HISTORIES OF THE INVISIBLE: MUSIC TECHNOLOGY
DISCOURSES IN THE AGE OF PHONOGRAPHY

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Abstract

In this dissertation I identify and examine various discursive strategies in a number of theoretical, aesthetic, and technical writings about music technologies, and assess their impact on related phonographic and musical practices.

I examine sources from several polemical and divisive moments in the discursive history of the phonograph, namely: Popular science articles about the phonograph that appeared in various periodicals from the mid-1870s to the early 1890s; Articles concerning sound engineering research from scientific journals of the 1920s to 1930s; Aesthetic writings in audiophile journals of the 1920s-1950s; Popular histories of the phonograph; and a small number of influential writings by media theorists of the mid to late twentieth century.

In contrast to many recent studies that frame these discourses in terms of the interaction of phonography as a technology versus music as a culture, my dissertation challenges the view that music technologies, in particular sound recording and reproduction devices, have influenced musical practice and culture in one way or another. Indeed, the dissertation shows that these kinds of approaches have had the unintended effect of creating and sustaining listening practices that are themselves “phonographic.” The final chapter examines the influence of these phonographic listening practices on various branches of music scholarship and pedagogy.

Keywords

Sound studies, technology and culture, phonography, sound art, music composition, music technology.
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# Contents

Abstract........................................................................................................................................ iii

Acknowledgements ......................................................................................................................... iv

Preface: Searching for Phonography .............................................................................................. viii

Chapter 1: Stokowski’s flub ............................................................................................................. 1
  “See-no-orchestra” ......................................................................................................................... 6
  Theory, practice and the discourse gap ......................................................................................... 9
  Dynamics, drama, and intimacy ................................................................................................... 12
  Reproduction, enhancement, representation .............................................................................. 19
  Issues raised by the Bell – Stokowski collaboration .................................................................. 20
  Who are Phonographers? ............................................................................................................ 22
  Phonographic theory .................................................................................................................. 23
  Pure aurality and meta-narratives in sound recording ............................................................... 28
  Ideal Listening and the “Two Musics” Problem .......................................................................... 31

Chapter 2: Phonograph Mythology ................................................................................................. 36
  The Spirit-Finder: Echoes of a Phonographic Myth ................................................................. 38
  Primary Mythological Texts ...................................................................................................... 42
  The Techno-Mythic Voice .......................................................................................................... 45
  Thomas Edison: Alchemist, Faber, Mythmaker ........................................................................ 47
  A Story Without an Invention .................................................................................................... 49
  Edison’s Essays and the Fundamental Phonographic Myths ............................................... 52
  Primacy ....................................................................................................................................... 56

v
Surrogacy.......................................................................................................................................58
Transcendence..................................................................................................................................60
Anxious reactions to phonograph mythology..................................................................................65
The Human Phonograph and the Crisis of the Human Subject.........................................................68
Myth, Anxiety, and Belief..................................................................................................................73
After Phonograph Mythology: The Emergence of the Phonographic Real ..................................77

Chapter 3: The Aesthetics of Original Sound .....................................................................................81
A Professional Genealogy of Representational Media .................................................................87
Sound Engineering and Classical Music........................................................................................91
The “Is it art?” Question..................................................................................................................92
Mediation Failure and the Reality Trap...........................................................................................96
Which Reality? Fidelity Theorists and Musical Performance.........................................................102
Whose Reality? Fidelity Theories as Musical Preference..............................................................107
Imagining the Pro-Phonographic.....................................................................................................110
The Pro-phonographic Conceit.......................................................................................................113
An Aesthetics of Original Sound......................................................................................................117
Intrinsic / Extrinsic Sound Space....................................................................................................120
Sounds to Live Inside Of..................................................................................................................124
The Inconvenient Usefulness of Progress Narratives .....................................................................126

Chapter 4: Music and the Phonographic Listener..........................................................................129
Reproducing an Ideal Listener: Adorno’s “Radio Symphony” ....................................................130
“Absolute Symphonic Dimensions” and Phonographic Listening..............................................133
Origins of the Phonographic Listener............................................................................................138
Eduard Hanslick and Phonographic Listening...............................................................................143
The Phonographic Listener in Recent Music Scholarship...........................................................145
“Humanly Organized Sound” ................................................................. 146
The “Two Musics” Problem ................................................................. 150
The Legacy of the Phonographic Listener ........................................ 153
Towards a Phonographic Lexicon ....................................................... 155
Escaping the Reality Trap ................................................................. 156
Phonographic Communities ............................................................... 160
Music is More Than Sound .............................................................. 161
Works Cited .................................................................................. 163
Preface: Searching for Phonography

If there were a common English word for ‘auditory hallucination’ it might be the title of this study. Before beginning I assumed that there must be at least a small body of theoretical work exploring the unique types of composing, performing, and listening that take place while making musical recordings—practices very familiar to me from time spent in recording studios as a musician, and latterly producer and somewhat inept sound engineer. I was also curious about how theories might reflect the colorful manipulations of sonic space that occur in the production of recorded music, and hoped to answer questions like: What were the narrative strategies underlying the ubiquitous end-of-track fade out? What kind of semiotic tricks were involved in superimposition of extraneous noise in early digital-age popular musics? What principles guided the expressive uses of reverberation and depth effects?

Instead of these imagined theories I found that the bulk of critical writing devoted to sound reproduction, with some notable and very recent exceptions (Moorefield 2005; Hodgson 2010; Doyle 2005; Zak 2001), was comprised mainly of heated polemics almost exclusively devoted to arguing the success or failure of sound recording as a technique of capturing pre-existing sonic material. As Colin Symes puts it:

1 The medical term paracusia (sometimes paracusis) is not in common usage and is also used to refer to other types of auditory dysfunction.

2 These studies have gone a long way towards filling the void – but after well over one hundred years of recorded music, and with the collapse of the recorded music industry indicating that the golden age of phonography may have ended some time ago, the question remains, why so little so late?
…there is no coherent theory of recording, not even a universal term to describe the science of recording…Any theories that exist, unlike those of film – recording’s nearest analogue among the performing arts – are dispersed throughout the history of recording. There is no equivalent of *auteur* theory…what pockets of coherent thinking there are relate only to recording’s effects, detrimental or beneficial, on the appreciation of music (Setting the Record Straight: A Material History of Classical Recording 2004:34).³

As Symes suggests, recording is viewed as a science, one that since its inception has had a problematic relationship with musicians and musical culture. While highly persuasive and well-reasoned arguments for more coherent approaches to sound recording theory that reflect actual practice have surfaced periodically throughout the history of the phonograph, for some reason these have not had much effect on the thinking of the majority of sound theorists.⁴

The fact that, after more than 100 years of the gramophone the majority of scholars in the field still choose to regard musical recording as an inherently flawed type of reproduction, suggests that there are underlying issues that have prevented sound theorists from adequately reflecting or informing practice. In the process of uncovering these issues the direction of my study changed, becoming a much more general exploration of modern and contemporary notions of music, sound, and science, and how various types of discourses surrounding these

³ Although Symes is discussing classical music recording, this lack of coherence seems to pervade the entire realm of musical sound recording regardless of genre.

