37
Dropping Down Low: Online Soundmaps, Critique, Genealogies, Alternatives

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Key

Located between the compound noun 'soundmap' and its detached corollary 'sound map' is a stable definitional ground for the diagrammatic representation of acoustic place. It may be, however, that this territory is more narrowly circumscribed than necessary, is isolated from a wider genealogy, and contains some partially buried commitments which further compromise soundmapping's methodological potential. This chapter proceeds from a verification of my own bona fides in relation to this sonic practice, draws out that wider genealogy, then unearths those commitments – which are understood to involve the alignment with a specific technological apparatus and the adoption of a particular perspectival frame. I conclude by proposing three alternative approaches that are freighted with the means to deliver, in their diversity, formations of knowledge of the heard world that are transposed from the conventions of the cartographic to the experimental possibilities Samuel Thulin has recently designated the 'cartophonic':

> '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 [their] representation […] '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.
>
> (Thulin 2018: 193)

Orientation

My practice-orientated research seeks to establish sensory resonances between environments and their inhabitations. The sites in which my recording and listening strategies have found themselves include a suburban strip measuring 500 metres by 200 metres, the public

galleries and backstage operations of a municipal museum, an organic small holding enmeshed in the concrete and steel infrastructures of a busy airport, a wind farm on a plateau, a series of footpaths in a national park, and a stretch of local woodland close to my home. I understand all these to be forms of soundmapping yet appreciate that they would to be excluded from definitions; nonetheless, at least two of my past projects more closely resemble the normative soundmap.

The first of these, *51° 32 ' 6.954" N / 0° 00 ' 47.0808" W*, was a contribution to the Sound Proof exhibition at E:vent Gallery, London, in 2008. This emerged from a three-month period of field work devoted to a 100 metre by 100 metre zone of the Lower Lea Valley, an area previously comprising light industrial units, transport networks, residential architecture from a variety of historical epochs, a canalized waterway, and liminal greenspaces but which was undergoing a process of demolition and construction for the London Olympics. *51° 32 '6.954" N / 0° 00 '47.0808" W* represented a 'mapping of intangible qualities, in the space where social and ecological, past and future intersect' (Biagioli 2018: 98) and comprised an hour-long audio composition of layered but otherwise unprocessed field recordings, a booklet of field notes and photographs, and an A0 scale map (that was reprised in A1 format for the exhibition catalogue). One of the curators of the exhibition recently addressed the work:

> Carlyle's contribution to a sense of social and spatial orientation is asserted through finely noted observation of activity and ephemera encountered during his visits to the site. These seemingly inconsequential events and objects are plotted diagrammatically on his map as key markers of the site, giving prominence to the vernacular components of this site in transition. His approach echoes the notion that whoever maps the space gives that landscape and location its territorial characteristics.
>
> (Biagioli 2018: 102)

The second project which bears closer structural analogy to how soundmaps are conventionally conceived, developed from field work of similar duration but differentiated by a more diffuse location in the rural environment of the Picentini mountains, in the hinterlands behind Naples and Salerno. Commissioned by the Fondazione Aurelio Petroni, an organization based in the small town of San Cipriano Picentino, it formed part of a multimodal account of the region entitled *Viso Come Territorio / The Face as Territory*. One of my contributions involved placing field recordings on an online map, deploying a platform devised by Peter Cusack for his *Favourite Sounds* project. The web-based mechanism enabled the *Viso Come Territorio* map to be gradually populated over the spring of 2012, to be accessed remotely (and retrospectively, since the soundmap remains online), and to function as the basis for an installation during the exhibition. Salomé Voegelin engaged with this soundmap online and in her book *Sonic Possible Worlds* described the encounter:

> This geography is not that of San Cipriano Picentino and not of my living room either but that of their possibilities generated in my recentred listening, exploring the material that sounds there and bringing it back into the actuality of my present listening that is every thicker and pluralized for it. These sonic narratives do not share in the generality of the

visual map, nor in the image we might have of an area […] I am not following the map but mapping my own while listening.

(Voegelin 2014: 34)

This prior involvement in the creation of soundmaps has combined with experiences as a user that date from relatively early in the gestation of what we recognize as their typical form and my 2007 edited book *Autumn Leaves: Sound and Environment in Artistic Practice*, included documentation of several such soundmapping projects. Reflections on the creation and consumption of soundmaps have informed a previous conference paper on this theme, which sketched some initial problematizations of soundmapping as a sonic research methodology (Carlyle 2014), problematizations that are now deepened, are contrasted with alternative approaches, and are situated within a genealogical frame.

