bringing sounds that are spread over geographic areas, ranging from the neighbourhood to the globe, into smaller sites and using visitors' movement through those sites as a key interface element for exploring the sounds (Powell, 2008; *Locus sonus: Locustream Tuner* 2005/2007; Muller, 2015).

Next, there is the idea of using sound technologies to generate maps, or the conversion of *sound-into-map*. The most common of these maps are bathymetric maps, which use SONAR (Sound Navigation and Ranging) to arrive at representations of the physical features of land under lakes and oceans. Communicating acoustic information is not the point of these maps, and they are not aurally oriented. Rather sound is used as a means to an end, a practical tool put in the service of generating an accurate visual representation of a submerged geographic area.

There is also cartographic sonification or the idea of *map-into-sound*. Here, certain aspects of maps are made audible. Sonification can be used both for improving accessibility to geo-referenced information for the visually impaired (Delogu et al.,

2010; Krygier, 1994) and for ‘expanding the representational repertoire of cartography and visualization’ (Krygier, 1994, p. 149). The primary intention of sonification is not to represent sounds that took place in an area, but to approach sound as a valuable way of communicating myriad forms of information that make up a map. Sonification in digital cartography has been critiqued by some on the grounds that it risks prioritizing a purportedly objective, technically driven approach to sound and space at the expense of addressing aspects such as emotion, culture, and memory (Théberge, 2005; Caquard et al., 2008). Sonification can, however, tap into these latter dimensions as in projects such as Sara Adhitya’s *Sonified Urban Masterplan for Paris* (2014), which links sounds to urban features presented on a map in a way that is musically and culturally inflected, playing on existing associations between certain sounds and certain kinds of places, and conceiving of the playback of the map as ‘urban orchestra’ (p. 172).

Another combination of sound and cartography is found in maps that represent acoustic properties of places through their graphic design: *maps-of-sound*. Kornfield, Schiewe, and Dykes (2011), for instance, present a framework for the visualization of sound on maps. A recent initiative, the HowLoud project, provides visual representations of sound levels in urban locations throughout the United States as a service to aid those in search of real estate. Much earlier, during the 1960s, the Campaign to Protect Rural England began creating ‘Tranquil Area’ maps as a way of raising awareness about industrial intrusion and promoting the protection of tranquility in the English countryside (Matless, 2005, p. 752). These efforts have continued into the present with the maps showing the degree of tranquility found in different parts of England (Jackson et al., 2008). Similarly concerned with the proliferation of human-made sound post-industrialisation, members of World Soundscape Project (WSP) in Canada developed Isobel maps in the 1970s, showing decibel levels in different

contiguous parts of an area in a way that resembled topographic maps (Truax, 1978, p. 65). The WSP created Sound Profile maps, as well, intended to represent the area in which a sound, such as a church bell, could be heard (Truax, 1978, p. 5; Schafer, Davis and Truax, 1977, pp. 15, 51, 53). Other *maps-of-sound* include the European Environment Agency's noise maps, the WSP's maps of sounds heard in an area according to time-of-day, soundwalk maps and music maps. These last two kinds of maps also fall into the final category in this typology: *maps-of-sound-as-interface*.

Maps-of-sound-as-interfaces use the map not only to represent sounds, but also to guide the map-user through a sonic experience, with the possibility of forging connections between map-maker and map-user in the process. Beginning in the 1970s, the WSP's soundwalk maps presented routes and showed points of interest, suggesting sounds to listen for or objects to interact with, sometimes offering questions about the soundscape for the soundwalker to consider. They were created for mobile map users and presumed active participation in the soundscape. These maps operated as scores for movement and attention, and the best of them created a sense of continuity between the soundwalk-map creators' own experiences in the place, the representation of the place through the map and instructions, and the soundwalkers' exploration of the mapped area. Other maps, such as the Seattle Music Map (2005) and the England Rocks map (2008), are aimed at tourists and music fans, guiding them through places that are important to musical heritage. Cohen and Lashua (2010) have also encouraged musicians to provide hand-drawn music maps of Liverpool as a research tool for 'prompting narratives and memories of musicians' mobile practices' (p. 77), while Gershon (2013) has used sonic cartography to explore identity in educational spaces, and O'Keeffe (2015) has used sound mapping as an iterative method for investigating the role of sound in social life. Such maps are created with the intention of being more

than passive documents of sounds; they are interfaces for revealing and performing relationships between people, places and sounds.