⁴ Some of the earliest attempts at a representational theory of the phonograph appear in the pages of Gramophone magazine in the 1920s. I survey these and give an overview of the history of sound theory in Chapter 3.
notions interact, conflict, and influence ideas about music and music making. The study of music recording nevertheless remains central, since it is here that most of the significant trends in thinking about music, sound, science and technology have come into conflict and played out.

Perhaps the most significant of these underlying issues is suggested by Syme’s use of the word ‘recording’ to describe something more specific: the recording of music. Sound theorists tend to consider recording as an invariant, idealized process guided by universal principles, rather than a group of related but specific practices. The word ‘recording’ is itself a general term – a recording can be of any type of sound, not just music. Behind this use of the term ‘recording’ lies a generalized concept of sound that has informed thinking about recording and music since the mid 19th century, as Jonathan Sterne has shown:

As the notion of frequency took hold in nineteenth-century physics, acoustics, otology, and physiology, these fields broke with the older philosophies of sound. Where speech or music had been the general categories through which sound was understood, they were now special cases of the general phenomenon of sound... Sound itself became the general category, the object of knowledge, research, and practice (Sterne 2003:23).

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5 James Lastra’s discussion of Harry F. Olson and Frank Massa’s ‘invisible auditor’ model for sound recording, which they insisted was equally applicable to recording movie dialogue as it was to classical music, doggedly holding their standpoint even in the face of evidence of artistic failure, is a case in point. In practice, film sound recordists were using close miking techniques analogous to the close up shot, one of many early examples of theory diverging from practice in sound recording (Lastra 2000:159).
If music, at least in the domain of scientific research, has become a “…specific instance of sound…” as Sterne suggests (2003:71), then this would amount to a major reclassification of music itself, with far reaching implications for music scholarship.  

Contemporary definitions of music show some evidence that music has in a sense been annexed by sound, in the form of overly generalized definitions of music (Bakan 2007:7), and a growing division between scholarly and vernacular conceptions (Nettl 2003). This last point begs the question, what would a shift in conceptions of music within scholarly circles mean for music making at an everyday level? If Sterne’s proposition that music is thought of as an instance of sound is correct, then attempts to define music would presumably lack specificity. As a starting point for exploring this question, I devised a simple and very unscientific experiment: to solicit some definitions of music from a diverse group of musicians engaged in some way with academic research in various fields of music, reasoning that the influence of any re-categorization of music under an umbrella of all sonic phenomena could be measured by the extent to which these definitions were able to disambiguate music from other categories or instances of sound.

Every couple of years I teach a compulsory class at Istanbul Technical University (named, appropriately enough, ‘Music and Technology’) that includes students of every discipline in the program—performers, composers, sound engineers, ethnomusicologists, theorists, and students of music business. I asked these students to propose the most appropriate and meaningful definitions of music they could come up with. They offered five in total—here are the first four:

“Music is sound produced by humans.”

“Music is sound organized as frequencies, durations and amplitudes.”

The influence of the field of acoustics on definitions of music remains largely unstudied – I take up this point in Chapters 1 and 5.
“Music is sound plus intentionality.”

“Music is sound organized into textures.”

Beyond the compelling fact that all of the above definitions begin with the words ‘music is sound,’ even after combining and paraphrasing all four into the most specific possible hybrid. For example ‘sound as frequencies, durations and amplitudes, intentionally organized and produced by humans’—there is nothing to distinguish music from any other instance of humanly organized sound: speech, prayer, applause, electronic alarms or warning systems, honking of car horns, radio drama, theatre, sound for cinema or television, telegraphy, to name but a few. In subsequent conversations with other students, many were prepared to go even further: “Oh music is sound, that’s all. You don’t even have to say it’s organized…” observed one doctoral student confidently, recalling these words from *American Music Teacher*: “Music, in itself, expresses nothing. To paraphrase Gertrude Stein, ‘a sound is a sound is a sound.’” (1969:19).

The fifth and final definition on offer proved revealing for quite different reasons, when the rest of the class impatiently dismissed one student’s suggestion that ‘music is an expression of emotions.’ Struck both by the consensus and non-specificity in the accepted definitions, and by the overtly negative reaction to the final one, I posed another question: Why do you make music?

“I can express things with music that I cannot express with words.”

“Music is the most effective medium for communicating emotions.”

“Music enables me to influence the feelings of others.”

“Music has greater intensity of expression than language.”

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7 This particular paraphrasing of Gertrude Stein has proven popular with critics discussing referentiality in music (Milicevic 1998; Peters 2004).
These explanations expressed much of the specificity, subjectivity, sense of social context or participation, and emotional involvement that we tend to associate with everyday music making, but were entirely absent from their definitions of music itself. Since that first experience I have repeated the experiment, posing the same two questions to subsequent classes for several years, and each time I find similar results. The definitions of music that these musicians seem most at home with tend surprisingly towards the general and scientific, while more subjective alternatives are likely to cause discomfort or even embarrassment. When asked to explain their personal reasons for engaging with music however, one sees a completely different perspective – almost as if they were talking about something else altogether. How did there come to be such a gap between the ways that we understand or connect with music at a personal level, and the way that we choose to define it – between scholarly and vernacular understandings of music?

I argue throughout this study that there is a predominant idea of what music is—an ‘official’ version of music\(^8\)—that is often in conflict with other equally valid but more colloquial notions. Assumptions about science, technology and culture are intimately bound up in these discursive problems and I believe that understanding this conflict between the objective and subjective depends in large part on a reconsideration of the technical (or scientific, or technological) in music making. A careful study of the history of music recording and reproduction—perhaps the most culturally resonant meeting point of technology and music—provides the platform from which I explore these questions.

