

Eavesdropping:
A Reader

Edited by James Parker
and Joel Stern



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The earliest references to eavesdropping are found in law books. According to William Blackstone's *Commentaries on the Laws of England* (1769), 'eavesdroppers, or such as listen under walls or windows, or the eaves of a house, to hearken after discourse, and thereupon to frame slanderous and mischievous tales, are a common nuisance and presentable at the court-leet'. Today, however, eavesdropping is not only legal, it's ubiquitous—unavoidable. What was once a minor public-order offence has become one of the key political and legal problems of our time, as the Snowden revelations made clear.

Eavesdropping addresses the capture and control of our sonic world by state and corporate interests, alongside strategies of resistance. For James Parker (Melbourne Law School) and Joel Stern (Liquid Architecture), eavesdropping isn't necessarily malicious. We cannot help but hear too much, more than we mean to. Eavesdropping is a condition of social life. And the question is not whether to eavesdrop, therefore, but how.

Cover:

Susan Schuppli *The Missing 18 1/2 Minutes* 2018. Congressmen listen to nineteen presidential tapes made available during the Watergate hearings before the House Judiciary Committee, 1974.

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The earliest-known references to eavesdropping are in court records. According to the *Oxford English Dictionary*, the first attested use of the noun 'eavesdropper' is from 1487, in the rolls of a local Sessions Court in the Borough of Nottingham. But, in 1425, jurors in Harrow, Middlesex, were already reporting one John Rexheth for being a 'common evesdroppere', 'listening at night and snooping into the secrets of his neighbors'.¹ (Fig. 1) And in 1390, John Merygo, a chaplain in Norwich, was arrested for being 'a common night-rover', 'wont to listen by night under his neighbour's eaves'.² Eavesdropping was one of the most commonly reported offences in England's market towns and rural villages from the end of the fourteenth century to the start of the sixteenth.³ But the roots of the term are much older. And contemporary usage has long since exceeded its medieval origins.

Today, 'eavesdropping' refers to everything from inadvertent and trivial acts of overhearing to police wiretapping to global surveillance structures and the massive corporate data capture on which they depend. Much of this is perfectly legal. Despite eavesdropping's origins as a language of censure and prohibition, its use in contemporary legal texts is often more ambivalent. Thus, s632 of the California Penal Code prohibits the intentional use of any 'electronic amplifying or recording device to eavesdrop upon or record' so-called 'confidential communications', only for s633 to immediately provide a blanket exception for law enforcement. Eavesdropping isn't the problem here—only eavesdropping on certain communications

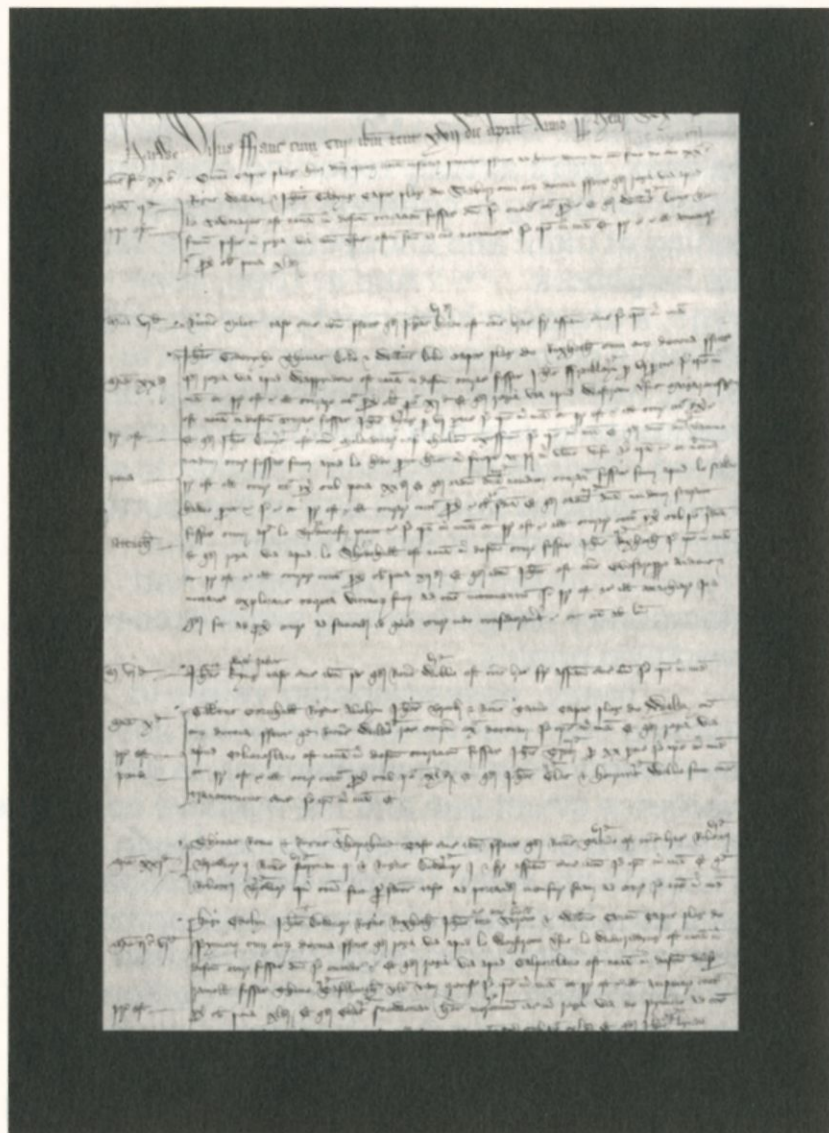


Fig. 1 Leet Roll of 14 Richard II, 1390.

(confidential⁴), in certain ways (electronic), by certain people (private citizens).

Colloquially, eavesdropping retains its implication of transgression, and so its critical edge. When we wield the term against major corporations like Apple or Amazon—‘Alexa has been eavesdropping on you this whole time’⁵—the point isn’t that this kind of activity is prohibited, but that it should be.⁶ Likewise, when we worry about neighbours or colleagues eavesdropping on us, when we close a door or don headphones in order not to overhear, it’s because we know some things aren’t meant for prying ears. All listening situations presume and imply a threshold of audibility. Eavesdropping is often the name given to its breach.

What is eavesdropping then? Above all, a language for holding listening to matters of ethics, law, and politics. Through its long history and diverse use, this much has never wavered. Eavesdropping has always been used to describe and contest the norms of listening. Indeed, one way of reading its history is as an index of the ever-shifting anxieties produced by and projected onto the excessive and unruly ear.⁷ This history is a rich resource for thinking through the ethical, legal, and political dimensions of listening today, but it is not necessarily binding. Such is the nature of precedent, as any good common lawyer will tell you. It’s a way of attending to the past in and for the present, sometimes to ‘follow’, sometimes to ‘distinguish’.⁸

This book looks to eavesdropping for its potential as a critical and aesthetic practice. In doing so, in important ways, it draws on and departs from the history of the term. In particular,

it attempts to bracket some of eavesdropping's more 'negative' connotations—especially its association with secrecy and surveillance—so that it is possible to imagine it as a mode of art, activism, and critique. When the world's most powerful corporations and governments eavesdrop on us with ease, what would it mean to listen back? What if we were to occupy the position of the eavesdropper, own and take responsibility for it? What might be learned? Politically, what might be gained? Artistically, what might be possible?

These questions matter, since eavesdropping is unavoidable, a fact of life. We all overhear. Listening is excessive. We cannot help but hear too much, more than we mean to. Listening, in this sense, is neither simply active nor passive. It is both an act of will and of surrender. And the reverse is also true. Because of sound's essential leakiness, especially in a world of ubiquitous networked microphones, we are also desperately vulnerable to listening. As Brandon LaBelle explains, 'what I say is never only for whom I face within a zone of proximity'.⁹ To speak or to make sound is already to expose oneself, to chance being overheard. Eavesdropping is both the condition and the risk of sociality. The question is not whether to eavesdrop, but how.

This book pursues an expanded definition of eavesdropping, one that critiques contemporary mechanisms for listening in but also advances subversive practices of listening back. It is concerned with malicious, aberrant, and repressive listenings, but also with the responsibilities of the earwitness. Specifically, it documents works first gathered for exhibition at

the Ian Potter Museum of Art, in Melbourne, in 2018, then presented at City Gallery Wellington, in 2019. But we envisage this book as more than just a supplement to these exhibitions. We hope it will also be read independently, as a collection of original research and writing that speaks and listens for itself.

Eavesdropping is, at once, our subject and our methodology. Many of the works are about eavesdropping, many are examples of it; often both. They direct attention towards specific technologies (answering machines, radio telescopes, smart speakers, networked intelligence) and politico-legal systems (surveillance, capitalism, settler colonialism, detention). Some address eavesdropping in a register that is personal and intimate, others are more distant or forensic. Scale ranges from the microscopic to the cosmic, from the split-second to the interminable. What all the artists have in common, however, is a concern not just for sound or listening themselves,¹⁰ but for the normative worlds in which sound and listening are necessarily situated and intervene. The book is not just an argument for and about eavesdropping, therefore, but also about sound and listening and their relationships with art and law.

Eavesdropping involves two conceptual moves; first, from sound to listening; second, from listening to its ethics, laws, and politics. Of course, all sonic art is also about listening, and listening always raises ethical, legal, and political questions. But it is a matter of emphasis. Work that foregrounds such questions has been underrepresented curatorially.¹¹ *Eavesdropping* begins from the position, as Douglas Kahn puts

it, that 'sound leads elsewhere',¹² and that this 'elsewhere' is often what's most interesting, important, and generative. Seth Kim-Cohen suggests something similar when he writes that sound always and necessarily 'speaks to selves beyond itself',¹³ when he insists on drawing out the 'non-cochlear' dimensions both of sonic art and of listening generally,¹⁴ and when he advocates 'shallow listening' as a kind of omnivorous, expansive, or excessive listening practice directed towards the proliferating social contexts opened up by a work.¹⁵ It is not a matter of dismissing sound's materiality or listening's embodiment. The point is simply that these dimensions of sonic experience are always also social, that bodies have histories, and that artists working with and against these dimensions of listening warrant considerable attention.

The necessary corollary is that works can and should be understood as contributions to what legal scholar Robert Cover called the 'nomos'—the 'normative universe'.¹⁶

We constantly create and maintain a world of right and wrong, of lawful and unlawful, of valid and void. The student of law may come to identify the normative world with the professional paraphernalia of social control. The rules and principles of justice, the formal institutions of the law, and the conventions of a social order are, indeed, important to that world; they are, however, but a small

part of the normative universe that ought to claim our attention. No set of legal institutions or prescriptions exists apart from the narratives that locate it and give it meaning. For every constitution there is an epic, for each decalogue a scripture.¹⁷

... for every executive order an exhibition. And, it is worth pointing out that, in the original Greek 'nomos' meant not only law or norm but also, crucially, song or melody.