These various ways of combining sound and cartography are not mutually exclusive. Rather they show different priorities and emphases that may be part of a sound mapping practice that involves multiple cartophonic combinations. The last category in particular, *maps-of-sound-as-interfaces*, demonstrates a potential that is shared by all the approaches insofar as any of these maps can be used in the pursuit of making connections and building relationships, though some exhibit this impulse more explicitly than others. Maps do not necessarily inherently fall into one category or another, as they are always made meaningful in specific contexts and ‘*always remade every time they are engaged with*’ (Kitchin and Dodge, 2007, p.335).

Online sound maps have this reserve of approaches to combining sound and cartography to draw on, while also exploring additional combinatory avenues. For instance, Emily Thompson’s project ‘The Roaring Twenties: an interactive exploration of the historical soundscape of New York City’ includes a map showing the location of noise complaints, following a *map-of-sound* approach, while also supplementing these silent sound documents with mapped contemporaneous news reels that make sounds audible. It is the new ability to attach audio recordings to maps that has been one of the most utilised affordances of online sound maps. In many cases, however, even as sounds are stuck to points on maps this practice itself has not become enough of a sticking point to generate debate that might enliven divergent possibilities. Rather, it tends to be a default assumption that the sound should be a faithful recording of the place that corresponds to its position on the map. Other ways of attaching sounds and maps are then in danger of falling by the way side.

In the following section, I analyze three platforms – Freesound, audioBoom, and Radio Aporee – as a way of further illustrating how particular kinds of audio and phonographic practices dominate online sound mapping. A documentary impulse and idea of phonography as high-fidelity field recording hold sway, while at the same time other approaches are latent even within platforms that exhibit the predominant tendencies of online sound mapping.

Cartography and Phonography in Three Online Platforms

While practices of online sound mapping are highly varied, offering manifold entry points for a consideration of how relations between sound and cartography might evolve, it is possible to identify core tendencies around which the more experimental practices orbit. Three platforms, chosen for their relatively large numbers of users and the different purposes for which they combine sound and cartography, serve as primary examples in the analysis: Freesound, audioBoom (rebranded from Audioboo in 2015), and Radio Aporee. Freesound is an audio repository for which location data is one of several search parameters; audioBoom is a platform for spoken word and radio-oriented content, and was used for the British Library's UK Soundmap; and Radio Aporee is a project directed specifically at combining sound recording and cartographic practices, presenting a global sound map. Freesound and audioBoom are platforms where location is one among many possible organizing criteria for audio files, whereas Radio Aporee and the Audioboo-supported UK Soundmap aim to reveal something about places *through* audio files. The platforms thus serve as examples of different motivations for bringing mapping and sound together online, ranging from the goal of gaining an understanding of places via sound, to using location as a way of understanding and navigating an archive of sounds. Although the former goal is the most common among

projects that explicitly refer to themselves as sound maps (Radio Aporee and the UK Soundmap use this term, whereas Freesound and audioBoom do not), the latter goal is equally relevant to an open approach to online sound mapping in which differences in motivation or emphasis are not taken to indicate ontological differences that preclude what counts as cartophony. Given that Freesound and audioBoom are not first and foremost oriented toward sound mapping, the value of examining them lies in uncovering what kinds of sounds *are* mapped within these platforms. In other words, how do sound and mapping come together across a range of platforms, including those that are not labeled as sound maps by their developers? This approach to the analysis demonstrates the consistency of practices of combining mapping and sound in a variety of online contexts. Despite their overt differences in audio content and function, Freesound, audioBoom, and RadioAporee, like the majority of online sound maps, tend toward the *map-of-sound* category of the typology, featuring a cartographic base layer populated with visual representations of sound in the form of icons such as pins or pulsating dots that can be clicked to listen to the attached audio files. Delving into these platforms reveals multiple aspects of the normative mimetic tendency to pin a high-fidelity field recording to the location on the map that corresponds with where it was recorded.