\(^8\) I borrow the distinction between ‘official’ and ‘unofficial’ understandings of music from Tia Denora, whose work I discuss in Chapters 1 and 4.
Chapter 1: Stokowski’s flub

Leopold Stokowski chose an inconvenient moment for his clumsy accident. While trying to enhance a crescendo during the climax to the immolation scene of Wagner’s Götterdämmerung, he twisted a large volume dial on the primitive mixing console in front of him so hard that it broke off in his hand. Luckily most members of the audience of scientists, musicians and critics assembled at the Academy of Music in Philadelphia on the night of April 13th 1933 were sufficiently distracted by the unusual circumstances of the performance not to have noticed. In the absence of a real orchestra on the stage, three large banks of speakers disgorged music of at times earsplitting volume, accompanied by a display of colored lights intended to depict flames destroying Valhalla. The music was relayed through a network of customized high quality telephone equipment from a simultaneous remote performance, by the Philadelphia Orchestra under the baton of Associate Conductor Alexander Smallens with soprano Agnes Davis singing the role of Brünnhilde, in the Academy ballroom three floors above the main concert hall. Stokowski himself was conveniently hidden from view, seated in a booth among the audience instead of his usual place on the podium. Walter Kaempffert of the New York Times summed up the oddity of these circumstances: “The audience in the Academy of Music felt as if it were in the presence of disembodied performers under the direction of a discarnate conductor” (Kaempffert 1933:14).¹

The apparent purpose of this spectacle was to test the results of more than two years of research and collaboration between Stokowski and engineers from the Bell Laboratories into

¹ For a description of the April 13th concert from the press perspective, see also Musical America (Musical America 1933) and the Washington Post (Washington Post 1933).
new methods of high quality pickup, broadcast and reproduction of symphonic music over telephone lines before an audience who, in the words of chief engineer Harold D. Arnold, “…were by interest and experience particularly well qualified to judge of musical performances” (McGinn 1983:48). The stated goal of the research was flawless transmission and reproduction of the musical program performed by the Philadelphia Symphony, such that the listeners in the reproducing auditorium would have exactly the same sonic experience as they would if seated in front of the live orchestra. This first broadcast took place between two rooms in the same building and was a trial run for another more demanding test twelve days later on the 25th of April, when the orchestra and Smallens remained in the Academy of Music while Stokowski and the team of engineers in charge of the reproducing system moved operations to Constitution Hall, Washington D.C., a distance of about 140 miles, where they presented an identical program before the annual meeting of the National Academy of Sciences.²

This was by no means the first such experiment in multichannel musical broadcasting, but the Bell / Stokowski collaboration was unprecedented in terms of its artistic ambition and sheer logistical scale.³ A brief description of the musicians and engineers participating in the second intercity broadcast, and the chain of reproductive technologies connecting them, illustrates the massive allocation of technical and human resources involved.

For this event the orchestra, conductor and soloists reclaimed the stage at the Academy in Philadelphia, playing to three microphones positioned around the empty stalls of the  

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² The project’s technical infrastructure and goals are described in detail by Frank B. Jewett (1933).

³ Robert McGinn contrasts this with previous attempts at multichannel broadcasts (1983), and Sivowitch surveys earlier experiments in musical broadcasting (Sivowitch 1967, 1970).
concert hall in a configuration intended to capture the spatial impression of the auditorium and the musicians’ position in it (Bell Laboratories Record 1933:256, 360). The output of the microphones passed to a basement level amplifying station then along three parallel cables to a telephone toll office manned by radio engineers, who modulated the signals to a high frequency carrier range for transmission along lead-covered underground lines skirting the north of Chesapeake Bay on the way to the capital. In addition to existing points in Elkton and Baltimore, Bell Laboratories built three new repeater stations housing amplifiers, equalizers and other corrective circuitry in Holly Oak, Abingdon and Laurel (Jewett 1933:438-439). After demodulation at the toll office in Washington a further set of cables connected to Constitution Hall, passing the signal through the mixer manned by Stokowski, again seated towards the rear of the audience flanked by several Bell engineers (Popular Science 1933:50). Finally the signal travelled to the stage-mounted speakers, themselves the product of research by a separate team of engineers tackling the problem of how to widen the dispersion angle of high frequency content to reach a greater portion of the audience than had been possible with existing equipment.⁴

If Bell Laboratories’ commitment to the project is evident from the huge infrastructural investment, Stokowski’s dedication was no less remarkable.⁵ He was even criticized during

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⁴ These speakers might qualify as early predecessors of the now familiar line array configuration widely used in live sound reinforcement systems today (Bell Laboratories Record 1933:258).

⁵ McGinn has examined the possible motivations behind the collaboration, and he cites chiefly Stokowski’s disappointment with radio broadcasts of the Philadelphia Orchestra in prior seasons, for which he worked with the National Broadcasting Company, and the desire of the Bell Laboratories to develop high quality sound recording equipment geared to
the concert season leading up to the preparation for the project for neglecting his normal
duties as conductor of the Philadelphia Orchestra (Philadelphia Orchestra Association 1933).

Although Stokowski was not conducting, his role in shaping the music was central and
typically dramatic in its effect. From his position at the mixer he was able to communicate
various instructions regarding tempo and dynamics to Smallens in Philadelphia through a
talkback system, but more importantly he added an extra layer of interpretation to the music
through manipulation of several dials for control of volume and frequency balance. One dial
regulated the volume of the extreme left and right channels and another the center channel,
allowing independent control of the voice of soprano Davis (Jewett 1933:437) relative to the
orchestra. In the moments leading up to his accident with the mixer, Stokowski was
apparently using this extra dial to amplify the singer’s volume level far above a normal
acoustic balance with the orchestra, creating the impression that “…the invisible Miss Davis
[was] as huge as the Statue of Liberty” (Kaempffert 1933).

Both broadcasts were widely publicized and garnered front-page news in the New York
Times and Washington Post respectively. A large picture of Stokowski manipulating the dials
of the mixing desk appeared in the middle of the Post’s front page, stealing column space
from reports of financial calamities caused by the ongoing depression and international
espionage. Of the second intercity broadcast, Linton Martin of the Philadelphia Inquirer
wrote: “For those alive and alert to the significance of the episode, it took rank as an epochal

exploiting emerging markets in the music industry (1983). It is also likely that American
Telephone & Telegraph, of which Bell Laboratories was the research and development wing,
was looking to write-off costs, since as the telecommunications giant was state owned profits
were capped (Baura 2006:120).
event in the history of musical performance” (1933), while Elisabeth Poe waxed that “…a new era had dawned in music…” (Poe 1933).

