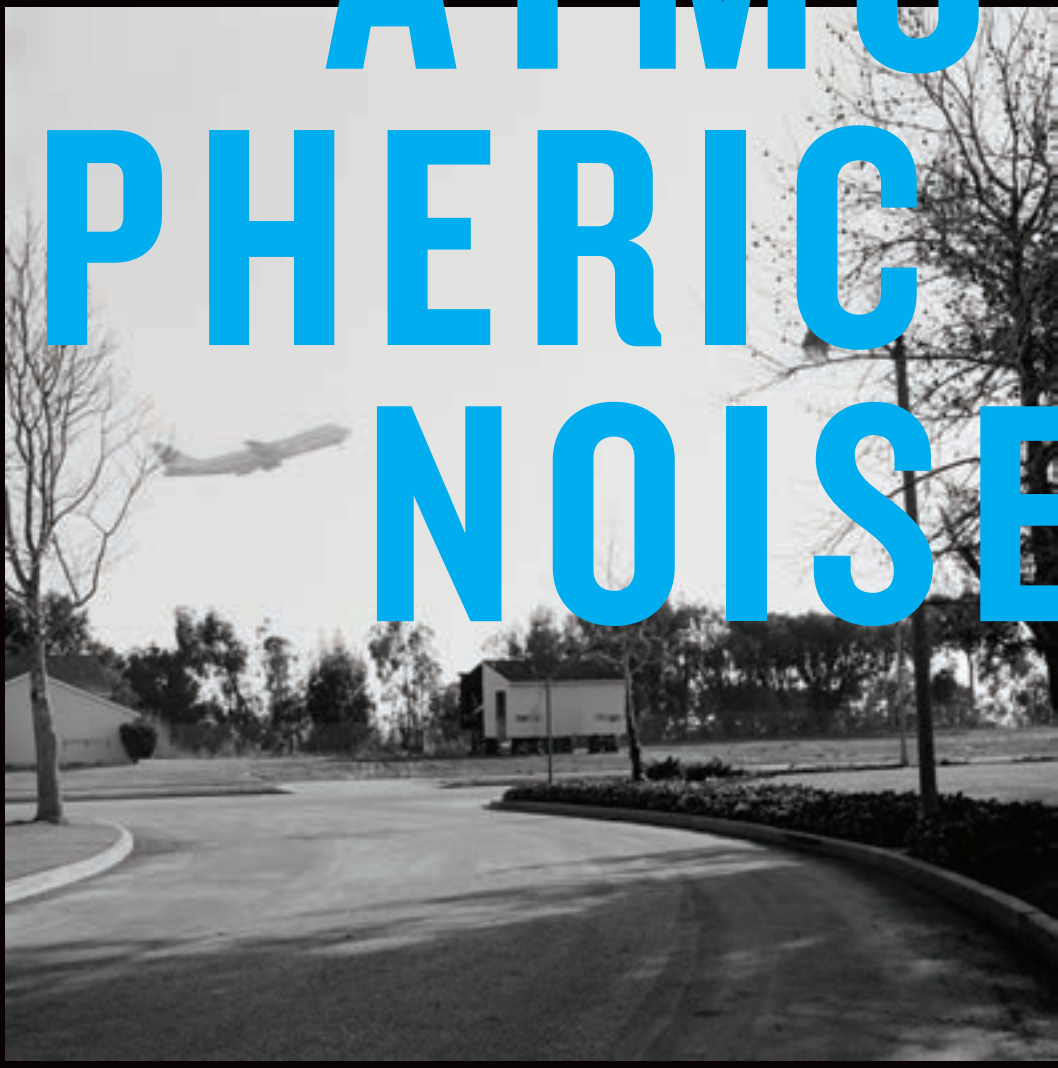
THE INDEFINITE URBANISM OF LOS ANGELES

ATMOSPHERIC NOISE



MARINA PETERSON

ATMOSPHERIC NOISE

ELEMENTS *A series edited by Stacy Alaimo and Nicole Starosielski*

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MARINA PETERSON

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for Cassius

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ACKNOWLEDGMENTS

A mosquito buzzes around me as I sit at my desk doing a final round of edits, coming into audibility before flying away. It is small and fast, and I lose sight of it as soon as I clap in its direction. While its sound is distracting, I'm more annoyed by the thought of being stung by an insect swarming in the outside swamp of a Texas fall—hotter and wetter this year than ever before. The mosquito, in its lines of flight, brings into being an atmospheric assemblage of sound, air, and sense that I trace in this book—which, even in its uncertainty, affords new modes of attunement. The origins of this project were serendipitous. Working at the Huntington Library on a fellowship for another project, I came across files on airport noise in county supervisor Kenneth Hahn's collection. Reading residents' complaints and Hahn's attempts to address the problem of noise, I was drawn in by the work noise was doing in amplifying gaps in airspace jurisdiction. Caught up in noise and its atmospheric entanglements, I moved away from the seeming immobility of concrete and water—the matter of the littoral infrastructures with which I had been engaged—and followed noise toward national legislative histories and acoustical engineering, toward the neighborhoods around LAX, toward the airport itself.

The book draws on material found in L.A. area archives that range from those of the Huntington Library and the City of Los Angeles to LAX's Flight Path Museum, the El Segundo Public Library, the Los Angeles Public Library, and the Centinela Historical Society in Inglewood, along with special collections at area universities (UCLA, USC, Cal State Northridge, and Loyola University). National archives consulted include those of the EPA's Office of Noise Abatement and Control and the National Noise Abatement Council. Many people were generous with time and resources. Hillel Schwartz invited me to peruse the material he collected for his omnibus *Making Noise: From Babel to the Big Bang and Beyond*. LAWA's Environmental Services staff was exceedingly helpful in giving me access to various aspects of their work related to noise. Acoustical engineers with Veneklasen

and Associates and the Western Electro-Acoustic Laboratory shared their experiences and expertise. After narrowly missing the ferry, Les Blomberg came by canoe to paddle us to the island on which he was staying, where he shared his thoughts on noise, developed over decades as the founding director of the National Noise Abatement Clearinghouse.