Started in 2005 by the Music Technology Group of Pompeu Fabra University in Barcelona, Freesound has the broadest array of different kinds of audio of the three platforms. As stated on the website, ‘Freesound aims to create a huge collaborative database of audio snippets, samples, recordings, bleeps, ... released under Creative Commons licenses that allow their reuse.’ The platform provides a space for users to browse sounds in multiple ways, upload and download material, and ‘interact with other sound-artists’ (‘Freesound’, n.d.). In 2012 the creators of Freesound posted a survey in

the website's forum, asking users several questions, including how they use Freesound and how the platform is different from other sound-sharing sites. Responses showed that the platform has become very popular among film-makers and musicians, as well as sound designers and researchers, due to its huge repository of royalty-free sounds contributed by users. Contrasting Freesound with other sound-sharing sites that are oriented towards particular kinds of audio, such as music, survey respondents appreciated the openness of Freesound in terms of what audio could be contributed and retrieved – 'the vastness and variety of material available' as one respondent put it.

Mapping is not the primary focus of Freesound, but users have the option of tagging their contributions with location coordinates, and the website can be navigated as a global sound map displaying all sounds that have latitude and longitude data. However, while there may be a vastness and variety of material available on Freesound, the provision of location data for this material is incredibly uneven. In November 2015 two of the most popular overall tags on the platform were 'synthesizer' and 'field-recording', accounting for 13.5% and 8.5%, respectively, of the total 290,000 contributed sounds, with other popular tags including 'drum', 'voice', 'noise' and 'loop'. Of the 'synthesizer' sounds only 0.05% were geotagged (given location data), while 46% of the 'field-recording' sounds were geotagged. This disparity is not accidental. Throughout the history of sound recording, certain sounds – particularly those of musical instruments – have been purposefully separated from indicators of place through practices of recording in hermetically sealed sound studios that provide the conditions for sonic isolation (Blessner and Salter, 2007; Thompson 2002). On Freesound, studio recordings, and especially synthesized sounds, are extremely rarely geotagged, upholding the apparent irrelevance of place for these sounds. The resultant global sound map consequently reveals and perpetuates the idea that some sounds have

stronger attachments to places than others – sounds tagged with descriptors such as ‘ambiance’, ‘nature’, ‘water’, and ‘people’. The risk is twofold: that some places such as studios are taken to be non-places, and that the complex dynamics of myriad forms of relationality between sounds and places – such as the idea of a sound inspired by a place or created for a place – are masked in favour of what appears to be a self-evident connection: a recording made in a particular place.

The trajectory of audioBoom reveals a different but potentially complementary logic of mapping and sound. A headline from the Guardian appearing shortly after Audioboo’s initial launch in 2009 reads: ‘AudioBoo aims to become YouTube or Twitter of the spoken word,’ clearly establishing the scope of the company’s ambitions (Weaver, 2009). Contributors could record and upload short audio files – ‘boos’ – with the Audioboo mobile app, and these boos could be plotted on a global sound map according to GPS data, provided users chose to disclose their location. Over the years, however, Audioboo (rebranded as audioBoom in 2015) scaled back features associated with mapping sound, cutting the global sound map view from its website and focusing its attention elsewhere with the slogan ‘Radio Reimagined’. While audioBoom provides the option for anyone to create an account and post sounds, it has shifted away from amateur, user-generated content and more towards the delivery of professional content: ‘audioBoom works with some of the biggest names in broadcasting across sport, entertainment and current affairs to bring their content to listeners worldwide via Facebook, Twitter and other media platforms’ (audioBoom, ‘About Us’, 25 Nov 2015).

The decline of mapping features on audioBoom suggests that location data is not a high priority for the audio content it currently delivers. Indeed, this professional content is intended to diffuse, to move across the largest audience possible, rather than be pinpointable on a map. As it is primarily spoken word, it also connects with a history

of separating voices from places and spaces. Mobile phones equipped with multiple microphones, not for achieving high-fidelity field recordings, but for noise cancellation – reducing background sounds during a call – are the latest in a long line of practices of extracting verbalized communications from the sounds of the environment. While practices of isolation and extraction have been evident on film sets, radio, and in recording studios since the 1920s exemplifying the ‘soundscape of modernity’, which seeks a clear, efficient signal (Thompson, 2002), corollaries run even further back in tensions between approaching the voice as sound and as sign. Prior to the invention of the phonograph Leon Scott sought through his phonautograph to record voices, but he had no desire to play them back. He dreamed instead of mute but legible inscriptions that could form a universal language of sound, separating vocal communication from its audible manifestation (Sterne, 2003, p.46). Moreover, examining the history of ethnography recording, Sterne points out how the idea of preserving actual sound recordings had to be learned and adopted by institutions, since according to D.K. Wilgus, transcriptions were considered the ‘primary analytical basis for work in folklore or anthropology’ (as cited in Sterne, 2003, p. 325). Commenting on the continued prevalence of transcription in ethnographic accounts today, Gallagher and Prior (2013) note: ‘This taken-for-granted privileging of verbalized meaning over sonic features of research encounters is particularly problematic for geographers, since it tends to silence geographical specificities: regional accents; the sexed, aged and gendered aspects of voice; and the acoustics, ambiances and resonances of the spaces in which research encounters take place’ (p. 4).