In summary, this was arguably one of the most thoroughly planned, ambitious, well-publicized and costly ‘experiments’ of its kind ever conducted in the field of audio engineering – but curiously enough, no one could agree on what to call it.

John Mills of the Bell team proposed “cenno-orchestra system”, 6 while press reviews referred variously to an “Auditory Perspective Music Test” (Poe 1933), a “phantom orchestra” (Washington Post 1933), or “remote control of musical tones” (Musical America 1933). One writer gushed about the “musical miracle” he had witnessed (Washington Post 1933) while Ruth Howell of Musical America coolly summed the evening up as “…not really a musical event at all, but an engineering feat” (Howell 1933).

It may seem insignificant that it was so difficult for all involved to find a common descriptive moniker for what they were doing in Philadelphia, Washington D.C., and all those 150 miles in between on that night in April 1933, until one considers that it has proven equally so for historians to describe the complex set of practices and theories that have sprung up around music and sound technologies since the invention of the phonograph. At the present time, almost eighty years after those musicians, engineers and critics struggled to find a convincing label for the phenomenon they had participated in, there is still no single term that adequately describes innovative combinations of music and sound recording technologies such as the cenno-orchestra.

This is not for want of trying – at various points the word ‘phonography’ has been proposed as a term that might identify these artistic forms and practices, but has proven problematic from the outset. Before sound recording came along it had already been claimed

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6 From ‘cenotaph’. Journalists eagerly parodied this as “see-no-orchestra”.
by stenography (Pitman 1842), and more recently has been suggested as a term for loosely related practices such as field recording (Dumiel 2011) and audio montage (Kahn 1990). The strongest argument for phonography came from Evan Eisenberg, who appropriated the term in his classic study “The Recording Angel” – but perhaps in recognition of its failure to gain acceptance, removed it from the title of the second edition.\(^7\) While this lack of a term could easily be dismissed as a relatively insignificant taxonomic issue, I argue that it reveals deep-seated contradictions in musical cultures and their interaction with sound technologies. These contradictions continue to profoundly influence more general notions of music, as further investigation of the ceno-orchestra project reveals.

“See-no-orchestra”

Given the difficulty for Stokowski or anyone from the Bell team to put a name to their endeavors, it is hardly surprising that the public ‘tests’ they performed were in fact no such thing. The truly experimental phase of the research – the hard work of codifying perceptual responses to various musical and auditory phenomena – had already been carried out through long and painstaking experiments conducted at the Bell Laboratories and the Academy of Music.\(^8\) The public events could be seen as another chapter in a long history of attempts to educate people in how to relate to new and bewildering media technologies, rather than as a

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\(^7\) Pitman shorthand is still in use today. “Phonography” is the title of albums by Stevie Moore and DJ Smash. Perhaps appropriately, the final and possibly fatal ambiguation of the term came from Brittney Spear’s eponymous 2010 release.

\(^8\) The results of research directly related to the ceno-orchestra project were presented in a special symposium and later published (Fletcher 1934).
way of testing its accuracy in the reproduction of music; while they were not really experiments in a scientific sense, they are very significant as examples of contemporary thinking and practice in the field of music recording.\textsuperscript{9} In fact, the auditory perspective ‘concerts’ mark a watershed moment in phonographic history: they crystallized ideas from the previous decade of research into electrical phonography and laid the theoretical groundwork for conceptions of how music and technology interacted for the rest of the century.

Perhaps most importantly, in the decade and a half leading up to the concerts, scientists from a relatively new discipline – electrical engineering – entered the field of music recording (Morton 2000:26). The engineers involved in this new discipline, most notably those associated with the Bell labs, embarked on a prolonged period of research throughout the 1920s and 1930s with one of their aims being to form a scientific basis for a discipline that had until that time, under the previous era of mechanical phonography dominated by Edison, languished in the empirical domain (Lastra 2000:85). As I will show, the ways of measuring, quantifying and talking about sound that this new scientific community developed had a dramatic influence on musical culture throughout the remainder of the century.

At the same time, cultural and theoretical tensions that existed in the era of mechanical phonography became more highly articulated and thus more polarized than they had been previously. Right from the beginning of the mechanical recording era there had been something of a disconnect between the stated principles and actual practices involved in sound recording (Lastra 2000:124). In the era of electrical recording, the problem became

\textsuperscript{9} The audio ‘test’ has a special role in phonographic history; Charles Musser describes the colorful and very unscientific exhibitions of the mechanical phonograph (1990:57), while John and Susan Harviths consider Edison’s tone tests as an ingenious marketing tool (1987).
especially acute when a recording betrayed an artistic or aesthetic take on a musical
performance, as was the mostly the case with the Bell / Stokowski collaborations. Rather than
create an “accurate” sound picture of the Philadelphia Orchestra in concert, Stokowski and
the Bell engineers used recording technologies to improve upon or, as Stokowski himself put
it, “enhance” the musical results. The recordings that they produced were highly personal and
at times idiosyncratic interpretations of musical performances, not literal sonic replicas.

The problem that this caused for sound theorists was that as soon as any kind of
aesthetic or artistic decision-making enters into the recording process it becomes difficult to
describe sound recording in terms of reproduction. As Rick Altman puts it:

Depending on the type, location, and movement of the microphone(s) used
in the recording process, the recorded sound substitutes an apparent sound
event for the original phenomenon. Revealing its mandate to represent
sound events rather than to reproduce them, recorded sound creates an
illusion of presence while constituting a new version of the sound events
that actually transpired (Altman 29).

For Altman, the manipulation of recording technologies introduces both symbolic and
interpretive elements to sound recording, rendering it a process of representation as opposed
to reproduction. In addition to the placement or movement of microphones, Stokowski and
the Bell engineers had at their disposal a range of other tools that they used to interpret and
manipulate the sound space, as I will show below.

While subsequent generations of sound engineers and producers felt comfortable
“monkeying with the microphones” during record production (Eisenberg 121), on paper
theorists doggedly insisted that recordings aspire to be auditory facsimiles of concert
performances. This divergence between theory and practice became the norm in sound theory for the remainder of the century; for the most part, theorists have either characterized representational recording practices as fleeting exceptions to or unnecessary violations of the code of sound fidelity, or simply omitted them from theories of recording altogether.

At the same time, sound engineers and producers needed to talk about what they were doing at a practical level, and indeed one of the most profound achievements of the Bell scientists was developing a means of doing so. From the outset, however, this new language to describe representational practices involving sound and music was considered a strictly technical discourse, which failed to gain recognition or influence at a scholarly level.

