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Sounds of the Projection Box: Liner Notes for a Phonographic Method

Michael Pigott

Abstract:

In order to document, investigate and analyse the soundscape of the analogue projection box before it passes into history, a series of audio recordings was made within functioning boxes, a selection of which have been released as an 'album'. The recordings, made in UK boxes that maintain both 35mm film projection and digital projection, also capture the shifting sonic texture of this environment as it changes from primarily analogue to primarily digital operation. This article explores the role of phonographic field recording as a practical methodology within a film historical research project that investigates the role of the film projectionist and cinematic projection throughout the history of cinema exhibition in the UK. It proposes a set of systematic principles for approaching the use of phonographic field recording in this context, and shows how they may be applied. Through an analysis of both the recordings themselves and the experience of making the recordings, it extracts some observations regarding the character, history and culture of the projection box as a lived environment and workplace. Just as cinema-goers seldom get to see inside this hidden room at the back of the auditorium, these sound recordings also reveal it to be a soundproofed box, a noisy environment in which the interface between operator and machine takes audible form, in which noise of one sort indicates smooth operation, while another sort indicates faults that need to be addressed. The article considers the legibility of noise and proposes that the relationship between projectionist and machine is significantly aural as well as visual and tactile.

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Keywords: analogue; field recording; projection box; projectionist; soundscape; workplace.

This article describes an attempt to adapt and integrate sensory ethnographic procedures within a film historical research project. As part of my work on the Projection Project I made a series of audio recordings within working projection boxes in the UK, which document the sonic environment of the film projectionist's workplace.¹ A selection of these recordings was released as an 'album' on the Gruenrekorder record label in 2017.² This article is intended as a parallel textual output, a means of offering theoretical and methodological context for the project and of highlighting some of the kinds of knowledge and understanding that can be produced using this method.

The recordings, made in projection boxes that maintain both 35mm film projection and D-Cinema digital projection, capture the shifting sonic texture of this environment as it changes from analogue to digital operation. While the primary purpose was to approximately preserve a soundscape that is at risk of disappearing without trace, the secondary purpose was to examine the vital role of sound in the work of the projectionist. This article will explore the viability and usefulness of this practical methodology and, through an analysis of both the recordings themselves and the experience of making the recordings, extract some observations regarding the character, history and culture of the projection box as a lived environment and workplace. It will consider the legibility of noise and propose the relationship between projectionist and machine as one that is significantly aural as well as visual and tactile. Following Karen Bijsterveld's work on the history of noise in industrial workplaces (2012) I will suggest that the layers of mechanical noise in the projection box constitute both a noisy workplace to be endured, and a legible set of signals that the skilled projectionist depends upon during everyday practice.

The following is intended to provide a contribution toward the further development of phonographic field recording as a viable method within the humanities and social sciences. As a form of extended 'liner notes' they will provide an explicit articulation of the thought behind the process and the potential avenues that lead away from it.

The soundproof box

The small room at the back of the cinema contains both the hidden labour of the projectionist and the hidden apparatus of film projection.

Sounds of the Projection Box

Beyond making these vital supports of the cinema experience invisible, the enclosure of the projectionist and their equipment within the projection box also ensures that they remain *inaudible*. Early guidance to motion picture theatre managers and operators encouraged them to consider sound as a key factor when deciding upon the location and design of the projection box:

The projection room must be as nearly as possible soundproof, to the end that the noise of the projectors, the rewriter, and the motor generator set or transformer, as well as the conversation sometimes necessary between the projectionist and his assistant be not audible in the auditorium. (Richardson 1922: 301)

It is well-known that one of the main concerns for cinema-planners in the first half of the twentieth century was to make the projection box fireproof, in order to prevent the highly flammable film from setting the whole building on fire, especially while it was full of customers. However, this very practical concern was combined with a number of aesthetic concerns to do with light and sound leakage. Wooden projection boxes were discouraged for obvious reasons, but metal construction boxes were found to ‘act as sounding boards, increasing the noise of the operation of the projecting machine’ (Meloy 1916: 59). For this reason, asbestos boxes, as advertised in Figure 1, were popular.³

The text of the advertisement in Figure 1 boasts that the Johns-Manville booth is ‘gas, smoke and sound-proof’, lumping sound in with other undesirable leakages. The unspoken implication, however, is that these undesirable emanations should be contained within the box, along with the projectionist. Gas and smoke could be ventilated away to some degree, but the noise of projection was something that the projectionist had to learn to live with.

