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The Matter of Timbre: Listening, Genealogy, Sound

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The Oxford Handbook of Timbre

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Abstract and Keywords

This chapter offers a critique of traditional Western accounts of timbre to propose that, instead of a secondary parameter subordinated to pitch and rhythm, timbre is a general category—a condition of possibility for listening—that depends on embodied perception and makes difference audible. The chapter draws from phenomenology as well as psychoacoustic and ethnographic research, focusing on case studies ranging from Fatima Al Qadiri to Julius Eastman, alongside ethnographic analyses of Barundi Whispered Inanga, sonic encounters in nineteenth-century Colombia, and readings of Jean-Jacques Rousseau, Eduard Hanslick, and Guido Adler, to provide a broader account of timbre that encompasses the imbrication of acoustic components with memory, affect, and language. In this respect, timbre emerges as an important critical and musicological category that helps us address issues of embodied difference and culturally dependent forms of listening, while reassessing the prominence of Eurocentric conceptions of musical values.

Keywords: phenomenology, perceptualization, mimesis, affect, acoustemology

The sound component of Josh Kline's 2015 installation *Freedom* is a cover version of "The Star-Spangled Banner" made by Fatima Al Qadiri, a Senegal-born producer who divides her time between Kuwait and Brooklyn.¹ Kline's multimedia installation explores the gap between the ideological elevation of freedom and the pervasive militarization of the police in today's United States—a tension embodied in four iconic riot-gear-clad Teletubbies with video screens embedded in their bellies. These dystopian "Po-po" guard three metallic palm trees that sprout credit cards and zip-tie handcuffs from their branches, in a setting that evokes the 2011 Zuccotti Park Occupy camp. Al Qadiri's melody, shrouded in delay and reverb, resonates across the space, filling it with the palpable anxiety of police violence and hypermodern alienation.

Example 1. Al Qadiri, Fatima. "Star-Spangled." 2014

Al Qadiri released the track online as an independent piece on July 4, 2014, at a time of rising awareness about racialized violence in the West; see Example 1. She presented it as a dedication to "American national nightmares. On [the] one hand, dark dreams of suburban serial killers and mangled hitch-hike heads. On the other, a false hope of national greatness cooked by covert agendas."² Even heard as an independent piece, the familiar anthem—fragmented and repeated through a "ping-pong" delay effect—returns as a haunting refrain. But perhaps the most unsettling element in Al Qadiri's piece is the cold, synthesized voice choir that hums the melody (a sound she employs in most of her releases.) Much of the critical power of Al Qadiri's music comes from the timbral ambiguity of this sound. We hear it at once as uncannily inhuman, and also hopelessly dated as a synthesizer patch. The immediacy of our reaction is tied to the complexities surrounding the voice as an object to be analyzed and synthesized, whose timbral profile is particularly complex to analyze and reproduce convincingly. The human voice attracts our attention and elicits affective responses more than any other sound. Our world is saturated by synthesized voices and we are slowly growing accustomed to their omnipresence. The sound Al Qadiri employs, however, produces an experience of the uncanny that remains tied to a past, utopian time, when voice synthesis promised the unification of nature and technology—a dream that, as Alexander Weheliye notes, required a non-racialized, universal "man" as its model.³ Under closer examination, late twentieth-century voice synthesis does not promise unification as a posthuman future, but reminds us of the latent colonialist drives that fueled these dreams in the first place. If this patch is uncanny, it is not because it is an acousmatic voice, nor because of its degree of resemblance to its original model, but because it immediately raises the question of whose voice is presumed to be the model, and which other voices have been excluded from this technological version. What happens to the moral and political value of the human voice when it is reproduced as consumer technology? What is it about this timbre—about timbre in general—that transforms the vocal showpiece that is "The Star Spangled-Banner" into the stuff of techno-capitalist nightmares, even if the song remains the same? And what kind of critical discourse can we employ to analyze its effects?

Recent studies on the voice offer insightful avenues for answering these questions. As Nina Sun Eidsheim notes, vocal timbre is always already political. The voice is the site of projections, expectations, and regulations, a repository for cultural attitudes toward gender, class, race, and sexuality.⁴ The sound of one's voice seems intimately tied to one's individual identity, yet only recently have we started to develop a conceptual repertory that accounts for this perception and all its associated troubles. Here, I argue that we need a theory of timbre that accounts for the micropolitics of the voice and its underlying genealogies. The first difficulty is that we lack the language to discuss timbre as such and, I will argue here, this is no innocent oversight. Rather, it is the result of engrained modes of thinking about matter, identity, and difference that condition Western musical theory. How we talk about timbre is inseparable from how we think of the differences

between sonorous and listening entities and thus from the ontological distribution of beings in the world.

Timbre is an odd phenomenon. Pitch, rhythm, and dynamics—the main traditional parameters of musical sound—employ either discrete values that divide a continuum, or an absolute measure that expresses them, independent of musical context. Traditionally, pitch is defined either as divisions of the octave (relative) or as determined by frequency (absolute); duration is defined as subdivisions of a beat (relative) or durations (absolute); intensity is described by terms such as *pianissimo* or *forte* (relative) or measured in dB (absolute).⁵ But timbre, a notoriously ambiguous notion, is not easily expressed in discrete values, whether absolute or relative. The presupposition is that pitch, duration, and intensity are variables—what a sound *does*. Timbre, on the other hand, is understood as an invariable and unchanging condition—what a sound *is*.⁶

As a multidimensional parameter, timbre cannot be placed on a single continuum defined by absolute or relative terms. Rather, the vocabulary of timbre consists of approximations that attempt to name a quality we cannot seem to define; it works as a dispersion of elements—reference to a source, metaphorical and synesthetic descriptions, or resemblances between sounds—that imply comparison between events without their own specificity. Textbook definitions of timbre preserve this indeterminacy. As a familiar one puts it, “if two tones are judged to be ‘different’ and yet have the same pitch and the same loudness, then they must differ in timbre.”⁷ This understanding of timbre as a “wastebasket attribute” implies that sounds that lack a measurable and comparable pitch do not have timbre, or that we cannot measure it without equalizing other parameters.⁸ Yet it also points to a certain aspect in sounds with which we are familiar as listeners, even if it does not specify what produces the residual differences we hear.⁹ There is always something else in sounds other than what we say about them—something that resists definitions and one-sided accounts. After accounting for pitch, duration, and intensity, a sound prompts us with something else: an instrument or body, a texture, a color, its reverberations, a reference, a memory, an affect. These belong to timbre as a kind of excess. Timbre easily discloses or hides its source, it confuses or tricks us, at times combining with other sounds, masking itself and masquerading as the sound of something else. In this “wastebasket attribute” we keep hearing things we did not initially perceive or expect in sounds. The “difference” that the textbook definition seeks to establish is not just the comparison of individual parameters; it is an endless comparison of all the particularities that arise when we listen attentively. The measure of timbre is neither absolute nor relative, but differential.

Difference is also what is at stake in Cornelia Fales’s “paradox of timbre.”¹⁰ Timbre carries the most nuanced information about a source, its location, and the environment through which the sound has travelled. Yet “it is also the dimension that is most divergent from the sound in the physical world.”¹¹ For Fales, this difference is the result of “perceptualization,” namely “the process by which necessary interpretive elements are identified, created, and combined with acoustic properties of the environment to create auditory percepts.”¹² Further differences emerge through digital analysis. The

spectrogram fixes the perceived ambiguities in sounds and allows us to bypass subjective variations and obtain a stable object. It gives us valuable elements with which to identify why a particular sound has its particular timbre (its attack and decay have a certain shape, it is harmonically-based or formant-structured, and so on). To arrive at the perceived sound, however, we need to measure the difference between the physical event and the sound as experienced by a listener, not to mention the gap between sound as a heard, temporal event and sound as a visual, static image.¹³ Timbre, therefore, is measured both by differences between sounds themselves and by differences between sounds and their (human) perception.¹⁴ In this chapter, I will discuss what is at stake when considering these differences empirically, by digging into the wastebasket of timbre to extract those textures and colors, references, memories, and politics—the very things that carry the affective power of sound as heard.

If timbre is excess, as I am proposing here, then this wastebasket is not one that receives useless components, but one that keeps producing them—a weird kind of wastebasket, or no wastebasket at all. In other words, timbre is a remainder. The inexhaustibility of sounds demands that we keep listening, that we approach sounds as rich, multifarious—and often disturbing—events. The stakes of these demands are high, for this remainder makes difference audible. This is why we need to develop a theory of timbre that measures up to the demand for broad listening practices. My trajectory here follows two complementary paths. A preliminary, analytical examination shows that timbre cannot be reduced to the name of the instrument or source that produces it, or to its empirical status as a physical event. These approaches (which I will call nominalist and empiricist) fail to account for the role of embodied perception, which phenomenology understands as always permeated by memory and affect. This means that we cannot conceive either of timbre as a parameter or of listening as a faculty in isolation from each other and from their entwinement with affect and power. Rather, we need to think of the imbrication of these elements as constitutive of sounds as heard and of the “musical subject” that hears them.¹⁵

But if it is true that we need to consider timbre as depending on embodied perception, then this means that a purely analytical approach—whether nominalist, empiricist, or purely phenomenological—is insufficient, both because it remains at the level of language and because it omits the history of how we came to listen to timbre in this way. This history is not so much written in books as it is on the body: it will have determined what we can listen to, what is audible to us. Tracing this history amounts to understanding the imbrication of sound and listening as a result of their formation—or, as Foucault writes about genealogy, thinking of the body as a surface on which events are inscribed. Accordingly, in the second section I trace the notion of timbre from its first modern usage in Rousseau to its demotion as a secondary parameter in Eduard Hanslick and Guido Adler’s foundational texts on musicology. Throughout these two sections—analytical and genealogical—I will develop the main thesis of the chapter, that timbre is the condition of possibility for sound and listening, but that, given the embodied character of listening

and the historicity of its formation, it might be impossible to arrive at a universal theory of timbre that does not betray its particular character. Making listening possible, timbre remains irreducible: a differential parameter that uniquely allows us to engage with the materiality of sound.