Our purpose is not to exaggerate the similarities between art and law or to downplay the different ways they are related to and authorise violence.¹⁸ Even in a Western tradition that has done its best to separate them, the threshold between law and art remains porous. The gallery is also a law school. Both are institutions in which senses of justice are fashioned and faculties of judgment shaped. As far as eavesdropping is concerned, each of the works embodies, speaks to, and intervenes in 'sonic imaginations'.¹⁹ Some of these interventions may be taken up by legal and political actors or institutions, consciously or otherwise,²⁰ but they all engage us in a process of self- and world-making. 'To inhabit a nomos', Cover writes, 'is to know how to live in it.'²¹ How to live and listen. While this is always true, many of the works in *Eavesdropping* are overt about it. They appropriate or adopt legal techniques, categories, and idioms; they frame their concerns in relation to law's violence or redemptive power; they deliberately put their audience in a position of ethical or political discomfort. These works

understand and foreground their normative potential. They bring ethics, law, and politics into the gallery to show that they were already there. In terms of sonic art, eavesdropping is one way of naming the necessity of this relation.

The devil is in the details. How precisely do the works engage with or critique the ethics, laws, and politics of listening and being listened to? From what position or perspective? According to what politics of their own? In addressing these questions, we want to use eavesdropping's history to structure our thoughts, excavating the term's forgotten resonances, drawing out its potential as a critical and aesthetic practice. The next three sections, therefore, comprise a deliberately playful, speculative, and sometimes anachronistic engagement between the works and eavesdropping's diverse pasts. This, perhaps, is another mode of 'listening back', not just to power now, but also to and through history. In a nod to Walter Benjamin's 'modular' historiography, our purpose is not to approach eavesdropping's rich and varied pasts 'contextually', but precisely to wrench them from that context, to put them into 'constellation' with—and make them speak to questions of—listening in the present.²²

Eaves | Threshold

Long before the term had anything to do with listening, an 'eave' was simply a threshold or boundary. The term has its earliest recorded use in the *Anglo-Saxon Chronicle*, a collection of annals written during the reign of Alfred the Great at the end of the ninth century. 'Eaves'—in Old English, 'efes'—is used there to describe the

edge or margin of a wood.²³ The term is used in an identical way in the Anglo-Saxon Charters of the same period, but with a legal inflection. The Charters were legal instruments issued in the names of kings. They were sometimes writs or wills, but were typically 'diplomas' made for the purpose of granting land that therefore required precise descriptions, known as 'boundary clauses'. Thus, in the Swinford Charter of 951–9, King Eadred is said to have granted one of his ministers land beginning at 'Swine ford', leading from there to 'Pecg's ford', on to 'robbers' ford' ... 'from Ymma's to Cuda's valley ... along (the) dyke to the brook to the stone digging; from the stone-digging by the eaves to Welshmen's croft', and so on, until the entire estate had been mapped.²⁴ In another charter, from 963, the leased land ran 'from deep pit to Oldberrow, always beside the eaves (æfescē) of the wood to rushy nook' and 'from frost hollow always beside the eaves (efæscē) to the smooth meadow'.²⁵

(Fig. 2) John Mitchell Kemble observed that, in this period, the term was 'not confined to the eaves of a house, as with us', though the term 'eavsdrip' had already begun to be used in that context. The term also applies, he wrote, 'to the overhanging edge of a wood, the rim or brink'.²⁶ Here is the etymological origin of a feature of eavesdropping that remains to this day. Whatever its purpose—its ethical, legal, or political valence—eavesdropping always involves the transgression of a border, the crossing of a threshold of listenership or audibility.

In Lawrence Abu Hamdan's *Saydnaya* (*The Missing 19db*) and Manus Recording Project Collective's *how are you today*, the borders in question are literal: the thick walls of Saydnaya

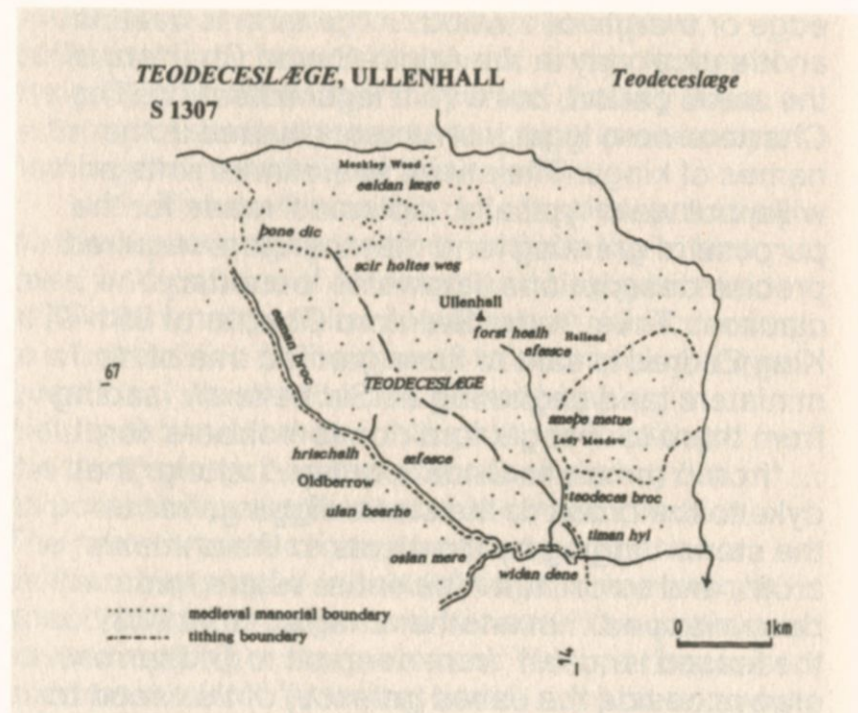


Fig. 2 Mapping of the medieval boundary clause from Teodecesleage, Ullenhall, from Della Hooke, *Warwickshire Anglo-Saxon Charter Bounds* (Woodbridge: Boydell and Brewer, 1999), 79.

prison; the barbed-wire and curfewed compounds of the detention and 'refugee transit' centres on Manus Island; the national borders of Syria, Australia, and Papua New Guinea; along with all the laws, conventions, treaties, and international politicking that produce and sustain them. The political intervention of both works comes in part from the artists' transgression of these borders, and their ability to make audible and bear earwitness to a location and a system of violence that has been deliberately muted. Both works facilitate 'listening at a distance',²⁷ a counter-listening across physical and national boundaries, to and against forms of state brutality that also amount to major human-rights violations. If silencing is a technique of power here, listening suggests itself as a mode of resistance.

In Joel Spring's *Hearing, Loss*, the borders at stake are different. We hear the artist, a Wiradjuri man, talking with his mother—prominent researcher, educator, activist, and Indigenous-health worker Juanita Sherwood—about her work treating otitis media, an inflammatory disease of the middle ear capable of causing profound hearing loss. It affects Aboriginal children at higher rates than anyone else in the world—both Spring and Sherwood have suffered from it. Their conversation is relaxed and familiar in a way that immediately conjures the intimacy of family and expressly doesn't speak to or invoke another listener. As a result, it is hard not to feel intrusive. We experience one kind of threshold then, as we hear about others. The staggeringly high rate of the disease among Aboriginal children, Sherwood explains, is largely a consequence of underdiagnosis by educators and health

workers, as symptomatic behaviour that would normally prompt medical intervention is routinely dismissed as disobedience. 'The most common term for these kids was that they were naughty and that they were misbehaving, and they were not listening. Of course, they weren't listening because they could not hear.' The threshold in play here is what Jennifer Stoeber terms the 'sonic colour line', 'the hierarchical division sounded between "whiteness" and "blackness"',²⁸ the 'sonification of race and the racialisation of listening'.²⁹ In the case of *Hearing, Loss*, the problem is not just the mishearings of white ears, but the fact that these mishearings inscribe themselves onto the eardrums of black bodies, often permanently. Only by breaching a further threshold, by investigating otoscopically and broaching the politics of the ear canal itself, can this auditory effect of colonialism be made visible and its story be told and heard.

The colonality of listening is a major theme in Samson Young's *Muted Chorus* too. The artist has a chamber choir perform Baroque choral works by Antonio Lotti and J.S. Bach 'without projecting the musical notes'. Everything else, except the musical notes—the phrasing, intensity, concentration, and formality—must be retained. Mute is not silent. It involves the conscious suppression of dominant voices as a way to uncover the unheard and the marginalised or to make apparent certain assumptions about hearing and sounding. In any act of muting, something is amplified. In this instance, the result is a collective whisper. There is already a politics at work here, since to whisper is to voice what cannot yet be said 'out loud', to imagine

and produce a listenership outside or beneath a certain threshold of audibility. In *Muted Chorus*, that threshold is the Western canon itself, precisely those great 'masters' of the European classical tradition reduced by Young to a whisper. 'The institutions of music continue to neglect and negate Asian composers', he writes. 'Composers outside the West are invisible in their own concert halls.'³⁰ Inaudible too. This is an open secret, of course—one reason perhaps why Young has the whisper so dramatically amplified in the gallery.

Eavesdrop | Medium

The idea of the 'eaves' as a boundary extends back and forth through history via the juridico-architectural formation of the 'eavesdrip' (later 'eavesdrop'). Already, as 'efes' was being used to describe the edge of a forest, the Old English 'yvesdrpæ' had come to refer to an ancient legal custom or 'folkrigh' (folcricht) whereby property owners were prevented from building right up to the edge of their land. The Roman jurist Gaius (130–80) attributes the rule that two or three feet be left around the perimeter of any building to the Athenian statesman Solon (640BCE),³¹ but direct evidence of that law can only be sourced back to the Twelve Tables of ancient Rome (450BCE) under the name 'ambitus' (clearance or 'the going around' of a building).³² The common theory is that the norm began as a way of protecting property rights, both from gradual encroachment from a neighbouring property and from damage caused by water running off a neighbouring property. Hence, by the ninth century, the 'eaves-drip'. In 1878, however, William Hearn, the first dean of the

new faculty of law at the University of Melbourne, offered an alternative explanation: that the custom of the eavesdrop emerged to protect the secrecy and privacy of sacred household gods (typical of ancestral worship in ancient households) from the profane spaces of the outside world.³³ According to this theory, to eavesdrop was to disturb the protected separation of sacred and profane. Today, when we talk about the 'eaves' of a house, and still imagine eavesdroppers lurking there, these are the echoes we no longer hear. The eavesdrop was the legally mandated gap of two-to-four feet around the perimeter of a home that, by the fourteenth century, would provide the perfect opportunity—indeed the medium—for surreptitious listening in the villages of rural England.

What is the medium of eavesdropping? Not sound, not even listening. In this history, it is the eavesdrop. Just as, in Rosalind Krauss's thinking, the medium of Ed Ruscha's famous paintings, photographs, and prints of Californian streetscapes and gas stations is not painting, photography, or printing, but the car. The car, she says, provides the 'conditions of possibility' of these works, their logic or rule.³⁴ The ways of seeing and experiencing the world produced by the car—the social and material structures it implies and is embedded in—are what Ruscha's works point to and investigate. We might think of the eavesdrop in a similar way, as the specific listening situation established by a set of spatial, material, and normative conditions. The medium of eavesdropping, in this sense, isn't just the wall or window through which one listens, but also the conditions of access and invisibility the eavesdrop entails.