Scale

A conventional interpretation of a soundmap is announced in the very first line of the relevant Wikipedia entry as 'digital geographical maps that put emphasis on the sonic representation of a specific location'. By embarking on a speculative genealogy, I hope to demonstrate that what currently tends to pass for a soundmap – on Wikipedia and elsewhere – need not be as narrowly defined and that there are historical resources for mapping sound that prefigure something of the alternative approaches which this chapter finishes with, approaches which might be considered under the rubric of Thulin's 'cartophonic'.

Perhaps most recently presented in this lineage would be the noise map which, in its paradigmatic form, constitutes what cartographers call a choropleth, a thematic map where colour gradations reflect distributions of density, in this case measured (or simulated) acoustic intensity. In Europe, noise maps tend to be associated with the Environmental Noise Directive (END) (Council of the European Union 2002) and in a case study-based article offering the methodological innovation of triangulating noise maps with 'sound maps and soundscape maps', acousticians Francesco Aletta and Jiang King indicate that 'noise mapping is certainly one of the most relevant operational tools that the END relies on, providing visual representations of the yearly average noise levels in a selected area […] useful to assess easily the population's noise exposure and consequently to spot areas where noise action plans are required' (Aletta and Kang 2015: 1). Though we can enthusiastically acknowledge the imperative 'to listen beyond an exclusive focus on the quantitative regulation enshrined in noise pollution policies' (Di Croce 2016: n.p.), it might be, as we shall hear, that the choroplethic approach can be adapted to amplify other aspects of the sounded environment without succumbing to the conventions of the soundmap.[1]

Predating the choroplethic noise map and equally implicated in the substitution of visual for acoustic information was the audiospectrograph, the development of which is critically reconstructed by Joeri Bruyninckx as a complex process in which the impetus towards mechanical inscription (of bird song) involved a renegotiation of the competing legitimacies of sensorial and scientific knowledge and propelled 'recorded sound further

into even flatter and more controllable, comparable units of sound […] deal[ing] with the dimension of time in a more felicitous way […] deal[ing] with the problem of noise, by erasing it visually' (Bruyninckx 2012: 145). Bruyninckx cautiously concludes that the audiospectrograph and such successor technologies as the spectrograph and the sonogram are taken to 'illustrate a scientific culture in which places of science are demarcated by sterility and silence and underscore the need to understand how this scheme is enforced by and reinforces wider cultural expressions of modern sound control' (147).

Valerio Signorelli has uncovered other such antecedents, dating, for example, 'the earliest documented examples of soundmap […] in the research conducted, in the 20s, by the Finnish geographer Johannes Gabriel Granö […] [who] developed a specific methodology to describe landscape features through direct multisensory observations of the proximate environment and a series of hatched maps' (Signorelli 2017: 155). It is possible to uncover two persuasive prior claimants to the title of earliest soundmap, each as imbricated within a scientific culture as the noise maps and the audiospectrographs, albeit a Victorian paradigm rather than Bruyninckx's Modernism. In 1888, the Royal Society of Great Britain reported on the eruption of the volcano Krakatoa, devoting extensive analysis to associated acoustic phenomena, of which two dimensions attract attention. First of these dimensions are the series of topographic maps plotting the global movement of the pressure waves that persisted for nearly 100 hours after the eruption, the data for which were recorded as traces detected by the network of meteorological barographs. Second is the report's tabulated accumulation of ear witness accounts from mariners, colonial administrators, weather scientists, and others which arguably constitutes another cartography, of which evidence from the Rodrigues Islands' Chief of Police – 4,777 kilometres from Krakatoa – is edifying: 'stormy […] heavy rain and squalls, […] wind […] blowing with a force of 7 to 10, Beaufort Scale […]. Reports like the distant roars of heavy guns'. The table of textual witnessing in the Royal Society report functions to map the perceived movements of sound across what was estimated to have been 'a 13th of the surface of the earth' (Furneaux 1964: 18), bringing detailed coloration to the more orthodox representations in the global plotting of pressure gradients on the projected continents and oceans.

The textual component intimates other pedigrees for a critical conceptualization of the soundmap as method. Ear witnessing reports, such as that derived from the Rodrigues Islands' Chief of Police, James Wallis, are perhaps less infrequent as mapping of acoustic phenomena within Victorian scientific culture than might have been anticipated. Archival analyses conducted by one of my doctoral students, Jennifer Allan, suggest the other conceivable candidate for earliest soundmap – some fifty years before Signorelli's Granö – in John Tyndall's *Report on Fog Signals* (Tyndall 1874). Alongside a bird's eye projection – a projection I will later call 'aerial' after Voegelin and R. Murray Schafer – that depicts the radial acoustic propagation from the fog signal and the 'sound shadow' in a bay neighbouring the coastal test site of South Foreland in Kent, there are circular graphics to demonstrate perceived loudness of a trumpet as it is directed to different points of the compass, where the intensity is given both in numbers and linguistically as 'weak, faint, good, very good'. In parallel to the Royal Society's report on Krakatoa, diagrams and maps are supplemented with a textual attention to the sonorous that can be comprehended as

another mapping of the transmission vectors of sound, Tyndall's language rehearsing the words of Wallis and others in the tables of aural testimonies:

> The heavy rain at length reached us […] the sound, instead of being deadened, rose perceptibly in power. Hail now added to the rain, and the shower reached a tropical violence. The deck was thickly covered with hailstones which here and there floated upon the rainwater […]. In the midst of a furious squall both the horn and the syren were distinctly heard; and as the shower lightened, thus lessening the local noises, the sounds so rose in power that we heard them at a distance of 7 ½ miles.
>
> (Tyndall 1874: 22)

Although sensually attentive and allusive, the respective reports of Tyndall and Wallis, each bending their listening practices to the geophonic, remain within the parameters of gridded, choate writing. Other textual cartographies of sound have shown less obedience to the grid, and more proximity to that digital writing addressed by N. Katherine Hayles in which text 'becomes a process […] "eventilized", made more an event and less a discrete, self-contained object with clear boundaries in space and time' (Hayles quoted in Carpenter 2017: 105). Two contrasting para-literary illustrations, separated by a neat century, that might also be accounted for as sonic mappings can be located in an example drawn from F. T. Marinetti's 'parole i libertà' (words-in-freedom) and in Christian Marclay's video work *Surround Sounds* (2015). Marinetti's poem 'Après la Marne, Joffre visita le front en auto' (1915) is described by curator JoAnne Paradise as 'unusual in that it borrows the basic form of a military map' to evoke what she dubs the 'surround sound' of the battle, depicting the physicality of landscape and troop dispositions and the sonority of combatants, their screams, machine gun reports, and artillery blasts rendered through an 'eventilized', dynamized combination of typography and paint strokes (Finkelaug 2006). Marclay's own Surround Sounds resembles an animated version of Marinetti's poem, deploying a graphic depiction of comic book sound effects to infer, in the gallery's own interpretation text, 'the acoustic properties of each word. "Boom", for example, is no longer static on the page, but bursts into life in a sequence of colorful explosions, while "Whooosh!" and "Zoooom!" travel at high speed around the walls. The work fuses the aural with the visual, and immerses the viewer in a silent musical composition' (White Cube 2018).

I am arguing that Marclay's and Marinetti's onomatopoeic 'eventilizations' constitute soundmaps and belong to a genealogy that can be obscured by the current conventional definitions. Room within the terminological scope of the soundmap can also be made for the more recognizable antecedents in choroplethic noise maps and audiospectrographs just as accommodation can be found for the diagrams of acoustic propagation encapsulated in Tyndall's fog horn tests or the Royal Society's plotting of the auditory aftermath of Krakatoa. The 'ear witness' textual testimonies that were also embraced by Tyndall and the Royal Society plant other roots from which new practices can grow. Indeed, in advance of the relatively recent access to digital and network technologies, the historical incarnations of soundmaps most closely approximated these two examples emerging from that (Victorian) scientific culture. Signorelli draws justifiable additional attention to the presence of a variety of soundmaps within the 1970s research of the World Soundscape Project (WSP) such as

their 'isobel map of Stanley Park in Vancouver […]; the Sound Profile Map of the Holy Rosary Bells of Vancouver; the yearly graph of natural soundscape in British Columbia coastline; a pictorial representation that shows the sound sources converted in textual notation; the acoustic horizon of Bissingen in Germany, and Lesconil in France' (Signorelli 2017: 156). If Signorelli's illustrative examples correspond to Thulin's *maps-of-sound* – a category in which he incorporates the Campaign to Protect Rural England's 'Tranquil Area' maps from the 1960s – other projects by researchers associated with the WSP would be classified in Thulin's taxonomy as *sound-as-map*. The *sound-as-map* is constituted as a 'sonic cartography […] 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 sound spaces' (Thulin 2018: 196).