To think across the two sections, I draw on diverse sonic examples, including music by Fatima Al Qadiri and Julius Eastman, as well as ethnographic analyses of Barundi Whispered Inanga and sonic encounters in colonial New Granada. These examples make difference audible in various ways. They are racially and culturally marked as different: female, black, queer, indigenous. They come from outside the Western canon, yet make oblique references to it. From these positions, they expose how traditional notions of timbre are bound to the canon and are hence limited in their capacity to describe different forms of sonic effectiveness. In Al Qadiri's music, timbre appears as a marker of difference between styles, cultures, subject and object, and even nature and culture as mediated by technology; in Eastman, timbre becomes a compositional resource that displaces pitch and rhythm-centered approaches conventionally associated with black and queer musics. As will become evident, and as Al Qadiri's example foreshadows, the human voice has a key role in these histories. By attending to the encounters between ethnomusicologists and Barundi peoples, as well as Europeans and their others in colonial Latin America, I argue that the voice is not a stamp of personal identity, but the timbral mark of difference. Vocal timbre is the site where cultural and natural differences—the embodied capacities to hear and to understand an other as a sounding entity—are most audible.

The Materiality of Sound

The timbre used in Al Qadiri's cover of "The Star Spangled Banner" is unmistakable, but it is also ambiguous: it recalls vintage synthesizers at the same time as it evokes futuristic dystopias, it is both human and also machinic, unremarkable and also disquieting. Timbre—as a remainder—is the "and also" of any attempted description of sounds. In all cases, these aspects constitute the materiality of sound and timbre is the parameter by which we encounter this materiality. For Jean-Luc Nancy, "timbre is the resonance of sound: or sound itself. It forms the first consistency of sonorous *sense* as such, under the rhythmic condition that makes it resound."¹⁶ But the matter of timbre is not just sound itself. Timbre is not the "stuff" that sound is made of—air in motion. A materialist approach to timbre would not describe timbre in terms of sound waves, frequencies, and formants. This would better be called a physicalist or empiricist approach, and it would tell us no more about the synthesized choir than we already knew by hearing it (even if this knowledge is necessary to create the sound in the first place). It would not tell us anything about the anxiety, about the uncanniness that remains in those disembodied voices, trapped inside a synthesizer's preset sound. To recall a distinction offered by Brian Kane, the matter of sound is neither in its figural aspects (sound defined as tone or

scale degree) nor in its formalized aspect (sound as sheer noise), but in the gap between the two.¹⁷ The “matter” of timbre, as I suggest here, takes seriously the pun it playfully proposes.¹⁸ The analytical and critical interest of timbre lies in the “and also”—in whatever remains after we have analyzed a sound’s physical composition. Timbre is inexhaustible because it is not reducible to matter, although it is not purely ideal either. Timbre is what matters when we listen.

Pitch, duration, and intensity also matter: sounds have specific temporal and spectral determinations that can be measured empirically and perceptually. We speak of the pitch of a sound, a rhythm articulated by some source, at a given intensity. These parameters seem to have the same claim to defining the materiality of sound as timbre does. One can think of timbre as made up of a collection of pitches (as frequencies or partials) or conversely one can argue that a melody has the same pitches whether it is played on the flute or the violin. In these cases, it seems that pitch is independent of timbre, yet to arrive at this account of pitch we need to perform the kind of mental abstraction—Kane’s figuration—that I analyze below as an “idealization” of sound. On the other hand, there are sounds that do not have a defined pitch but have quite defined timbres—cymbals, drums, white noise, extended techniques such as “slap tonguing” in reed instruments—that are commonly foregrounded in all sorts of music.¹⁹ In other words, one can have sounds without rhythm or pitch, but not without timbre. It does not even seem possible to imagine sounds without a determined timbre, as when Wittgenstein wonders if we can distinguish between a sound’s timbre (*Klangfarbe*) and the sound itself (*Klang als solchen*).²⁰

Pitch and rhythm, conversely, depend on the matter of timbre. If we accept that timbre is in part the result of what we call the envelope (the shape of a sound in terms of attack, decay, sustain, and release), then our perception of rhythm and meter will be altered as the envelope varies.²¹ Similarly, insofar as the timbre of a sound depends to a large extent on its overtones (or its spectral composition), and since these tend to be harmonically organized in the case of tempered Western instruments (where overtones generally correspond to multiples of the fundamental frequency), then there is a relationship—a 2:1 proportion, for example—between the timbre of these sounds and the kinds of intervals and scales that can be used in conventional Western music.²² It is difficult, and perhaps fruitless, to settle on whether the parameters of music are inseparable and whether there is one such parameter that can act as an “elementary atom” of music.²³ Yet we still need to analyze how timbre, as a parameter that reveals so much of sound’s materiality, came to be demoted to a secondary status in most of Western musicology.

In musical practice, however, timbre is not always approached as a secondary parameter. Some strands of minimalism—beginning with Terry Riley’s 1968 *In C*, up to Julius Eastman’s 1980 compositions *Crazy Nigger* and *Gay Guerrilla*, Glenn Branca’s 1982 “Indeterminate Activity of Resulting Masses,” or Michael Gordon’s 2009 *Timber*—employ repetition of simple melodic cells performed by any number of instruments of the same type such as pianos, guitars, or simantras (amplified 2x4 wooden beams) to produce massive timbral complexes. In these compositions, harmony, melody, and rhythm are

relatively stable and the musical development occurs by exploring the timbral effects that occur by accumulation, resonance, and reverberation. Similarly, in musical genres from EDM to reggae and remix cultures, a DJ, dub selector, or producer applies filters and other timbral transformations to records that are otherwise fixed and whose musical structure relies on the repetition of basic rhythmic and tonal structures. In this case, audiences—dancers—respond to rhythm, but the DJ’s most prominent manipulations are on timbre and their success as performers is measured largely by how their audiences react to timbral modifications on tracks whose rhythmic content is largely fixed.²⁴ In a world of synthesizers and sound designers, there is as much attention given to the sculpting of each particular sound as to the more traditional aspects of composition. What used to be the concern of luthiers and organologists now belongs also to composers, producers, studio engineers, and musician-engineers or “digital luthiers.”²⁵ These practitioners employ and understand timbre in ways that overlap with musicological discourse, often valuing it more than theory itself has done, even if practical motivations overshadow critical analysis. Yet sometimes, as I argue in the case of Al Qadiri, there are forms of practice that work as critique and pose fundamental questions: What is the matter with timbre? If timbre is “the resonance of sound,” why has it so rarely—or ever—held a central place in Western music theory?

Even if we take into consideration their material aspects, parameters such as pitch, duration, and intensity become ideal abstractions—unheard events—when timbre is left unaccounted for. We cannot conceive of the materiality of sound without thinking of timbre. This is a second paradox of timbre: in the Western tradition, timbre has typically been considered a secondary parameter and yet we cannot conceive of a sound without timbre, nor account for pitch and rhythm without timbre. With this paradox comes an analytical problem. It seems reductive to single out timbre and hold that all aspects of music depend on it. Lawrence Kramer, for example, objects to Nancy’s claim that timbre is the resonance of sound, arguing that, on both logical and musical grounds, “it makes no sense to single timbre out for idealization, even in the name of sheer materiality or ‘sonorous sense.’”²⁶ But, I contend, timbre is not the “essential element in music and in listening generally,” as Kramer’s reading of Nancy has it.²⁷ It is neither the pure material of sound nor the essence of music; hundreds of years have passed without it being of much critical relevance. And yet, it is still the case that we cannot have sounds or music without timbre. Timbre is at the same time a *secondary* parameter and a *global* parameter.

To use a philosophical turn of phrase, timbre is sound’s condition of possibility. More precisely, timbre names the irreducibility of sounds to any particular parameter other than this global parameter. This does not mean that timbre becomes the principal parameter to which all others are subordinated. Rather, as soon as we accept that pitch and rhythm are conditioned by timbre, their status as primary parameters is put into question, and with this the general organization of Western music theory and history. Attention to timbre’s paradoxical secondariness shows that the other parameters of music are already idealizations. This is not just a matter of theory. Al Qadiri’s music, for example, uses timbral mimicry to expose the cultural limitations of pitch and rhythm-

centered aesthetics that reduce difference to timbrally-fixed, preset stereotypes.²⁸ The solution to this paradox might lie in distinguishing between timbre as an empirical, secondary parameter (as we usually think about it) and timbre as a global parameter (as a condition of possibility for all sounds). But before that, I will turn to examine the ways we traditionally discuss timbre and how these approaches contribute to preserving timbre as a secondary parameter in pitch and rhythm-centered approaches to music. Only by exposing the problems of thinking timbre as a secondary parameter can we see what is at stake in considering it as a condition of possibility for all sounds.