Consider the recordings produced by the Manus Recording Project Collective.³⁵ Since 2013, nearly two thousand men have been indefinitely detained on Manus Island, in Papua New Guinea, by the Australian Government, after arriving in Australia seeking asylum. When the Manus Regional Processing Centre was formally closed on 31 October 2017, after the Papua New Guinea Supreme Court declared it unconstitutional, the men still detained there were ordered to relocate to new, smaller detention centers in Lorengau, Manus' major town. The authorities eliminated provisions and removed the diesel generators powering the facility, but the men refused to leave—the culmination of years of organised resistance against their involuntary and indefinite detention. Eventually, they were forcefully evicted.

how are you today is a collaboration between some of these men—Abdul Aziz Muhamat, Behrouz Boochani, Farhad Bandesh, Kazem Kazemi, Samad Abdul, and Shamindan Kanapathi—and André Dao, Jon Tjhia, and Michael Green in Melbourne. Each day for fourteen weeks (the duration of *Eavesdropping's* first presentation at the Ian Potter Museum of Art), one of the men on Manus made a sound recording and sent it 'onshore' for swift upload to the gallery. By the exhibition's end, there were eighty-four recordings in total, each ten minutes long. The result is an archive of fourteen hours—too large to synthesise, yet only a tiny fraction of the men's ongoing internment. These are not just field recordings, they are also evidence, produced at a time when more direct forms of testimony seem exhausted. If they document a soundscape, they also speak of the politico-

legal system that produces and frames it, so that we don't just hear the sounds of the Manusian jungle and the Pacific Ocean, but also Behrouz and Samad listening, six years into their captivity. Likewise, what we hear when we listen to Aziz cooking or Kazem showering is both the powerful normalcy of such activities and how their meaning is radically transformed by the violence of their setting. For Krauss, one task of the artist is to 'invent' and investigate the medium in question. What is the medium of this work? Not sound, not the platforms or technical infrastructure required to make Manus audible thousands of kilometres away and for posterity (WhatsApp, Dropbox, and wireless Internet of varying degrees of stability), but offshore detention itself. That is the 'condition of possibility' of *how are you today*—the dark logic that it sets out to condemn and explore.

By contrast, Susan Schuppli's *Listening to Answering Machines* is more concerned with artefacts, what they register or evidence, and how they can be made to speak.³⁶ It presents recordings from a collection of audio-tapes gathered by the artist from thrift stores following the transition to digital voicemail in the 1990s: an accidental archive encompassing details about both the people who owned the machines and all those who reached out to them by leaving their messages behind. No doubt they never contemplated their shared sonic intimacies might one day be sold off as mere detritus—the dead technological remains of domestic life—let alone make their way into a gallery. There is something uncomfortable but undeniably pleasurable—voyeuristic, for want of a sonic equivalent—about choosing to listen. Each

recording is a tantalising fragment of a life lived; a portrait in sonic miniature, full of real humour, affection, melancholy, and, above all, the profound ordinarieness of picking up the phone—today we would call them 'landlines'. They are, of course, increasingly few and far between. And the machines once attached to them—along with all the whirrs and beeps, and the unique forms of speaking and listening they ushered into being—are gone from our lives entirely. In the end, *Listening to Answering Machines* is more concerned with this now-obsolete medium than with the lives of the people on whom it allows us to eavesdrop. The medium is quite literally the message here. And it is only with the benefit of hindsight, and by virtue of Schuppli's careful gathering, that the real novelty of this medium comes into focus and its obsolescence can be processed.

Eavesdropper | Agent

Most legal histories of eavesdropping begin with the following definition from William Blackstone's *Commentaries on the Laws of England* (1769), one of the most influential texts in the common-law tradition.³⁷ 'Eavesdroppers', Blackstone writes, 'or such as listen under walls or windows, or the eaves of a house, to hearken after discourse, and thereupon to frame slanderous and mischievous tales, are a common nuisance and presentable at the court-leet.' (Fig. 3) Notice a few things here. Blackstone doesn't define the wrong of eavesdropping so much as the figure of the eavesdropper. Further, insofar as the eavesdropper presents a 'nuisance' worthy of censure, it is by

enue to any thatched or timber buildings, declared to be a common nuisance, by statute 9 & 10 W. III. c. 7. and therefore is punishable by fine. 7. *Eaves-droppers*, or such as listen under walls or windows, or the eaves of a house, to hearken after discourse, and thereupon to frame slanderous and mischievous tales, are a common nuisance and presentable at the court-leet: or are indictable at the sessions, and punishable by fine and finding sureties for the good behaviour'. 8. Lastly, a *common scold*, *communis rixatrix*, (for our law-latin confines it to the feminine gender) is a public nuisance to her neighbourhood. For which offence she may be indicted; and, if convicted, shall be sentenced to be placed in a certain engine of correction called the trebucket, castigatory, or *cucking stool*, which in the Saxon language signifies the scolding stool; though now it is frequently corrupted into *ducking stool*, because the residue of the judgment is, that, when she is so placed therein, she shall be plunged in the water for her punishment*.

6. IDLENESS in any person whatsoever is also a high offence against the public oeconomy. In China it is a maxim, that if there be a man who does not work, or a woman that is idle, in the empire, somebody must suffer cold or hunger: the produce of the lands not being more than sufficient, with culture, to maintain the inhabitants; and therefore, though the idle person may shift off the want from himself, yet it must in the end fall somewhere. The court also of Areopagus at Athens punished idleness, and exerted a right of examining every citizen in what manner he spent his time; the intention of which was[†], that the Athenians, knowing they were to give an account of their occupations, should follow only such as were laudable, and that there might be no room left for such as lived by unlawful arts. The civil law expelled all sturdy vagrants from the city: and,

* Kitch. of courts. 20.

† *Ibid.* 1 Hawk. P. C. 132.

* 6 Mod. 213.

* 1 Hawk. P. C. 108. 200.

VOL. IV.

* 2 Inst. 219.

† Valer. Maxim. l. 2. c. 6.

* Nec. 80. c. 5.

X

in

Fig. 3 William Blackstone *Commentaries on the Laws of England* 1769

virtue of, first, their location (under the 'eaves') and, second, what their listening yields ('slanderous and mischievous tales'), not the act of listening itself. This is why, from the end of the fourteenth century up to Blackstone, the eavesdropper was closely associated with two other figures: the 'common nightwalker' (nearly all men, connected with the 'vagrant') and the 'scold' (always women). Both were understood as posing problems of public order: the nightwalker because they were out after dark and thus liable to provoke a disturbance of the King's peace, the scold because their 'false tales' 'sowed discord ... controversy, rumors and dissension'.³⁸ Much the same could be said of the eavesdropper.

Though indictments for this cluster of offences had dwindled by Blackstone's time, that didn't stop the juridical figure of the eavesdropper travelling with his *Commentaries* to Britain's colonies, where it lay mostly dormant before being revived in the twentieth century in response to the emerging crisis of wiretapping. In *The Eavesdroppers* (1959), an influential text commissioned by the Pennsylvania Bar Association,³⁹ Dash et al. begin with Blackstone before moving on to distinguish wiretapping as a 'specialised form of eavesdropping'.⁴⁰ 'Electronic eavesdropping', they write, 'goes back at least one hundred years. Shortly after the telegraph came into existence and wires were strung from pole to pole, wiretappers were busy intercepting the coded communications.'⁴¹ As with Blackstone's eavesdropper, wiretappers were originally individuals: 'ordinary eavesdroppers', Dash calls them.⁴² It was only gradually that the figure would come to be associated,

first, with private investigators and corporate espionage; then, with surveillance by police, law-enforcement agencies, and secret agents; and, finally, with the algorithmic power of global megacorporations and the surveillance state.⁴³

(Fig. 4) Likewise, it was only in the nineteenth and twentieth centuries that eavesdropping shifted from being a public-order problem to primarily a matter of privacy and security.

As the enormous cache of documents leaked by Edward Snowden in 2013 showed, together, programs such as EVITAP, RHINEHART, VoiceRT, and SPIRITFIRE enabled the National Security Agency and its Five Eyes partners to use automatic speech recognition and transcription technologies, along with audio-fingerprinting techniques and targeted keyword searches, to analyse international telephone calls, media broadcasts, and intercepted audio and archival recordings at breathtaking speed and scale. Piggybacking on massive corporate platforms and private infrastructure, government eavesdropping that once required an actual person to do the listening could now be performed automatically, in bulk, with ever increasing precision. Today, eavesdropping is no longer simply electronic, but algorithmic.⁴⁴

But perhaps eavesdropping has always hovered between human and nonhuman, actor and actant, individual and system.⁴⁵ Look at Athanasius Kircher's 'Spionage-Ohr' (Spy Ear) from Book IX of his *Musurgia Universalis* (1650) on 'echotectonics' (the architecture of echoes).^(Fig. 7) The image proposes an extraordinary 'listening system' in which giant shell-like tubes puncture the thickly fortified walls of a building, allowing members of



Fig. 4 Susan Schuppli *The Missing 18½ Minutes* 2018. Tape equipment used to play White House Watergate conversations for the House Judiciary Committee, 1974.



Fig. 5 Nicolaes Maes *The Eavesdropper* 1657

the Royal Court to listen in on the plaza below. The funnels replicate in architectural form the physiology of the ear—a twisting and turning canal leading to a hypersensitive centre. Kircher speculated that the apparatus would ‘render any articulated sounds clearly and distinctly inside a room, no matter how distant from the outside, just as if it were next to the ear, with no one suspecting where it could come from’.⁴⁶ For anyone familiar with Jeremy Bentham’s famous panopticon devised over a century later in 1787, the similarities are striking. In both cases, the purpose is not just to surveil but to discipline: to ensure that those under surveillance understand that what they do can be seen and what they say heard.⁴⁷ Already in 1650, Kircher was imagining a technique of power that, following French philosopher Peter Szendy, we might call ‘panacoustic’.⁴⁸ Who or what is the agent of the eavesdropping here? One of the things this image does so brilliantly is stage the relationship between the eavesdropper and the systems, structures, and architectures on which they depend. Indeed, what it suggests is the impossibility of ever really holding these apart.

The relationship between these two different dimensions of agency is also brilliantly illustrated in Sean Dockray’s video *Learning from YouTube*. Dockray superimposes an open Google Chrome ‘window’ containing a YouTube video of himself talking into a Google Home Assistant onto Nicolaes Maes’s famous painting *The Eavesdropper* from 1657. (Fig. 5, 6) There are no ‘eaves’ here, no ‘eavesdrop’ either, but there is plenty of architecture, along with all the thresholds of audibility and structures of listenership,

visibility, and invisibility entailed. There are walls and doorways, interiors and exteriors, rooms and windows 'real' and 'virtual', networks not only of corridors but also of cabling, stretching out from homes under roads and seas to vast data centres in deserts.⁴⁹ In Maes's painting, a young woman, in search of her maid, catches herself short in the staircase to listen, as the maid is led off by a well-dressed man. She looks directly at us, her finger raised to her lips, implicating us in the scandal.⁵⁰ The Google Home Assistant (whose voice we recognise as female) listens as the artist (a man) narrates a story about algorithmic listening and the novel forms of power it helps inaugurate. His own voice is led off immediately by the assistant for processing somewhere far away. It has also been recorded and uploaded to YouTube for analysis by the very automated system the work explores. Google's Audioset is an 'expanding ontology of 632 audio-event classes and a collection of 2,084,320 human-labelled 10-second sound clips drawn from YouTube videos'.⁵¹ The purpose is to train the company's 'deep learning systems' in the hope that, someday soon, they will be able to 'label hundreds or thousands of different sound events in real-world recordings with a time resolution better than one second'.⁵² Together, so-called 'personal assistants' (a phrase so evidently intended to ingratiate them into our homes) and YouTube are just kindergarten for a potentially enormous corporate listening apparatus—an algorithmic 'panacousticon'—the effects of which we should not expect to be benign.