Frame

With Thulin, I want to open up the genealogy of the soundmap to usher in instantiations of *sound-as-map* and I want to welcome both methods which can be configured in relation to the lineage of noise maps, audiospectrographs, and textual testimonies and methods which find forms external to those pedigrees. Yet the definition deployed by Wikipedia and others effectively bars entry to cartographies which do not bend to 'digital geographical maps that put emphasis on the sonic representation of a specific location'. In Jacqueline Waldock's early analysis of the form, she identifies 'a new interactive, publicly engaging medium […] a social media application […] the interactive soundmap' (Waldock 2011), which is echoed by Milena Droumeva in her later articulation of the soundmap as 'publicly engaging digital artefacts' (Droumeva 2017: 337). This commitment of the soundmap to a specific technological apparatus and the association between soundmaps and web-based distribution is, with perhaps inevitable circularity, one cemented by subsequent online discourse. In 2010, Merle Patchett posted 'Mapping Sound and Sounding Maps' to the blog Experimental Geography in Practice, introducing a field in which only two of the eight illustrative examples of 'sonic maps' are delivered offline (one of these being the work of the WSP); in 2015, Cities and Memory – 'which, though resembling traditional online soundmapping portals […] defines itself as a global artwork, a participatory, yet curated portal for real and imagined soundscapes' (Droumeva 2017: 345) – published its 'Top 10 Sound Maps', all of which are internet platforms, as are the fourteen 'other sound maps well worth investigating'.

Cities and Memory cast their selection in an economy of personal taste, that same inspiration that has energized enthusiasm over more than two decades for the sound-triggering symbols that populate what must count as the hundreds of online soundmaps. Such preferences for what inspires are compelling and it is to be conceded that the potential benefits of online soundmaps include: inserting the tactics of crowdsourcing within sound arts practices; exploring auditory locality's relations to the live and the recorded (see Soundcamp 2020; and Locus Sonus 2020); investigating the ways in which

the cartographic might be harnessed to diagrammatize what is perceived as negative and as positive in environmental sound (see Hush City n.d.; and Metcalfe 2013); coordinating acts of sensory conservation that approach the motivations of salvage ethnography (Samuels et al. 2010: 338); and discovering a mechanism in the internet-based map which makes the production and distribution of self-initiated, thematically coherent site-orientated sound projects as accessible as it does their consumption.[2]

These benefits aside, it is this mechanism of accessibility itself that is one of dimensions of online soundmaps that troubles their easy adoption as a sonic methodology. Whether it is Google Maps or any of the rival geographic information systems that are used as the base layer on which the online soundmap is created, each complex blend of cartographic material is derived from remote sensing systems and aerial photography from within an institutional environment favouring 'free trade, an open market and privately funded research and development […]. It requires a well-funded military–industrial complex that develops defense technology' (Lee 2010: 910). Whatever creative adaptations are made to these base-layers, 'it is important to recognize that they do so within a production environment where their emancipatory potential is always constrained by institutional forces that govern the production, storage, and provision of geo-spatial data' (Jetahni and Leorke 2013: 488).

In parallel to this question of 'the master's tools', attention needs also to be devoted to the mechanisms of access since the availability and cost of the high-speed internet necessary to upload material to an online sound map is far from equal. Jason Farman's 2010 article, for example, distinguished digital signal transmission costs in Japan as 6 cents per 100 kilobytes per second – a price that amounted to 0.002 of the average monthly salary – from the cost for the same data transfer rates in Kenya at twice the average monthly salary. More recent research substantiates the concern that 'internet exclusion coincides with other forms of marginalization […]. In the case of Africa, global digital inequalities have reinforced existing racial as well as economic chasms, shutting out a huge proportion of the continent from access to the internet. Although some 14% of the world's population resides in Africa, only 3% of the world's internet users live on the continent' (Robinson et al. 2015: 574).

The specific technological apparatus through which the conventional soundmap is delivered is the first of the two problematic investments I referred to earlier: the differential economics of access, the broader milieu of militarized and capitalized spatiality, and the imbrication within a logic of data collection where 'location-based services are being recognized as participative ways to normalize surveillance: a process through which leakages of personal information are seen as "normal" or "natural" in everyday life' (Diogo 2018).

This investment undercuts the 'seemingly neutral medium of the sound map' (Droumeva 2017: 339), as does the second problematic investment, which relates to a particular perspectival frame. The base maps are never faithful analogues of geomorphology nor indexical renditions of the built environment: they are the multitude of 'little white lies' that Mark Monmonier identifies as the basis of every map. These distortions are what 'suppresses truth to help the user see what needs to be seen' (Monmonier 1996: 25); without

such deliberate down-scaling of information, a map would be rendered useless. This point is implied in Schafer's thoughts on what he calls 'soundscape notation', thoughts which inadvertently recall Jorge Luis Borges's anti-cartographic fable *On Exactitude in Science*:

> While everyone has had some experience reading maps […] few can read the sophisticated charts used by phoneticians, acousticians or musicians. To give a totally convincing image of a soundscape would involve extraordinary skill and patience: thousands of recordings would have to be made; tens of thousands of measurements would have to be taken; and a new means of description would have to be devised.