Timbre: Analytically

Like the other parameters of music, timbre is subject to idealizations or abstractions that preserve its status as a secondary parameter. We can distinguish between two attitudes in traditional modes of thinking about timbre: nominalism and empiricism. Nominalism consists in reducing timbre to the name of the instrument that produces it: strings, oboe, contralto, analog synthesizer. In everyday speech, we refer to sounds by the name of their source even if we know (1) that the physical properties that define the sound of an instrument vary (depending on the register, as in a clarinet; or extensively, as in a synthesizer; or according to the performer, as between John Coltrane and Wayne Shorter); (2) that the medium of transmission affects the sound's properties; and (3) that the way we perceive sounds does not correspond exactly to how they occur in the physical world as measured by a spectrogram.²⁹ In the nominalist attitude, a flute is still a flute whether it is live, recorded (on magnetic tape, vinyl, encoded as an mp3), or imagined. The spectrogram will reveal wide divergences between these sounds, but for the nominalist it is still good enough to call them "flutes" and to refer to the sound they emit as an "A."³⁰ Typically, Western composers are nominalists: they usually write for one instrument or another and the requirement is generally that the piece or part is performed by an instrument of the kind specified in the score, without any strict requirements about the nature of such an instrument, its particular sonorous qualities, and so on. When analyzing music, one refers to the piano, the strings, or the drum machine and expects readers to hear or imagine these timbres without difficulty—except when we confront those who actually do not know what these instruments are, which exposes how much information is conveyed by the statement "this is a piano." In its simplest form, the textbook definition—that timbre is the difference in sounds when all other parameters are equal—presupposes a nominalist approach: the difference between two sounds that are otherwise equal in pitch, duration, and intensity is satisfactorily addressed by giving a different name to each sound as a source (for example, a flute and an oboe). The nominalist employs timbre as a label, which allows her to jettison or repress the instability of timbre in order to consolidate the hierarchy of "what really matters" in music: pitch or rhythm, form, style, and so on. This approach simplifies our discussions of music (allowing us to bypass the complexity of sound as experienced and to

examine music in non-sonorous media), but it has the drawback of making us forget that timbre is a multifarious phenomenon, that no two sounds are identical, and that there is always something more to be heard in every sound.

In empiricism, on the other hand, what really matters are the physical properties of sounds, such as waves unfolding over space and time, even if human ears cannot hear everything that makes up these events.³¹ Empiricist analysis aims to isolate the acoustic parameters that make music have the effect it does. What makes a sound sound as it does in physical terms? How is it produced, transmitted, and eventually perceived by the ear (the latter considered as another acoustic interface)? And how can we examine this process, grounded solely on sense experience and technological devices? In answering these questions, empiricism deals with a certain multifariousness in timbre that nominalism sidesteps, yet it reduces this multifariousness to questions about the physical behavior of sound and our cognitive capacities. The main concern of psychoacoustics is to provide empirically grounded models that bridge physical sound and human listening, modeling human listening itself as a mechanical process.³² It assumes a linear, causal sequence of source-stimulus-sensation-perception that acts instantaneously, immediately, and unidirectionally, from outside to inside. That is, it thinks of timbre as a problem of perception, as a psychoacoustic phenomenon that is best explained through analysis and empirical research. In this sense, timbre ceases to be a musical parameter and becomes just another aspect of the physics of sound.

Consequently, when reincorporated into musical discussions, empiricism paradoxically falls back to nominalism. The possibility of generalizing empirical discoveries depends on maintaining a nominalist attitude with respect to the timbres themselves, as when test subjects are asked to compare samples of sounds: “a flute; an oboe.” While the test reveals empirical differences, these will be later folded back into the notion of how a flute’s timbre behaves in general. This approach is necessary for designing audio technology such as synthesizers, hearing aids, and encoding techniques. Its effectiveness in these applications guarantees its epistemological value and sets the truth-standard against which all other approaches are measured.

Both nominalism and empiricism are attitudes that preserve timbre as a secondary phenomenon because they contribute to a certain idealization of sound—the reduction of sound to an ideal entity such as “A major.”³³ To approach timbre from a nominalist position, both as a naive attitude and as a fallback from empiricism, means to privilege those aspects of music—pitch and rhythm—that can be dealt with in positive analytic terms, and which do not provide the same perceptual and analytic challenges as timbre does. While there is much empirical research into the perception of pitch and rhythm, we are so accustomed (in the West) to identifying sounds with their musical notation that entire analytical operations can be made on collections of pitches and rhythms without these ever having to be rendered as sounds, even after the “work-concept” and its adjacent presuppositions have been historicized.³⁴

The problem arises when these reductions are taken for granted and naturalized as that which constitutes music or sound “as such.” Pitch and rhythm are crucial to preserving the identity of the “work concept”—indeed its ontology—in ways that timbre is not. Put in stronger terms, our Western canon—the very idea of a canon of music—depends on being sloppy with timbre. For a nominalist like Nelson Goodman, tonal and rhythmic elements are constitutive properties of works. Timbre is constitutive in a nominalist sense, namely that we expect piano sonatas to be performed in pianos, but the kind of piano—and hence the resulting timbre—is not.³⁵ By fixing the non-material parameters, leaving timbre only barely defined as instrumentation, the medium of notation ensures optimum repeatability by means of resonification of the abstract work.³⁶ This repeatability, in turn, helps preserve the idea that tonal and rhythmic elements are constitutive of the “work,” while timbre is not. When Nancy speaks of timbre as “the resonance of sound,” on the other hand, this is hardly an idealization of timbre, *pace* Kramer. On the contrary, it is an operation that seeks to undo the idealization of sound that has been normalized by music theory and history.

Underpinning this idealization of sound is the presupposition, shared by both empiricism and nominalism, that listening is a purely physical phenomenon. While nominalism holds that music “proper” is “in the notes,” empiricism claims that real sound is only a physical event. In both cases, timbre falls out of the equation. For this reason both attitudes are committed to a scientific naturalism and ontological physicalism that recognizes as real only that which has a measurable, spatiotemporal physical existence. The physicalist premises of empiricism are that everything that matters about listening can be understood by producing models that reproduce sound transmission as an acoustic phenomenon (that is, in terms of frequencies, partials, and envelopes); that these operate causally and in “real time” on the listener’s ears and mind; and that this process works in the same way—universally—in all cases. The crucial question for this view is how to reconcile sound as physical reality with sound as heard, especially since timbre reveals a wide gap between the two.

The empiricist approach relies on an analytic division between what Fales calls a physical, “acoustic world” where the acoustic signal is produced and dispersed and a subjective, “perceived world” created by listeners as a result of their translation of signals from the acoustic world.³⁷ In the acoustic world, there are only frequencies of different amplitude and these interact in specific ways. In the perceived world, on the other hand, listening is the result of “perceptualization,” an unconscious cognitive process that fuses these frequencies, often in a heuristic, approximative way, into timbre as a unified phenomenon.³⁸ For the empiricist, the perceived world is a facsimile of the acoustic world, which alone is real.³⁹ In “The Paradox of Timbre,” Fales shows how the gap between the two is made audible through sounds that juxtapose different timbral phenomena in various ways. Whispered Inanga, for example, is a musical practice from the East African Barundi people consisting of a whispered text accompanied by an 8-stringed wood zither called an *inanga*. The *inanga* complements the missing sounds required to make the whispered text in Kirundi—a tonal language—understandable as speech.⁴⁰ The combination of whisper and string sound is an effect of perceptualization

invisible to acoustic analysis that exposes the role of perception in shaping acoustic experience. Fales remarks on the cultural specificity of this effect by noting how Alan Merriam's recordings of *Whispered Inanga* fail to capture the timbral effect, since Merriam himself was unable to hear it and thus position the microphone correctly.⁴¹

From a phenomenological perspective, on the other hand, the difference between the acoustic and the perceived world only arises when the empiricist introduces the spectrogram as the measure of what is "real," displacing the source of meaning from one pole to the other. The spectrogram reveals aspects of sounds inaudible to human ears and thus clarifies how perceptualization works by producing an "objective" counterpart to sounds that can be fixed and examined across visual media. Without spectrograms, timbre would remain a matter of imprecise language. Yet what the spectrogram reveals about the acoustic world falls within this humanized rendering, not outside of it: technology is only another mode of disclosure, it does not preexist the world, nor does it offer unmediated access to it. The spectrogram is not evidence of sounds as they really are, but a different mode of experiencing sounds—crucially, through a different sense and by transforming a temporal event into a spatial object. We cannot undo the work of perceptualization in experience, even after understanding how it operates. The phenomenologist's common objection to empiricism still holds: we rarely listen to sounds as they are presented to us in the laboratory. Instead, we listen to Al Qadiri's cover of "The Star-Spangled Banner" and its uncanny voice preset, or to the dense timbral clouds produced by four pianos in Eastman's *Gay Guerilla*—and the many genres it anticipated even as his works were forgotten—not to the voices or pianos themselves nor to their harmonic spectra. Alternatively, if we do not speak Kirundi we can only hear whispers and plucked strings in *Whispered Inanga*, not the timbral effect by which sounds become speech, nor the ritual moment when the spirit Kiranga appears after a successful performance of *Inanga ya Kubandwa*.⁴² We listen "culturally" to timbres that are charged with affect, the conduit of social forces.⁴³ A trained researcher like Fales can employ spectrograms and ethnography to illuminate both the physical and cultural aspects, yet listeners outside this particular culture still cannot hear it meaningfully as *Whispered Inanga*, even after learning how it works. This is the difference that timbre reveals. Attention to timbre, in this case, exposes aspects of our experience of sound and music. As Fales shows, Western pitch-centered attitudes misconstrue the importance of timbre not only for specific musical practices, but also for our conception of musical practices and sound in general. Timbre is the result of the interplay between the acoustic and the perceived world through perceptualization; it is also the site where collective memory and cultural difference manifest themselves in sound.

Perhaps it is clear by now that nominalism and empiricism, while seemingly opposed, are in fact closely related: they both rely on the same physicalist and naturalist premises and together contribute to the idealization of sound. Moreover, both rely on perceptualization as "an unconscious cognitive process" by which physical sounds appear to us as timbre. Like the Kantian transcendental, perceptualization conditions experience without being part of experience, that is, we are never aware of its operations, so that we assign to the object a constitution that depends on how it appears to us. This transcendental character

renders timbre unknowable in its totality, which explains the dispersed vocabulary we use speak about it (often in the form of “ineffability”), the incapacity to “theorize” it, and the paradoxes that it embodies. To consider timbre as inseparable from the “unconscious cognitive process” of perceptualization, a process somehow hardwired in all forms of human listening, is to return timbre to that which cannot be known as such, beyond systematicity, or beyond critique.