The ideal of controlling sound within the cinema theatre had already arisen within the silent period,⁴ but with the coming of sound the acoustic design of auditoriums became a vital concern and led to what Emily Thompson characterises as a desire for the purest ‘signal’ possible through the use of electrical amplification and the minimisation of reverberation (2002: 256–63). By the mid-1930s, it was taken for granted that the audience should ideally not be disturbed by the noise of projection.

Several of the sound recordings that I have made attest to a fact already known to many which is that soundproofing masks the fact that the projection box is a very noisy environment and that analogue film projection was, and is, a noisy business. Throughout this early period of

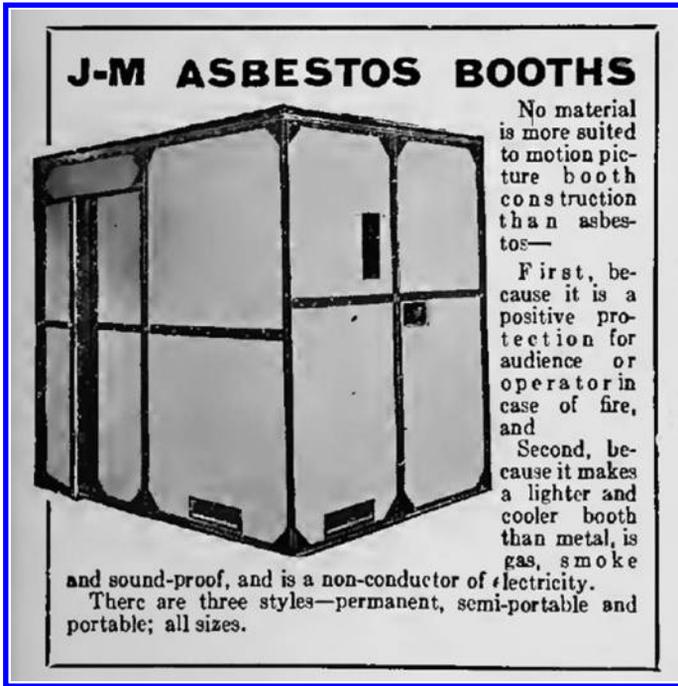


Fig. 1. Advertisement for Johns-Manville projection booths (Meloy 1916: 129).

development there was little concern for the acoustics of the projection box and the auditory experience of the projectionist beyond the need to ensure that no one outside of the room would have to hear it.

What can we say, then, about the noise contained within the projection box? How might one find a way to pierce that thick fog in order to analyse it, to find out what sounds the projectionist heard and what they meant? How might one go about investigating the sonic environment of the projectionist, and what words might be used to describe and analyse it? In the following I attempt to briefly establish some concepts that will be useful to the enquiry, make reference to some key precursors and situate the results in relation to other work being done on the historical understanding of the relationship between sound, noise and work.

The soundscape (theoretical and methodological sources)

R. Murray Schafer's influential theorisation of the concept of the 'soundscape' provides an important foundation for the current work.

Here Schafer establishes the nature and limits of the soundscape as an object and field of study:

The soundscape is any acoustic field of study. We may speak of a musical composition as a soundscape, or a radio program as a soundscape or an acoustic environment as a soundscape. We can isolate an acoustic environment as a field of study just as we can study the characteristics of a given landscape. (1994: 7)

He goes on to delineate a method for deconstructing and anatomising a soundscape, identifying three key classes of sounds that are usually present: keynotes, signals and soundmarks (ibid.: 9). The keynote constitutes the background of a soundscape, the often unnoticed, but ever present, fabric of sounds against which we consciously hear the other two classes of sound. The signal is the sonic cue that we listen for, the necessary warning that something we are conceptually prepared for is happening. The soundmark 'is derived from landmark and refers to a community sound which is unique or possesses qualities which make it specially regarded or noticed by the people in that community' (ibid.). All three of these classes of sounds will be invoked later, but for now I would like to offer a little more detail on the keynote. This class is especially important because it plays the greatest role in determining the character of a soundscape. While it may not always be consciously recognised by inhabitants, indeed precisely because it has the capacity to go unnoticed, the keynote forms the dense atmosphere of a soundscape, the environment within which a subject and a culture emerges and endures. It consists of the everyday sounds of environmental, civil and biological processes combined: weather, transport, industry and the indeterminate hubbub of people and other animals flowing together into what can often seem to be a single texture of background sound. It is this capacity to intuitively understand such a complex combination of sounds as a unified whole that makes it something that we can call a soundscape. Importantly, Schafer suggests that the soundscape shapes the people who live within it. Its ubiquity is matched by its pervasiveness and certain background sounds 'may have imprinted themselves so deeply on the people hearing them that life without them would be sensed as a distinct impoverishment' (ibid.: 10). Ultimately, Schafer is suggesting that keynote sounds play a vital role in making and marking a culture, and that the subtraction of certain component sounds can have a damaging effect, and even be felt as a loss by members of that culture.