Many of the archives were themselves spaces of ethnographic encounters. This was especially true of LAX's Flight Path Museum and Learning Center, staffed by retired airport workers, including a former director of public relations and an aircraft mechanic. They had a wealth of knowledge not only about what was housed in the museum's library and file cabinets, but also about aircraft noise as experienced and politicized. While the Flight Path Museum held an abundance of material, elsewhere there was a palpable absence of archives on airport noise; Inglewood's Centinela Adobe highlighted its nineteenth-century history, and at the city's public library, an archivist was aggressive about throwing things away. Items I read about in congressional hearing transcripts had been saved by people involved in early work around airport noise. I am grateful for their generosity in sharing their memories and materials. Yvette Kovary, whom I found in the phone book after searching for some of the main organizers against airport noise, had a file of papers and photos related to her struggles to keep the airport from taking her home and that of her neighbors. Rudi Mattoni, with whom I talked on the phone but did not meet in person, told me about a box he had of material related to his El Segundo blue butterfly conservation work. Veneklasen and Associates had original copies of their reports from noise measurement surveys in Inglewood, while the mobile units developed for early environmental sound measurement were stored at their acoustic testing laboratory.

Research for the book began while on a faculty fellowship from Ohio University, and the manuscript was completed on a College Research Fellowship from the University of Texas at Austin. Huntington Library fellowships provided additional support, along with a place to work that affords the necessary focus to write, interspersed with walks in their gardens and rich interdisciplinary conversations. Other spaces for thinking with others came through opportunities to present portions of the book, even in nascent stages, when my thought had run ahead of the material. The book has benefited from conversations at the University of California, Irvine's Center for Ethnography in the Department of Anthropology; the Music and Sound Working Group and Department of Comparative Studies at The Ohio

State University; New York University's Music Department Colloquium, the University of Texas at Austin's Department of Anthropology; UCLA's Culture, Power, and Social Change series in the Department of Anthropology; the Digital Writing and Research Group's Digital Field Methods Institute at the University of Texas at Austin; Rice University's Ethnographic Studio Salon; the Modern Studies Group at the University of Texas at Austin; and the Materialities, Texts, and Images Program Brown Bag series at CalTech. Conference presentations allowed me to play with material that solidified into chapters and offered interdisciplinary engagements; especially generative were the Cultures of Energy symposium at the Center for Energy and Environmental Humanities at Rice University; &Now 2015—Blast Radius: Writing and the Other Arts at CalArts; the Music, Property and Law symposium at the University of Texas at Austin; and the annual meetings of the International Association for the Study of Popular Music, the Society for Cultural Anthropology, and the American Anthropological Association. My wind noise recordings were presented as an audio installation in the Society of Ethnomusicology (SEM) Sounding Board exhibit.

Much of my conceptualization of noise came out of thinking about sound and/as energy with graduate students at Ohio University, both in seminars and through the collaborative Energy Soundscapes project. Friendships that are also ongoing intellectual conversations make every book a pause in a process, a web of thought woven from encounters and exchange too rich to disentangle. Colleagues and graduate students who contributed to this book at various stages through their conviviality and generosity of ideas are, especially, Gretchen Bakke, Casey Boyle, Vicki Brennan, Craig Campbell, Jason Cons, Nina Eidsheim, Ofer Eliaz, Veit Erlmann, Cassie Fennell, Andrea Frohne, Nikita Gale, Megan Gette, Michael Gillespie, Brian Harnetty, Keith Murphy, Josh Ottum, Alessandra Raengo, Dario Robleto, Erin Schlumpf, Louis-Georges Schwartz, Jena Seiler, Barry Shank, Jesse Shipley, Stefanie Sobelle, Nicole Starosielski, Katie Stewart, David Suisman, Adel Jing Wang, and Elana Zilberg. Chepo Peña made my life easier by preparing the images.

I am delighted to be working with Ken Wissoker, whose support has anchored the work of writing an idea into being and whose vision of the project has allowed it to bloom. The comments of two anonymous reviewers were instrumental in helping me clarify the stakes of the project. Earlier versions in different forms appeared in *Social Text*, *Postmodern Culture*, and *Between Matter and Method*. Generous readings by anonymous reviewers for *Social Text* and *Postmodern Culture* helped develop and sharpen the ideas

guiding the book. A workshop at Banff with contributors to the co-edited (with Gretchen Bakke) volume *Between Matter and Method* provided a space to imagine with others possibilities for play with form.

Enormous thanks to everyone who provided child care while I went to archives, conferences, and airport meetings, especially my parents, John Peterson and Joanna Vaughn; brother and sister-in-law, Jesse Peterson and Mia Doi Todd; Kendra Field and Khary Jones; and Michiyo Suda and Umar Rashid Foster. And of course Hamza, for infusing joy into a child's everyday life, for life together (and apart), and for giving me all the art books on air. This book is for Cassius, who lived the project from the time he can remember and is eager to write a book together—though you may not have written the words of this one, you have infused breath and noise into them.

LAX NAZ—*Los Angeles International Airport Noise Abatement Zone*. The houses had been acquired through eminent domain but had not yet been demolished or removed. John Divola's 1970s photos of homes in the flight path slated for demolition visualize the atmospheric quality of this process (figure I.1).[1] The images captivate in their stillness, their muteness, their silence. The airport mowed the lawns during the week, and teens broke in on the weekends. Divola photographed traces of the latter: the angularity of broken glass and screens gaping in their frames (figures I.2 and I.3). Interior walls spray painted. A garage door a conversation in dueling fonts: KLAN THIS HOUSE SOLD PIG VANDAL GARD DOG WUS HERE REWARD $100. Tire tracks of bulldozers. Unwittingly ethnographic, the images' formality is at once performative, exploratory, and reflexive—a way of moving through the city's margins. Divola's interest lies in atmospheric light, the rendering or imprint of space, the photo as a remnant, as physical evidence of time, place, and action. The images convey the material qualities of a built environment composed by noise, where sound from the sky shapes neighborhoods and lives. Not representational, they are embedded in and emergent from this place, a place in process, where shattered remains of windowpanes register sky, palm tree, or an absent human presence. What the house sees, hears, feels. "The houses are silent witnesses," I offer. "I don't anthropomorphize," he says. The houses are mute—(not-blank) canvases on which are inscribed traces of human activity. A zone of stillness, following the presence of inhabitants, both long term and temporary, preceding the presence of bulldozers.