AudioBoom certainly does not silence the voice, but it does exist within a history of voice recording that has often reduced the significance of the full range of sounds that occur in and along with vocalizations, minimizing certain connections to

place. And if such connections to place are not taken to be important for the voice, why bother mapping them? Of course, there is another perspective. Gallagher and Prior's assertion of the geographical specificities of voice, could be used to suggest the possibility that the voice already says so much about place that mapping it further may be irrelevant. Maybe audible voices are always already their own cartographies – *sounds-as-maps* – despite any attempts to separate voice and environment. Further analysis of this issue is required. One might ask, for instance, to what extent attributes of radio practice such as studio conditions and standardized speaking patterns develop homogenous senses of geography, while occurring in very particular locations. In any event, showing the location of an audio file and making audio files browseable according to location has not proven to be a prime concern of audioBoom as a spoken word radio platform. This suggests a disjuncture between mapping and the conventions of talk radio.

Audioboo was, however, utilized in 2010 as a key platform for the British Library's UK Soundmap, a crowd-sourced *map-of-sound* project inviting Britons to send in recordings of their environment, 'be it at home, work, or play' ('UK Soundmap', 2011). The project featured a blog with updates, guidelines, and recording recommendations from the editor, Ian Rawes, who now runs the LondonSoundSurvey, a project dedicated to collecting a wide variety of sounds related to England's capital. Around 80% of the recordings contributed to the UK Soundmap were made on mobile phones, aided by the ease-of-use of Audioboo. While Rawes appreciated this participation he also encouraged users to invest in better recording equipment, offering recommendations on how to make the transition from mono smartphone recording to higher quality stereo recording (Rawes blog 02 Feb 2011). Audioboo was useful because it tapped into a device many people already owned, but it was not considered

the ideal method of obtaining recordings of places to put on the map. Operating on a smart phone with mono recording capabilities, compression, and noise cancellation, the Audioboo app seemed better suited to voice-recording – its original purpose – than to recording environmental sounds. This bias points to the persistence of what James Lastra (2000), in his examination of early Hollywood film sound debates, has referred to as the ‘telephonic’ model of sound reproduction, where the top priority is intelligibility. Today, this telephonic model is unsurprisingly associated with the mobile phone. By contrast, the ‘phonographic’ model of sound-reproduction (Lastra, 2000), which prioritizes perceptual fidelity to sound events, has been associated not only with dedicated recorders but with the pursuit of mapping. These associations become even more evident in Radio Aporee.

Unlike Freesound and Audioboo, for which geographic information is only a part of the overall platform, the Radio Aporee sound map project is primarily and explicitly dedicated to mapping sounds. A visitor to the website first sees a satellite map of the world, which quickly zooms in to where the most recently uploaded audio file has been tagged as that file begins playing. Launched in 2006, the project is described by its creator, artist Udo Noll, as arising from ‘former artistic research on mapping, spatial conditions and the navigation between the real and the virtual’ (n.d.-c, n.p.). According to Noll, the collaborative and geographically expansive nature of the project developed naturally as he shared his work with friends who told their friends and so on.

Radio Aporee works with the resonances between phonographic and cartographic practices. Phonography, here, refers to a way of approaching field recording. As Noll puts it, ‘this project is about sounds from spaces and places, origin of place is important, also the quality of the recording’ (n.d.-b, n.p.). Noll strongly discourages cell phone and camera recordings, recordings of music or compositions,

recordings under a minute in length, heavily edited recordings, recordings that ‘fake’ locations, and recordings that include commentary unless the commentary is recorded on-site. He provides a hyperlink to phonography.org, a website documenting approaches to environmental field recording. Contributing a brief article entitled ‘What is phonography?’ to the website, Yitzchak Dumiel notes that phonography ‘is distinct from recording in general only to the extent that the capture of sound is privileged over its production. This bias reflects an attempt to discover rather than invent’ (n.d., n.p.). The privileging of discovery, and its positioning contra invention, grounds this approach to phonography in ideas of reproduction and representation much more than in a creative performativity that more expansive phonographic practice would include. While Noll has created other projects that use the sound map as a basis for experimental adventures in sound, the map itself is designed as a marriage of cartography and phonography (as field recording) from which these more inventive projects can take flight.