In addition to offering a theoretical foundation for the current work, Schafer also offers a precedent for the use of phonography

as a method for documenting and investigating the soundscapes of the world. As a founder of the World Soundscape Project at Simon Fraser University, Schafer helped to develop the field of ‘acoustic ecology’ and the practical application of sound recording within an ecological framework. Subsequent figures such as Steven Feld have made important progress in adapting this method as a viable form of anthropological study.⁵ However, I would suggest that, within the realm of academic ethnography, anthropology and the broader social sciences and humanities, this model of phonographic field recording and soundscape analysis has been undervalued. Though this kind of work has continued to be developed as a mode of serious enquiry, it has largely been pursued outside academic contexts.

There is, of course, a long history of sound recording as a tool within anthropological and ethnographic practice, but it has predominantly been used to record voice and music, as a means of conducting interviews and documenting traditional music and ritual. The focus, in both uses, is on capturing a partially known phenomenon that is in the ‘foreground’ of the recording and which clearly functions as a cultural expression. In many cases these ethnographic recordings are later treated as texts to be read in a much more comprehensive manner, often taking into account details available in the ‘background’ of the sound.⁶

However, while the background inadvertently comes along for the ride and often emerges as a valid source of information for analysis, it is seldom the case that the background is the primary subject of the original recording. In this respect the field-recording practice of Ernst Karel and its role within the wider work of the Harvard Sensory Ethnography Laboratory (SEL), provides a key reference point and methodological model for my approach to the recording of the projection box. Karel, who is Lab Manager and Lecturer in Anthropology at the SEL, has profoundly influenced the video-based output of the lab, advising on the place of field-recording in films such as *Sweetgrass* (2009) and *Leviathan* (2012), ethnographic documentaries that distinguish themselves, Max Goldberg suggests, by ‘the way the sound is allowed to exceed the image’ (2013). Karel also produces sound-only projects: phonographic recordings such as *Materials Recovery Facility* (2012) and *Swiss Mountain Transport Systems* (2011), the first of which documents the soundscape of a recycling plant in Charlestown, Massachusetts, and the latter a selection of gondolas and funiculars in different mountainous parts of Switzerland. Both recordings seem to use the microphone as an investigative instrument, not just a component technology of documentation, but

as an active sensor within an apparatus of exploration and analysis. They attempt, in a self-consciously subjective and approximate way, to capture and convey a sense of what it is like to inhabit these spaces. They document a particular soundscape, but they also permit the listener to encounter it in a way that encourages and facilitates a special kind of attentive listening and analysis. They are not neutral documents; through the parameters of microphone choice, placement, movement, timing, editing (and more) the recordist performs an interpretation of the soundscape, but it is one that maintains an openness to further creative interpretation and associative enquiry. The factors that make the soundscape so difficult to analyse and talk about—its paradoxical muteness, its apparent neutrality and lack of expressivity—are precisely those that make the recording a vital and productive text for analysis once placed within a context of critical attentiveness. Karel himself, in an interview with Daniel Barrow, articulates some of the critical lines of flight produced by his ‘Materials Recovery Facility’:

These are the sounds of a very specific human situation, a specific point in the history of civilisation. Wrapped up in them is a complex story that one could take in any number of directions: the development and production of these complex materials in the first place, and all the resources that go into that; what the materials are used for; human behaviours and tendencies concerning what to do with these materials after they’ve been used; analyses of those behaviours; and strategies devised to address them. (Barrow 2012: 16)

Barrow glosses the significance of this approach nicely: ‘recording estranges lived experience; by isolating sound’s aesthetic qualities, it makes it possible to think historically about what lies behind them’ (ibid.: 16). This function rests upon the separation of sound from image: to ‘isolate’ and ‘ estrange’ through the decision to represent only the soundscape of an environment.