Each house is singular, connected to another through its own skin. Shadows of tree branches appear as veins emerging on the surface of a stucco wall. Plywood is nailed into window frames, bowing from moisture or patched together like an incipient Louise Nevelson sculpture. These are portraits rather than a totalizing aerial view, which would cast air's potential as one of command and control. The process of removal is registered in re-

FIGURE I.1 LAX NAZ, exterior view W, John Divola, 1975.

lation to individual houses, portrayed in close-up. Though it is evident the houses were once populated, the photos do not suggest a sentimentality of loss or absence, of past pleasures or activities, lives lived and lost to eminent domain. They are not records of urban transformation, of invisible infrastructures, or of a "history of forgetting" (Klein 1997). There is no sense of a desire for recuperation or reclamation of these spaces. They simply exist in their present form, suspended for a moment. There is an immediacy in their presentness, a presence, of photographer and building, of wind, of the singularity of the vandal: ostensibly male, ostensibly teenaged, in another boy's bedroom (figure I.4).

In conversation with Divola, I suggest that many things are indexed beyond the activity of humans; we can see the presence or effects of temporal and ephemeral forces—wind (palm trees moving), time of day (shadows),

FIGURES I.2–I.3 LAX NAZ FE, site 23, exterior views B and A, John Divola, 1975.

climate (vegetation). "Indexes of noise," I say. "Sure, in a broad abstract way. If you take the title at face value," he responds. "But I have no way to deal with it literally, to deal with noise literally, as content." What work does the title do? "Noise abatement zone" grounds the airport in the city, in neighborhoods of people annoyed by the noise of aircraft. Though Divola's photographs are not about noise or noise abatement, there is an ambivalence in his rejection of the title as having any meaning in relation to the images; the series includes photographs of airplanes departing (figure I.5). The sound of airplanes is silent, silenced. Yet the presence of noise pervades. It is agent. "Noise abatement zone" suggests that noise has made these houses what they are, one after the other, one next to another. The airport (LAX) lurks as the source of a process in which the houses are caught up—the specter of infrastructure and its effects on urban landscapes.

Not lenses through which one may glean demographic or historical "information," the photos ask to be taken seriously in and of themselves, for what they offer in their materiality, their palpability. Nonrepresentational, they do not scale out or shift to categorical thought but instead are a cul-de-sac of sorts, a space in which to dwell, where something happened and is happening. Or an eddy that catches up some things—leaves, pollen, plastic—that then move on, drifting downstream or downwind as another force arrives, a stronger current or just a different one that disperses the

FIGURE I.4 LAX NAZ, site 76, interior view I, John Divola, 1975.

temporary vortex. The photos perform the subject of the book—with airport noise responsible for the transformation of this neighborhood and its homes, noise itself withdraws. The invisibility of noise structures perception and casts a quality of impermanence onto sound that is echoed in the muteness, and impermanence, of the houses.

Noise is atmospheric. Palpable in its sensation, noise is nonetheless ephemeral and indefinite; falling away as both sound and category, it proliferates into an array of atmospheric forms. Attuning toward noise is thus also an attuning toward the atmospheric. This is amplified in the case of airport noise. As people listen to sound from the sky, the aerial is drawn into perceptibility, figuring the permeability of bodies and matter. The dif-

FIGURE I.5 LAX NAZ, exterior view Z, John Divola, 1975.

fuse and dispersed quality of noise makes people accustomed to experiencing and conceiving of that which is indeterminate, to dwell, that is, in uncertainty. The atmospheric emerges as a quality coalescing across multiple registers: that of the aerial and the ephemeral, dynamic relationships between forms of matter, and the indeterminacy of forms and concepts. Thus, what we learn from noise is a rich and dynamic way of attuning toward and understanding the atmospheric. And while noise is not the only thing that does this, the particular ways in which it does make it central for learning to think and feel the atmospheric. Building on a robust discussion of forces and attunements that bring the atmospheric into focus, I insist on the significance of sound and listening, and, by extension, a broader atmospheric sensorium.[2] The atmospheric is audible as well as visible, heard as much as breathed. Substantiated in sound, it emerges in moments in which noise

matters. Around LAX, these include airspace law and urban land use; the palpable yet unstable nature of "annoyance" and its metricization; environmental imaginaries and the permeable, resonant skin of bodies and homes; and the precarious presence of a neighborhood now home to an endangered species of butterfly.

While the issue of airport noise is not unique to Los Angeles, there is a specificity to the story—and atmosphere—of the city.[3] Renowned for the quality of its light, Los Angeles, it has been said, "glows" (Weschler 1998). The light can pull you into a daze, all spaced out, watching the streets pass by as you traverse the city via its freeways; it can throw "you into such a trance you fail to realize how time is passing" (Peter Bogdanovich, quoted in Weschler 1998, 95). The climate is pleasant, the temperature in a range that casts skin as coterminous with air. A city definitive of sprawl, its verticality goes largely unnoticed—freeways built on embankments such that drivers look down on rooftops of single-story homes, stack interchanges that seem to make cars fly over and under one another, two downtowns of high-rise office towers whose height is limited by the imminent possibility of fault lines rupturing. It is also a relatively quiet city, the sound of freeway traffic blurring into a background white noise punctuated, perhaps, by sirens or a circling helicopter (Manaugh 2017). Airplanes, when they pass overhead with their roar and whine, shatter a stillness in which human speech is the measure of acoustic amplitude.