Empiricist research is focused on explaining this seemingly transparent operation to argue that timbre is the result of perceptual mechanisms that are largely the same for all human listeners and depend on unchanging physical phenomena, both of which are measurable and can be reproduced. Natural invariance underpins cultural variation. Empiricism thus assures the objectivity of its findings through particular cases that exhibit unchanging rules; nominalism allows these particular, empirical discoveries to be taken as universals. Ethnographic research also contributes to this aim. For example, the fact that perceptualization operates similarly in Tuvan throat-singing and Barundi Whispered Inanga suggests it is a universal phenomenon, even if Western listening practices tend to ignore the uniformity of these two forms of musicking.⁴⁴ The promise of empiricism is that, even if we currently do not have a general theory of timbre, we should be able to arrive at one through more research and experimentation.

Yet, as Fales also shows, timbre is historically and culturally determined—sometimes in conflicting and problematic ways. Empiricist research has produced the voice patch in Al Qadiri’s track, but it cannot explain the troubling effects it has on its listeners. After all, part of its affect depends on how its seemingly non-racialized vocal timbre conveys anxieties about how technology construes the notion of a universal human. Timbre is thus poised—strategically—between universality and particularity, and as a critical concept it depends on how we can maintain this in-between position. In the long run, empiricism and nominalism might lead us astray, as the idealized notion of sound they uphold simultaneously proclaims a false universality—depending on specific Eurocentric musical values—and a meaningless particularity—since timbre is there conceived as a secondary parameter without significant value for our experience of sound. Is it possible, then, to claim that timbre reveals something about sound in general that idealized tonal and rhythmic aspects or nominalist generalizations do not, while simultaneously holding that the differences that timbre reveals have a particular power—the power of the singular, not just the empirical—to reveal historical and cultural differences?

One possible way is to argue, with Foucault and Merleau-Ponty, that those transcendental conditions of possibility for experience—such as perceptualization—are also historically and culturally conditioned. Foucault introduced the idea of a “historical a priori” to counter the presumed universality of Kant’s transcendental Ego, first as changes in modes of knowledge, later as modes of power.⁴⁵ In another vein, Merleau-Ponty argued against empiricism by holding that the body—its memories, tendencies, habits, and diseases—must be taken as a condition of possibility for experience too.⁴⁶ There is no disembodied, transcendental Ego, but always a localized body, whose situated and embodied constitution determines that which can be experienced meaningfully. These two

approaches—a genealogical understanding of the transcendental and a phenomenological approach to embodied perception—are useful in thinking of timbre as a phenomenon where the imbrication of the body and perception, as listening, is at the same time privileged and taken for granted. Indeed, if timbre is inseparable from cultural as well as physical and physiological difference—since it is not enough to understand the process without sharing the meaningfulness of its world—then the universality of timbre falls to the ground.

Timbre reveals both particularity and universality. It is at the same time both an aspect of sound and the condition of possibility of all sounds. As suggested above, timbre is a “specific,” empirical parameter (often treated as secondary), and a “global” or parameter, conditioning our experience of sounds in general. This double aspect affords timbre with the critical capacity of undermining universalist claims about listening and sound in general that depend on idealized notions such as tone and rhythm, while itself resisting its own universalization.⁴⁷ We would do well to conceive of timbre as a musical or sonorous “empirical transcendental of the transcendental,” or a *quasi*-transcendental, inseparable from the “specific” parameters that traditionally define musical sounds.⁴⁸ Timbre, therefore, is not so much an analytical wastebasket, but rather a condition of possibility for all sound (that without which no sound is possible). But it is also a condition of impossibility insofar as it demonstrates that the experience of sound is always particular, historical, and embodied, incapable of being subsumed under general theories or raised to the level of the universal. Accounting for this impossibility keeps us from thinking of timbre as an absolute, ahistorical parameter to which all others are subordinated. It demands that every claim on its universality is met with an acknowledgment of the limitations of such claims: for there is always a remainder, a reverberation that keeps resonating—even if we stop listening.

Timbre: Genealogically

The scarce attention that timbre has received in the West shows how effective the work of perceptualization is. Timbre disappears as a phenomenon as it becomes imbricated with the other senses, to the extent that we borrow from them to discuss timbre. Just as we speak of *Klangfarbe*, or sound-color, we encounter the grain, mass, harshness, brightness, roundness, or depth of sounds as tactile or visual aspects. These imprecisions are not unusual, nor are simply the result of inappropriate uses of language. Part of timbre’s inexhaustibility is the unavoidable contagion it suffers from other senses.⁴⁹ The senses borrow, encroach, and intertwine with each other, and timbre makes this contagion audible. It suggests that this sensorial entwinement is primary, whereas the discrete senses are a latter formation. More importantly, sense contagion opens us to an affective engagement with the world. Perception is always already intersensory; the perceptual body is the site where physical and cultural elements are woven together in a meaningful experience.⁵⁰ The body gives sense “not only to the natural object, but also to cultural

objects like words.”⁵¹ Thus, when we hear a sound and listen to its timbre, we already experience it as imbricated with something else: timbre is not only auditory but also visual, tactile, physical, and physiological. Timbre, like the body, sits at the nexus of experience.

For the phenomenologist, this imbrication also includes a temporal aspect. I never perceive the isolated, instantaneous samples that the empiricist employs in the same way as I experience sounds in everyday life. In the latter case, the sound I hear always combines the *retention* of the sounds that preceded it (so I can hear an interval, or trace the movement of a source in space) and the anticipation (*protention*) of how that sound is going to behave. I can never perceive an instant of time—or a succession of instants—such as the spectrogram seeks to represent. This is so of all experience, but it is especially important for timbre: attack and decay are temporal aspects, and even if the spectral components of a sound are stable, its timbre varies when it is cut, rearranged, or simply reversed.⁵² Timbre is never an instantaneous or static phenomenon; it is always conditioned by temporality and permeated by memory.

Merleau-Ponty’s analysis of experience discloses a body of habits and practices that is also traversed by history and political forces. Al Qadiri’s version of “The Star-Spangled Banner” channels the political unrest of the past years; the erasure of difference in music history resonates in Eastman’s timbral clouds. There is no pure perception without affect, since the imbrications between embodiment, language, disposition, sensation, and mood are always in operation. These imbrications are constantly re-formed in experience, so that every sound comes to us already charged with affect. Both “strong” and “weak” forms of power are part of the technologies of the body and perception is one of the main fronts where this shaping takes place. As I shall argue, our concept of timbre—and our modes of listening to it—has been shaped historically by forces that do not register in empiricist or nominalist approaches. Timbre sits at the intersection of two series of elements that appear now as intertwined: on the one hand, perception as inseparable from memory, history, and power; on the other hand, sound as heard and the “musical subject” that hears them. A genealogy of timbre that attends to this micropolitics of the body and to the ways power is coded into perception, as William E. Connolly puts it, will serve to locate the trajectories and sites of resistance as we reconsider the relationship between timbre, listening, and the body.⁵³

How far back can we extend a genealogy of timbre? As Emily Dolan writes, there was a time before timbre, that is, before we had a specific language to refer to the various phenomena that today we understand as timbre.⁵⁴ As Bonnie Gordon suggests, the experience of timbre was not born with the word itself. Moreover, there are ways to trace the modes in which timbre was discussed in the past, as Deidre Loughridge has done with the violin mute in the seventeenth century.⁵⁵ We can extend this prehistory as far back as we like, as long as we know what to search for. For our purposes, the evolution of the word “timbre” is an important landmark, recalling—with Nietzsche and Foucault—that genealogy is neither a history of ideas nor a search for origins, but rather a form of

tracing the “descent” (*Herkunft*), that is, the accidents and modifications of the notions we employ today and the way they have been inscribed on the body.

Thus far, I have discussed timbre without making a strong distinction between types of sources: synthesizers, pianos, and flutes; Whispered Inanga; and even imagined sounds have equally helped us examine timbre as a quasi-transcendental parameter. However—and this is the crucial element in this genealogy—the human voice has been central in discussions of timbre since the coinage of the concept in Diderot and D’Alembert’s 1765 *Encyclopédie*. The entry on sound, written by Rousseau, discusses timbre in terms of difference: “As for the further difference found between Sounds by the quality of their Timbre, it is obvious that it depends neither upon pitch nor volume.”⁵⁶ Rousseau’s approach is nominalist: he compares the timbres of a flute and an oboe, moving from the *je ne sais quoi* (the acme of musical ineffability) of the flute to synesthetic adjectives (dryness and harshness) of the oboe.⁵⁷ He concludes, again under the cover of ineffability, with a rhetorical question on the issue of the voice: “What could we say about the different timbres of voices with the same force and pitch?”⁵⁸ No one, says Rousseau, has examined sound in this aspect. In thus naming it, Rousseau outlined the various attitudes we hold toward timbre setting the standard we still use to understand it today.

The nominalist comparison between instruments is laid out in the *Encyclopédie*’s entry for “timbre,” also written by Rousseau. Here, he suggests that the difference between instruments can be ordered hierarchically, from the worst to the most beautiful:

Timbre is the word used to describe the quality of a sound that makes it harsh or sweet, dull or bright (*aigre ou doux, sourd ou éclatant*). Sweet sounds, like those of a flute, ordinarily have little brightness; bright sounds are often harsh, like those of the *vielle* or the oboe. There are even instruments, such as the harpsichord, which are both dull and harsh at the same time; this is the worst timbre. The beautiful timbre is that which combines sweetness with brightness of sound; the violin is an example.⁵⁹

Rousseau’s ranking is differential: it uses two different (synesthetic) scales—sourness and sweetness, dullness and brightness—to map various timbres. The various instruments sit across the field defined by these scales. As Dolan argues, the criterion that determines which pole is privileged is suggested by describing the violin’s timbre as “beautiful,” a keyword that situates this logic within the mimetic system of eighteenth-century musical aesthetics in which vocal music was held in the highest esteem. The most beautiful timbre is the human voice, and the beautiful instrument is the one that best imitates it. Dolan calls this reasoning “the standard of the singing voice.”⁶⁰ This canon served as a measure for discussing specific aspects of instrumental timbre and the meaningfulness of instrumental music, drawing upon the meaningfulness of the voice “while remaining estranged from it.”⁶¹ Johann Georg Sulzer defined it quite explicitly in 1771: “the most excellent instrument is that which is most capable of imitating the human voice.”⁶² In a system held together by the rigid mimetology of classical imitation, the human voice is the transcendental measure in a hierarchy of bodies, media, and objects that make up

musical practice.⁶³ It measures what can be heard, understood, and judged as a beautiful sound, in terms of value: the best and the worst. In other words, the eighteenth-century conception of timbre, organized by the standard of the singing voice, is an “acoustic assemblage,” a form regulating the relationship between a listening entity “that theorizes about the process of hearing” to entities that hear and entities that produce sound.⁶⁴ The standard of the singing tone defines what the sonorous “is” in the first place and determines how other entities relate to it in mimetic terms, that is, in terms of hierarchically organized difference that places the human (European, classically trained) singing voice at the cusp.