(Schafer 1994: 99)

In an extension of this argument, Schafer asserts that 'the microphone gives the close-up but nothing corresponding to aerial photography' (Schafer 1994: 99), a position that is echoed by Voegelin: 'Sound suggests a geography from within the depth of the place, rather than projecting an aerial view' (Voegelin 2010: 144). And yet, the 'aerial' of Schafer and Voegelin is precisely the perspectival frame which is projected by the conventional online soundmap. The aerial perspective which suspends the soundmap user at an abstracted height particularly chafes as a distortion because it is insensitive to the condition often ascribed to sound as that which engulfs the listener – like the 'surround' relationship attributed earlier to Marinetti and to Marclay. Moreover, the top-down aerial view, reiterates the militarized projection that is a function of the online technological apparatus, since it belongs to 'the cartographic imagination inherited from the military and political spatialities of the modern state' (Weizman 2002). Finally, although the aerial representation depends upon the vertical for its elevation above the visualized ground, it paradoxically occludes the vertical axis itself (Carlyle 2000, 2014). The nodes on a conventional soundmap are positioned on a flat plane where altitude can have no place, a diagrammatization that is particularly problematic methodologically at a historical juncture when political geographers are seeking to invest the vertical as a significant territorial dimension, when 'such a perspective neglects the three-dimensional politics of the worlds above, below and around borders' (Graham 2016: 3).

In addition to its symbolic evacuation of the vertical, reiteration of the militarized projection and dislocation from the 'surround' of sound, the aerial dimension of the soundmap risks disembodying its users through a process that parallels the sensory hierarchization evoked by Michel De Certeau in his famous meditation on the view from the 110th Floor of the World Trade Centre: 'one's body is no longer clasped by the streets […]. Nor possessed, whether as player or played, by the rumble of so many differences. The city's agitation is momentarily arrested by vision' (De Certeau 1984: 92). The 'rumbles' are not entirely silenced, of course, since their amplification is the very functional imperative of the soundmap, yet there is an objectivized distance. Whether the map user moves the mouse and activates a virtual button from a rendered height or observes from afar a flattened, static visualization, both might be processes not entirely divorced from Bruyninckx's 'sterility', hailing the user at Donna Haraway's 'vantage point of the cyclopean, self-satiated eye of the master subject' culpable of 'seeing everything from nowhere' (Haraway 1988: 586 and 581).

The spatial demarcations involved in conventional soundmaps reach further still, the aerial perspective obscuring those complexities of urban soundscapes that relate to what Matthew Gandy has called 'the spatial porosity of atmospheres and the uncertain distinctions between what constitutes "inside" and "outside"' (Gandy 2017: 356). It is not simply that the construction of soundmaps' interfaces tends to isolate individual sources, and hence ignore the overlapping complexities, since some platforms, such as Cusack's *Favourite Sounds*, do allow multiple nodes to play simultaneously in a simulation of porosity. Rather, what is at issue is the prioritization of externalities, another consequence of relying on graphic base layers engaged from above and a problem that Waldock's research has been important in addressing:

> Within the short history of soundmaps, there has developed a cycle of otherness that obtains its clarity in the absence of the domestic. Within the sound maps there appears to be a trend to capture the public rather than the private moments of life […] there are only a handful of recordings within the home.
>
> (Waldock 2011)

Just as Waldock's analyses have drawn our attention to soundmaps' capacities to silence auditory activities occurring under the roofs and behind the walls rendered on-screen and online – and how that suppression is a gendered one – Isobel Anderson has explored how only if the boundaries of the 'online gridded soundmap platform' are traversed can we access 'the peripheries of lived experience' and reveal 'the invisible "in-between-space" of personal relationships to sound, but also the unseen spaces of urban architectures' (Anderson 2016).

Projections

The final stage of this chapter is inspired by Anderson's projects that 'map sound in unconventional and creative ways' (Anderson 2016) and by Droumeva's suggestion of an 'alternative grammar' (Droumeva 2017: 346). It is informed by the wider genealogy of soundmapping and it has been alerted to the jeopardies of a specific technological apparatus and of the particular perspectival frame that is the aerial.

Textual/Graphic soundmaps[3]

In the parameters developed by Jacob Smith in *Eco-Sonic Media*, soundmaps which involve the inscription of written or graphic information have the potential to eschew complicity in a 'material culture that has caused so much environmental damage' (Smith 2015: 4); subject to the sustainability credentials of the paper and inks, these might instantiate Smith's 'no-wattage sound technologies' (6, 168). Such cartophonies can be threaded back to the genealogies of the textual components in Tyndall and in the Royal Society report and

of the 'eventilized' words on Marinetti's page; equally, they are stitched into the histories of ornithological transcription that propelled the development of the audiospectrographs analysed by Bruyninckx and ultimately form part of the wider, complex, and antediluvian fabric of sound notation, as Schafer's reference to 'soundscape notation' underscores.