If Dockray's work is about a form of eavesdropping whose agency is distributed and diffuse, Lawrence Abu Hamdan comes closer to

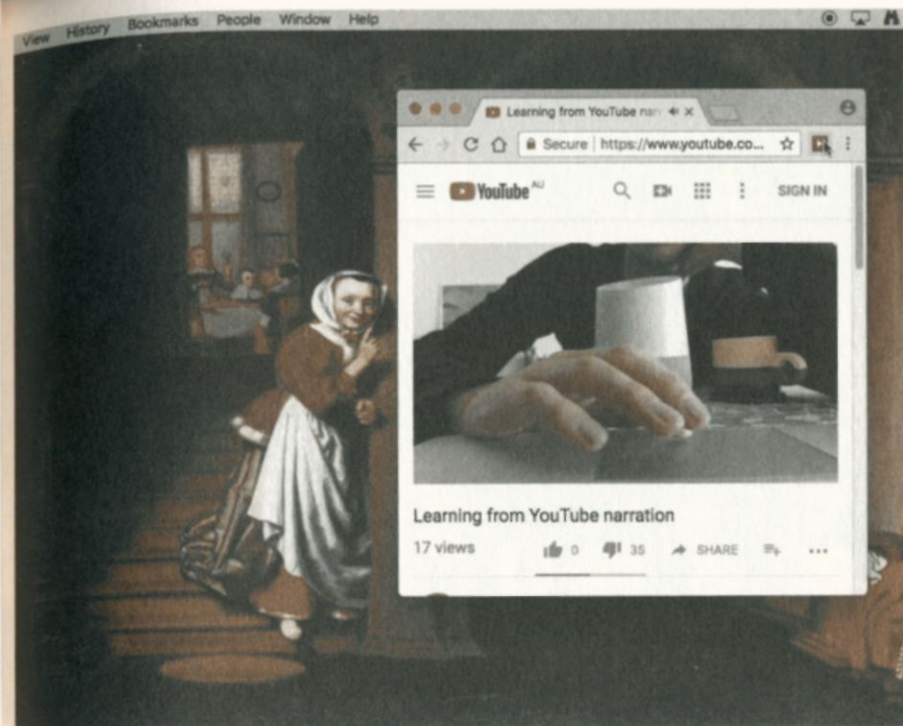
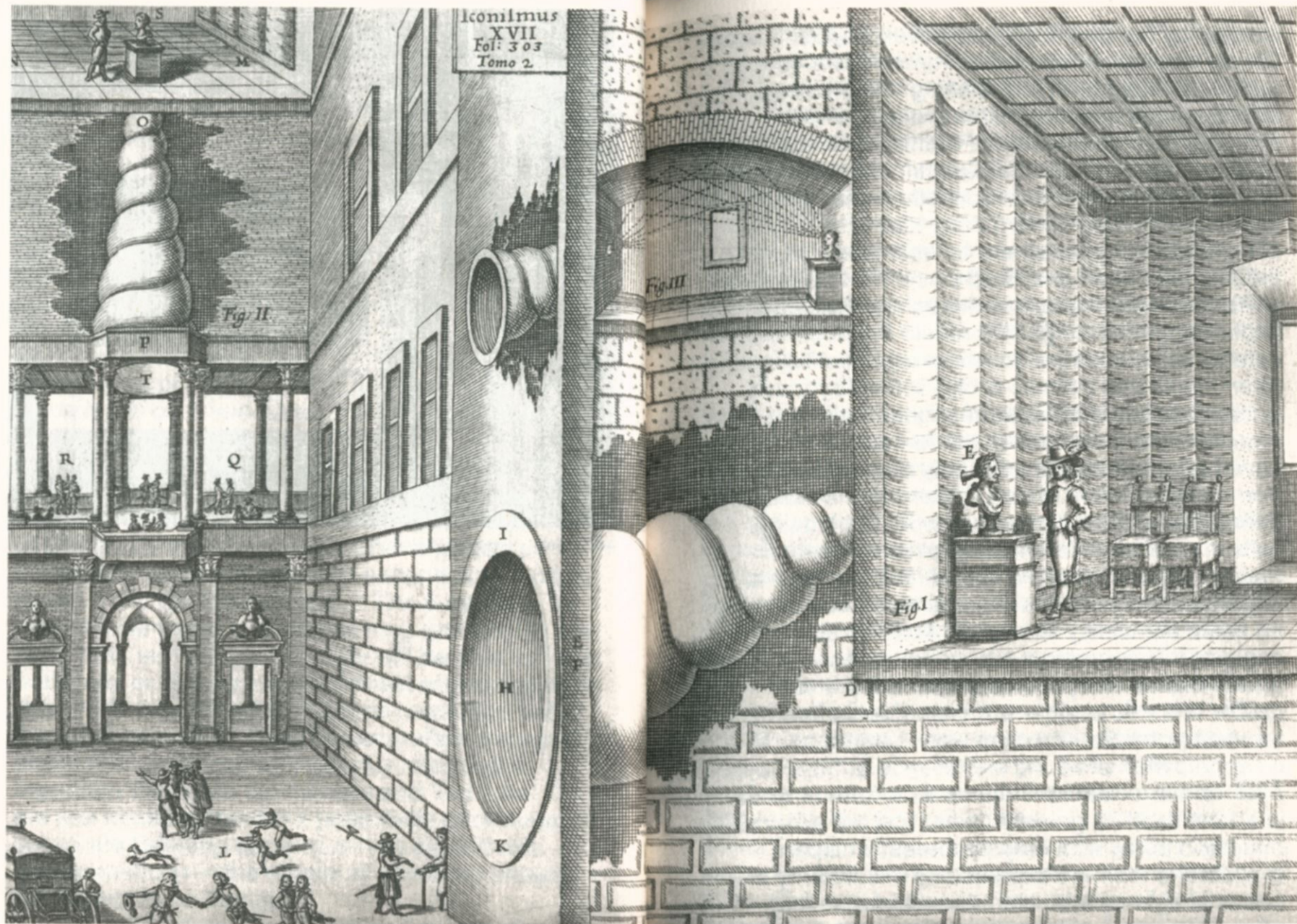


Fig. 6 Sean Dockray *Learning from YouTube* 2018



Eavesdropping

Fig. 7 Athanasius Kircher *Musurgia Universalis* 1650.
Image: University of St Andrews Library, Fife, Scotland

occupying the position of the eavesdropper himself. On his website, he describes himself as a 'private ear'. And *Saydnaya (The Missing 19db)* comes directly out of a collaborative project between Amnesty International and Forensic Architecture, a research agency based at Goldsmiths, University of London.⁵³ The work is an acoustic investigation into Saydnaya Military Prison, thirty kilometres north of Damascus, Syria, where an estimated 15,000 people have been executed since 2011. Like many of Abu Hamdan's projects, it appropriates and expands upon a range of forensic methods and categories of doctrine on which legal institutions often like to claim a monopoly. Since Saydnaya is inaccessible to independent observers and monitors, the memories of the few survivors to have been released are the only resource available from which to learn of and document the violations taking place there. Since they were kept in tiny cells in near total darkness and risked death if they so much as made a sound, that memory is largely auditory. 'In this silence, detainees develop an acute sensitivity to sound', Abu Hamdan explains. 'The constant fear of an impending attack makes every footstep sound like a car crash.' It is this acuity—both its violence and its forensic potential—that the work centres on. The weaponisation of sound and silence at Saydnaya, Abu Hamdan claims, amounts to 'a form of torture in and of itself', a gradual assault on the prisoner's mind and body, with only the barest whispers available to them as expressions of solidarity or acoustic agency. Abu Hamdan estimates that, after 2011, the audible range over which Saydnaya detainees could safely project their voices was as little as twenty-six centimetres, so that the distance

between prison walls is hardly the only measure of their confinement. The work also documents how the whispers became four-times quieter after 2011, when anti-government protests began and conditions at Saydnaya worsened significantly. Through careful interrogation of survivors' testimony, Abu Hamdan discerned a nineteen-decibel drop in the capacity to speak, which stands as a testament, he suggests, to Saydnaya's transformation from a prison to a death camp. We could understand his account as eavesdropping by proxy—the result of Abu Hamdan's listening to their listening, to which we are invited to listen in turn.

In Fayen d'Evie's *Cosmic Static*, made with Jen Bervin, Bryan Phillips, and Andy Slater, listening is measured in light years, not centimetres. And though the eavesdropping is astral rather than earthly, questions of agency are still at stake. The work deals with the ancient human impulse to cast our ears upwards to the heavens, a desire at least as old as the Pythagorean obsession with the 'harmony of the spheres' (which was always also a concern for natural law—the fusion of cosmos and nomos—since to know the universe would be to know order itself). But the work is also concerned with human/nonhuman relations, and what it would even mean to know that a non-human agency had been detected through the cosmic static. At its heart is the story of amateur radio operator Grote Reber, who succeeded in detecting this static in 1938, using a parabolic antenna built in his Chicago backyard. Two bodies of field recordings are sampled; one from Tasmania, where Reber moved in 1954 and constructed antenna farms by stringing wires across sheep-

grazing lands, and the other from the Grote Reber Museum at the University of Hobart's Mount Pleasant Radio Observatory. Another narrative collages fragments from the history of extraterrestrial listening, including field recordings at SETI's Allen Telescope Array in Hat Creek, California, where a small staff maintains forty-two small dishes, searching for anomalous stellar and interstellar signals. A third story explores the research of SETI astrophysicist Laurance Doyle, who studies the language complexity and signal transmissions of nonhuman species—from plant-insect communications to monkey whistling and baby-dolphin babbling—to develop methods of discerning intelligent extraterrestrial signals amidst the galactic noise. The experience of listening—as a form of searching—is replicated in the gallery. The multiple narratives of *Cosmic Static* are distributed across an array of conventional and hyper-directional speakers, inviting the listener to scan the space and position themselves in the path of one signal or another. We are caught and led by our listening, not to some ideal position, but into a field of play constantly in flux. As the artists explain, quoting Reber's diaries, local children appropriated his telescope for climbing bars, and signals were occasionally disrupted by animals engaging with tuner boxes beneath the antenna. Alien intelligences are not the only nonhuman agents implicated in this listening. When Grote Reber died, his body was cremated and boxes of his ashes were distributed to radio observatories around the world, where they were affixed to the rims of the parabolic dishes that listen out for extraterrestrial signals to and through the cosmic static to this day.