Ultimately, this standard organizes what we effectively hear according to what the voice offers as a paradigm. As Rousseau’s *Essay on the Origin of Languages* puts it, the voice is the immediate sign of the presence of other sentient beings. Of these, moreover, the human voice is highest: “birds whistle, man alone sings, and one cannot hear either a song or an instrumental piece without immediately saying to oneself: another sensitive being is present.”⁶⁵ The voice communicates the moral passions necessary for life in a community. Anything that mediates it—harmony or harsh timbres—is supplementary: dangerous and necessary at the same time. When Rousseau discusses the role of language in aesthetic and social decline he focuses on timbre. He describes the voices of the northern “ignorant barbarians,” as “harsh [*dure*] and devoid of accent” and “noisy without being sonorous [*bruyante sans être sonore*].” “Since all their articulations were as harsh as their voices were nasal and muted [*sourdes*],” he continues, “they could only give a sort of brightness [*éclat*] to their singing, which was to stress the sound of the vowels in order to cover up the abundance and harshness [*dureté*] of the consonants.”⁶⁶ This is the answer to the question from the *Encyclopédie*: even if two voices are the same in pitch and loudness, they will differ in the degree of “degeneration” of a certain people in comparison to its unmarked models. Just when the promise of an abstract reason shared by all was establishing itself as a revolutionary principle capable of overthrowing oppression, the voice remained a marker of irreducible distance between people—cultural difference turned second nature.

At its core, phonocentrism—the privileging of the human voice as the sign of presence and absolute value—was, in the context of the French Enlightenment, a means of safeguarding a certain idea of the human through the affective power of the voice, at a time when European reason was struggling to measure itself against its others.⁶⁷ Timbre—here an interface between nature and culture—was the measure of this difference. In Rousseau’s case, the normative timbres were those of “southern peoples” in contrast to the “northern barbarians,” but this idiosyncrasy did not diminish the Eurocentric bias of the standard of the singing voice, nor did it limit the scope of Rousseau’s phonocentrism. As the nineteenth century elapsed and the disciplines of musicology and ethnomusicology came to be, it became clear that this phonocentrism was always just a form of a more extended logocentrism. Ultimately, what Rousseau’s phonocentrism privileges in the voice is neither its materiality nor its timbre, but the illusion that the voice (*phonē*) is the

immediate signifier of reason (*logos*) and the measure (*logos*) of man's moral perfectibility. The voice and the instruments that imitate it evidence (European) man's (imagined) place in the world.

This phono-logocentrism persists in the foundational texts of musicology, even after the idea of absolute music seemed to replace the standard of the singing voice. Eduard Hanslick's well-known anti-mimetic principle—that music's content (*Inhalt*) consists only of "tonally moving forms"—sought to break with the classicist aesthetics of the eighteenth century and, in doing so, it relegated timbre to the role of a secondary parameter. For Hanslick, music proper only exists with the commensurability of tone (*Messbarkeit des Tons*).⁶⁸ The measurable tone is an ideal entity without timbre, affect, or history that becomes apparent only to a listener who employs the disembodied faculty of the transcendental imagination. Scales, chords, and timbres are the elementary materials (*elementaren Stoffe*) out of which themes are fashioned. Different timbres and harmonies alter the specific character of a theme.⁶⁹ Unifying these elements is, again, the idea of the beautiful, which Rousseau located in the voice as a sign of moral perfection. In Hanslick, on the other hand, the beautiful is judged solely by the transcendental imagination, which contemplates the musically beautiful as a pure, ideal entity, on the condition that it is not affected by feelings, knowledge of biography, history, or politics.⁷⁰

The same principle is evident in a well-known text by Guido Adler, Hanslick's successor in Vienna and theoretical heir. In Adler's 1885 manifesto "Scope, Method and Aim of Musicology," timbre is not even a relevant parameter to analyze music. Systematic musicology is concerned with studying the laws of music, and is divided into harmony, rhythm, and melody as the combination of the former two.⁷¹ Adler's definition of music as "the art of organizing tones" depends on the same commensurability of tones posited by Hanslick: "Only in that moment when a tone is compared and measured (*gemessen*) according to its pitch ... with instruments that measure pitch ... can one speak of a musical knowledge as well as an art of working with tonal material."⁷² Pitch is the only musical element that gives evidence of rational, purposeful organization. Sounds that lack pitch—that are just timbre—cannot be compared systematically and therefore cannot serve as the foundation of a science that would explain the laws and regularity (*logos*) of its object. Adler requires that pitches be divested of timbre. Musical works not written "in our notation" must be transcribed in order to be analyzed.⁷³ The unwritten "natural song that breaks forth from the throat freely and without reflection" always has a particular timbre, but this timbre says nothing to the Adlerian musicologist. Here, with the demotion of timbre to the role of the secondary parameter, the "work-concept" is consecrated. Musicology, beholden to what is communicable—to the rationality of sound—was logocentric from its inception.

The mention of "natural song" in Adler's manifesto already points toward the larger implications of this logocentrism, that is, to its function in distributing beings between "nature" and "culture," or between natural and civilized people (*Natur-* and *Kulturvölker*).⁷⁴ Musicological knowledge begins where nature ends. To be "cultured"—to possess musical knowledge—is always to possess a certain kind of body. To listen like

Adler and Hanslick is to be capable of moving from resonance (*Klang*) to tone (*Ton*); to be capable of focusing on the figural tone, the unified whole and the organic relationships that arise only from the comparison of measurable pitches. Musical education, from ear training to composition, consists in the production of a “cultured,” ableist body that is attuned to this form of listening, that hears the measurable tone as an ideal entity identical to itself, unchanging across timbral difference—a body or an ear capable of hearing the most subtle harmonic variations, yet incapable of listening to cultural difference: an aesthetic, transcendental ear.

One might object that Hanslick’s formalism is an extreme case, but the consequences of this bodily training are documented extensively in travelers’ diaries outside of Europe, for example in colonial Latin America as incisively analyzed by Ana María Ochoa Gautier.⁷⁵ Here, timbre not only distinguishes European ears and voices from their others, but even serves to mediate between different ontological registers. Ochoa Gautier focuses on nineteenth-century descriptions of the sonorous performances of a labor class of free, mixed-race boat rowers from New Granada called bogas. European travelers described the various sounds—vocal utterances and stamping of feet—produced by the bogas while rowing as “a bellowing ruckus,” “a variety of uncouth sounds,” as well as “blasphemous epithets” sung to different deities and “screaming in excess, imitating the sound of the tiger, the whistling of the serpent, the shout of the parrots and the voice of other animals.”⁷⁶ That these travelers did not recognize such performances as music is not surprising, but it remains as evidence of the disciplinary power of the standard of the singing voice as an acoustic assemblage. In contrast, Ochoa Gautier interprets the same performance by the bogas as participating in Amerindian perspectivist ontologies, as a means to relate differently embodied beings through acoustic mimesis. By “en-voicing” the ontological multiplicity of beings from the jungle, the bogas can move across the divide between nature and culture that organizes the West. The mimesis of vocal timbre is, too, a measure of difference, but what it measures is not the distance from an ideal model (the standard of the singing voice), but rather the degree of becoming that one can acquire by vocalizing other beings, “the transformational potential of becoming that all envoicement entails.”⁷⁷ If Inanga ya Kubandwa is a means to make a deity present through timbre, the acoustic mimesis of the bogas is a way of becoming-other by examining the differences of diversely embodied sounding beings. In these cases, timbre is an interface between various ontological and social registers: divine-human; animal-human; nature-culture; the West and the rest.

Timbral Presets and the Micropolitics of Format

Example 2. Yamaha DX-7 “Voice 1” patch

But the West also has forms of collapsing the difference between culture and nature that determines the logocentric and phantasmagoric preeminence of idealized sound. Today, popular music and out-of-the-box composition software do most of the work of negotiating cultural difference through timbre. The voices in Al Qadiri's cover of "The Star-Spangled Banner" offer a paradigmatic case of this collapse. Research into speech synthesis was begun at Bell Labs as early as 1939 with the invention of the vocoder. By 1980, speech synthesis was widely available in commercial synthesizers such as the Yamaha DX-7, the first to introduce frequency modulation (FM) synthesis. The synthesized voice of the DX-7, as shown in Example 2, is a compressed modeling of spectral formants, accomplished by coupling a carrier and a modulator for each of the three formant groups necessary for vowel recognition. In this way, only six oscillators are necessary to render a human-like sound, while traditional additive synthesis would require up to 200 oscillators. Pulse-code modulation (PCM) synthesis, featured first in the Roland D-50 synthesizer, combined sampling with the wave oscillators of subtractive synthesis, thus adding noises—crucially in the attack segment of the sound—and other details that could not be reproduced with regular synthesis. The Korg M1 expanded the size of the samples, while adding the capacity for stacking multiple samples and effects in a single chain through presets accessible with the touch of a button. It was the best-selling synthesizer of the 1990s. By supplementing synthesis with sampling, PCM suggests that formant groups are not enough to synthesize voices with verisimilitude. This technology provided a sense of realism and high definition coupled with accessible prices and interfaces that changed the market, especially in consumer synthesizers. In the long run, this clarity and accessibility came to represent precisely the opposite: locked in the synthesizer's read-only memory (ROM), these timbres continue to refer back to a series of specific times, places, and genres. The preset sounds contain "real" instruments and human voices, perhaps the voices of anonymous Korg workers as minuscule samples, embedded in each synthesizer and now freely floating through the internet.