While Karel himself is careful to distinguish his recordings from ‘proper’ anthropology, I suggest that there is a valuable mode of enquiry in evidence here, one that is affirmed and contextualised by advances in the developing field of ‘sensory ethnography’. In Sarah Pink’s view, sensory ethnography ‘is a reflexive and experiential process through which understanding, knowing and (academic) knowledge are produced’ (2009: 8). It is set in contrast to a model of ethnographic practice that organises around observation as a mode of data gathering, and instead promotes a model of ethnography that is

a process of creating and representing knowledge (about society, culture and individuals) that is based on ethnographers' own experiences. It does not claim to produce an objective or truthful account of reality, but should aim to offer versions of ethnographers' experiences of reality that are as loyal as possible to the context, negotiations and intersubjectivities through which the knowledge was produced. (Ibid.: 8)

In fact, Pink tries to avoid using the term 'data' to describe the 'ways of knowing and understanding that are produced through ethnographic practice' (ibid.: 8). In its call to attend to the multi-sensoriality of ethnographic practice, sensory ethnography opens itself to a wide variety of modes and technologies of enquiry and documentation which constitute alternative routes to knowledge and understanding.

And yet, even Pink's vision of sensory ethnography is primarily concerned with ways of expanding and enhancing approaches to interacting directly with people and cultures, rather than places and things. And perhaps this is how it should be, but it does not quite encompass the territory that I wish to investigate. I therefore propose to adopt key points of Karel's practice, supported by the methodological ground opened up by both the Harvard Sensory Ethnography Lab and the vision of sensory ethnography laid out by Pink, as a means of investigating the soundscape of the projection box. The set of guiding principles that I have determined includes:

1. The use of a set of microphones as sensors within an embodied apparatus of investigation, leading to the production of a sonic document which constitutes a subjective exploration of a soundscape.
2. The intention for that document to convey a limited sound-image of the sensory experience of what it is like to inhabit a specific sonic environment. In this way it serves a preservative function, as a self-consciously subjective and approximate document of a unique, and potentially historically relevant sonic environment.
3. The intentional uncoupling of sound from image in order to realign the attention of the listener. The recording asks for a critical attentiveness to sound in the absence of a visual reference point, in order to facilitate alternative ways of thinking about the sources of the sounds.

The sonic culture of the projection box

In an article concerned with the historical debate over industrial noise in factories and the necessity to protect the hearing of workers,

Bijsterveld suggests that one of the main factors preventing the uptake of earplugs and other abatement measures in a number of extremely ‘noisy’ industries was the vital but often unacknowledged (by medical professionals and industry campaigners) role that sound played in the everyday activities of the factory floor (2012: 153). She asserts that ‘hearing protection made workers feel insecure about the direction from which sounds came, and caused communication problems as well as a “nasty feeling”’ (ibid.: 160). Furthermore, sound provided certain kinds of useful information:

engineers had often considered industrial noise as a sign of inefficiently running machines. What is more, the specific character of the mechanical noises informed them about the inefficiencies’ causes. This practice of listening to machines in order to diagnose the origins of mechanical faults was also evident in car repair. At a Dutch anti-noise meeting in the mid-1930s, an engineer talked at length about the rattling, puffing, whistling, clicking, tapping, crashing, screeching, howling, crying, grinding, cracking, sneezing and whizzing of cars. He asserted that the analysis of motor sounds could reveal deviations from normal function before these could be detected visually. (Ibid.: 161)

Bijsterveld uses the work of Cyrus Mody to expand these findings outside of the industrial workplace and to enrich the sense of the usefulness of noise beyond the indication that something might be wrong with a machine. Mody studied materials and surface science laboratory environments and found that sounds were seen to be at times disruptive ‘contaminants’ to experiments, but could also prove ‘epistemologically relevant’ (2005: 186). He observed the significance of sonic feedback for laboratory technicians in the use of their instruments, both for the monitoring of correct operation and for gleaning certain kinds of relevant information. Sonic cues played a vital role in the interaction between technician and instrument, and knowing how to usefully interpret and respond to those sounds was a marker of a skilled operator:

When things run smoothly, these sounds unfold regularly, marking out the running of a clean experiment. Learning these sounds, and the experimental rhythm they indicate, is part of learning the proper use of the instrument ... Instrument users often coordinate visual and auditory cues to manage the variety of information before them. The tacit knowledge of such sounds is difficult to pass on from one operator to another and usually comes only with long experience with the instrument. With such experience also comes the tacit knowledge of the sounds made when tools are not operating smoothly. (Ibid.: 186)

Mody highlights the experiential aspect of this knowledge—it is accrued through time spent using the instruments. What’s more, a heightened sensitivity to the sounds was also linked to an implicit sense of being closer to the instrument and thereby achieving a more intimate relation to the event of the experiment. Careful listening allowed the technician to narrow the distance between the observer and the observed: ‘some operators describe listening to the microscope as bringing them more in tune with its operation’ (ibid.: 188). For that class of technician interested in attending closely to the sounds (which Mody correlates with those who also have a tendency to build or modify their own instruments), the ability to perceive and interpret a variety of different sounds was extremely significant. For them, ‘sound facilitates the acquisition of knowledge, precisely because of its aesthetic qualities’ (ibid.: 189).