Thus throughout the phonographic era we see a profound disjunction between theory and practice, evident from the first musical recordings but intensifying after the convergence of music recording and electrical engineering. This disjunction had two main effects on music recording discourse: first, it drew a sharp line between musical and technical practices; and second, it pushed discussion of any representational practices into the technical domain, increasing an already existing divide between philosophical debates about music recording and technical discussions about how to manage or manipulate those many aspects of the discipline not reflected or recognized by fidelity theories.

Theory, practice and the discourse gap

As the prime example and artistic product of the research carried out by engineers at Bell Laboratories in the years between the world wars, the ceno-orchestra project deserves special scrutiny as it shows the origins of the main discursive and theoretical trends that concerned music and sound recording technologies for the rest of the century and beyond.
The emergence of a disjunction between theory and practice is evident from two contradictory statements in Frank B. Jewett’s address given to the National Academy of Sciences a few days before the second presentation. The first statement defines the project objectives:

For the perfect pick-up, transmission and reproduction of orchestral music a system is needed, such that the sound reproduced in the ears of the listener is the same as that which would be produced in his ears if he were listening to the orchestra directly. In other words, the frequency, intensity and phase relations of the sound in each ear must be accurately reproduced in order best to convey the frequency and intensity range of the sounds and the spatial relations of the instruments (Jewett 1933:435).

Both the specificity of Jewett’s language and the establishment of three new criteria for describing sound – frequency, intensity and phase relations – are noteworthy. Later in the same address he directly contradicts the first statement by noting that the equipment is used to exaggerate or enhance musical dynamics:

When a system capable of handling a greater intensity range than that ordinarily produced by an orchestra was finally developed musicians were quick to take advantage of it as a means of increasing the sound intensity

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10 Jewett’s language draws heavily on previous research at Bell Laboratories (see for example Olson & Massa 1934) and prefigures the rhetoric of the high fidelity movement that began several years later.
during crescendo passages above normal and in decreasing the intensity
during very soft passages below normal (Jewett 1933:436).

So on the one hand Jewett maintains that “perfect pick-up, transmission and
reproduction” relies on the listener hearing the exact same dynamics, spectrum and phase
relations as they would at the real concert, while on the other hand he suggests that this
concern can be sacrificed in the service of a presumably aesthetic goal, at least in terms of
musical dynamics.\(^\text{11}\) Indeed, on the night of the concert Stokowski took advantage of the new
equipment to ‘enhance’ rather than merely reproduce the music, and the audience noticed.
The degree of Stokowski’s enhancements were less than subtle, as Howell of Musical
America noted: “The first half of the program was demonstrated exaggeratedly, to show the
possibilities of contrast and intensity, the toning down and toning up possible by use of the
new telephonic devices…Consequently the music suffered, and so did the listeners’ ears.”\(^\text{12}\)

\(^{11}\) As Jewett suggests, both parties - Stokowski and Bell - were interested in pushing the
system beyond its initial goals of perfect reproduction. As Jewett describes it, Stokowski saw
an opportunity to increase dramatic appeal through increasing dynamic contrast, while Bell’s
desire to exploit the full audible dynamic range from the threshold of audibility to the pain
threshold - “…the intensity range, which an ideal system should be capable of handling, is set
by the range between the loudest sounds that a listener can hear comfortably and the faintest
sounds that he can hear in a quiet audience” - seems to have its roots in contemporary
experiments into loudness perception and definition (Fletcher & Munson 1933).

\(^{12}\) (Howell 1933). Rachmaninov and others echoed these criticisms several years later, when
listening to a similar test in Carnegie Hall in 1940 (McGinn 1983:65). Some of the
experiments conducted in the Academy hall during rehearsals were later released by the Bell
During the course of the project the initial aims of the research evidently changed so completely that the ‘results’ – if one considers these as a set of recommended practices – fundamentally contradicted the guiding principles for ‘perfect reproduction’ established at the outset. Not only were the “frequency, intensity and phase relations” reaching the ears of the audience quite different from what they would have experienced by listening to the orchestra directly, these differences were deliberate, dramatic and very obvious to all present. But rather than allow the theoretical principles underlying the ceno-orchestra to evolve to reflect these new aesthetic practices, Jewett et al. continued to espouse the goal of ‘perfect fidelity’. Stokowski’s enhancements cannot be dismissed as something done in the heat of the performance either. As records of the research process show, the idea of aesthetic enhancement, of exceeding the sonic limitations of a normal orchestral concert, were quite calculated – the practices that so disturbed Ruth Howell were in no way incidental and had been thoroughly studied and prepared.

*Dynamics, drama, and intimacy*

The approach to managing dynamic range underwent several important changes during the course of the project and is particularly revealing of how practice evolved and outgrew initial yet persistent theoretical assumptions. More interestingly, both Stokowski and the Bell scientists had their own separate aesthetic ideas about dynamics. The difference in their two approaches and how they chose to express them explains much about the plight of phonographic theory.

Laboratories, and exaggeration of both stereo perspective and dynamics is apparent (Audio News 1980).
From Stokowski’s side, broadly speaking the research passed through three phases: from assessing acceptable dynamic range reduction, through proposing that the highest artistic results could be achieved only by maintaining the original dynamic range without any reduction, then finally to exploring dynamic range expansion as a means of enhancing artistic appeal.

While the decision to exceed the natural dynamic range of the orchestra is documented by both Stokowski and Jewett, their logic in doing so is not. An explanation along theoretical lines of how this change in objective squares with Jewett’s explicit criteria for ‘perfect reproduction’ is nowhere to be found in any of the literature surrounding the project.