Airport noise is a condensation of forces and processes already in play, amplifying existing dynamics even as it yields its own effects, tendrils unfolding into newly fabulated fields, or domains encountered anew through sound. In the 1960s and 1970s noise emerges as a pressing concern, bringing into relief broader attenuations and tendencies of the era that foreground atmospheric figurations and logics. These include *The Blue Marble* (the first image of Earth from space); nuclear threat; environmentalism; smog; the Light and Space artists of Southern California, who used aerospace materials to play with perception; Yves Klein's *Air Architecture*; inflatables; Charlotte Moorman playing cello while being lifted into the air by helium balloons; *Atmosphères*, Ligeti's score for the film *2001: A Space Odyssey*; the dematerialization of the art object; the notion of liminality as an indefinite state of ambiguity, a moment of suspension outside what otherwise seems structured; the use of electricity to create amplified sound and electronic music; postmodernism; indeterminacy as a concern of composers and artists; systems thinking then anchored in cybernetics or "ecology," efflorescing as "climate" or "the cloud." This was an atmospheric moment that con-

tinues into the present, a sense of indeterminacy lingering as a condition of our time.[4]

NOISE, AN OPENING

Insofar as noise is made, whether as sound or in its designation, it is emergent, approachable principally as an ethnographic concern.[5] Hence I take an "acoustemological" approach to noise, Steven Feld's term for understanding "local conditions of acoustic sensation, knowledge, and imagination," which in this case include sensation, discourse, technology, law, and urban infrastructure (1996, 91). This is a sonic ethnography of how people (and sometimes technologies) listen. Rather than describing sounds I hear, I listen with others, attending to how they listen. I listen to the experiences of residents in the flight path and memories of homes removed as a result of noise. I listen with acoustical engineers measuring and metricizing noise, along with legislators grappling with how to solve the problem of noise. I listen as airport environmental services staff listen to sounds heard by noise measurement microphones and inscribed in noise contour maps. I listen as a microphone listens to a room, testing its eligibility for soundproofing. I listen to the determination in the voice of a man whose career has been spent lobbying for antinoise legislation, as well as to the stilled thrill of another who has long loved butterflies. The noise they encounter is sensed and made sense of; perceived, it is figured as disrupting communication and concentration. It reveals the permeability of buildings and recruits sympathetic publics concerned with hearing, productivity, and sensory experience. It is recorded and measured, construed as something that might be managed even as it seems to escape control.

Always coming into being, noise is necessarily immanent; intrinsic, or inherent, to its instantiations in assemblages of machine, air, body, or building, it provides a way of exploring sound as such. Hence a theory of sound emerges in which sound is not instrumentalizable, containable, or objectifiable.[6] As such, I do not offer a general definition of noise, whether unwanted, ontological, metaphysical, or even relational.[7] Nor do I ascribe a particular value to noise or the experience thereof. Noise, instead, is "an opening"—"anarchic, clamoring, mottled, striped, streaked, variegated, mixed, crossed, piebald multiplicity," it "is possibility itself. It is a set of possible things, it can be the set of possible things" (Serres 1997, 56). There is something curious about how this "thing" of noise that everyone comes together around is not "there"—and how something ephemeral is made

to matter through scaffolding that includes metrics, publics, law, and discourse. A material-discursive "monster," a "quasi object," an "unformed object" or "hybrid," noise emerges in and through things: ear, window, air, microphone diaphragm, the creation and circulation of standards, sound transmission graphs and their interpretation, perception and affect, law, regulations, technology, civic mobilizations, and sensation (Haraway 1992; Latour 1993; Murphy 2013).

Proliferating into a multiplicity of atmospheric forms, noise shapes, grounds, and resonates across concrete formations, which include airspace territory, the inscription of metrics, environmental legislation, residential architecture, and infrastructural edge spaces. Not a thing in and of itself, noise is a "compositional node" from which "lines of contact radiate out" and "energies distribute" (K. Stewart 2013). Thus tracing noise as it is heard and made meaningful entails paying attention to emergent forms and concepts; to interconnections and entanglements that are material, sensory, imagined, and social; to movement and shape-shifting forms; and to a proliferation of effects. It means attending not only to how and in what terms *noise* is produced as such but also what is externalized and how they also matter; these are the excesses, the logics and illogics of categories as they are taken up in various contexts. It means attending to how that which is blocked, excluded, and occluded nonetheless percolates, escapes, seeps out the edges, explodes, implodes, expands into and out of gaps that take the form of doubt, noise complaints, love of home, weather, wind, fog, vibration, touch. The management and regulation of noise depends on and draws partially from a modern physics of acoustics, which both curtails and affords wider potentials for the sonic. Hence, while necessarily engaging, and often relying on, a modern physics of sound, I also read against the grain of its role in designating truth value, drawing out both its assumptions and weirdnesses (and in this way, departing from much work in sound studies). And while I aim to avoid reducing its multiplicity to a singularity, I, like others, find noise seductive in its malleability, its ability to be at once material and metaphor, matter and method.

SENSING ATMOSPHERIC MATTERS

Good to think (or sense) with, the atmospheric is difficult to pin down, to make conform to any one thing, to harden into existing categories. At the same time, like noise, the atmospheric is not "out there," either physically or conceptually; rather, it is present, pervasive, and immanent; it imbues,

becomes, and permeates; it is perceived, sensed, and heard. In its emphasis on a physicality of the ephemeral, the book is an explicit engagement with and intervention into an expansive literature that falls broadly under new materialisms (Bennett 2010; Coole and Frost 2010; Latour 2007; T. Morton 2013). Informed by the spirit of this work, I write through *things*—noise, atmosphere, annoyance—as a means of attending to materiality in motion. There is something of a lacuna in this literature on the particular qualities of diverse forms of matter and their entanglements. In particular, gaseous or energetic forms of matter tend to be treated in similar terms as those that are more durable and concrete. A now burgeoning literature on air and atmosphere, however, engages explicitly with questions of materiality. Hence, while Luce Irigaray (1999) famously accused Heidegger of "forgetting of air," a recent turn toward the atmospheric by scholars across disciplines has begun to remedy this tendency.[8] As Derek McCormack notes, "atmosphere has become one of the most theoretically and empirically alluring of concepts" (2018, 6). In drawing out qualities of matter and their entanglements, I incorporate approaches that destabilize not only the human subject but the solidity of all kinds of matter. This is what Karen Barad describes as "intra-action," or "*the mutual constitution of entangled agencies*." Relationships, rather than ontological qualities of things, give form to "boundaries and properties" of "components of phenomena" (2007, 33, 139). For Barad, quantum physics provides a means of conceptualizing matter as fundamentally destabilized, consisting not of boundaries between things but the constant movement of electrons. Noise facilitates this openness: animated electrons, it amplifies the indeterminacy of boundaries between forms of matter.[9]