There is a certain logic to the merging of phonography and cartography. Both navigate the line between partial, artistic, culturally-influenced expression and aspirations to objective, neutral truth. Phonography is perhaps more inclined to admit the artistic, whereas many forms of cartography still must maintain a mask of neutrality, or at least an accuracy that can be instrumentalized beyond the realm of art. In *Radio Aporee*, although Noll claims the intention is to ‘create a cartography that focuses solely on sound’ (n.d.-c, n.p.), sounds are anchored to a visual base map composed of satellite imagery. Jason Farman argues that ‘satellite and aerial photographs’ link to machinic production from orbital locations...point toward disembodiment, the dislocation of the subject, and objectivity’ (p.7). While Google Satellite View is the product of a socio-technical network including human labour and biases, much of this is hidden from view.

On Radio Aporee, attached to the satellite map, are the sounds of places captured in high-fidelity – the sonic near-equivalent of satellite imagery, except for an important difference: the artistic purview of the contributor. Though places must not be falsified and the interest of phonography lies in ‘unauthored sounds’ (Smith, 2001), there is room for creative framing, revealing hidden sonic aspects of places in ways that would disrupt the base map if applied to its representational power. For instance, it is not unusual to explore how changing the position of the mic changes the captured sound object, while the view from above appears stable, omniscient, un-situated. Phonography seems to disavow authorship and claim it at the same time – it posits the transparency of the technology such that fidelity to the sound event is possible, while also acknowledging the effort and unique perspective of the phonographer. Cartography has similar tensions, but often navigates them differently, hiding subjectivity more completely, with platforms like Google Maps presenting the transparency and fidelity of the representation as authorless and self-evident.

In different ways Freesound, audioBoom, and Radio Aporee reveal the dominance of a particular logic of combining maps and sounds that prioritizes indexicality and fidelity. Freesound offers a vast array of audio, but by and large only environmental field recordings are geo-tagged and appear on the map view. Audioboo/audioBoom flirted with sound mapping in its early days, but has significantly reduced mapping features as it has gained in popularity, suggesting that cartography is of minimal importance to the delivery of its spoken word, radio-oriented content. Meanwhile, Audioboo’s use in the British Library’s UK Soundmap was directed at environmental sound and raised the issue of the sound-recording fidelity of smart phones. The platform for which cartography has always been absolutely vital, Radio Aporee sound map, makes it clear that phonography as field recording is what is sought,

discouraging other approaches and types of sound, such as lo-fi recording, music or heavily edited audio works. All three platforms also focus on the idea of a *map-of-sounds* rather than more thoroughly engaging with the categories of *sound-as-map*, *sound-into-map*, *map-into-sound*, or *map-of-sound-as-interface*. Thus, both in platforms that organize audio files according to location data, and in platforms that seek to reveal something about places by attaching audio files to maps, there is a core tendency to focus on sounds of the environment recorded with the greatest clarity possible and to present them as a particular type of cartophony. While this might seem like an entirely obvious approach, such obviousness risks preventing a more inclusive and expansive investigation of the bonds between mapping and sounds online.

In the following section I suggest possibilities for expanded phonographic practice, examining some online sound mapping projects that deviate from the norm and in doing so demonstrate the relational and performative potential of sound mapping.

Expanding Cartophony

The immediate strengths of the high-fidelity, indexical approach to sound mapping are its simplicity and its clear organizational logic – pin the audio where it was recorded. One of the advantages pointed out by some of its practitioners is the inherent act of bringing sound to the map, so as to present a more situated perspective on place. This situated perspective is like a sonic version of Google Street View, but it is also different, in the way that Tim Ingold (2000) has identified the difference between the ‘taskscape’ – the realm of activity and mobility – which is most readily perceived through sounds, and the ‘landscape’, which comprises sedimented forms of the taskscape. In Google Street View we see landscape, architecture, and the mute, frozen movements of vehicles and people; through sound recordings we hear those movements in those spaces. There is a difference in temporality between the images and the sound recordings. But rather