Example 3. Korg M1 "Choir" patch

One does not need to be a specialist of synthesis to recognize the timbre from Al Qadiri's "Star-Spangled" as the Korg M1's "Choir" patch, shown in Example 3. It is a sound that has been disseminated through innumerable productions since the synthesizer's 1988 release.⁷⁸ Al Qadiri's almost obsessive use of this sound is not casual: by employing this and other presets, her music seizes the micropolitics of timbre and its encoding through format to produce a series of displacements of the categories of gender and race that underpin underground dance music.⁷⁹ The sounds she employs are both synthesized and sampled. They are both human and machinic; generically preset and pointedly critical; universal and racialized. Her sounds belong to the 1990s, but also to dystopian futures, to the video games Al Qadiri played as a young girl in Kuwait during the Iraqi invasion and to our worst fears about techno-capitalism. They work both as underground dance music and critique. A fairly simple spectrum discloses the anxieties of the present, providing a counterpart to Rousseau's logocentric timbral hierarchization and its persistence in empiricist theories of timbre.⁸⁰ Al Qadiri's music is a genealogical critique of the

materiality of capitalism's colonial fantasies that functions through attention to the affective charge in the timbre of synthesized voices as well as the way gender and race are encoded, replayed, and commodified worldwide through the cheap formats of consumer technologies. From the vocoder to the Korg M1, speech synthesis belongs to the same history of compression that culminates with the MP3. Just as the MP3 carries the imprint of a listener, so do the voice presets of the most notable synthesizers of the 1980s and 90s. This imprint is inescapably charged with affect. Speech synthesis, paradigmatically the M1 (Apple's "Siri" might be another case study), encodes timbre through format. Format accumulates affect by exploiting the "perceptual capital" of communications corporations (and more recently of the "New Economy" governed by the military-entertainment complex where young gamers are trained as soldiers), forming a sedimented history disseminated through consumer technologies, but obscured such that its products acquire, in Jonathan Sterne's words, "a sheen of ontology when they are more precisely the product of contingency."⁸¹

Destroying this sheen of ontology is the task for the new acoustemologies of timbre.⁸² Sitting at the interface of sounding and listening bodies, timbre has been shaped by different forces through history. Where empiricism and nominalism consider timbre as an unchanging aspect of sound—what a sound *is* as opposed to what it *does*—we find a different story: if pitch depends on the commensurability of tone, timbre is the mark of incommensurable difference. Timbre is the condition of (im)possibility of sound, always particular: in one way in Julius Eastman's music, in a different way in *Whispered Inanga*, and in yet another way in a Haydn keyboard sonata performed on a period instrument and placed in Beghin's "virtual room." In each case, our experience of timbre is a bundle of perceptualization, reverberations, otoacoustic emissions, but also memories and anticipations. The physical and physiological elements are, in experience, inseparable from the memories and expectations by which we make sense of sounds, whether consciously or not. These forces become audible through a materialist approach that encounters listening as an affective imbrication with sound's sources and their histories, however threatening or distant they might appear. Whether shaped by the phonocentric standard of the singing voice, considered as an interface between ontological worlds, or as the fantasy of the unification of nature and technology, timbre—paradigmatically vocal timbre—is the measure by which these differences are negotiated in sound. When we reduce timbre to the poles of the cultural (nominalism) or the natural (empiricism), when sound is idealized and difference naturalized, we lose grasp of its quasi-transcendental status. Timbre's inexhaustibility depends on the incommensurability between the ontological and cultural registers that we constantly have to negotiate. Our bodies—voices and ears, but these are just metonymies—are the sites of these negotiations and timbre is their language. By the same token, timbre can give us new ears. Timbre is a space that opens in the embodied, affective sensorial relation with the world; it brings out differences where we could only hear identity. Timbre is the global parameter where new acoustemologies begin.

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Notes:

(¹) Kline's installation was first presented in the New Museum's 2015 Triennial exhibition, *Surround Audience*, curated by Lauren Cornell and Ryan Trecartin.

(²) <https://www.wired.com/2014/07/adult-swim-fatima-al-qadiri>

(³) Alexander G. Weheliye, "'Feenin': Posthuman Voices in Contemporary Black Popular Music," *Social Text* 20, no. 2 (2002): 21–47, doi:10.1215/01642472-20-2_71-21.

(⁴) Nina Sun Eidsheim, "The Micropolitics of Listening to Vocal Timbre," *Postmodern Culture* 24, no. 3 (2014): n.p.; and "Race and the Aesthetics of Vocal Timbre" in Olivia

Ashley Bloechl, Melanie Diane Lowe, and Jeffrey Kallberg, eds., *Rethinking Difference in Music Scholarship* (Cambridge: Cambridge University Press, 2015), 338–365.

(⁵) Current theories on rhythm and meter—and to a lesser extent pitch and tonality—generally examine how these binaries can be complicated, but it remains that timbre cannot be easily mapped onto either absolute or relative values.

(⁶) Cornelia Fales, “The Paradox of Timbre,” *Ethnomusicology* 46, no. 1 (2002): 58. With respect to the etymology of *timbre* in French—“a stamp of origin”—Pierre Schaeffer remarks on, and later distances himself from, the commonsense notion of timbre as “a reference to the instrument, a trademark.” Pierre Schaeffer, *Treatise on Musical Objects: Essays Across Disciplines*, trans. Christine North and John Dack (Berkeley and Los Angeles: University of California Press, 2017), 34. For Schaeffer, whose conception of a musical object consists in separating sounds from their causes, “the timbre of [a musical] object is nothing other than its sound form and matter, a complete description of it, within the limits of the sounds that a given instrument can produce, when all the variations in facture it may have are taken into account. The word *timbre* with reference to the object is therefore of no further help to us in the description of the object itself, since it merely involves us in a reanalysis of the most subtle of the informed perceptions we have of it.” Schaeffer, *Treatise on Musical Objects*, 180. In place of timbre, Schaeffer distinguishes between a sound’s morphological qualities (a sound’s spectral composition, divided into facture and mass) and temporal qualities (duration and morphological variation in time). Ibid. 345. For a succinct and updated account of Schaeffer’s morphological analysis of sound, see Michel Chion *Sound: An Acoulogical Treatise*, trans. James A. Steintrager (Durham, NC: Duke University Press, 2016), 170–182. For a critique of Schaeffer’s system, see Brian Kane, *Sound Unseen: Acousmatic Sound in Theory and Practice* (New York: Oxford University Press, 2016), 15–134. For alternative systems of classification, see David Wessel, “Timbre Space as a Musical Control Structure,” *Computer Music Journal* 3, no. 2 (1979), <http://articles.ircam.fr/textes/Wessel78a/>; Stephen McAdams, “Perspectives on the Contribution of Timbre to Musical Structure,” *Computer Music Journal* 23, no. 3 (1999): 85–102.

(⁷) Aram Glorig and American Academy of Ophthalmology and Otolaryngology, *Audiometry: Principles and Practices* (Baltimore: Williams & Wilkins, 1965), 55; see also William Sethares, *Tuning, Timbre, Spectrum, Scale* (London: Springer, 2005), 27.

(⁸) Albert S. Bregman, *Auditory Scene Analysis: The Perceptual Organization of Sound* (Cambridge, MA: MIT Press, 2001), 55.

(⁹) Carol Krumhansl, “Why Is Musical Timbre so Hard to Understand?” in *Structure and Perception of Electroacoustic Sound and Music*, ed. Sören Nielsen and Olle Olsson (Amsterdam and New York: Excerpta Medica, 1989), 44. Inexhaustibility should not be confused with ineffability, although we will see why timbre is sometimes described as

ineffable. For a critique of the cultural history of ineffability, see Lawrence Kramer, *The Thought of Music* (Berkeley and Los Angeles: University of California Press, 2016).

(¹⁰) Fales, “The Paradox of Timbre,” 57.

(¹¹) Ibid., 58.

(¹²) Ibid., 63.

(¹³) But we do not need to go as far as to claim that fixed representations of sounds are false while only pure sound is true, as this would repeat the “audiovisual litany” where critiques of the overvaluation of the visual over the audible continues to reinscribe an ideological conception of the senses and their imagined hierarchies. Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham, NC: Duke University Press, 2003), 15–19.

(¹⁴) For relations between human and non-human perceptions of timbre, see Stephen Michael Town and Jennifer Kim Bizley, “Neural and Behavioral Investigations into Timbre Perception,” *Frontiers in Systems Neuroscience* 7 (2013), doi:10.3389/fnsys.2013.00088.

(¹⁵) For Emily Dolan, the notion of timbre is intimately bound with the birth of modern musical aesthetics, namely in Johann Gottfried Herder’s claim that sensation and cognition are inseparable, such that musical aesthetics must focus on “music’s immediate sensations and its mediating technologies, its instruments.” Emily Dolan, *The Orchestral Revolution: Haydn and the Technologies of Timbre* (Cambridge, MA: Cambridge University Press, 2013), 88. On the notion of a “musical subject,” see Jairo Moreno, *Musical Representations, Subjects, and Objects: The Construction of Musical Thought in Zarlino, Descartes, Rameau, and Weber* (Bloomington: Indiana University Press, 2004).

(¹⁶) Jean-Luc Nancy, *Listening* (New York: Fordham University Press, 2009), 41.

(¹⁷) Brian Kane, “The Elusive ‘Elementary’ Atom of Music,” *Qui Parle* 14, no. 2 (2004), 130–131.

(¹⁸) And which I playfully appropriate from Isabelle Stengers. For the use of this term, and the distinction between materialism and physicalism, see Stengers, “Wondering about Materialism,” in *The Speculative Turn: Continental Materialism and Realism*, ed. Levi Bryant, Graham Harman, and Nelson Srnicek (Melbourne: re.press, 2015), 368–380.