A profitable analogy might be made between this kind of workplace affinity and that of the projectionist, which becomes most apparent once the relationship between technician and instrument is disrupted. As Richard Wallace points out:

The removal of 35mm film projectors represents the removal of a certain type of work that demanded skill, knowledge and attention ... from which much of the meaning of being a projectionist was derived ... The loss is embodied by the physical absence of both projectors and other projectionists, but also the sensory loss of the sound of the projector running. (2017: 20–1)

In an interview with Wallace, projectionist Brad Atwill attested that the replacement of 35mm projection by digital had altered his workplace in a way that was immediately obvious:

I opened the door into projection and it being silent was so unnerving and that was when it really hit home ... you’d hear that whirring and the ticking and you knew that things were running ... It was a weird feeling and it was all because the business end of the projector wasn’t clicking away and sounding beautiful. (Quoted in ibid.: 20–1)

Atwill’s comments indicate both a functional and aesthetic role for the sounds of analogue projection. The ‘whirring and ticking’ indicates correct and ongoing operation, but beyond this the emotional impact of the multiple absences inflicted by the changeover to digital is metonymically summed up in the disappearance of the ‘beautiful’ sound of the running projector. Wallace goes on to cite an attempt by projectionists at the Odeon Cinema in Glasgow Quay to maintain the soundscape of the analogue box beyond its redundancy. Although

the cinema had changed over to digital projection, some of the 35mm projectors were still present, and projectionist Mike Marshall tells a story of making up a short loop of film for the purpose of running it through a projector, to artificially produce the familiar sound of analogue projection, a 'dummy' sound serving only the aesthetic function of facilitating the persistence of a certain familiar soundscape, even while the actual work itself changed radically (ibid.: 21).

Here a by-product of the analogue apparatus of cinema, the inherent noise, supersedes its origin. The machinery of the moving image is employed in order to produce its characteristic mechanical noise (while the image itself is 'muted' because it doesn't matter). At a point of turbulent change within the industry the noise in the system suddenly takes the place of the product. At least, this is the case for a certain class of individual—those whose position as managers and readers of the noise kept them closest to it, while the average cinema-goer was shielded from it by a century of architectural concealment in the name of pure cinematic sound.⁷ There is something particular about the way that the dummy film loop is being used in the Glasgow Odeon, and it finds a surprisingly analogous precedent in another point of technological changeover, when one type of machine left a room and a different kind took its place in order to do the same job in a different way. Bijsterveld cites Gerard Alberts' description of the operators at the Philips Physical Laboratory in the Netherlands responding to the replacement of their noisy mechanical calculators with relatively silent electronic computers in the 1950s by artificially amplifying the inner workings of the computers using microphones and speakers, in order to replicate the kind of sonic feedback they were used to getting from their instruments (2012: 161). There is, of course, a significant distinction to be made here. The Dutch laboratory workers gained a specific operational benefit from the amplification of the computers: they could hear things happening inside their machines. The benefit to projectionists at the Glasgow Odeon, on the other hand, was of a purely environmental and behavioural kind, because the sound they sought had nothing to do with the job they were now being paid to perform. One wonders, though, how much the Dutch lab workers were also reassured by the replenished and reclaimed soundscape of their workplace.

The sound of analogue projection, then, as is the case with many other examples of analogue workplaces, can bear a great deal of emotional significance for workers. This emotional connection is seen to be amplified in the case of skilled workers whose enhanced relationship with their instruments relies in large part on auditory

feedback and the ability to ‘read’ the varying sounds of the machine. To refer to Schafer’s categories of sound: the background din of projectors (combined with ancillary electric machines) provides the keynote of the soundscape, while the complex variety of sounds produced by the projector during operation offer signals for the projectionist to interpret. The iconic sound of film running through the projector is a soundmark, a unique and meaningful auditory marker, which may be reproduced (even if artificially) in order to remember and replenish a culture for which it plays a defining role.