At the outset of the project the Bell scientists were mainly concerned with assessing how dynamic range might acceptably be reduced in order to better fit the limits of existing broadcasting systems. In a private memorandum in 1932, Arnold noted that the maximum dynamic range that a symphony orchestra was capable of was about 70-80 decibels, but added that this fact was “…not conclusive as to the aesthetic necessity of such wide ranges…” and that further study was needed to assess how much reduction of dynamic range was possible without impairing the aesthetic effect of the broadcast. He went on to describe in detail a means of testing the perceptual significance of various reductions of dynamic and spectral range before an audience of musical experts: “It became apparent that satisfactory judgment could only be obtained by preparing a substantially perfect reproducing system, by installing it to pick up from a first-class orchestra, and by arranging for properly representative persons to listen in an acoustically satisfactory room and with adequate electrical means for controlling frequency and volume range” (McGinn 1983:48). Arnold’s first imagining of the ceno-orchestra performance seems to have been to broadcast an orchestral performance to an audience seated in a hall and then make various reductions in
timbral and dynamic range to assess how much was possible without aesthetic loss, as judged by an audience of experts.\textsuperscript{13}

But doubts later emerged as to the possibility of any aesthetically lossless reduction in dynamic range at all. In the year prior to the unveiling of the ceno-orchestra, J. P. Maxfield noted that broadcasts of reduced dynamic range failed “…to transmit the full emotional value which would have been received had the full range been used” (1932:127). Work continued on developing a system that could faithfully transmit the full dynamic range of the symphony orchestra concert; but at precisely the moment when this became possible, there was a sudden and unexplained (from the perspective of ‘perfect reproduction’) change of objective. Faithful reproduction of dynamic range was, it seems almost immediately, sacrificed in favor of a more appealing aesthetic effect. Stokowski described this moment during a particular experiment as follows:

We had two rooms, a large auditorium and a smaller one, but still a large room, not far from it. We wired it to the smaller room. We measured by a process so that we would have exactly the same level of intensity in the smaller room as we had in the larger room. Then we increased that six and a half times.

\textsuperscript{13} The idea that an essentially subjective process, musical aesthetics, could be defined, quantified, studied and observed in a scientific manner is typical of early modernist thinking about sound and perception generally. Jonathan Sterne discusses the impact of scientific / objective thinking and the emergence of generalized models of hearing and sound (Sterne 2003:2).
According to Stokowski, this increase of dynamic range opened up exciting new artistic possibilities:

We shall be able to lift the loudest places of our crescendo and fortissimo to that top level, and then keeping that up there we shall be able to stretch the lower level down to just above noise level. Then we shall have a most tremendous range of tone, of crescendo, of diminuendo, of the antithesis and contrast between very loud and very soft… (Stokowski 1932:15).

Elsewhere, Stokowski stated that he believed this increase in dynamic range would enhance the “eloquence” of music, potentially even making broadcast music more appealing than live concert music.¹⁴ So the observation that a reduction in dynamic range resulted in aesthetic loss quickly led to the conclusion that an increase in dynamic range would then equal an aesthetic gain, with the idea of faithfully reproducing the ‘original’ dynamic range lost in the middle. From Stokowski’s perspective, one can easily see the reason: What would be the point, artistically, in precisely duplicating something that already exists? As Howell, who was in any case dismissive of Stokowski’s enhancements, wrote: “When the program was over, the question in everyone’s mind was: what for?” (1933:18). If Howell was

¹⁴ (McGinn 1983:56). On the Bell side, J. P. Maxfield acknowledged early in 1932 the possibilities for “…new forms of entertainment, different from any which can now be witnessed in auditoriums” (Maxfield 1932:122).
factoring out Stokowski’s enhancements as anyhow undesirable, then the remaining goal – ‘perfect reproduction’ – evidently seemed pointless.\footnote{Stokowski’s idea that broadcast music might make use of a greater dynamic range than that of a concert is anyhow practically flawed; the higher level of ambient noise in most domestic listening spaces compared with the concert hall places a limitation on the maximum dynamic range for classical music broadcasts.}

In any case by the time the public tests took place, the “electrical means for controlling frequency and volume range” were used for artistic enhancement rather than testing for the perceptual effects of degradation in frequency or dynamics, and it was left largely up to Stokowski to determine what these artistic enhancements would be. In this Stokowski was less visionary than he might have been; he seems to have viewed technology as an extension of orchestral and musical technique, which could most effectively be used to enhance existing forms and practices rather than forge new ones.\footnote{Timothy Day makes a similar criticism of Glenn Gould (2000:32). His view that Gould’s innovations are an eccentric distortion of the music recalls Ruth Howell’s reaction to Stokowski’s dynamic enhancements.} Arved Ashby sees Stokowski’s approach to music technologies as fundamentally analogous to his well-known innovations in orchestral technique:

Free bowing – and free breathing, its equivalent in wind sections – is but one example of Stokowski blurring Platonistic distinctions between “artificial” sound production techniques and ambience as a “natural” aspect. It shows him instituting a kind of pre-electronic sound-enhancement technology, and therefore differs in quantitative rather than qualitative terms.
from the imaginative and unorthodox recording methods that he also
developed (Ashby 2010:1117).

As Ashby notes elsewhere, Stokowski “… ‘played’ sound technologies as if they were
musical instruments…” (2010:1121); in other words, he viewed sound technologies as a way
of enhancing existing performance technique. Increasing the dynamic range as a means of
creating greater dramatic contrasts can be seen in the historical context of a move to greater
textural contrast in classical repertory of the 19th and early 20th centuries (Rosen 1997:43).

Maxfield had his own ideas about manipulation of dynamics. He noted during concert
broadcasts with the Philadelphia orchestra elsewhere that without the visual cue of the
performer that one had in the live concert hall the listener lost a degree of intimacy with the
performer, but that some readjustment of balance with the help of an extra microphone could
help to regain this sense of intimacy (1932:125). His suggestion to rebalance and manipulate
natural dynamics in the service of a particular aesthetic then constitutes a representational,
and thus artistic practice; but, being a scientist and of the opinion that aesthetic matters were
better left to musicians, he described his conclusions in the way he felt most comfortable
with—using scientific or technical terms.

So while both Stokowski’s and Maxfield’s practices of dynamic manipulation were
based on aesthetic concerns, one of them – Stokowski’s use of dynamic expansion – was
regarded as an artistic practice, while Maxfield’s reduction of dynamic range through
rebalancing of microphone levels, became a technical discussion. Beyond his own future
experiments with Bell, Stokowski’s techniques for dynamic range enhancement failed to
grow into a significant practice in the field of sound recording. However, Maxfield’s ideas
about rebalancing and the results of his studies into dynamic range reduction became
founding principles of mix engineering (or ‘balance engineering’ as it was first known) and
dynamics processing. The practices of adjusting individual musical levels and creatively applying reductions in dynamic range in order to achieve a particular kind of aesthetic effect, like intimacy, are indeed central to music recording culture; as mastering engineer Bob Katz puts it, “…a lot of contemporary music genres are based on the sound of compression…” (Katz 2007).