Eaves, eavesdrop, eavesdropper. Threshold, medium, agent. Eavesdropping is the composite of these elements, both in and out of the gallery. Our project is to enliven and expand eavesdropping as a critical and aesthetic practice. Compiled by and with the artists, the chapters that follow address key works for those interested in the ethical, legal, and political dimensions of listening that have not been significantly addressed in any of the major institutional surveys of sound art to date. Not all the works in the *Eavesdropping* exhibition are represented. The show also includes Lawrence Abu Hamdan's *Rubber-Coated Steel* (2016) and *Conflicted Phonemes* (2012), Susan Schuppli's *The Missing 18 1/2 Minutes* (2018), and Sean Dockray's *Always Learning* (2018). Moreover, many related performances, lectures, and workshops are not included, but certainly informed this book. Details and documentation can be found on the project's website (<https://eavesdropping.exposed>), which we will update with the project's future iterations. For now, we hope this book goes some small way towards opening up the ethics, law and politics of listening as a field of investigation in the arts and beyond. Eavesdropping is not just a matter of listening in, out or back, therefore, but also of listening forward.

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5. Geoffrey A. Fowler, 'Alexa Has Been Eavesdropping on You This Whole Time', *Washington Post*, 6 May 2019, www.washingtonpost.com/technology/2019/05/06/alexa-has-been-eavesdropping-you-this-whole-time/?utm_term=.f9153f5085f9.
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Cosmic Static
Fayen d'Evie and Jen Bervin
with Bryan Phillips and Andy Slater

Cosmic Static is a collaboration between myself and Jen Bervin that came out of a shared interest in sensory writing, embodied reading, and extraterrestrial listening. As part of Bervin's artist residency at the Search for Extraterrestrial Intelligence Institute (SETI), we collaborated with sound artists Bryan Phillips and Andy Slater, scientists Laurance Doyle, Jim Palfreyman, Jon Richards, and Jill Tarter, and artists Justy Phillips and Margaret Woodward (A Published Event) to create the work for *Eavesdropping*.

Cosmic Static experiments with the dynamics of dissipated and concentrated listening using narrative fragments from the history of extraterrestrial listening. Ultrasonic projections of field recordings and stories of scientists dedicated to listening for extraterrestrial signals are filtered through a sculptural element—a repurposed copper radio-telescope feed once used to search for anomalous stellar and interstellar signals at SETI's Allen Telescope Array (ATA), in Hat Creek, California. As the audience moves within and around ultrasonic beams, encountering discrete phrases at some moments and wandering into polyphonic disturbance at others, each body listens in on a different poetics and collectively activates the kinaesthetics of close listening in community.

I am blind-ish or quasi-blind—to adopt terms suggested by artist Jennifer Justice and xenolinguist Sherri Wells Jensen respectively (distilled from a spirited discussion of alternatives to ableist categorisations like 'the visually impaired'). One trajectory of my art practice deals with blindness as a critical position, and another with writing, reading, and publishing.

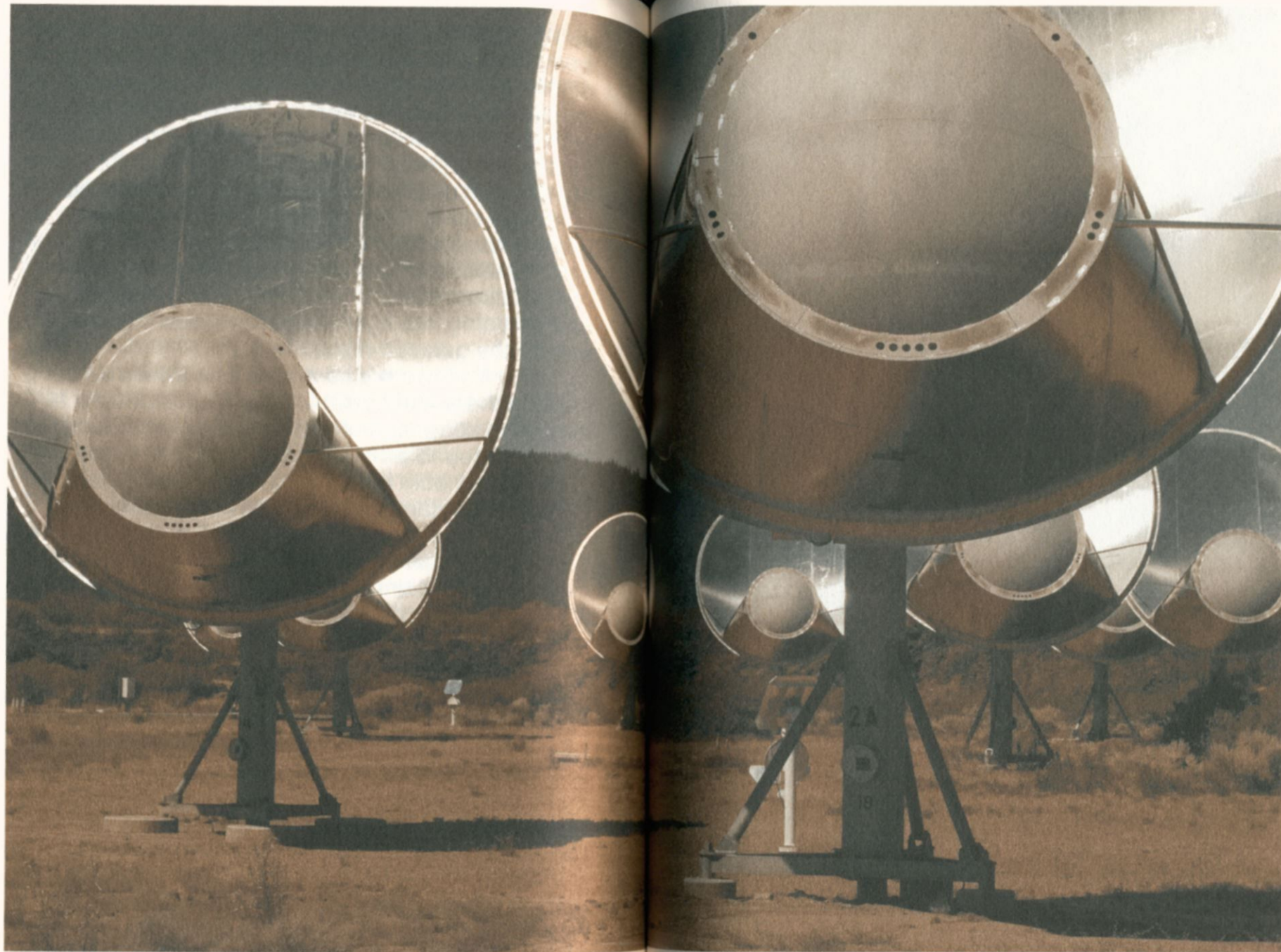
My collaboration with Bervin has afforded me an opportunity to think between and across these territories. One of the scholars who has influenced my contribution to our work is Tanya Titchkosky. Through a close reading of Audre Lorde's essay 'Eye to Eye', she observes that an array of cultural processes conspire to treat disability as a signifier of limits or ends to the body. She suggests that, by investigating the subjective and intersubjective assigning of peripheralities, we may learn something about interpretive relations to embodiment and how individuals and communities define humanity. By reconceptualising peripheralities as critical positions, I propose that we may reach beyond normative biases and inhibiting definitions of humanity, invoking new forms of choreopolitical resistance and transformation. During my conversations with Bervin, I have been provoked to think about how we use language, and how audiences can be invited to experience dematerialised texts by blundering—blindly stumbling in search of story.

The stories encountered in *Cosmic Static* include the exploits of Karl Jansky, who detected mysterious star noise in 1931, and Grote Reber, the founder of modern radio astronomy. Reber built the first parabolic antenna in his Chicago backyard in 1937 to listen to radio emissions from outer space. He succeeded in detecting cosmic static in 1938. For a decade, he maintained a lonely vigil listening for extraterrestrial signals. In 1954, he moved to Tasmania—where the ionospheric density is low—in search of quieter skies. The work also includes field recordings from SETI'S ATA, from the Tasmanian landscapes (where Reber constructed antenna farms by

stringing wires across sheep-grazing lands), and from the Grote Reber Museum at the University of Hobart's Mount Pleasant Radio Observatory (where radio astronomer Jim Palfreyman first recorded the Pulsar Vela glitching in 2018). Finally, the work explores the research of SETI astrophysicist Laurance Doyle, who studies the language complexity and signal transmissions of non-human species—from plant-insect communications to monkey whistling and baby-dolphin babbling—to develop methods of discerning intelligent extraterrestrial signals amidst the galactic noise.

The two sound artists who joined us in crafting the audio narratives for *Cosmic Static* also have connections to blindness. Andy Slater is a blind sound artist based in Chicago, where Grote Reber built his backyard antenna. Bryan Phillips is ocularnormative but has collaborated with me over several blindness-led exhibitions, transfiguring audio description as a creative, ekphrastic medium. Reber was not blind, but was profoundly deaf. The Tasmanian museum dedicated to archiving his life and legacy includes a display cabinet of his hearing aids. When we first exhibited *Cosmic Static* in Melbourne, I was troubled by the inaccessibility of our dustcloud of narratives to deaf audiences. This publication has allowed us an opportunity to redress this absence. Through the parallel presentation of transcriptions of the audio narratives, we offer a reading via textual blundering.

—Fayen d'Evie





Cosmic Static

Fig. 20 Fayen d'Evie and Jen Bervin with Bryan Phillips and Andy Slater *Cosmic Static* 2018. Photo: Bethany Woolfall

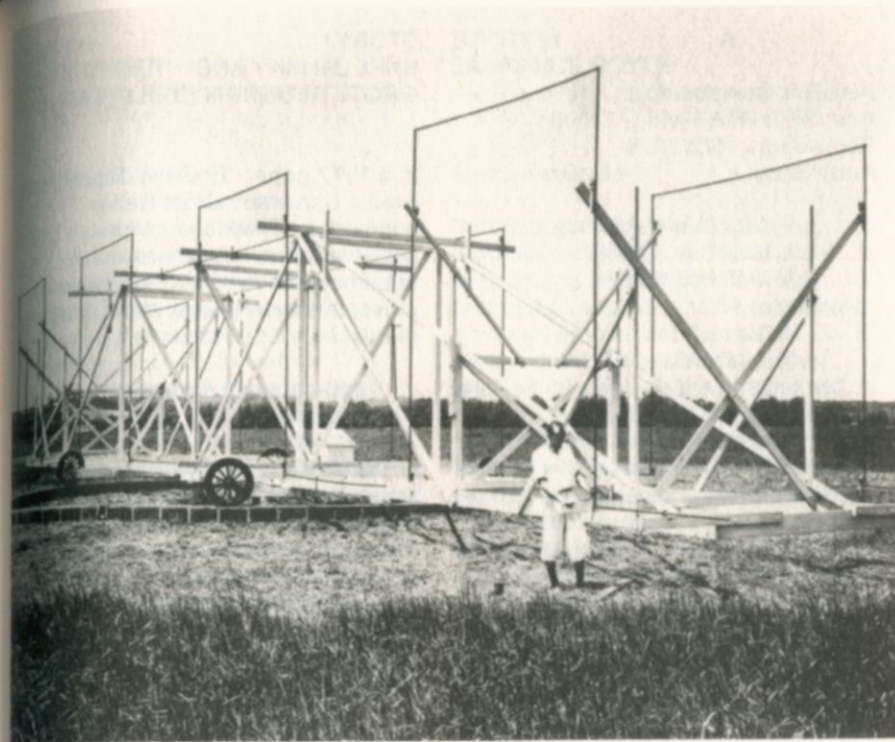


Fig. 21 Karl Jansky and his Merry-Go-Round, Holmdel, New Jersey, 1933. Image: National Radio Astronomy Observatory, Charlottesville VA

Ambient Composition
from SETI ATA Field
Recordings 16/2/2018
Andy Slater

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STORY I
KARL JANSKY AND
GROTE REBER^{1,2}

In a 1977 paper, 'Endless, Boundless, Stable Universe', Grote Reber concluded, 'Time is merely a sequence of events; there is no beginning, nor ending. The material universe extends beyond the greatest distances we can observe ...'