Technical considerations

The projection box recordings were made using a high resolution four-track field recorder and four cardioid condenser microphones. The recordings were made digitally, capturing sound at 24 bit/96 Hz in the ubiquitous .wav format. The raw recordings were then ingested into a PC-based Digital Audio Workstation, which allowed me to sync and mix between the four tracks. This mixing stage permitted a particular mode of analysis—allowing me to navigate the sonic space of the recorded projection box by ‘riding the faders’ of the mixer. The four tracks recorded the projection box from different points within the space, offering four distinct sonic ‘perspectives’. Played together at equal volume the tracks compose a dense overall sonic ‘image’ of the soundscape, but altering the volume of individual tracks allows the listener to separate and focus in on the individual ‘parts’ of the soundscape.

I went into the box with the intention of making two very different kinds of recordings. The first kind would attempt to capture the sounds of the individual machines and practices in intimate detail. For these recordings I positioned the four microphones at four points around the machines while they were being operated. The microphones were within two inches of the machines themselves, between three and six feet from the ground, and arrayed around each machine in a roughly four-cornered formation. The close proximity of the microphones, and the relatively low recording sensitivity that was required, facilitated a narrowing of the ‘focus’ of each track, so that they picked up noticeably distinct parts of the overall sound of the machine and the associated operation. Using this setup I recorded the lacing up and running of a print of *Rear Window* (1954) on two separate 35mm projectors, and the ‘making-up’ of the print on a Cinemeccanica rewind bench. For the purposes of easy identification and discussion I have chosen to call this category the ‘detail’ recording.

Sounds of the Projection Box

The second kind of recording that I set out to make would attempt to accurately document the ‘whole room’ of the projection box, to capture a sense of the sonic environment, or soundscape, of the projectionist’s workplace in detail. For these recordings, I used two cardioid condenser microphones positioned in the centre of the room and arranged in a wide stereo pattern, as well as the field recorder’s on-board stereo-pattern microphones to complete the four tracks. I have chosen to call this category the ‘soundscape’ recording.

However, it became clear that there was value in recording the sonic environment without concern for the ‘purity’ of the recording. Allowing unexpected and interruptive elements to remain within the recordings produced a potentially richer text for later analysis. And so a key methodological outcome from this first recording experiment was the identification of a third kind of recording that seemed necessary and desirable—the ‘documentary’ recording. Though similar, this category is distinguished from the ‘soundscape’ recording by its capacity to encompass all three levels of Schafer’s sound-system: keynote, signal and soundmark. The documentary recording of starting a projection of *The Thing* (1982), for instance, captures: the background din of the air conditioning, projector ventilation system and fans contained within the amplifiers, sound mixer and digital projector that was also running; the two projectionists talking before the start of the film, discussing whether it was time to go or not; the clicks and whirrs as the 35mm projector is started by Tom, the first projectionist; and the initial strains of *The Thing*’s ominous synth soundtrack coming through the monitor speakers in the box.

Some observations

My initial attempts to make the ‘detail’ recordings were surprisingly revelatory, not of individual details of the practices but of just how much excess sound needed to be removed before we could isolate the central sound. In order to record the practice of ‘making up’ a film at the rewind bench I set up the four microphones around the two distinct ends of the machine, where the two film reels rotate. However, after listening back to the first recording I made in this way, I noticed how the central sound that I was interested in was surrounded (to use a spatial metaphor) by other sounds. We turned off the digital projector at the other end of the box, which seemed a somewhat embarrassing oversight to have begun with. We turned off the air conditioning, which produced a low, dense thrum, a bed of sound that seemed to me to cloud and soften the sharper sounds of the rewind bench. But this

didn't quite do it – there were still other sounds getting in the way of a clear auditory 'image' of the rewind bench in action. We turned off the rack amplifiers to eliminate the noisy fans that were housed in each one, but still there was an irritating whine, sounding something like a fan, but with the addition of a high-pitched electrical whirr. The source was indeed yet another fan, this time hidden in the slightly unexpected location of a small audio mixer. Finally, a relatively isolated recording of Tom working at the rewind bench could be made. This gradual peeling away of the layers of sound in the space revealed the distinct sonic strata that together comprised the overall soundscape. I had thought that I would encounter an unusually quiet projection box, at a time when no screenings were scheduled and not many people were in the building apart from myself and one projectionist, but it quickly became obvious that there were many more pervasive layers of sound constituting the soundscape of the projection box, even during its downtime.