To a lesser extent than dynamics, frequency range and phase relations were also subject to various degrees of creative misuse in the ceno-orchestra. While binaural audition was hardly a new concept and the relevant scientific background already well researched, the clever locution ‘auditory perspective’ and the context of the budding field of psychoacoustics helped put a new spin on multichannel reproduction. Stokowski was behind the idea to include this feature in the experiments. In tests at the Academy of Music he expressed a strong preference for binaural recording and playback, and convinced the Bell technicians to add auditory perspective to their list of criteria for assessing ‘perfect reproduction’, in addition to dynamics and frequency range (McGinn 1983:49). Bell followed up with a set of experiments to assess the optimal number of channels and location of microphones for pickup in order to create the impression of a ‘virtual stage’. They found that the addition of a third channel significantly increased accurate depth localization (Steinberg 1934:248). However, by the time of the broadcasts, this extra center channel was used primarily to adjust the balance of the soloist relative to the orchestra rather than help to achieve any sense of greater perspective (Bell Laboratories Record 1933:259).

17 Coincidentally, on the same day as the review of the auditory perspective concert, the New York Times featured a report of the success of simultaneous experiments into 3D cinema (New York Times 1933).
Reproduction, enhancement, representation

Quite apart from Stokowski’s colorful but conservative exploitation of the new possibilities offered by the ceno-orchestra, the truly radical accomplishment of the Bell / Stokowski collaboration was the establishment of three new criteria for talking about sound. The three parameters described in the scientific discourse of the time as volume range, frequency range, and auditory perspective (or ‘phase relations’) (Bell Laboratories Record 1933:255) came to dominate the art of music recording, and are still evident in contemporary theories of music production and engineering, where (in keeping with modern ideas about sound as a kind of transitory object) sonic material is often discussed in terms of three ‘dimensions’: dynamic range, spectrum, and image (Hodgson 2010:157). For music recording, these three parameters became fundamental building blocks of new representational languages, much as melody, rhythm, timbre, texture and harmony constituted both discursive and practical kernels of Western European art music of the common practice era. As in the days of the ceno-orchestra, however, this continued to be seen as a technical rather than an artistic discipline (Hodgson 2010:vii), and perceptual engagement with this discipline as “technical” as opposed to “musical” aurality (Corey 2010:5). Similar concerns with frequency and dynamic range (and within dynamic range, the concern with managing the noise floor) were of course evident in the prewar period, but the Bell engineers, drawing on other fields of research, took these concepts out of the empirical domain by linking them to absolute standards and clearly defined acoustical properties.18

18 The Acoustical Society of America established a Committee on Acoustical Standardization in 1929, which reported its first series of recommendations two years later (Committee on Acoustical Standardization 1931). These sonic parameters might have had an impact on
While these new standards and definitions were established, music recording in the case of the ceno-orchestra remained a highly aestheticized representational practice, and in the final result had little to do with copying the experience or sonic phenomena of a live orchestral concert. Aesthetic enhancements were seen as either undesirable or extraneous technological intrusions on the musical material, and were not reflected in theories of music or sound recording published by any of the scientists involved.

**Issues raised by the Bell – Stokowski collaboration**

In summary, following the period of intense research into new methods of recording involving electrical technologies in the 1920s and 1930s, sound recording discourse came to a state of general confusion caused by the simple problem of how to reconcile the conflicting goals of maintaining the real or apparent acoustic transparency of sound technologies required by fidelity theories, with embracing music recording as a new type of representation. This conflict occurred first and most forcefully in the case of Western European art music, leading to a disjunction between theory and practice whereby musicians and engineers conceived and exploited new representational models, simultaneously attempting to square this with the contradictory imperative that what they were doing should to a greater or lesser degree remain artistically neutral. This disjunction between theory and practice was evident much earlier in the work of Edison (Lastra 2000:86), but became more highly polarized after scientists working with new electrical technologies established absolute standards and principles for measuring and discussing sound and its perception.

concert music of the 20\textsuperscript{th} and 21\textsuperscript{st} centuries, for example frequency range in the spectral school, or spatiality in the music of Stockhausen (Harvey 1975:55).
The failure of theories of music recording to recognize representational practices means that music recording has generally been conceived in terms of separate musical and technical spheres. As David Morton awkwardly puts it: “The recording of music is an activity that combines a very old form of culture, the performance of music, with a variety of technological processes to create a new form of culture” (Morton 2000:13). Morton’s division into musical and technological parts represents the opinion of most critics and historians of sound recording and music in the 20th and 21st centuries.

Even in studies that recognize music recording as a creative field, it is usually understood to mean studio or engineering practices, and ignores studio-specific types of performing, composing and listening to music (Zak 2001; Hodgson 2010). Against this critical backdrop, discussions of music recording as a representational practice became an unofficial technical dialogue subordinate to fidelity theories.

This split between theoretically sanctioned and pragmatic discussions of phonography is similar to Tia DeNora’s observation about the split between ‘official’ and vernacular understandings of music (DeNora 2000). The central point of this study is to argue that these things are related: that the fracture in notions of music springs from the discursive conflicts we see between music and technology in music recording.

Several critical questions concerning the history of music recording technologies might help to clarify or resolve this relationship. These questions are:

1) How did the earliest discourses surrounding nascent media technologies influence subsequent developments in theory and practice?

2) In comparison to film and photography, phonography as struggled for recognition as an “artistic” practice. Given the many similarities between these three media, what factors contributed to this situation, and what aesthetic or artistic dimensions of phonography remain?
3) Given the heavily interdependent nature of phonography and music over the past century or more, is there any connection between phonograph theory and the polarization of the “official” and the “unofficial”, that is to say the vernacular and the scholarly, in music?

Who are Phonographers?

The gramophone is the single media invention of the late modern era that failed to lead to its own theoretically recognized representational forms. Still and moving picture cameras, television, and – lest one suspect a visual hegemony – radio (Crook 1999), each bequeathed their own unique artistic milieu. Douglas Kahn asserts that phonographic history is punctuated by ‘attempts’ at an art in various guises that never fully materialized (Kahn 1990:302). In contrast to Kahn, I argue that it was not the phonographic arts themselves, but cohesive theories of phonography that failed to appear. Why was phonography unable to develop theories better able to reflect its varied practices?

In Chapter 3, I attempt to answer this question by examining the influence of foundation communities on subsequent theoretical trends in music recording. Rather than repeating the familiar question ‘what is phonography?’ (or what might it have been), but beginning instead by asking ‘who are phonographers?’, I show how the thinking and practices established by early practitioners in music recording shaped the dysfunctional

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19 The main problem with the ‘what’ questions is that they tend to focus arguments on objects, rather than roles or practices. Since the objects that define sound recording are phonographic technologies, studies then revolve around these technologies and how they are used, which leads to by now familiar arguments about how technologies affect music making.
theoretical terrain of what Kahn – if he believed in their existence – would call the phonographic arts.