In 1928, twenty-two year old Karl Jansky joined Bell Telephone Labs, and, due to his weakened kidneys, requested work that would not exert undue pressure upon him. Jansky was tasked with recording the arrival and intensity of radio static that might interfere with transatlantic telephone transmissions.

In Holmdel, New Jersey, Jansky built a directional rotating antenna made of three-quarter-inch brass pipe, mounted on a wooden framework supported by Ford Model-T tyres, and connected to a small motor, so that the array made a complete revolution every twenty minutes. His workmates called it Jansky's merry-go-round. In the middle of August 1931, Jansky began recording.

'From the data obtained, it is found that three distinct groups of static are recorded. The first group is composed of the static received from local thunderstorms in storm centres. The second group is composed of very steady weak static ... from thunderstorms some distance away. The third group is composed of a very steady hiss-type static, the origin of which is not yet known.'

For over a year, Jansky analysed and repeated his recordings, accumulating data.

STORY II
GROTE REBER
AND JIM PALFREYMAN³

Grote Reber

We are dealing with the electromagnetic waves from the cosmos, or literally cosmic rays. Robert Millikan appropriated this terminology in about 1925 for a phenomenon which is neither cosmic in the sense of originating beyond the solar system, nor a ray at all. So, I decided to call these radio waves from Mother Nature Cosmic Static. This honours the original purpose of Jansky and tracking local thunderstorms. Peculiarly enough there may be some truth in the name cosmic static. The origin ... of part of these natural radio waves probably is due to randomly moving electrons interacting with magnetic fields in space.'

At this point, this massive supernova explosion is where most of the heavier elements are made ... In fact, the carbon that's in your right arm probably came from a different supernova than the carbon in your left arm. Most of the things you see around here were made in supernova explosions, except for gold and platinum ...

'If the star is massive, bigger than eight solar masses, it's big enough to go supernova and the remains collapse down. What we have is an object so dense, it has an escape velocity greater than the speed of light, collapsed into a black hole.

If we get this Goldilocks-sized star somewhere between five and eight solar masses, it's big enough to go supernova, but not big enough to

Laurance Doyle

'Information theory is a type of mathematics that was developed at Bell Labs to calculate how big telephone lines need to be to transmit a certain amount of information across them. They also developed analysis of static on the phone line.'

'There's kind of a subdivision of information theory called Zipf's law. He was a linguist around 1950 or so. He had his students log the frequency of the occurrence of different letters and words in an average novel. And ... if you plot on a logarithmic scale the frequency of occurrence of the letters in the book *Ulysses*, you get Es occurring most of the time, then As, then Ts, and then the Qs, which occur the least number of times ... and then, if you plot them in that order, you get a forty-five-degree line that goes through all the points: the minus-one slope. Then he does Russian phonemes and they give a minus-one slope. And he does a Chinese book: minus one. He did a whole bunch of languages and they all come out with this minus-one slope.'

'Somebody else later did baby babbling, not quite horizontal, but more flat than the minus-one Zipf slope ... So it basically shows they do not actually have a language, which the minus-one slope indicates. By the time they're about twenty-two months old or so their communication system has the right frequency of occurrence distribution of the signals to give the Zipf slope minus one.'

'Brenda [Dr Brenda McCowan] had done some research with bottlenose dolphins at Marine World and she gave me her paper. The

[illegible]

'... the direction of arrival of this disturbance remains fixed in space, that is to say the source of this noise is located in some region that is stationary with respect to the stars from some source outside the solar system. The direction from where the waves seem to come ... is very near the point where the line drawn from the sun through the centre of the huge galaxy of stars and nebulae, of which the Sun is a member, would strike the celestial sphere. The coordinates of that point are approximately right ascension of seventeen hours thirty minutes, declination minus thirty degrees (in the Milky Way in the direction of Sagittarius).'

On 5 May 1933, a headline at the top of the front page of the *New York Times* announced, 'New Radio Waves Traced to Center of the Milky Way: Mysterious Static Held to Differ From Cosmic Ray, No Evidence of Interstellar Signalling.' A week later, the *Times*' 'Week in Science' column reported: 'Karl G. Jansky ... has been studying static, disturber of the radio peace. The Earth's atmosphere is highly charged with electricity. When the tension becomes too great, there are flashes between cloud and cloud, and between cloud and earth, and hence the crashes, the sputtering, and frying that we hear in our radio sets when there is a thunderstorm ... The ether, still a convenient assumption despite the disrepute into which it has fallen ... may be likened to a wonderfully responsive instrument that has a range of sixty octaves ... As in a case of a piano, the deep notes of the ether are produced by slow vibrations, and the high notes by the very fast ones—thousands in the one case and many quintillions a second in the other ... The physicist

form, an object that turns into a black hole. What we get is a neutron star. The gravity is still incredibly intense; it's so strong that it can force the electrons into the nucleus of the atom and basically removes all the space from the atom, and the electrons combine with the protons to form neutrons. It's incredibly dense; a cup full of this stuff would weigh as much Mount Everest.'

'Just like an ice skater would pull their arms in on the rink when they're spinning, they speed up. This big star has collapsed down to twenty kilometres across. It speeds up and spins quite quickly ... When they're first born, we think they spin at around fifty times per second and they gradually slow down with time. The Vela pulsar that we're going to listen to today ends at eleven times per second. It had its supernova about ten thousand years ago ...'

'It was quite close; one-thousand light years, but still close. Those neutron stars are a massive magnet and it was three trillion times the magnetic field we're sitting in right now—the Earth's magnetic field is incredibly strong. But out of the pulse of these magnetic fields comes electromagnetic radiation. So, we've got our object and it's spinning like this. The radiation's coming out here like a little beam of light and as this turns, if it happens to pass in front of Earth, we see a brief flash on each rotation. If we see that, it's called a pulsar.'

Very soon after the first pulsar was discovered, the Vela pulsar was discovered in an observatory just outside Canberra, at the Molonglo Observatory, and it turned out to be the brightest pulsar in the sky.

The pulsar's spin is gradually slowing down—very gradually, not much, gradually slowing down—and then once every three years (and we

paper included, just incidentally, in one of the tables, the frequency of occurrence of the different dolphin whistles. So I had this idea, well, I wonder how close to Zipf slope they come. So, I plotted it, and it gave a minus 0.95, in other words a minus-one slope. And I went and had a cup of tea, because I thought "This is a moment." And then I did it again and I got the same result. And I called Brenda and she said, "I'll be right there." So, we basically had this idea of introducing Zipf's law, and information theory in general, into animal communication studies.'

'So then these two baby dolphins were born at Marine World, and Brenda recorded them. And they were babbling. The distribution of their sounds landed exactly with the same slope as baby babbling, so we knew that they were not born with their language. And, by the time they're about eighteen-months, these little guys were obeying Zipf's law. So we figured that they had matured into the modern adult bottlenose-dolphin voice language.'

'Then the idea occurred to me ... being an astrophysicist more than an animal-communications person, I was thinking what is the most complex kind of star? Well, there are neutron stars that rotate, and they're called pulsars, and there are thousands of them in the galaxy. They were called LGMs when they were first discovered, which stands for Little Green Men. Well, what if I take the most complex star I can think of [pulsars] and do a Zipf plot of its pulses, with each pulse as a signal? So I did that, and it was -0.7. In other words, if you're doing an extraterrestrial search for intelligence, an intelligence signal cannot be confused with even the most

[illegible]

strikes the lowest key on this sixty-octave ethereal piano. And the key is a great terrestrial, transatlantic radio station ... As he plays higher on his ether piano, the physicist obtains shorter and shorter radio waves ... and not until he reaches a wavelength of 14.8 metres does he hear the stars sing ...'

Jansky pursued his study of star noise, publishing 'Electrical Disturbances Apparently of Extraterrestrial Origin' (1933), 'Radio Waves from Outside the Solar System' (1933), and 'A Note on the Source of Interstellar Interference' (1935). But, despite the early flurry of public excitement, in 1938 Jansky ceased his study of star noise. His supervisor recalled: 'More than five years had passed since he made his epochal discovery and not a word of encouragement to continue his work had appeared from scientist or astronomers ... Karl would have needed a large steerable antenna to continue his work, and such antennas were unknown to us at that time. Radio astronomy, as such, did not then exist.'

And then Jansky, like all the Bell Labs radio engineers, was swept into constructing radars for the war.

Grote Reber

In Wheaton, Illinois, lived a young amateur radio enthusiast, Grote Reber, a self-confessed DX addict: D for distance, X for unknown; DX, the hobby of listening to distant radio stations. Late at night he scanned for radio signals, but 'after contacting over sixty countries, there did not appear to be any worlds to conquer'. But Jansky's publications had alerted Reber to a new frontier—galactic radio signals.

can't predict it), it suddenly speeds up. We're not talking about a lot here; three parts per million. But we time these things with atomic clocks and some of these pulsars are as accurate as atomic clocks. So three parts of a million is huge. It's like coming home and finding your clock is an hour fast for no apparent reason.'

Grote Reber

All known pulsars are within our Milky Way. When a pulsar is discovered in a neighbour galaxy, the dispersion of pulse will give some idea of the density of free electrons between the galaxies ...'

Jim Palfreyman

it's called the dispersion measure. And these fast radio bursts—the first one was discovered at least ... had a very high dispersion measure, which said it was not from our galaxy; it was from another galaxy. These flashes, they started finding more. We sort of just went trawling through the data. They've built various telescopes to try and catch them live. So we don't actually know what the cause of these things is, and, of course, the speculation is that it's alien laser beams ... used to push objects in space with light, and it could be an alien structure doing that ... It's probably not (laughs). It could be objects colliding. We do have one fast radio burst. It repeats. So that means it's not a single cataclysmic event. So that could be a pulsar, but only [inaudible] bright pulsars occasionally that we can see, and we just can't see the others.'

(footsteps on gravel)

complicated and well organised star system.'

'Brenda has invented a way of classifying signals that has stood the test of time over the past several decades. It's called the K-means cluster 60-point analysis and basically it looks at the contour of the signal. A signal could be a sonogram from a dolphin whistle, or it could be a pulse from a pulsar. And it turns out the Vela pulsar, which is the one we were using, gave four kinds of pulses that have different contours. So, we took those, only four signals, and we plotted those in terms of the frequency of occurrence and got the slope. And the slope did not obey Zipf's law. So in other words pulsars are not sending out intelligent signals ...'