It also highlighted the artificiality of the 'detail' recordings that I was attempting to make. It is highly unlikely that a projectionist would bother to eliminate all of those continuous background sounds while at work, so what, then, was I really trying to achieve by fabricating this unnatural recording condition? It became clear that the 'detail' recordings, which constituted part of a larger attempt to examine the 'background' of a soundscape, could be understood to simply establish a new 'foreground'. However, the detail recording of Tom making up a print of *Rear Window*, as artificial as it might be, provides us with something that might be more difficult to identify in a 'soundscape' or 'documentary' recording. Set against the clean background of relative silence, the minute sounds of the process stand out with greater clarity, their sonic shape and texture more sharply defined. We hear the film flutter as it passes through Tom's hands and onto the take-up reel. We hear the rhythm of his actions as he joins two reels together, carefully placing both ends in the splicer, pulling and tearing a length of splicing tape, sticking and clamping. The metallic thud of the splicer seems unusually loud in this quiet context. All the while we hear the intermittent sound of Tom quietly whistling (perhaps an interesting, though distant, correlation to Bijsterveld's argument that working at a machine provided an occasion for song (2012: 160)). The 'detail' recordings afford the opportunity to delve into the background and methodically isolate certain component sounds, to facilitate a kind of scrutiny that is made difficult precisely by the fullness of the unrefined soundscape. They offer a mode of discovery and analysis (of specific sounds, of sound relationships and of sonic texture) that

is complementary to the broad-brush approach of the 'soundscape' recordings.

The 'documentary' recordings, on the other hand, offer an excess of detail, complicated by the fact that many of the sounds seem to blend together in a way that makes the background difficult to pick apart. Nevertheless, interesting details shine through. Another recording of Tom making up a film at the rewind bench, this time *The Thing*, and this time in the unadulterated noisy environment of the projection box, features a quiet, but furious, clicking sound deep in the background. This is the sound of Jerry, the second projectionist, frantically clicking on a mouse button as he plays *Minesweeper* (1990) on the projection box PC. The PC was installed during the digital changeover to facilitate the easier acquisition of digital licence keys that accompany the DCI prints that arrive on hard drives to be played on the D-Cinema projector. It is telling that time once taken up by the multiple tasks of analogue film projection is now filled with *Minesweeper*, an early PC game that for many years came pre-installed on every Windows computer, and offers the same kind of time-killing potential as solitaire (which Jerry also regularly plays on this PC).

A final example from a detail recording of lacing up and rolling *Rear Window* on a 35mm projector: the recording begins with the rustle and flutter of the film, as Tom's hands nimbly thread it around the sprockets and gears, interspersed with the loud clanks of various locking mechanisms and the electrical creak of Tom momentarily running the motor to move the film along its path. Once laced, he turns the motor on fully and the film audibly begins to flow through the machine, rhythmically rustling and clacking with the familiar staccato beat (the widely recognisable soundmark of 'film projection'). The beat is so fast that it almost blends into a constant tone, as the rapid and consistent percussive sounds mark the mechanical progress of the film around sprockets and through the constantly moving shuttle. It becomes a compendium of parallel whirrs, discernible at different frequencies: a rich, thick sound at the centre of the frequency spectrum (the sound of multiple gears turning smoothly); a rougher, rasping high-frequency rhythm (the film itself moving around its path); and a low-frequency hum in the bass range (the motor running). However, less than a minute into the projection, the rhythm is broken, led by the high-frequency percussive sounds slowing down and going out of phase with the rest of the composition. For a few moments it sounds as if the high-frequency rhythm is dragging behind the other frequencies, as if falling over itself. When making the recording, I watched as Tom responded with a series of deft hand movements, gently guiding

the film back into line, finally holding it in place, with the barest of physical contact, in order to ensure it was now back on track. This form of skilled manual error correction avoided the necessity of halting the projection and starting it again. It depended upon Tom's intuitive knowledge of how to fix the problem, but also upon his rapid recognition of the problem, which was initially indicated by the sound. He happened to be at the projector at the time and so could quickly trace the visual source of the error, but it is also the case that sound patterns such as this offer a signal that can be interpreted from anywhere in the box. It is in the nature of the projectionist's job that they do not continuously monitor the projector visually. However, simply by listening, and knowing what the different sounds mean, the projectionist may turn his or her back on the projector, move around within the box, pursue other tasks such as rewinding or making up another film, while simultaneously monitoring the ongoing projection aurally. The legibility of the sound signals, and the capacity of the skilled projectionist to read those signals, is vital to this aspect of the job.