than reifying such differences, it is most useful to consider how they might illuminate or resonate with one another. For instance, by making temporality perceptible in a different way, sound recordings have the potential to draw out the other temporalities and rhythms that go into constructing the map, perhaps hinting at the non-immediacy of the apparently immediate and complete image of the world as map. Just as the sounds on a sound map are from different times, so are the images that compose the visual map: the ‘new digital photographic map transforms a time–space unicum (the photograph taken at a specific time, in a specific place) into a fractured time within a space continuum (a composed photographic image that merges different times and connects contiguous spaces)’ (Lapenta, 2011, p. 17). The notion of contiguity in turn illuminates one of the limits of sonic representation: there is yet to be a sound map that plots all contiguous sound spaces around the globe – a complete topography of sound – and even if there were such a map, it is difficult to image how one could ‘zoom out’ to *listen* to the entirety of the surface of the Earth in the way that one can *view* a single representation of this surface.³ Attaching high-fidelity, indexical sounds to maps does not just reveal another layer of information, but presents an opportunity to rethink maps, to explore their construction dialogically by considering visual and sonic practices in relation to one another.

While the high-fidelity indexical approach offers these valuable opportunities, it is nonetheless vital to complement it with a wider variety of practices. As Waldock (2011) has argued, many sound maps present themselves as participative and publicly engaging, with an implied democracy of access and contribution, while in practice participation is often circumscribed by unspoken norms (p.2). Waldock points out how the majority of sound map contributors are men (70%), mostly between the ages of 20-50, and she asks how this might contribute to a particular ‘recording culture’ that

dominates online sound maps.⁴ She notes that most recordings contributed to sound maps are made outside rather than in domestic spaces, do not contain sounds made by the recordist, and are uploaded without commentary. The relationship between the recordist and the sound is downplayed, as the acoustic properties of the sound, apparently outside social and cultural realms, are valued as impersonal data. There are some resonances here with the previously identified emphasis on phonography as field recording. And yet, I hesitate to say that such practices are too phonographic. Rather, it may be they are not phonographic enough.

If phonography is taken not to mean ‘field recording’ specifically but more generally the recording and dissemination of sound, then there are other possibilities for the coming together of phonography and cartography, alternative cartophonies. Douglas Kahn (1990) argues that phonographic art has lagged behind photography in part due to the initial tendency to reproduce already-existing aural cultural forms, such as music, poetry, literature, theatre and reportage, rather than exploring more fully the new possibilities that sound recording opened up. One of these possibilities was mimesis – reproducing sounds of places and activities. But during the early twentieth century when ‘noise’ was becoming integrated into music in the work of those such as Italian Futurist Luigi Russolo, mimesis was often diverted in favour of musical principles. Mimetic field recordings, like the kind of recordings frequently attached to maps, are relatively recent entrants in the history of aural cultural forms, and so, to some extent, they may be viewed as remedies and interventions into the dominance of musical forms. However, Kahn’s point is not that one type of sound practice is inherently more progressive than another. Rather, he argues, the problem is that ‘what has been avoided is an aural cultural practice along a greater gamut of signification: sustained, overt mimesis, tones as asemantic as possible, and all points between – everything polyphonic and

polysemic' (p. 18). Writing these words in 1990 during the rise of digital sampling, Kahn perceives the possibility of a greater embrace of diversity of sound in emerging practices. Indeed, sound art has exploded over the last 25 years, exhibiting a vast array of approaches to aural culture. Online sound mapping then might productively engage with the expansion of the phonographic arts – not just mimesis (though it is undoubtedly valuable) but a greater spectrum of recording and sound production practices.

Projects engaging with these possibilities, often working across categories of the typology and especially exploring on the notion of *maps-of-sound-as-interface*, are emerging. Such projects acknowledge that, as Anderson (2015) puts it, 'we must map listening rather than solely fixed sound' (n.p), and they frequently combine relational qualities of listening with investigations of the circulations and transformations of sounds through compositional processes. For instance, the rapidly expanding Cities and Memory project (started in 2014) purposefully plays with ideas of representational accuracy, memory, and imagination, providing an online sound map composed of field recordings and re-interpretations of those recordings: 'Every faithful field recording document on the sound map is accompanied by a reworking, a processing or an interpretation that imagines that place and time as somewhere else, somewhere new' (<http://citiesandmemory.com/what-is-cities-and-memory-about/>). The Next Station, a recent collaboration between Cities and Memory and the London Sound Survey, takes this approach to the London Underground, providing a map with the goal of not only documenting the transit system but creating 'an alternative sound world based on the experience and memory of the iconic Tube' (<http://citiesandmemory.com/thenextstation/>). As another example, Ximena Alarcón's Sounding Underground project merges the idea of *sound-as-map* with the notion of