(¹⁹) Dolan, *The Orchestral Revolution*, 54. For Schaeffer, pitch is an aspect of the morphology of sound that depends on the concept of *mass*: for example, a sound with an identifiable pitch—like a clarinet—is said to have a “tonic mass,” whereas a cymbal has a “complex mass.”

(²⁰) “Notes for Lectures on “Private Experience” and “Sense Data” in Ludwig Wittgenstein, *Philosophical Occasions, 1912–1951*, ed. James Carl Klagge and Alfred Nordmann (Indianapolis: Hackett Publ. Co, 1993), 203.

(²¹) But rhythm is also, in a sense, first: a timbre needs to be articulated; it needs to have a beginning and an end for its contour to appear entirely and, according to Schaeffer, a duration of at least 50 ms—the “thickness of the present”—to be perceived as more than a blip. Pierre Schaeffer, *Treatise on Musical Objects: Essays Across Disciplines*, trans. Christine North and John Dack (University of California Press, 2017), 159. For Nancy, rhythm allows for timbre to emerge: “rhythm, dancing, opens up timbre, which resounds in the rhythmized space.” Nancy, *Listening*, 39.

(²²) There is, however, a gap between these harmonic relations, the scales they give rise to, and the instruments where these are played. The tempered scale, instruments that employ tempered scales, and the representational media associated with common-practice music theory, require a certain “fudging” of interval sizes in order to arrive at an abstract system of notes/tones, at the expense of both harmonic “purity” and timbral complexity. Alexander Rehding, “Three Music-Theory Lessons,” *Journal of the Royal Musical Association* 141, no. 2 (2016), 266–270. When employing timbres that do not preserve the harmonic distribution of overtones that correspond to Western scales, it becomes impossible to distinguish between consonance and dissonance, even as the “itches” are the same. Sethares, *Tuning, Timbre, Spectrum, Scale* (London: Springer, 2005), 3. Sethares also cites experiments where the envelope of one sound is combined with the spectrum of another sound. In some cases (oboe, tuba, bassoon, clarinet), spectrum was more important for identifying the sound; in others, it was envelope (flute); while others were of comparable importance (trombone, French horn); *ibid.*, 29. For more on hybrid sounds or “auditorial chimeras” see Stephan Helmreich, “Chimeric Sensing,” in Florian Hecker, *Chimerizations* (Brooklyn, NY: Primary Information, 2013), 9–15.

(²³) Kane, “The Elusive ‘Elementary’ Atom of Music,” 138.

(²⁴) The relation between minimalism and electronic music has been explored mostly in relation to rhythm, but timbre also plays an important role. Consider recent recordings such as Mantra Percussion’s 2016 *Timber Remixed* and the Nonesuch 1999 compilation *Reich Remixed*. See also David Carter, “‘Reich Remixed’: Minimalism and DJ Culture,” *Context: Journal of Music Research*, no. 37 (2012): 37. For the central role of reproduction technology in black musical cultures, see Alexander G. Weheliye, *Phonographies: Grooves in Sonic Afro-Modernity* (Durham, NC: Duke University Press, 2005).

(²⁵) Sergi Jordà, “Digital Lutherie: Crafting Musical Computers for New Musics’ Performance and Improvisation,” *Department of Information and Communication Technologies*, 2005. Thor Magnusson, “Designing Constraints: Composing and Performing with Digital Musical Systems,” *Computer Music Journal* 34, no. 4 (2010): 62–73.

(²⁶) Kramer, *The Thought of Music*, 19.

(²⁷) *Ibid.*

⁽²⁸⁾ As if responding to the emphasis on rhythm, vibration, and noise in Steve Goodman's account of the "futurhythmachine"—a digital continuation of the Black Atlantic, where underground dance music becomes a "sonic weapon in a postcolonial war with Eurocentric culture over the vibrational body and its power to affect and be affected"—Al Qadiri uses timbre to examine the ideas of vibration, gender, and difference that underlie genres such as dubstep and grime. Al Qadiri's "homage" to underground music is the antithesis of the genres she engages, a kind of hysteric mimicry (*sensu* Irigaray) that uses timbre to uncover them as the product of the male-centered culture of grime music (in records such as *Asiatisch* and *Genre-Specific Xperience*) and the military-entertainment complex (in *Desert Strike*). Sukhdev Sandhu, "Fatima Al Qadiri: 'Me and My Sister Played Video Games as Saddam Invaded,'" *The Guardian*, May 5, 2014, sec. Music, <https://www.theguardian.com/music/2014/may/05/fatima-al-qadiri-interview-kuwait-invasion-saddam>; Steve Goodman, *Sonic Warfare: Sound, Affect, and the Ecology of Fear* (Cambridge, MA: MIT Press, 2012).

⁽²⁹⁾ See Schaeffer, *Treatise on Musical Objects*, chs. 2 and 3 for an extended version of this argument.

⁽³⁰⁾ After all, one can argue that pitch is a reduction of timbre: we can only speak of an A dominant chord that resolves to D minor if we abstract from these sounds all the noises, harmonic and inharmonic partials, resonances, distortions, filtering, and so on, imagining a pure sound of infinitesimal duration. For pitch-centered theories, the timbre of an instrument is irrelevant insofar as all harmonic relations hold across instruments. Even when we refer to a single pitch as "A," we purposefully ignore the fact that along with the 440Hz frequency that we recognize as "A," there is an infinitesimal number of concomitant sounds, harmonic partials being only a fraction of these, that are as important to our perception, understanding, and enjoyment of musical sounds as the 440Hz frequency is.

⁽³¹⁾ Strictly speaking, empiricism is an epistemological position, while nominalism is a metaphysical one. Empiricism (true knowledge only comes from sense experience) is most commonly opposed to rationalism (logical reasoning is the only way of overcoming sense deception), while nominalism (only particulars exist; universals are fictions) is opposed to realism (universals do exist, and particulars are their instantiations). But if empiricism holds a metaphysical commitment, it is a kind of nominalism: there are no universals; through sense experience we encounter only particulars.

⁽³²⁾ For the history of this understanding of listening, see Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham, NC: Duke University Press, 2003); and *MP3: The Meaning of a Format* (Durham, NC: Duke University Press, 2012).

⁽³³⁾ Roger Scruton holds a similar distinction between, on the one hand, a sound's timbre considered "through its physical cause," by which he means both nominalism ("the sound of a clarinet") and empiricism (referring to the "physical cause") and, on the other hand,

a sound considered “metaphorically,” (hearing an E Major chord in Wagner as “a sudden golden blaze”). Roger Scruton, *The Aesthetics of Music* (Oxford: Oxford University Press, 1997), 39. For a discussion of this distinction and the problems with Scruton’s account of metaphor see Kane, “The Elusive ‘Elementary’ Atom of Music,” 127.

⁽³⁴⁾ Still, timbre does not play a central role in Lydia Goehr’s watershed essay *The Imaginary Museum of Musical Works: An Essay in the Philosophy of Music* (New York: Oxford University Press, 2008). As Emily Dolan has noted, it was first necessary for musicology to turn its attention to the materiality of musical experience away from its idealist aesthetic traditions. Dolan, *The Orchestral Revolution*, 20.

⁽³⁵⁾ An interesting case is the extent to which historically informed performances can go to reconstruct instruments and, more recently, performance spaces that reproduce historically accurate timbres. The most telling of these is Tom Beghin’s *The Virtual Haydn*, where pieces performed on faithful reproductions of period instruments are processed with filters and reverberation effects that simulate “virtual rooms,” that is, models of sound refraction taken from real spaces where Haydn’s works might have been performed. “The Virtual Haydn: Complete Works for Solo Keyboard” (Naxos 8501203, 2011). In this case, nominalism begets empiricism.

⁽³⁶⁾ I owe these formulations to Alex Rehding and Emily I. Dolan, and thank them for the invitation to contribute to this volume and for their insightful editorial comments.

⁽³⁷⁾ Fales, “The Paradox of Timbre,” 62.

⁽³⁸⁾ Ibid.

⁽³⁹⁾ “Though subtle and brief, the moment offers listeners phenomenal evidence that the world is a facsimile, a humanized rendering—as though perception were nothing more than a projection of features onto a domain whose real character is indecipherable. In this moment, the paradox of timbre is revealed.” Ibid., 75.

⁽⁴⁰⁾ Ibid., 79.

⁽⁴¹⁾ Ibid., 56.

⁽⁴²⁾ Ibid., 81–82. In Fales’s essay, Whispered Inanga is given as an example of a timbral effect that is invisible to acoustic analysis (it depends entirely on perceptualization) while Inanga ya Kubandwa, performed as part of an initiation ritual and sung to a high falsetto and producing a particular timbral effect known as *ubuguruguru*, employs timbre juxtaposition, which “depends on purely acoustic elements of the sound, so that spectral analysis of Inanga ya Kubandwa shows clearly the features that qualify a timbre as formanted or harmonically-structured.” Ibid., 85. In Fales’s interpretation, the first kind of performance, which engages perceptualization, means that the audience has to become an active participant to hear the timbral effect, while the second kind, being a purely acoustic effect, appears as inescapable to the listener, building up “a musical

momentum that no one individual can halt or resist, until the contents of the perceived and acoustic worlds overflow into each other. It is in this overflowing that the significance of *ubuguruguru* appears to lie." Ibid., 87.

(⁴³) Similar observations can be made with respect to Tuvan throat singing. See Theodore Levin's contribution to this volume.

(⁴⁴) Fales, "The Paradox of Timbre," 91.

(⁴⁵) Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (London and New York: Routledge, 2002), xxiii.