A phenomenal approach to the atmospheric emphasizes sensation and immaterial forms of energy, materializations over materiality—motion, emergence, immanence, in and of air and sense. Attending to listening affords engagement with these processes. As an energetic entanglement across forms of matter, listening is affective, a mode of bringing into being an "intensity of relations," a concrete poetics of encounter that amplifies the sensory as relational and affect as embodied.[10] Listening is an event in which something is happening or stirring, shifting orientations and relationships: "Sound affects: we feel it and it creates feeling" (Kapchan 2015, 40; see also Brennan 2004). At the same time, listening is indeterminate; as Brian Harnetty writes, "Listening is an act of uncertainty. When we listen closely" we are "unsure of what sounds or words we might encounter" (n.d.). Listening offers the possibility of attuning toward one another, or the refusal thereof.

Listening anchors a theory of deobjectified sound, which otherwise remains burdened by a distinction drawn by modern physics between sound and hearing. Such objectification becomes codified in modes of inscription, whether musical composition or recorded sound. To shift from this dichotomy, it is productive to conceive of listening as akin to senses of touch, proprioception, and thermoception—senses that do not distinguish between sense and that which is sensed.[11] Instead, sensory perception figures a body as being part of a world of atmospheric qualities rather than separable from it. Michel Serres, in theorizing the senses as "mingled bodies," locates mingling, or mixture, between body and world in the skin: "The skin is a variety of contingency: in it, through it, with it, the world and my body touch each other, the feeling and the felt, it defines their common edge. . . . I mix with the world which mixes with me. Skin intervenes between several things in the world and makes them mingle" (2009, 80; Connor 2003, 27–29). Or, as Erin Manning writes, "When the skin becomes not a container but a multi-dimensioned topological surface that folds in, through and across spacetimes of experience, what emerges is not a self but the dynamic form of a worlding that refuses categorization. Beyond the human, beyond the sense of touch or vision, beyond the object, what emerges is relation" (2009, 42). Elaborated more fully in chapters 1, 3, and 4, skin figured thus is crucial for the ways in which the atmospheric comes into being through the perception of noise. Approaching listening in this way affords a similar reading of other senses, whether vision or touch, while at the same time shifting from a focus on human senses. In what follows, many things are sensed: images, wind, heat, vibration, and noise. There are also many sensors, including walls, windows, chickens, microphones, and people.

Listening is compositional. Taking place in and through diverse modes of sensing, listening draws together emergent assemblages of matter. This is taken up explicitly in many of the chapters. For instance, in chapter 1 we see how bodily experience is wielded as evidence for the significance of aircraft noise even as its unreliability destabilizes noise as a concern. In chapter 2, noise as annoying is metricized and images become sites of engagement, casting a continuity of sense across hearing, vision, and thermoception. Through a discussion of the emergence of the category of noise pollution, chapter 3 thematizes sound as immanent, figured as airborne even as it is not a substance of air; here noise—pervasive yet diffuse—provides a cipher for environmental imaginaries. Chapter 4 attends to the physicality of sonic encounters that are largely excluded from the case itself, from sound as touch to the effect of fog on noise and the phenomenality of microphone listening.

Chapter 5 emphasizes the sensory capacity of buildings, walls, windows, and microphones, the resonance of which crafts a climate of listening. And in the last chapter, as humans attune toward butterflies, encountering soil and plants in a place where homes once stood, a sense of loss pervades. Lurking in these haptic encounters are shifts in frame offered by discussions of plant sense and multispecies entanglements, of what has been described as "vegetal being," "animacies," and "zoontologies."[12] Of this, work on plant sensing has been especially significant for turning my attention toward the nonhuman in a way that affords an investigation of noise as drawing together diverse forms of matter and ways of being—for attending to how other species, or forms of matter, might be sensing, or at minimum resonating.

Though many emphasize the pleasurable commingling of multispecies entanglements, noise draws attention to displeasurable and unwanted entanglements of body and atmosphere. Noise figures a body as permeable, ear and skin less a protective shield that might make a body "immersed" or "suspended" in sound than vibrating with sound, resonant to its very core (Choy and Zee 2015; Ingold 2011). This is a body threatened by that which is external to it, a body affected by noise, by the vibration of sound.[13] Hence noise has more in common with *exposure*, used to conceptualize a body under threat from a toxic atmosphere that permeates the skin.[14] As this literature demonstrates, a permeable body is not always desirable—we do not always want to be "enwinded" (Ingold 2011) or even vibrate with others. Vibration, at times used for healing, for the experience of trance, or as a mantra of togetherness, can also be an unwanted entanglement, a limit point of shared physicality with others, whether human or not. This becomes evident in the category of *environmental noise*, which draws together industrial sound, pollution, a standards definition of "unwanted sound," and regimes of measurement and control. Its contours, assumptions, and effects secure the significance of noise for the atmospheric. In the mid-twentieth century, infrastructures and technologies of mobility that initiated newfound aspirations for movement and flight also brought new sounds and sensations—the rubber of trucks on freeways and the unmuffled roar of engines, airports, and aircraft noise. These are the sounds of anthropogenic climate change: the combustion engine, fossil fuels, electricity. Their noise affords a sensory investigation of the contemporary condition, in which atmospheric entanglements are increasingly troubled.