'SETI has up until now said: we're going to look for a radio transmitter ... Our work introduced a new aspect of analysis which is: let's examine the message itself instead of just the carrier waves ... Instead of asking is there a transmitter, we ask is there intelligence in the message by looking at Zipf's law and channeling entropies. What gives minus one is humans, bottlenose-dolphin whistles, and humpback-whale vocalisations; and squirrel monkeys give about a minus point seven; ground squirrels minus point three. I would say that close to half the animal-communications people are now using information theory.'

'Up in Alaska, we recorded humpback whales, under the conditions of noise from boats and then the absence of noise, and I could calculate the channel capacity. In this case, it really was a channel. It wasn't just talking about a wire, and the static in the wire that Bell Labs developed

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B

Ambient Composition
from Tasmania Field
Recordings 9/7/2018
Bryan Philips

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Cosmic Static

'It was obvious that K.G. Jansky had made a fundamental and very important discovery. Furthermore, he had exploited it to the limit of his equipment's facilities. If greater progress were to be made, it would be necessary to construct new and different equipment especially designed to measure the cosmic static. I decided to do the job myself'.

Reber lived with his mother in a Wheaton suburb. In their backyard Reber constructed the world's first parabolic telescope. The skin was twenty-six-gauge galvanised iron and forty-five pieces of pipe, nine on the inside and thirty-six on the outside. These were supported on seventy-two radial wooden rafters cut to a parabolic curve. 'It is essentially a radio-type meridian transit that collects high frequency energy from space in a parabolic mirror, reflects the energy to an antenna within a drum, and feeds it to a wide-band high-frequency radio receiver.' The 'mirror usually emitted snapping, popping, and banging sounds every morning and every evening. The rising and setting sun caused unequal expansion in the skin and the various pieces would slip over one another until equilibrium was maintained.'

'After a few months, the novelty of my dish wore off on the local townspeople. It was like any other local monument, such as City Hall, a water tower, the county building, or a church ... However, several times a week, a car would stop and the occupants would stare and gawk at the dish. These were strangers. A few got out and took pictures. A very few would ring the doorbell and enquire as to the nature of my device. I considered placing a

Fayen d'Evie and Jen Bervin Talk, near the Former Site of Grote Reber's Bothwell Array

Because ultimately, we've travelled a long way to look for something we know is not here ...'

'That was trying to measure something that's not here.'

'I keep thinking of the SETI scopes; you know? Moving the array, pointing it towards somewhere, waiting for a moment for some signal, moving it away, pointing it elsewhere ... And most of that time not getting any kind of leads ... and it feels a little bit like that [laughs].'

'In some ways his correspondence too is like that.'

'Trying to find a signal that was sent a long time ago.'

'A long time ago, like light years a long time ago; like a thousand light years away. That's the pulsar we were discussing.'

'But I also mean trying to find a signal from him [Grote Reber] from even twenty years ago, forty years ago, sixty years ago. Like all these kinds of moments where he crossed time in places where we enter ... And you get these signals, but are they really anything meaningful?'

'I think we should interview a sheep.'

'They do run away though. I tried to go close before ... A really old sheep.'

'Exactly. [Laughter]'

Grote Reber

I arrived in Sydney on 1 November 1954 aboard the Orion, with ten cases of electronic apparatus in the hold.'

On sheep-grazing fields at Kempden, Grote Reber constructed an array of antennas from poles and

this equation for. I compared vocalising humpbacks with noisy vocalising humpbacks in the presence of boat noise. And I calculated—pretending boat noise is static and the icy straight is a wired channel ... I calculated how much the humpback whales would have to slow down to make sure that their message gets to the other humpbacks. And they were only slowing down about sixty percent of what they needed to, to ensure the transmission of the message. That was kind of strange, because like, well, they're going to miss forty percent of the message. How can they do that?'

'I was pondering that a couple of weeks later. I got a paper from the copy machine and I got back to my desk and a lot of words were missing because the copier was low on toner. And I realised that's what the humpback whales were doing. They're kind of getting the gist of it, because they have grammatical and syntax rules ... so I went looking for conditional probabilities between the signals ... So we discovered that there are internal structural rules within humpback-whale communication systems, and they use it for error recovery.'

'Humpback whales have a global communication system that's millions of years older than ours. They use tools; they build bubble nets to catch herring in. And it takes a coordinated effort. The humpback whales who do bubble net are not family. They're not necessarily related. It's based on skills. I think humpback whales are the only known species, besides humans ... that have long-term relationships based on ability. Some humpback whales start to blow ... and, by circling around and around, they create this cylinder of bubbles, and

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jukebox out front with a sign, "Drop a quarter in the slot and find out what this is all about." Longfellow Grade School was only a block away. Frequently, after school, some of the larger children would use the telescope as climbing bars. The overhang of the dish prevented the kids from running around on top. When it was parked in a vertical position during a rainstorm, large quantities of water would gush through the hole in the centre. This led to rumours that the device was for collecting rain or control of the weather.

'During the 1930s, air-navigation rules were very lax or non-existent. The dish must have been a spectacular curiosity from the air. Often, small planes would circle around, over, and back-and-forth repeatedly. At least three times these private planes were active when I had the dish turned far south and I was at the top of the service tower. The first time I had a rather frightening experience when a motorcycle seemed to be coming up out of the ground at me, right through the centre of the dish. Actually, a small plane was flying up the beam. Obviously, the dish had good acoustical properties.'

Throughout the spring and summer of 1938, Reber swept the sky surveying for signals at 3300 megacycles. 'The antenna was parallel to the celestial equator ... Various parts of the Milky Way, Sun, Moon, Jupiter, Mars, and several of the bright stars, such as Sirius, Vega, Antares, etc., were all examined ... Some small irregular fluctuations were encountered, but no repeatable results were secured which might be construed to be of celestial origin.

wire. 'Put up building on foundations and spent an hour looking for an empty cable spool, which was lost on the 23/06/56, southwest of post A, down slope, probably in a clump of grass, which will have to be burned off before the spool can be seen. Made two rock cairns to north of [inaudible] along top of east ridge. These marked possible sites for east ends of two additional spans across valley. All very speculative at present state of affairs.'

Throughout the period of observations Reber encountered many problems with the equipment. This included the occasional contact between animals and the tuner boxes located beneath the antennas. After the observations had ended and the equipment was finally being removed, Reber noted in his diary, 'Did not wind clock.' It is a matter of conjecture as to whether Reber ever came to accept that Kempden produced little or nothing in terms of useful results.

The original 1956 shed was moved to the Dennistoun property and used as a playhouse by Neil Johnson's children. It was later used as a storage shed, but sadly it fell into disrepair and was demolished in the late 1990s. No record has yet been found of the eventual fate of the second shed. The eastern pole for Antenna 4 was eventually cut up by Tim Johnson, the current owner of the property and used as firewood ... However, several artefacts remained at the site. The western pole for Antenna 3 fell in about 2002. It remains on the ground where it fell with many of the original footholds still in place and is just resolvable on Google Earth images. Other artefacts that have been found on the ground include stay wires, insulators, loose

the other humpbacks coordinate to chase the herring through vocalisations into the bottom of this cylinder made of bubbles. And as the whole thing rises they make noises at the bottom and it scares the herring up to the top and you start to see this bubble net hit the surface that's about a hundred feet across. The herring try to go out the side, but when they hit the bubble they drop, and it's really unpleasant, so they dart back in, and then it's all over for them. The fish come flying out of the water and then you see these huge mouths. And then you see seagulls doing the mop up.'

'An animal will make as complex a communication system for error recovery reasons as it can handle. Human languages go up to ninth-order word entropy. And, what that means is that, if you're missing a word, you can fill it in from the context, then the rule structure. If you're missing two words, the probability of you getting the right word goes down, but it's still possible to recover missing words. If you're missing nine words, that's just barely a non-random possibility of recovering missing words. But, if you're missing ten, you might as well pick the word out of the dictionary, because human language doesn't extend its syntactic influence farther than nine words away. We say, okay, well, how many signals can you do error recovery for a dolphin? Well, maybe five. And in humpback whales, we don't know: not enough data. And squirrel monkeys: two. There's a direct measure of the rule structure which allows error recovery. It also may be a direct measure of the complexity of the language.'

'Some anthropologists say that our social complexity led to

[illegible]

Cosmic Static

All this was rather dampening to the enthusiasm.'

As war broke out across Europe, Reber tinkered with his apparatus to heighten sensitivity. With the fine tuning, 'all kinds of manmade disturbance could now be heard which were before not known to exist. During the day, no worthwhile results could be secured because of the multitude of automobiles. This disturbance leaked into the drum from the back around the edge of the mirror ... After 10pm, disturbances quietened down, and observations were made in earnest.'

'It was now apparent that cosmic static from the Milky Way had really been found and it was of substantial strength, especially to the south ...' But automobile-ignition sparking continued to plague Reber, shifting the velocity potential of the antenna's 953 diode after 'each objectionable vehicle went by'. Yet he was not deterred: 'The above success ... whetted my appetite on the basis of "If a little is good; more is better."

Reber decided to attempt a radio survey of the sky. 'The first manmade electronic interference appeared during this survey. It was caused by badly adjusted IFF transceivers in aeroplanes. The squitter could be heard for ... miles when the plane crossed the antenna acceptance pattern.' But the interference only came from a few private planes and these rarely flew at night. Around two-hundred charts were obtained through 1943. Reber plotted the results on a flattened globe—contour maps of cosmic-static intensity across the celestial sky. The centre of the disturbance was the constellation of Sagittarius with minor maxima in

footholds, and some remains of all four eastern antenna supports.

If a person cannot hear, smell, feel, or see an object, this object does not exist. Only recently has it been realised, even among the scientific community that, "Absence of evidence is not evidence of absence."

Grote Reber decided to build a more elaborate structure out of poles and wire. 'A large flat open area away from manmade electrical interference was needed. By good fortune I contacted a sympathetic landowner whose Dennistown estate, five miles north of Bothwell, was suitable.' An array 33,520 feet in diameter, comprising 192 dipoles, was constructed. It was a meridian-transit instrument with a beam capable of being adjusted along the north zenith south plane. Enough data was secured to make a map of the entire southern sky.

The assumption is that intergalactic space is a void. By definition, a void lacks contents; light cannot interact with a void. By making this assumption the door is closed to all physical phenomenon. The only possible explanation of shifts of spectral lines and light from distant nebulae comes from relative motion. This assumption is based on an anthropocentric view of our surroundings.

Reber experimented with novel designs for cars and bicycles and solar houses. He investigated reverse growth of bean vines, carefully untwirling vines from their natural right-handed curl to a left-handed curl. 'Reversed Bean Vines' by Grote Reber, published in the Southern Appalachian Botanical Society, December 1960: 'Nine different

our vocal complexity. It may be a more- or-less direct measure of the social complexity of the species. The crow family has got gregarious and isolated pairs. If this theory is correct, then basically we should find one a very complex social system and the other not. But if we get an extraterrestrial signal it might be a long time, if ever, that we can translate it, but what we can do is calculate right away what the complexity of their communication system is.'

'What if they go up to twentieth-order entropy? Then we know, at least as far as their communication system goes, we are to them as squirrel monkeys are to us. One of the things we would do is quantify the complexity of humpback-whale communication systems. The second thing is ... they have a SETI kind of problem. They vocalise, and the signal may take hours to get there, hours to get back. If they want to meet, it takes about a month. So, it's kind of a SETI-like problem, except in SETI terms it takes years to get a round-trip message and it takes a thousand years or maybe a millennium to go there. What we're proposing is to examine how humpback whales handle a SETI-like problem like that.'