(⁴⁶) Maurice Merleau-Ponty, *Phenomenology of Perception* (London: Routledge, 2002). The prominent role of the visual in Merleau-Ponty's work should not be an impediment for using his philosophy for thinking through issues of sound and music. For music-oriented readings of his work, see Amy Cimini, "Vibrating Colors and Silent Bodies. Music, Sound and Silence in Maurice- Merleau-Ponty's Critique of Dualism," *Contemporary Music Review* 31, nos. 5–6 (2012): 353–370 and Jessica Wiskus, *The Rhythm of Thought* (Chicago: University of Chicago Press, 2015).

(⁴⁷) As Naomi Waltham-Smith puts it in her contribution to this volume, "from the standpoint of deconstruction, timbre is the problem of the transcendental."

(⁴⁸) While the Kantian transcendental lies outside the field it constitutes—timbre as the result of the "unconscious mechanism" of perceptualization described by Fales—the *quasi*-transcendental is one of the set of elements it also defines—timbre as a specific parameter but also a global parameter. It is thus both a condition of possibility *and* impossibility. Keeping this double status in mind is important for avoiding the pitfalls of empiricist universalism or transcendent ineffability. See Geoffrey Bennington and Jacques Derrida, *Jacques Derrida* (Chicago: University of Chicago Press, 1999), 267–270 and Naomi Waltham-Smith's contribution to this volume. I thank the anonymous reviewer at Oxford University Press for their insightful comments on the problem of the transcendental.

(⁴⁹) For the relation between timbre and contagion, see Naomi Waltham-Smith's contribution to this volume.

(⁵⁰) Merleau-Ponty, *Phenomenology of Perception*, 266.

(⁵¹) Ibid., 273.

(⁵²) In a reversed recording of a piano, "[t]he piano takes on many of the timbral characteristics of a reed organ, demonstrating the importance of the time envelope in determining timbre." Sethares, *Tuning, Timbre, Spectrum, Scale*, 28.

⁽⁵³⁾ William E. Connolly, "Materialities of Experience," in Diana H. Coole and Samantha Frost, eds., *New Materialisms: Ontology, Agency, and Politics* (Durham, NC: Duke University Press, 2010), 190. In this respect, the approach to timbre drafted here departs from the work of Schaeffer, whose use of phenomenological approaches has been criticized for effacing sounds' traces of production, turning sound into a phantasmagoric and mythical object and hence contributing to the same idealization of sound as empiricism and nominalism, however nuanced its description of timbre can be. Kane, *Sound Unseen*, 97–99 and 119–132. Merleau-Ponty's emphasis on the embodied imbrication of sensation, perception, and thought offers a way of thinking about sound that does not necessarily disassociate ear and eye in a phantasmagoric way. Conceiving of timbre as a differential parameter will help us avoid another pitfall of Schaefferian sound theory, namely its Cartesian drive to reduce felt experience into concrete presence. After all, Schaeffer talks of a "reduced listening." I insist on the opposite.

⁽⁵⁴⁾ Dolan, *The Orchestral Revolution*, 54.

⁽⁵⁵⁾ On the notion of time before timbre, see the contributions by Deidre Loughridge and Bonnie Gordon to this volume and Dolan, *The Orchestral Revolution*, 54.

⁽⁵⁶⁾ Jean-Jacques Rousseau, "Sound," in *The Collected Writings of Rousseau* (Hanover, NH: University Press of New England, 1998), vol. 7, 468.

⁽⁵⁷⁾ Ibid. Translation modified after Dolan, *The Orchestral Revolution*, 55.

⁽⁵⁸⁾ Ibid.

⁽⁵⁹⁾ Dolan, *The Orchestral Revolution*, 56, translation modified.

⁽⁶⁰⁾ Ibid., 59. The standard of the singing voice might not be limited to eighteenth-century France. It is possible that, as many other aesthetic ideals of the period, it originated in seventeenth-century Italy. In 1640, Giovanni Batista Doni wrote that of all the instruments, the violin is the one that "... better expresses the human voice, not only in song (in which some wind instruments may also succeed) but in speech itself; this one imitates so well in those quick accents." Quoted in Rebecca Cypess, "'Esprimere La Voce Humana': Connections between Vocal and Instrumental Music by Italian Composers of the Early Seventeenth Century," *The Journal of Musicology* 27, no. 2 (2010): 181, doi: 10.1525/jm.2010.27.2.181.

⁽⁶¹⁾ Dolan, *The Orchestral Revolution*, 66.

⁽⁶²⁾ Cited in *ibid.*, 60.

⁽⁶³⁾ Another way of categorizing instruments in the eighteenth century was with respect to how many different instruments they could imitate, such as organs and combination instruments. See Rebecca Cypess, "Timbre, Expression, and Combination Keyboard

Instruments: Milchmeyer's Art of Veränderung," *Keyboard Perspectives* 8 (2015): 45. See also Jonathan de Souza's contribution to this volume.

(⁶⁴) Ana Maria Ochoa Gautier, *Aurality: Listening and Knowledge in Nineteenth-Century Colombia* (Durham, NC: Duke University Press, 2014), 23.

(⁶⁵) Rousseau, "Essay on the Origin of Languages," in *The Collected Writings of Rousseau*, 326.

(⁶⁶) *Ibid.*, 330.

(⁶⁷) Phonocentrism is only a more limited form of logocentrism; the only difference is that phonocentrism makes explicit the privilege of the voice over writing; the voice—*phonē*—is privileged because it promises immediate access to the ideality and self-presence of *logos* as thought, which writing then mediates. Jacques Derrida, *Of Grammatology*, trans. Gayatri Chakravorty Spivak (Baltimore, MD: Johns Hopkins University Press, 1997), 11.

(⁶⁸) Eduard Hanslick, *Vom Musikalisch-Schönen: Ein Beitrag zur Revision der Ästhetik der Tonkunst* (Leipzig: J. A. Barth, 1874), 119.

(⁶⁹) *Ibid.*, 52.

(⁷⁰) *Ibid.*, 76.

(⁷¹) Erica Mugglestone and Guido Adler, "Guido Adler's 'The Scope, Method, and Aim of Musicology' (1885): An English Translation with an Historico-Analytical Commentary," *Yearbook for Traditional Music* 13 (1981): 10, doi:10.2307/768355.

(⁷²) *Ibid.*, 5.

(⁷³) *Ibid.*, 6.

(⁷⁴) Alexander Rehding, "The Quest for the Origins of Music in Germany Circa 1900," *Journal of the American Musicological Society* 53, no. 2 (2000): 349, doi:10.2307/832011.

(⁷⁵) Ochoa Gautier, *Aurality: Listening and Knowledge in Nineteenth-Century Colombia*, (Durham: Duke University Press, 2014), 48; see also Gary Tomlinson, *The Singing of the New World: Indigenous Voice in the Era of European Contact* (Cambridge: Cambridge University Press, 2009).

(⁷⁶) Ochoa Gautier, *Aurality*, 32–67. For more on the bogas see David Ernesto Peñas Galindo, *Los bogas de Mompox: Historia del zambaje* (Bogotá: Tercer Mundo Editores, 1988.)

(⁷⁷) *Ibid.*, 63.

(⁷⁸) The Korg M1 was in production only between 1988 and 1995, replaced by the "Triton" and the M3, which expanded the synthesizer's capabilities. The M1 sound bank

is now available as a computer plug-in also produced by Korg, which Al Qadiri employs for her productions.

(⁷⁹) Al Qadiri's 2014 record *Asiatisch* references a subgenre known as Sino-grime, which exploits the myriad of Japanese and Chinese instrument patches included in the Korg M1 while delighting in orientalist mimicry of Chinese music through pentatonic melodies. She emphasizes the relation between generic consumer technology and racial stereotypes in popular music. "The Korg M1, which is a synthesiser that's favoured by a lot of people that make *sino* music, is full of Chinese flutes, Japanese flutes—you name it. There is a want, a demand, for Asian motifs in music but martial arts and architecture are the largest sources of exposure to Imagined China for people who are consuming Western media." Al Qadiri exposes Sino-grime as an orientalist, "childlike," and "male dominated" genre, while at the same time extracting her own form of nostalgic pleasure from a music that she describes as "painfully digital ... and when I say painfully, I mean in a good way ... like a compendium of all the things that appealed to me as a child in sonic form." In "Shanzai," Al Qadiri writes nonsense lyrics that resemble Mandarin to the tune of Sinead O'Connor's "Nothing Compares to You," sung over synthesized choirs. For Al Qadiri, a linguistics major from NYU, language is also a timbral phenomenon that can be manipulated to expose stereotyped difference. Fatima Al Qadiri and Lauren Martin, "'I Want To Blast My Record In Chinatown': An Interview with Fatima Al Qadiri," 2014, https://thump.vice.com/en_us/article/i-want-to-blast-my-record-in-chinatown-an-interview-with-fatima-al-qadiri.

(⁸⁰) See, for example, Wayne Slawson, *Sound Color* (Berkeley and Los Angeles: University of California Press, 1985).

(⁸¹) Sterne, *MP3*, 8; For format theory and transcendentalism, see Daniel Villegas Vélez, "Review: MP3: The Meaning of a Format," *Journal of the American Musicological Society* 68, no. 1 (2015): 239–244, doi:10.1525/jams.2015.68.1.239.

(⁸²) Acoustemology, as Steven Feld defined it, consists in the exploration of "sonic sensibilities, specifically of ways in which sound is central to making sense, to knowing, to experiential truth"; Steven Feld, "Waterfalls of Song: An Acoustemology of Place Resounding in Bosavi, Papua New Guinea," in *Senses of Place*, ed. Steven Feld and Keith H. Basso (Santa Fe, NM: School of American Research Press, 1996), 97. To this definition, Ochoa Gautier adds a concern with difference and affect, with "the ways in which acoustic knowledge is located at the nexus of what we are able to make sense of and what is beyond sense making but still affects us. As such, the experience of such knowledge is not only articulated by how human beings make sense of the acoustic through words but also by the very allure of the acoustic, by the relation between the capacities of sound to affect different entities and of different entities to be affected by sound," Ochoa Gautier, *Aurality*, 34.

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