Although, in some of its manifestations, paradigmatic of Wikipedia's 'digital geographical maps that put emphasis on the sonic representation of a specific location', Cusack's long-running *Favourite Sounds* vehicle has also evolved in recent years to generate word clouds, in which solicited public preferences of acoustic place are rendered according to their statistical prominence in the sampled population. These word clouds – part of what Nicola Di Croce calls a 'sensitive attempt to represent personal feelings and build through them a collection of sensations which reflect everyday practices' (Di Croce 2016) – provide a contemporary example of the alternative approach to soundmapping which emphasizes the textual and the graphic. Introduced in the context of a community-engaging or pedagogic arts practice, this approach might avoid some of the intimidations of digital creativity and can construct a bridge for non-specialists to travel into the world of sound representation. A perspectival frame remains active, with elements of the aerial tending to persist in the more spontaneous initial efforts, but through guided iterations, the conventions of the top-down can be as challenged as any reflex elimination of porosity or 'in-between-spaces'.[4]

Cusack's word clouds correlate with the visual grammars we have come to associate with map-making; however, it may be that textual creativity can be entirely unhinged from the graphic, even from the 'eventilized', yet still retain a purchase on Thulin's cartophonic. Candidates can be identified within recognizable sound arts practices – Steve Peter's *Here-ings: A Sonic Geohistory* (2012) comes to mind, drawing as it does from a calendar year of listening devoted to a site in New Mexico and delivering sensed experience in spare, diaristic prose; so too, Voegelin's *Sound Words,* a mobile microsite that shuttles between personally authored and curated collaborations and has been hosted by various international festivals. Forms of locational writing that express an attentiveness to the sonorous yet fall outside genre delineations, such as those resonant passages of Nan Shepherd's *The Living Mountain*[5] that to my ear fashion for the Cairngorms a porous, ground-truthed soundmap that no screen with uploaded nodes could hope to match for nuance, might equally well qualify.

Desterilized soundmaps

For Bruyninckx, the audiospectrograph sought to flatten and control sound, it 'dealt with the problem of noise, by erasing it visually' (Bruyninckx 2012: 145). In common with the choroplethic noise map – the audiospectrograph is as attached to a specific, and loaded, technological apparatus as it is to a particular perspectival frame. There have been instances, however, of efforts to disentangle the spectrogram and the noise map from their silencing and sterile 'scientific culture', and to exploit their respective latent cartophonic possibilities (as opposed to their already materialized cartographic ones).

Bernie Krause's first encounter with spectrograms in the early 1980s is narrated in language dislocated from orthodox scientific culture – he evokes Turner's late seascapes and dares 'to think of the spectrograms as contemporary graphic musical scores' (Krause 2013: 87). Subsequent engagements with spectrograms enabled him to map the waxing and waning of biophonic and anthrophonic presences in particular places, both terrestrial and marine, that have been returned to over successive decades, and to represent these dynamics in the characteristic diagrammatic form. The spectrograms compliment the recordings from which they derive, sometimes coexisting spatially, as in the 2016 installation in the basement of the Cartier Foundation, Paris, which the exhibition designers explained within a representational schema of mapping, repeating the rhetoric of the 'surround' we have heard before: 'A cohesive, immersive experience that three-dimensionalises Krause's recordings and suggests scenes from the natural world […]. The spectrograms form an abstract landscape, an interpretation of the various global locations and times of day that Krause made the original recordings in a way that envelops the audience and encourages them to linger in the space' (United Visual Artists 2018).

The Spanish artist Edu Commelles decoupled the spectrogram further from its host scientific culture in *Spectre/A Secret Music* (2018) and, particularly, in *Espectrograma: Mislata* (2016) where a month of 'sound mapping the entire city' was concretized in two curved murals, each 2.6 metres high, one stretching out beneath low-rise tower blocks for 25 metres, the other spanning a neighbouring 20 metres. Although there is an audio dimension to the *Espectrograma* project, it is the soundless spectrogram structure, ironically given Bruyninckx's critique of silencing, which reverberates, since this, in the artist's own interpretation, 'aims to trigger imagination of the viewer to wonder which graphic correspond to each sound and to imagine those sounds […] sometimes, the imagined sound is the most powerful and compelling' (Commelles 2016).