map-of-sound-as-interface through an online artwork in which the user's navigation of the interface results in particular combinations of the sound spaces of the metros of Paris, London, and Mexico; visitors to the website are encouraged to provide comments sharing their experiences of this process. Also stretching across spaces, the iPad app Sound Map Hailuoto provides the listener with a means of combining sounds recorded on the Finnish island of Hailuoto with live sounds from the listener's immediate environment by activating the tablet's built-in microphone. Combinatory and compositional strategies characterize the Urban Remix project as well, as participants make field recordings and pin them to a base layer following the usual map-of-sounds logic, but then trace trajectories using the map interface as a tool for arranging the playback of multiple sounds in time and space (Edmonds et al. 2012; Freeman et al., 2011). The projects AudioMobile (recording app and global sound map) and its partner, Echoscope (3D virtual environment), also develop the idea of sounds as trajectories rather than pinpoints, and explore how navigating a 3D map interface operates as a performance and a way of creating audio compositions. Projects such as Cinco Ciudades and Folk Songs for the Five Points feature multiple kinds of audio attached to a map, including music and spoken word, and allow visitors to mix sounds from different places, creating a composition that spans multiple locations. And while Radio Aporee has specific guidelines grounded in notions of high-fidelity and accurate representation that dictate uploading sounds to the map, there are flexible and inventive options for browsing mapped sounds, including a geo-mixer that allows blending sounds from multiple locations. There is also the Radio Aporee Stream described as a 'responsive stream of sound, a topographic radio that listens, that may (or may not....) recognize and react to events, e.g. new sound uploads, listeners tuning in, mobile app activity, live sessions, phone calls etc.' (Noll, n.d.-a, n.p.).

Such projects approach the map not simply as a document populated with audio files revealing sonic information about places, but as an interface for a processual and relational experience of sound and cartography. These projects resonate with work in critical cartography that seeks to break down strict delineations between practice and representation, and that emphasizes the performative aspect of maps (Casino and Hanna, 2006; Crampton, 2009; Kitchin and Dodge, 2007). An expanded approach to phonography, one that takes in all sounds and their possible transformations, sits well with the critical and creative approaches to mapping that recognize the malleability and relationality of cartographic forms.⁵ Using a map changes it, argue Kitchin and Dodge (2007) – it becomes meaningful to specific people in certain contexts (pp. 338-339). And Casino and Hanna call for attention to ‘the myriad interconnections that make the production and consumption of map spaces a process of both authoring and reading simultaneously’ (106). These approaches to mapping are related to the blurring of consumption and production that has been theorized through terms such as ‘produsage’ (Bruns 2008), and ‘prosumption’ (Ritzer and Jurgenson, 2010). This blurring has simultaneously affected mapping practices, visible in the rise of crowdsourced cartography and ‘neogeography’ (Turner 2006; Wilson and Graham 2013) in Google Maps forums and OpenStreetMap, for example, and sound recording and production practices through the widespread circulation of audio files and software for manipulating audio files (Serazio, 2008; Sterne, 2012). To think of sound maps from this perspective means investigating the practices, relationships, and transformations that are put into play by the map as interface.

Conclusion

Through a typology of combinations of sound and map, an analysis of existing online platforms, and an exploration of experimental projects, I have highlighted the potential

contribution of sound maps for cartography and cultural geography. For a start sound maps supplement the visual representational strategies of cartography with a different sensorial approach to understanding space, place, and territory. In doing so, they prompt openings for rethinking the map. In sound maps that adhere to a high-fidelity, indexical aesthetic, appearing to follow the representational ideals of the base layer, the value of the map lies as much in the way sonic and visual practices rub up against one another, revealing something about each other in the process, as it does in the objective of mimesis. We can ask, for instance, how the time that it takes for a sound recording of a place to play through raises questions about temporality in a visual representation where the image of a city, a country, or the entire globe appears to be given instantaneously.