GLITCHING, A METHODOLOGY

Writing through noise is improvisational, musical practice providing a metaphor for tracing noise in its movement across atmospheric registers and for sticking with it in its ephemerality and indeterminacy. My writing stays close to things—materials, concepts, noise—in ways similar to how I play cello, one sound becoming another through a physicality of touch and instrument, an indefinite, rhizomatic form. I write with an ear to the sound and rhythm of words and to the ways in which they can convey scenes or moods or ideas. In free improvisation, a sound (that is always a multitude) moves into another; sometimes there is a folding in while at other times a pause or a rupture, a startling switch from one thing to another (Grubbs 2018). Repeating a sound, dwelling in it, the hand slips and something else yields, is opened, explored, drawn out and on until time shifts or another player prompts a change in tone or mood or tempo or volume. We play with and against one another, melding into a drone or an alternating, irregular rhythm; it gets loud and I pause or find a way to break through the bass with the highest pitch possible, sustained, softly. An experiment with materials and their textures, improvisation risks failure, whether falling off the edge of legibility or playing a string with such pressure the spiral paper clip used to prepare it pops off, clattering onto the floor somewhere in the darkness.

Improvisation entails experimentation with the sonic potentialities of an instrument—what the materiality of the cello yields as I draw the bow vertically, a scratchiness or click click click as string yields to and then resists the pressure of horsehair. There are tones to be found on metal parts meant to be still, used as tuners and otherwise unnoticed; whispers and wshswhshwhshses of wood, or paper placed under the bridge. These are glitches—sounds made beyond and against a particular history of the instrument, but nonetheless existing as potential. A glitch is a "noise" interrupting or erupting within an intended sound, a buzz or a squeal that betrays the inner workings or recursive potentials of audio technologies—dirty connections, crossed wires, microphones with too high a signal or held in front of an amplifier, a scratch that cuts across the grooves of a record. A sign of infrastructural failure or the materiality of digital technology, glitches are unintended sounds that are always potentially audible, with as much work required to keep them concealed as to make the intended sound heard.[15] Airport noise is itself a glitch, an unintended effect of infrastructure that makes it possible for humans to move from ground to air. And while most engagements with airport noise aim to control or minimize it,

I hone in on the noise itself, finding in it a means of tracing atmospheric matters.

Glitching as a method of investigation, analysis, and writing, I read documents and ethnographic encounters for textures and qualities of events. Hence images and audio recordings are engaged not only for their content but as objects in and of themselves. And while I attend to something of the specificity of a historical moment, I am not aiming for a totalizing account but instead present discrete, distilled concerns that nonetheless seep out and into one another, in ways that are often unstable and indeterminate. I treat archival material ethnographically, listening to its dynamics rather than situating it as an event in the past. Writing in present tense provides a way of animating ethnographic encounters and historical hearings, excavating the archive for its liveliness, or noise. Moreover, it engages hearings as active processes in which key terms were negotiated. A close reading rather than a comprehensive study, the writing performs analysis by attending to noise and its encounters, which might, in turn, fold into another kind of matter, noise itself receding. Neither the construction of a grand narrative nor an application of theory, the discussion stays close to noise itself, sorting out how it emerges and the matterings attendant to it. In this regard, it finds company in "thin description," what John Jackson describes as a "flat" ethnographic methodology, "where you slice into the world from different perspectives, scales, registers, and angles—all distinctively useful, valid, and worthy of consideration" (2013, 17), and what Heather Love offers as "forms of analysis that do not traffic in speculation about interiority or depth" but provide "exhaustive, fine-grained attention to phenomenon" (2013, 404). I read glitches, and read them as glitch, drawing out indeterminacies that are in or across the message, that are meaningful in their exclusion. A glitch methodology affords an amplification of im/materialities of sound and atmosphere even when that may not be the explicit concern of those with and to whom I am listening. Nonrepresentational, it "aims to rupture, unsettle, animate, and reverberate rather than report and represent" (Vannini 2015, 5; see also Anderson and Harrison 2010). Thus, while allowing the sensible to take shape and addressing how its logics spread out and congeal as form, I also draw out the "insensible" (Yusoff 2013) from adamantly sense-making projects.

I dwell in the vagaries, the gaps—where the formless begins to take on a form yet falters, where the sensible moves back into sense, taking shape as limits or exclusions that nonetheless have physical substance and qualities. As "connections between seemingly unconnected things" (Howe, quoted in

Swensen 2011, 38), gaps (like vacant lots and edge spaces) are not "emptiness" but rather "an active coupling" (Swensen 2011, 38) in which something happens. Gaps include slippages across temporal moments, the writing moving from a discussion of archival documents into recent ethnographic encounters as it traces a particular modality of noise. Some of this happens in a play between the text and the notes, the latter of which are substantive in and of themselves, and I hope will be read as such. There is a serendipity to the material, found in archives across the country, on government websites now devoid of a historical record under the current administration, in interactions with acoustical engineers and airport officials, and encounters with people who experience airport noise or work to ameliorate that experience. The archive resonates as an encounter not only with texts but with people who shared memories and knowledge. Much of the material is from minor archives, the places themselves sites of ethnographic engagement. Archivists—who often had personal experience with the subject—were helpful guides through sometimes opaque collections, at times even providing access to relevant items waiting to be cataloged. Many archives were personal, consisting of boxes of files in people's homes or shelves of reports in offices. And while I engage some sources for their content without situating them, I discuss others in relation to the place in which they are housed, with documents becoming animated objects in their own right, and the ethnographic necessarily emerging alongside the archive.

In tracing noise as it moves across registers, I find myself in dead ends, cul-de-sacs (literally and figuratively, if you know Westchester's geography), and potentially newly productive—and creative—spaces. These are little eddies of matterings in which I dwell, drawing out their qualities, whether as driving desires or undesirable intimacies. Finding ways out of the eddies (or not), I skim across the surface of things, accounting for temporal horizons and circulation, the movement of a concept or a political concern or a sensory experience. I attend to what the concept means, how it matters, how it catches up other things or changes into something else that might be similar to previous things or that is nascent, newly composing worlds and becoming event. Emphasizing concepts in things, I insist on an understanding of theory as being in the world—of the ethnographic as intrinsically theoretical—and the possibility of drawing that out through writing. As "concrete abstractions" (de la Cadena 2018), concepts are emergent in and through the material; they are what Manning calls "eventness in the making" (2009, 37).[16] More like wind than water, these eddies are flurries and gusts. Like noise, they might sound at times as if they do not quite fit.