Spectrograms or noise choropleths that are 'détourned' as singular soundmaps to address Droumeva's 'alternative grammar', are not entirely released from scientific culture (just as the grammar remains a grammar, however alternative). Rather, there are contiguities with what Eyal Weizman has to say of the forensic: '[We] use the term "forensics", but we seek, in fact, to reverse the forensic gaze and to investigate the same state agencies […] that usually monopolise it' (Weizman 2017: 9). A work by Lawrence Abu Hamdan, a colleague of Weizman, exemplifies the reversals that are possible here, reversals that can have the character of a counter-mapping, an expression that Nancy Lee Peluso introduced and which is highly instructive in the scope of the conventions of perspectival frame and specific apparatus: 'Counter-mapping can be used for alternative boundary-making […] for expressing social relationships in space rather than depicting abstract space itself' (Peluso 1995: 387).

Earshot (2016) is a multidimensional installation, its impetus derived from acoustic analysis previously commissioned from Hamdan by a charity who had sought to establish whether the Israel Defense Force had discharged rubber bullets or live rounds in an incident which left two unarmed teenagers shot dead in the occupied West Bank. An element of the research involved creating spectrograms of gunshots recorded on the day the youths died and these featured as evidence in newspapers and at a US Congress hearing; the

same visualizations later deployed in gallery spaces in different configurations and draw, precisely, a soundmap of the lethal chaos of social relationships in space rather than a more abstracted, sterile cartography.

Compositional soundmaps

Few material constraints impede the construction of the low-wattage textual and graphic soundmaps, and this is one of their advantages in a workshop setting; the many resources which Steph Ceraso identifies in her inter-chapter in *Sounding Composition* facilitate the more environmentally impactful form of the online soundmap, and she has shown that they can be developed as part of curriculum projects. Although soundmaps, both online and offline, permit this relatively accessible assembly by use of relatively available software, some practitioners have distinguished themselves through the duration of their commitment: Cusack's twenty years of his *Favourite Sounds* project, Krause's many decades devoted to the spectrogram. Annea Lockwood's *Sound Map of the Hudson River* (1982) took a year and demanded recordings from fifteen locations along a 563-kilometre course; the fieldwork for her *A Sound Map of the Danube* (2008) generated some 80 hours of recordings.

Although Lockwood distinguishes her approach by insisting 'my intention is different from compositional work' (Lane 2013: 31), I see her work as emblematic of a kind of soundmapping that is usefully defined as compositional. Like Lockwood's work, projects such as Fernando Godoy's *Atacama: 22° 54 '24 'S, 68° 12' 25' W"* (2017) and Cathy Lane's *The Hebrides Suite* (2015) depend on sustained investments of time; deliver as multimodal combinations of images, texts, and sound; and foreground an adjudicatory, authorial listening that is active at the site, in the edit suite, and later governs the gallery installation or other form of dissemination. As Lockwood has it, the initial 'site has to be really satisfying to listen to and make my ears prick up' and subsequent choices of recordings amount to 'selecting sites that are really engaging and vivid to me – really alive' (Lane 2013: 33–34). This is not to say that Lockwood, Lane, or Godoy resist inscribing the testimonies of others within their sonic mapping. We hear vocalized witnessing in Lockwood and Lane. Witnessing contributes to Godoy's sound world too, not through audible speech itself but by through the invocation of 'Atacama [as] a space of evocation, of memory, of overwhelming loss experienced by the mothers and women who have spent years searching for the remains of their loved ones […] buried there during the extermination carried out by the Chilean dictatorship' (Pisano 2018). It functions as another of Peluso's counter-mappings, triggering 'a critical process that questions epistemological maps of knowledge by offering a possible renegotiation of the meanings of language itself' (Pisano 2018).

The compositional maps by Lockwood, Lane, and Godoy each offer their own answers to James Clifford's question 'but what of the ethnographic ear?' (Clifford 1986: 12). Rather than the aerial, their exploratory altitude drops down to ground level and sometimes lower still, as in the below-surface hydrophone recordings of Lockwood and the contact microphone

recordings of Godoy and his Austrian collaborator Peter Kutin. These projects – that fall within the sound-as-map in Thulin's taxonomy – can have recourse to actual maps, such as those which appear in some of Lockwood's *Sound Map* installations and in Godoy's abstracted diagram that allows the audience to plug headphones into specific nodes on the gallery wall labelled with longitude and latitude in his contribution to the 2017 *Otros Sonidos, Otros Paisajes* exhibition at MACRO, Rome, curated by Pisano and Antonio Arévalo. However, in keeping with what Thulin says of this category, they approach 'visual representation as secondary or, in some cases, unnecessary to the mapping of sound spaces' (Thulin 2018: 196).