'If we intercepted a SETI signal, it wouldn't have been pointed to us necessarily. It may be a communication between two spacecraft, or a spacecraft and home base. Ninety-eight percent of the stars in the solar neighbourhood are older than the sun, so let's assume that the average extraterrestrial civilisation has a hundred-million years on us. If they're sending probes all around the galaxy, we could maybe intercept a signal from

[illegible]

Cosmic Static

Cygnus, Cassiopeia, Canis Major,
and Puppis.'

'A remarkable feature of our observations was that none of the radio signals of greatest intensity came from the direction of the bright stars. This suggested very strongly that the galactic radio waves we receive from the Milky Way do not originate in the stars at all. Where, then, are they coming from? Can they be emanating from interstellar space? Strange as it may seem, that looks like the most probable source. It appears that they come from the great clouds of interstellar dust and gas in the galaxy.'

For a decade, Reber had been alone—the world's only radio astronomer, listening each night for shortwave signals of extraterrestrial origin. As his successes emboldened others to join the shortwave search, his curiosity turned to cosmic static at longer wavelengths.

'I decided to try for observations of cosmic static at longwave length simply as an exploratory search. Whatever the wavelength, it must arrive at the observer at the surface of the Earth. As the wavelength increases beyond twenty metres, the ionosphere becomes increasingly important. The ionosphere is a mirror for radio waves silvered on both sides. The greater the electron density, the more effective the ionosphere becomes as a shield for longwave cosmic static. The lowest electron density is near the minimum solar activity, during winter, at night, between latitudes 40 and 50, near the agonic line, where the compass points true north. A manmade wave will be reflected back to earth allowing long-distance radio communication around the curvature of the Earth. A celestial radio wave

kinds of pole beans were planted in rows of about fifty hills each. All nine kinds twined about the poles in the same direction; namely a right-handed screw thread. The vines on even-numbered poles of three rows were carefully unwound and twined backward. The runner was loosely tied about two inches below the tip, and this process was repeated whenever the runner had grown eight to ten inches. The period between ties was only a couple of days at first and gradually increased. In all cases, there is an appreciably better ratio of ounces of beans to shucks, and, to a lesser extent, ounces of beans to vines—for the reversed vines compared to the normal vines. Apparently, this handling of the vines causes an increase in the ratio of fruit to supporting structure.'

Grote Reber wrote letters in longhand and on a typewriter to newspapers, to journals, and to intellectuals whose ideas intrigued or confounded him. Each day, Reber carried his letters to the Bothwell post office for delivery around the world. Grote Reber, General Delivery, Bothwell, Tasmania, Australia 7030. Reber's final letter was titled 'The Future of Mankind': 'The human race is heading for a disaster. Several people have discussed this before me. Nobody paid much attention. Tommy Edison during the 1920s secured land in Florida. His plan was to grow plants with suitable seeds, distil the seeds for oil, and refine the oil. He never got far because nobody was interested. I won't go into this subject here. It deserves attention.'

When Reber died, his body was cremated and boxes of his ashes were distributed to radio

one of them. And then we apply Zipf law. And then we apply information theory to quantify the degree of conditional probability between signals, and therefore quantify the complexity. And, if it's a twentieth-order entropy, or a fiftieth-order entropy or something, we'll know. Because, even if you don't have the signals classified exactly correctly, you still can get a Zipf slope of minus one if it's a language.'

"The only other thing that I've analysed really is cotton plants. It turns out cotton plants transmit kind of an air-traffic-control chemical message to these certain wasps that read the air-traffic-control message and land on the plants with the caterpillars they like. I took the chemical analysis and basically did a Zipf plot and then an entropic analysis. I determined that the cotton plant had a vocabulary of five. There are only two known predators. So, I wrote in the paper that there's got to be three more predators, because why else would a cotton plant have a vocabulary of five? I got a call from Pennsylvania and these botanical people back there said, "It does have those additional predators. How did you know that?" And I said, "The cotton plant told me."

'It's going to be unexpected from a scientist. Here's what I would ask them, a very short question, "What is your ultimate construction of the source of the universe?" So, I think I'd try and get as much about Planet Earth, including DNA if I could fit it in, so that somebody very advanced and very together might be able to reconstruct some of the events that happened on Earth before it destructed and how it was. I would want them to think, "wow,

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will be reflected back into space. The most auspicious places are near Lake Superior in the Northern Hemisphere and Tasmania in the Southern Hemisphere. The former looks out on the northern sky and the periphery of the Milky Way. The latter looks out at the southern sky in the centre of the Milky Way, a more interesting region.'

In the summer of 1947, Reber closed his operations at Wheaton, and began a search for ionospheric holes and quieter skies.

observatories around the world, where they were affixed to the rims of the parabolic dishes that persist in listening for extraterrestrial signals, for cosmic static, for glitches, for transmissions of other-than-human intelligence.

how beautiful, what a shame", and use it to enlighten other species in the galaxy as to what not to do.'

1. Grote Reber, 'A Play Entitled the Beginning of Radio Astronomy', *Journal of the Royal Astronomical Society of Canada*, vol. 82, no. 3, 1988: 93.

2. Grote Reber, 'Endless, Boundless, Stable Universe' (1977) <https://bazaarmodel.net/Onderwerpen/Endless-Boundless-Stable-Universe/>, accessed 1 August 2019.

3. Ibid.

LAWRENCE ABU HAMDAN is an artist and audio-investigator associated with the research agency Forensic Architecture, at Goldsmiths, University of London. His work explores techniques and politics of 'forensic listening'—diverse listening practices associated with legal forums and the technoscience of acoustic evidence. He is a finalist in the 2019 Turner Prize. He is based in London and Beirut.

JEN BERVIN is an artist and poet based in Guilford, Connecticut. Her research-driven, interdisciplinary work involves collaboration with other artists and specialists, ranging from material scientists to literary scholars. She is currently artist in residence at the Search for Extraterrestrial Intelligence Institute, in Mountain View, California.

FAYEN D'EVIE is an artist, writer, and curator based in Muckleford, rural Victoria. Her work argues the radical potential of blindness in challenging ocularcentric norms and offering a criticality attuned to complex embodiment, sensory translation, wayfinding, and the invisible.

SEAN DOCKRAY is an artist, writer, and programmer based in Melbourne. His work explores the politics of technology, particularly artificial intelligence and the algorithmic web. He is the founding director of the Los Angeles non-profit Telic Arts Exchange and the initiator of knowledge-sharing platforms The Public School and Aaaaarg.

MANUS RECORDING PROJECT COLLECTIVE was established in 2018 to produce work for *Eavesdropping*. It comprises six asylum seekers detained on Manus Island by the Australian government (Samad Abdul, Abdul Aziz Muhamat, Farhad Bandesh, Behrouz Bouchani, Shamindan Kanapathi, and Kazem Kazemi) and their three collaborators in Melbourne (André Dao, Michael Green, and Jon Tjhia). For individual bios, see pages 176, 177.

NORIE NEUMARK is a sound/media artist and theorist based in Melbourne. Her research focuses on voice and the new materialist turn. She exhibits internationally with Maria Miranda as Out-of-Sync. She is an Honorary Professorial Fellow at Victorian College of the Arts, Emeritus Professor at La Trobe University, and founding editor of *Unlikely: Journal for Creative Arts*.

JAMES PARKER directs a research program on law and sound at the Institute for International Law and the Humanities, Melbourne Law School. His 2015 book *Acoustic Jurisprudence: Listening to the Trial of Simon Bikindi* was awarded the 2017 Penny Pether Prize for scholarship in law, literature, and the humanities. He has been a visiting fellow at the Program for Science, Technology, and Society at Harvard Kennedy School for Government, and a faculty member at Harvard Law School Institute for Global Law and Policy Workshop, in Cambridge, Massachusetts. He is an associate curator at Liquid Architecture and co-curator of *Eavesdropping*.

BRYAN PHILLIPS is an artist working in community arts, music, and performance. His practice developed in Chile, but, after completing his Masters in Community Cultural Development at Victorian College of the Arts in 2013, he has been involved in projects with artists from Timor-Leste, Indonesia, and Australia.

PUBLIC OFFICE is a Melbourne-based design agency focused on the intersection of physical and digital publishing.

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ANDY SLATER is a legally blind musician, sound artist, and author. He is a 2018 3Arts/Bodies of Work Fellow at the University of Illinois and an Institutional Incubation Artist at High Concept Labs, in Chicago.

JOEL SPRING works across radio, architecture, art, and activism. A Wiradjuri man raised in Redfern and Alice Springs, his work focuses on contested narratives of Australia's urban culture and indigenous history in the face of ongoing colonisation.

JOEL STERN is a curator and artist concerned with theories and practices of sound and listening. With Danni Zuvela, he is Artistic Director of Liquid Architecture, Melbourne, which stages sonic experiences and critically reflects on systems of sonic affect at the intersection of contemporary art and experimental music. His other initiatives include the artist collective OtherFilm and the residency programme Instrument Builders Project. Stern is a PhD candidate in Curatorial Practice at Monash University. He is co-curator of *Eavesdropping*.

SAMSON YOUNG is a sound artist and composer based in Hong Kong. His interests include the politics of Western classical-music writing systems and the orchestra, and sound as a weapon.

LAWRENCE ABU HAMDAN

Conflicted Phonemes 2012
vinyl print, printouts, shelf

Rubber-Coated Steel 2016
video
21min 49sec

Saydnaya (The Missing 19db)
2016
mixing console, audio
12min 48sec

WILLIAM BLACKSTONE

*Commentaries on the Laws
of England* 1765
book
collection Alexander Turnbull
Library, Wellington

FAYEN D'EVIE AND JEN BERVIN
WITH BRYAN PHILLIPS AND
ANDY SLATER

Cosmic Static 2018
copper radio-telescope feed,
five-channel audio
13min

SEAN DOCKRAY

Always Learning 2018
Amazon Echo, Apple HomePod,
Google Home Assistant,
rug, cushions

Learning from YouTube 2018
video on computer monitor
11min 31sec

ATHANIUS KIRCHER

Musurgia Universalis 1650
book
collection State Library of New
South Wales, Sydney

MANUS RECORDING
PROJECT COLLECTIVE

Samad Abdul, Abdul Aziz
Muhamat, Farhad Bandesh,
Behrouz Bouchani, Shamindan
Kanapathi, and Kazem Kazemi,
with André Dao, Michael Green,
and Jon Tjhia

how are you today 2018
eighty-four ten-minute audio
recordings
14hr

SUSAN SCHUPPLI

Listening to Answering Machines
2018
seven answering machines,
five listening stations, audio
approx 25hr

The Missing 18½ Minutes 2018
colour photograph (584 x 876mm),
fifteen black-and-white
photographs (each 438 x 584mm),
audio (18min 30sec), two
headphones, printed document

JOEL SPRING

Hearing, Loss 2018
two-channel video projection
10min 9sec

SAMSON YOUNG

Muted Situation 5: Muted Chorus
2016
video
9min 6sec

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