The chapters hone in on particular moments and encounters, exploring some of the kaleidoscopic ways in which noise draws together humans and nonhumans, matter and air, amplifying modalities of listening, figurations of sound, and im/materializations of the atmospheric. As compositions, each chapter is an assemblage that coheres around a particular thematic concern. Not classical compositions that recapitulate the opening with variation, but improvisatory, the chapters sometimes end up in a place seemingly far from where they began, a place that might inform the whole as it emerges through an unfurling that moves the reader through, without argument, to the end. Atmospheric in form, insofar as noise provides an opening, there cannot be a conclusion in the conventional sense. In this way the writing echoes, or performs, what noise does as it moves through matter and across registers, resonating in concrete specificities even as it does not necessarily settle. Following John Law's incisive model in *Aircraft Stories*, the world is performed in the writing, a world understood as rhizomatic and fractional (2002, 6). This is anthropology as "a fabulatory art" (McLean 2017, 1)—a creative engagement with a world, a practice that is also a worlding.

In Chapter 1, "Aerial Attunements," I consider how air and ground are drawn together through listening as those living around the airport newly turned toward noise from the sky. At the dawn of the jet age, aerial attunements provided the basis for new atmospheric imaginaries—for air travel, for conceiving of air as partitionable territory, and for sensorial entanglements of bodies and air. Noise had already established airspace property rights through a 1946 Supreme Court case, *U.S. v. Causby*, in which a North Carolina chicken farmer charged that the sounds of military jets taking off over his coops had caused his chickens to take fright and die. Newly producing the atmospheric as space, civic mobilizations against aircraft noise around Los Angeles International Airport in the 1950s and 1960s revealed gaps between the federal jurisdiction of the sky and the municipal territory of the ground. The atmospheric coalesces as a listening space in which the experience of airport noise drew residents, FAA officials, and U.S. senators together in a series of legislative hearings. One of these was held in Inglewood, California, where residents were experiencing noise from LAX. "Experience" ultimately provides unstable grounds for law, and even as efforts are made to concretize noise through its inscription in recording and measurement, noise itself falls away.

Chapter 2, "Noise Annoys," examines how annoyance, commonplace and banal, adheres to noise even as efforts are made to excise it. An indeter-

minate, unstable affect, annoyance signifies the subjective nature of noise while carrying the weight of nuisance law—of noise as a concern of property. Metrics bring annoyance into being and give it shape, whether as an aspect of sensory experience or an outcome. Emphasizing the viscerality of abstraction, it discusses the development and proliferation of PNdB, or perceived noise decibel level, and its bracketing of *annoyance* in favor of *noisiness*, even as the former seeps back in, hanging on graphs and charted against decibel levels. The weight of perception shifts from the experience of noise to its inscription, the sensory rendered as abstraction. Despite a fixity of metrics, the gap between inscription and perception generates a relationship between the two—a dynamic friction in which discussions about the metric, about its relationship to experience, and about experience itself transpire. Inscription emerges as a form of lively matter that is sensory and affective. Heat maps of airport noise levels are a palpable instantiation of this viscerality, bringing into relief the coextensiveness of thermoception, hearing, and vision.

Chapter 3, "Environmental Imaginaries," traces the indeterminate category of noise pollution as it emerges in the mid-1960s and takes hold in American environmental legislation. The category of *noise pollution* both echoes and amplifies environmental imaginaries of its time, which, while increasingly atmospheric in logic and in substance, remained adamantly anthropocentric. The shift of noise from *nuisance* to *pollution* is significant for registering a then-nascent conceptualization of "the environment" grounded equally in an emergent planetary consciousness and a notion of a permeable body. Casting noise as pollution shifts from a relationship between neighbors to a generalized atmospheric condition, in which the noisemaker may or may not be known. And though it is demarcated as specifically airborne sound, the inclusion of noise in the Clean Air Act Amendments of 1970 does not make it a pollutant of air. Of air but not air, noise is pollution in and through its effects on human bodies, which, figured as permeable, become registers of the atmospheric. And while its general and pervasive quality prefigures something like a notion of "climate," noise pollution does not last.

Chapter 4, "Murmurs: Experiments in Glitching," turns to murmurs—soft, indistinct sounds whose indiscernibility risks illegibility. The negative that matters, murmurs are glitches within a glitch. They percolate up from within like a minor gesture that "opens experience to its potential variation . . . from within experience itself" (Manning 2016, 67), or a minor anthropology that "would make small multiplicities proliferate" (Viveiros de Castro 2013, 19). In this chapter, a series of short pieces takes up a physicality of

the ephemeral that emerges in productive gaps between the bases of establishing what noise is and what is excluded from noise and its control, what nonetheless continues to resonate, meaningful as its other. Amplifying the murmurs of the case, as fragments recuperating what is otherwise, they are themselves murmurs. A proliferation of matterings, they are about wind and weather, the vagaries of noise metrics and their sensory extensions into touch and thermoception, chicken fright, microphones, and kites. And even as they dwell in what is excluded, they distill some of the central points of the book. They are drawn together in chapter form to give weight to their presence and potentiality within the text. Imagine that they might be lifted out and read as a small book on their own.

Jet noise disrupted the continuity between indoors and out made possible by the Pacific climate of Southern California. In response, residential soundproofing turned urban life inward, closing holes in homes and fortifying an otherwise permeable skin. Chapter 5, "Vibrating Matter," explores how noise brings into being emergent materialities while newly shaping listening spaces. This was the era of a cultivation of a new kind of listening, in which high fidelity audio technologies oriented people toward recorded sound and away from environmental sound—and noise. Soundproofing registers homes as "bubbles," marking horizons of belonging and their limits. While the aim was to diminish the sensorial effects of unwanted entanglements, here I read against the grain to address how soundproofing makes evident the resonance of matter, "lively sound" animating the matter of walls and windows, the atmospheric materialized in the membrane of the home.