My advocacy for more experimental practices taking an expansive definition of phonography and merging it with mapping is intended to point to possibilities for further opening things up. Sound may have a capacity to re-orient the map, but multiple orientations to sound are also needed to avoid a circumscribed practice of sound mapping that might risk perpetuating a single 'recording culture' (Waldock, 2011) and limiting who has a voice and how it can be expressed (McAlister, 2012). Welcoming low-fidelity recordings, for instance, is a way of making sound mapping more accessible to those either without the resources or without the desire to participate in high-fidelity recording practices. Welcoming compositions and musical productions is a way of making sound mapping more responsive to a wider range of cultural engagements with sound that are shared by many people at a variety of levels. Encouraging further reflection on the relationships between the person contributing a sound and the place(s) linked to the sound's recording/production is a way of acknowledging and exploring the multiple ways people experience and communicate geography through sound. Furthering this reflection to attend to the way sounds

circulate through maps as visitors listen to them in different contexts and may download, re-mix, and compose with them, highlights an extended relationality of sound mapping. This relationality harks back to my discussion of *maps-of-sound-as-interfaces* and the way maps reveal and perform connections between people and between places. Building on this notion of the map operating as an interface for relationships between people and places, a more recursive relationality could be developed in which a map maps the relationships it helps bring into being – for example, this kind of relationality would be involved in a map that traces the circulations and transformations of sound that it facilitates, exploring the multiple geographies of listeners and those who re-compose the uploaded audio. Moreover, the different combinations between sounds and maps with which I began this article – *sound-as-map*, *sound-into-map*, *map-into-sound*, *map-of-sound*, *map-of-sound-as-interface* – could be more thoroughly entangled. For instance one could begin with sounds, convert them to a visual map, and then attach audio files to that map. Such examples, taking the map as performative interface and considering a multiplicity of phonographic practices, present possibilities for more varied participation as well as new approaches to the base layer.

Sound maps matter because they offer opportunities for (re)thinking and practicing geography through a combination of visual and aural epistemologies and communicative strategies. This means simultaneously appreciating that ‘sound might always already be a cartography’ (Carlyle, 2014, p.143) and that maps might always already invite listening. In other words, sounds and maps can be interpreted and practiced through each other. As new and diverse approaches are informed by the combinations that come before them, for those who look and listen attentively, practices

of mixing sounds and maps will continue to generate emergent cartophonies that contribute to the geographies we perform and inhabit.

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Notes

1. The downside to ‘cartophony’, however, is that its close association to ‘cartography’ also risks hemming it into some of the very conventions it aims to break out of, such as the mimetic approach to the representation of places. A similar term, ‘cartophonie’, has been used in the French language by members of the Centre for Research on Sonic Space & Urban Environment (Cresson) to refer to sound maps, particularly those that attend to qualitative, aesthetic, and social dimensions. See Chelkoff, Bardyn, Germon, and Laroche (2009).
2. It is beyond the scope of this article to describe the collaborative and creative parts of the project in-depth. However, compositions arising from this work can be found at: <https://soundcloud.com/samueltulin/sets/sound-map-compositions>
3. Canazza, Rodà and Salvati (2010) have attempted to create a zoomable topography of sound using microphone arrays and beamforming techniques in much more limited areas, such as a city square. The Exvis project at the University of Massachusetts at Lowell also experimented with a topographic approach to sound, primarily as an approach to sonifying data (Erbacher et al., 1995).
4. This is part of the much larger issue of gender disparity in sound and music technology. For projects addressing this issue see: Women in Sound/Women on Sound (<http://wiswos.bitbucket.org/>); female:pressure (<http://www.femalepressure.net/>); Yorkshire Sound Women Network (<https://yorkshiresoundwomen.wordpress.com/>); In and Out of the Sound Studio (<http://andrasound.org/>); and Sonora (<http://www.sonora.me/>).
5. Though it is beyond the scope of this article to examine in detail, the coming together of expanded phonography with critical and creative approaches to mapping can connect with, and could draw on, cartographic practices of psychogeography (Pinder, 1994) and the diverse work of artists who engage mapping through multiple media (Nold, 2009; O’Rourke, 2013; Wood, 2006).

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Figure Captions

Figure 1. Screenshot of Montréal Sound Map. Used with permission of creators, Max Stein and Julian Stein. Map data: Google, Cnes/Spot image, DigitalGlobe, Landsat.