Conclusion

The projection box, then, is a noisy sonic environment in which the sounds of the apparatus of projection are contained within, precisely so that they are not heard without. The projectionist must inhabit this space and live with the noise. However, we have seen that the sounds of projection can be advantageous, and meaningful, to the projectionist in at least two ways. The richly varied sounds of projection can provide useful information regarding the function of the projector and the state of the film. These sounds are most useful if the projectionist is able to successfully interpret them. Additionally, the sounds of projection form the soundscape of a workplace. The 'noise' of analogue projection can come to bear an affective weight, attested to by the sentimental bond that some projectionists still hold with the sound of film running through a projector. Indeed, it might be suggested that it becomes a shared cultural marker, what R. Murray Schafer characterises as the 'keynote' of a culture, which becomes most obvious through its absence. The projection box is, therefore, a noisy sonic environment to be endured, akin to the industrial workplaces described by Bijsterveld, but it is also a sonic text to be read, which played a vital role in the everyday work of the projectionist during the analogue era.

Sounds of the Projection Box

Beyond providing some information regarding the role of sound in the projection box, this project has also afforded an opportunity to contextualise a phonographic field recording practice, and to begin to formulate a coherent set of theoretical and practical resources. As liner notes, this article has hopefully done the job of introducing, of setting the scene and of articulating some thoughts about the sounds. However, I have only scraped the surface of what could be said about the usefulness of environmental phonography as a practical methodology within the humanities and social sciences, and my observations have barely begun to extract and articulate the rich details that are contained within the projection box recordings. I have not, for instance, mentioned the comparison to be made between the soundscapes of digital and analogue boxes, and I have said little about the contingent practices (such as talking, joking, whistling, eating and drinking) that are captured along the way. However, these and more are contained within the recordings, to be attended to by the critical listener.

I propose that the accompanying album of sound recordings (also entitled 'Sounds of the Projection Box') operates as a parallel research output, as the culmination of a process of investigation, documentation, analysis and interpretation. The album presents a curated selection of the recordings, and through its editing and ordering of the phonographic document it effects a further interpretation of what was already a subjective exploration of a very particular soundscape. Nevertheless, it also functions as a sonic document that captures and preserves an auditory trace of a certain place and time, a certain medium and its concomitant set of technological supports and work practices, and a certain discipline and culture: that of the projectionist. It represents my understanding of and experience of the soundscape of the projection box. Through the act of recording and editing it reveals and interprets some of the characteristics of this class of sonic environment, grounded by the specificity of the individual recording locations and times and the approach of the recordist.

In the absence of explicit commentary or visual reference point, the recordings leave space for further interpretation, for the critical-analytical work of the listener. The album represents the soundscape of the projection box to the listener, permitting approximate access to a space that was, and is, normally off-limits to the ordinary cinema-goer. Additionally, it preserves a trace or remnant of the analogue soundscape of 35mm cinema projection, an increasingly rare phenomenon.

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Notes

1. The Projection Project is a research project funded by the UK Arts and Humanities Research Council. Running from 2014 until 2018, it investigates cinematic projection, the figure of the projectionist and the uses of digital projection outside of the cinema.
2. *Sounds of the Projection Box* (Gruenrekorder, 2017).
3. This advertisement comes from a source published in the USA, where asbestos booths were popular. In the UK, brick-walled projection boxes were more common.
4. Rick Altman (2004) suggests that the silent period saw a trend toward the eradication of noise in the auditorium and an emerging preference for a single sound source at a time.
5. See, for example, Feld's seminal *Voices of the Rainforest* (1991).
6. My colleague Richard Wallace (2016) has written about the significant value in paying attention to the sounds in the background of audio interviews used as part of oral history projects.
7. The significance here, I would argue, is quite distinct from that of analogue noise, both aural and visual, within early twenty-first-century digital media and audio-visual culture, an examination of which is beyond the scope of the current work.

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Michael Pigott is Associate Professor of Video Art at the University of Warwick. He is co-investigator on the AHRC funded projects Sensing the City and The Projection Project. He is the author of *Joseph Cornell Versus Cinema* (Bloomsbury, 2013) and his album *Sounds of the Projection Box* is available on vinyl and in digital from Gruenrekorder.

Email: m.pigott@warwick.ac.uk