Chapter 6, "Indefinite Urbanism," focuses on infrastructural edge spaces that are effects of airport noise. Though thematized explicitly in the last chapter, the notion of indefinite urbanism applies to the book as a whole. Today, planes departing from LAX take off over dunes that, once held in place by the concrete foundations of homes, are now habitat for the El Segundo blue, an endangered species of butterfly. This is a place of "noisy silence," the ambivalence of "terrain vague" instantiated by the chain link fence encircling winding streets of neighborhoods where an ocean view remains, inaccessible without the picture windows that once framed it (Königstein 2014, 135; Solà-Morales 2014, 24). Encounters between people, neighborhoods, photographs, ice plant, and butterflies become atmospheric forms that echo those drawn together by noise, "encounters that have taken form" (Malabou 2015, 49). I dwell in the atmospheric qualities of the material, whether that of a photograph or a story, a finger drawing the outline of a hill, or a butterfly in flight. Noise itself recedes, remaining palpable in its effects.

Introduction

1. All images in the series can be found on John Divola's website, accessed May 5, 2020, http://www.faculty.ucr.edu/~divola/.

2. The literature on air and atmosphere is proliferating, spanning discussions of chemospheres and clouds, "anticipatory objects" and "affective atmospheres," and aerial images and volumetric urbanism. Some pieces I have found especially useful to think with include Adey 2010a; B. Anderson 2009; Böhme 1998, 2000; Choy 2012; Connor 2010; Howe 2015; Hu 2016; Ingold 2007; Lewis 2012; Lowe 2010; Martin 2011; McCormack 2014, 2018; Murphy 2013; Parks 2018; Peters 2016; Shapiro 2015; Sloterdijk 2009; and K. Stewart 2011.

3. In general I use *airport noise* rather than *aircraft noise*, though at times it is necessary to use the specificity of *aircraft noise*.

4. Bateson [1972] 2000; Cage 1961; Halpern 2015; Hu 2016; Lippard 1997; Peters 2016; Tsing 2017; Turner 1966.

5. Lefebvre's (1992) spatial trialectic is useful for understanding noise as at once phenomenal and semiotic, as practice, representational, and representation.

6. While sound is often objectified in its models (especially waves) or artifacts (recorded sound), approaching sound as energy makes it necessarily intrinsic to matter in motion, whether air, ground, water, or human. Douglas Kahn's *Earth Sound, Earth Signal* offers a model for attuning to the phenomenal properties of sound as energy, especially as emergent in and through perception. Concerned with addressing "a materiality often assumed to be immaterial," Kahn (2013, 17) engages the specificity of the physicality of energy in its transductions into audible sound. A deobjectified approach to sound is thematized most explicitly in chapter 3. See also Chow and Steintrager 2011; Cox 2011; Deleuze 2005; Eidsheim 2015; Goodman 2010; Ingold 2007; Kahn 2013; Peterson 2016a; and Trower 2012.

7. On noise, see Attali 1985; Bijsterveld 2008; Dyson 2014; Goddard, Halligan, and Hegarty 2012; Goodman 2010; Hainge 2013; Hegarty 2007; Hendy 2014; Keizer 2012; Novak 2013; Schwartz 2011; and M. Thompson 2017.

8. This is by now a robust literature. See note 2 for a list of texts that I have found influential.

9. In this way my project differs from McCormack's, who, in his discussion of the balloon as "envelopment," posits a distinction between an entity and the at-

mospheric, the latter withdrawn, sensed as variation but not fully accessible in and of itself (2018, 50–51). Rather than using atmosphere as differentiated from the durable object of object-oriented studies (which also understands the object, or what McCormack would call entity, as partially withdrawn), I use the atmospheric as a means of putting pressure on durability or solidity, moving toward entanglements between different forms of matter. Instead, this project is more closely aligned with Craig Martin's discussion of fog "as a gathering-force, intensifying the discussion of immanent entanglements of body *with* world" (2011, 454).

10. For affect in relation to atmosphere and sensation, see B. Anderson 2016; Heller, forthcoming; Massumi 2002; and D. McCormack 2010.

11. Work in sensory studies that I have found most helpful for thinking through perception as phenomenal and the body as entangled with its milieu includes that of Classen 2005; Connor 2003; Howes 2009; Laplantine 2015; Manning 2006; Paterson 2007; and Seremetakis 1996.

12. See especially Chen 2012; Hartigan 2014; Karban 2015; Kirksey 2014, 2015; Kohn 2013; Marder 2016; Marder and Irigaray 2016; Raffles 2011; Song 2013; Tsing 2017; and Wohlleben 2016.

13. Sonic weaponry generally relies on this capacity of noise, while using frequencies beyond the range of human audibility and hence shifting from airborne sound to vibration (Daughtry 2015; Goodman 2010; Volcler 2013).

14. See especially Alaimo 2010; Nash 2007; Roberts 2017; Shapiro 2015; Shapiro and Kirksey 2017; and Tousignant 2018.

15. For ways of thinking through and using glitch as method, see Berlant 2016; M. Chavez 2012; Kelly 2009; Krapp 2011; and Larkin 2008.

16. I find Barad's formulation especially compelling: "Theories are not mere metaphysical pronouncements on the world from some presumed position of exteriority. Theories are living and breathing reconfigurings of the world. The world theorizes as well as experiments with itself. Figuring, reconfiguring. Animate and (so-called) inanimate creatures do not merely embody mathematical theories; they *do* mathematics. But life, whether organic or inorganic, animate or inanimate, is not an unfolding algorithm. Electrons, molecules, brittlestars, jellyfish, coral reefs, dogs, rocks, icebergs, plants, asteroids, snowflakes, and bees stray from all calculable paths, making leaps here and there, or rather, making here and there from leaps, shifting familiarly patterned practices, testing the waters of what might yet be/have been/could still have been, doing thought experiments with their very being" (2012, 207–8).

CHAPTER 1. Aerial Attunements

1. The first commercial transatlantic flight, from New York to London, had occurred the previous year.

2. Los Angeles Airport became known as Los Angeles International Airport in 1949, with the designation LAX. Los Angeles World Airports (LAWA), established as the Los Angeles Department of Airports, is the airport authority that owns