The compositional sound-as-map artists I have chosen to exemplify this third category of alternative approaches all use field recording, editing, and various dissemination formats and, taken together, these institute their own technological apparatus. This may attract different issues from those I associated earlier with the online soundmaps' own apparatus, yet, to measure their methodological robustness, a similar critical auditing is indispensable in parallel dimensions of economics of access (and Smith's 'wattage'), implied spatiality and questions of data collection (such as the privacy and property rights of those inhabitants of place who we hear vocalized).

Other projects, though still accountable as an individual artist's responsibility, demonstrate a relaxation of compositional control, and accommodate collaborative methods that endow participants with technical skills and equipment to enable a certain autonomy to map their own localities, perhaps engaging more directly with issues of access and data collection in the technological apparatus. Waldock's work in Liverpool's Welsh Streets repositions the researcher so that the domestic spaces are foregrounded and, for their inhabitants, 'instead of listening in on them, this methodology makes it much more possible to listen to and with them' (Waldock 2016: 67). A similar recalibration is discernible in Hong Kai Wang's *Music While We Work* (2011), where retired sugar factory labourers become recordists, soundtracking the multiscreen and multichannel installation, 'allowing them to work on their own, identifying and recording the sounds of their former work environment – their aural universe. Wang believes that whoever holds the microphone and what he or she records, delineates, from various viewpoints, the right to speak, the right to interpret and the power relationships between sound-maker and recipient' (Chang 2011).

Compass

One of the significant advantages of the online soundmap relates to its capacity to deliver a collective listening for its audience from the collective, recorded, and uploaded listenings of its curated contributors. Cities and Memory's recent project *Sounding Nature* incorporated the work of 250 artists who supplied some 500 recordings from 55 countries; Udo Noll's *Radio Aporee* has evolved into a platform for 1,665 contributors and to hear the totality of its collective cartography would demand 115 days and 23 hours. The peculiarities of how Cities and Memory or *Radio Aporee* or any of the other online collective soundmaps

adapt the geographical information system's base layer to invite the rich, crowdsourced, material constitute a technological apparatus and a perspectival frame. These stipulate an invoked territory, in terms of the militarized, capitalized, surveilled infrastructure on which they depend, an infrastructure that has not surmounted the issue of digital inequality nor escapes Smith's critique of environmental damage, and stipulate an impelled listening position, in terms of the aerial that disembodies as it plugs porosity and stresses externalities. Some online soundmaps have invested energies in engineering a distinctive interface, though there is often standardization within a project in terms of how acoustic content is presented, despite wide disparities in that content and between many separate projects there is a palpable presentational homogeneity, partly because their creators gravitate to similar software.

Less homogenous is the genealogy of the soundmap, a family history in which scientific culture's noise maps and audiospectrograms form one branch, textual ear witnessing another, diverse diagrammatic innovations a third, and the various alternative approaches a fourth. The three alternative approaches I provided could each have been deepened to draw in more exemplars, just as they could have been broadened to incorporate other cartophonic categories: the transmission works of Dawn Scarfe or Jiyeon Kim suggest the possibility of a live soundmap, the reverberation of interior or external spaces in projects by artists as different as Viv Corringham and Davide Tidoni imply a performative soundmap, and a potential classification of storied soundmaps arises out of the separate creative research endeavours of Isobel Anderson and Ultra-Red.

It is not that the alternative approaches have somehow evaded technological apparatuses and perspectival frames: they are still soundmaps after all, each with an invoked territory and an impelled listening position. Rather, the alternative approaches agitate the apparatuses and frames to critical motion, hazard counter-mappings, lower themselves from the aerial, admit the porous, and slip from the cartographic into the cartophonic.

Notes

1. Not fully cartophonic but nonetheless intriguing is the Chatty Map collaboration between Yahoo Labs, Bell Labs, and the universities of Turin and Sheffield where choroplethic maps are generated from tags on social media data to characterize acoustic perceptions organized across axes of chaos, calm, monotony, and vibrancy and to characterize sonic diversity (see Aiello et al. 2016).
2. Perhaps the emblematic soundmap project, in its breadth and depth, its balance of complexity and coherence, is Ian Rawes's London Sound Survey (2008–2020).
3. I am borrowing this forward slash from the work of Alison Barnes: 'The forward slash [in geo/graphic] is used to reconfigure the context of the word representation in discussion of creative outputs that endeavor to go beyond a one-to-one "mapping" of place. The use of re/presentation in relation to both the research and practice of this type emphasizes both "re" and "presentation" and again creates a productive interplay that enables one to move beyond the idea of the mimetic with regard to an image of place' (Barnes 2018: 4).

4.   An insightful and inspiring account of the adaptation of soundmaps within classroom settings – and the compromises which emerge – can be found in Ceraso (2018).
5.   The passages in chapter 4 of Shepherd's book are particularly resonant (Shepherd [1977] 2011: 22–29).

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