Since on a cultural and historical level phonography has much in common with cinema I compare the foundation communities of both in an attempt to shed light on why cinema and other representational media were able to develop theories of their own artistic forms, while theories of phonography remained fixed on the idea of reproduction. I pay particular attention to the way that each media defines the “pro-mediated,” that is the events that occur in front of the camera and the microphone. I argue that the pro-phonographic, while less well articulated than the pro-filmic, is an aesthetic as well as a theoretical construction, one that has enabled colorful but heretofore unstudied creative practices in music recording.

Phonographic theory

In the absence of even a general term for phonography it is not surprising that theory is somewhat limited in scope. There is nothing as subtle or cohesive as the literature found in film and cinema theory, and until very recently no studies of the ‘language of phonography’ (Bazin 2005:23) uncovering the narrative structures that might inform practices of editing, multitracking, the use of special effects, or manipulation of balance and perspective. Colin Symes goes as far as saying that despite a huge volume of varied kinds of writing on the subject and a rich history of innovative representational practices, there is no unified theory of phonography at all (2004:34).

In fact, there are theories of phonography, expressed in often violent and divisive polemics. Since in the existing theories we find the root of the discourse problem that I believe leads to a fractured notion of music in contemporary musical culture, I examine and compare some of the most persistent of these theories in Chapter 3.
Music / technology polemics are especially focused during moments of change in practices and standards of recording – for example, the introduction of a new group of technologies such as electrical or digital recording – and form nodal points in the history of phonographic discourse. Comparison of these nodal points reveals that arguments and rhetoric tend to be repeated throughout history. Most attempts at a phonographic theory revolve around a specific model of fidelity. Fairly early on phonographic discourse got stuck on problems related to these fidelity theories, usually conflicts between competing models or how rigorously a particular theory should be implemented, and never managed to move much further (Lastra 2000:124).

In order to explain this periodic repetition of the same theoretical arguments, echoing the work of Jonathan Sterne I begin from the assumption that models of fidelity have less to do with absolute standards than aesthetic and cultural preferences (Sterne 2003:278), and attempt to uncover these preferences. I argue that a particular theory of fidelity tends to be framed by a code of ‘correct’ practices based on assumed normative concepts of absolute truth, nature, science, reality and the transcendent.

Furthermore, I argue that the “impact narratives” that Sterne identifies (2003:7) are in fact closely related to fidelity theories, each being a consequence of the other. Since fidelity theory insists on the acoustic transparency and non-impact of sound technologies (recall the specificity of Jewett’s criteria for ‘perfect reproduction’), any representational practice tends to be viewed as a technological impact on music. The interpretation of technological representation as a distortion or degradation of some ideal notion of music (recall Howell and Rachmaninov’s negative reaction to Stokowski’s representational enhancements) in turn reinforces the drive towards greater transparency and the dominance of fidelity tropes in sound recording theory. This discursive feedback loop has placed phonography in a gridlock, preventing any development of a richer, more comprehensive theory along the lines Symes
imagines; the fact that few if any authors have been able to suggest a viable alternative to fidelity theory also means that issues arising from perceived ‘effects’ of reproduction such as the end of originality, social fracturing and loss of human presence dominate histories of the phonograph and musical performance (Milner 2010; Katz 2010; Auslander 2008; Chanan 1995; Philip 2004).

In this chapter I focus on theories of sound recording found in classical music and film sound theory for two reasons: first, there is simply more writing concerning aesthetics and theory here; and second, these two scholarly discourses, when compared with their technical and vernacular cousins, have had a disproportionate influence on phonographic theory, especially in the case of classical music (Morton 2000:16). These two discourses borrow from each other extensively: the theories of Walter Benjamin (1968) and Theodore W. Adorno (1941) are foundational for classical and film music theory, but in reception experience a curious reversal: while classical music theorists seem more interested in appropriating the ideas of Benjamin, whose essay mostly concerns cinema and the visual arts, film sound theorists in some significant cases gravitate towards Adorno, whose article is specific in only discussing the reproduction of symphonic music. This discursive swapping-out of Adorno and Benjamin suggests that both film sound theory and classical music recording discourse suffer from an overly generalized approach to sound.\(^{21}\)

\(^{21}\) Classical music scholars whose work emphasizes Benjamin would include Robert Philip, Michael Chanan and Arved Ashby (Philip 2004; Chanan 1995; Ashby 2010); two film theorists who cite Adorno’s article are Thomas Y. Levin and James Lastra (Levin 1984; Lastra 2000:128). Levin carries much weight due to his background as a scholar of Adorno. Lastra acknowledges the specificity of Adorno’s arguments about the reproduction of symphonic music, and characterizes Levin’s application of this argument to film sound as a
Discursive questions aside, why have the “cultural and aesthetic preferences” identified by Sterne proved so dominant in the realm of theory? Why has it been so difficult to recognize the fundamentally representational, aesthetic nature of sound recording practices? Or to ask the question a different way, if in fact “many of the theoretical problems … [in phonographic discourses] … disappear when, in a thoroughgoing way, we understand the process as sound representation rather than sound reproduction” (Lastra 2000:137), why then have fidelity theories and impact narratives proved so persistent? I argue that the principle drive behind both is to enforce a separation between the artistic and the technical, and that examining modern understandings of technology itself is central to unlocking the puzzle of phonographic polemics.

While the central question posed by most standard histories of the phonograph, ‘how has the phonograph / sound recording affected music?’ results in histories of machines and their impact on culture (Sterne 2003:7), a general version of the same question, “how does technology affect culture?”, has been a central concern of technology and culture studies under the topic of technological determinism (Smith 1994; Pursell 2010); however, these approaches have been largely ignored in sound theory. What is behind the drive to discursively separate music from technology? I explore both the general history and usage of the term ‘technology’ itself (Marx 2010), and the changing cultural associations of ‘provocative generalization,’ using Adorno’s analysis to argue against “…a single understanding of sound and a single model of hearing,” stressing that “…an adequate theory [of sound] must take into account the specificity of both the sonorous object and the appropriate mode of listening” (131). In connecting the specificity of modes of listening to musical and social contexts he is close to the ideas of Ola Stockfeld (1997). I examine Adorno’s article in detail in Chapter 3.
technology after the First World War (Mackaman 2000:xiii), and speculate on the impact of this changed status on the influential theories of Walter Benjamin.

If then we can discard fidelity theory and accept phonography as a representational practice, in the midst of the theoretical lacuna described above the question arises: what do recordings represent?

Many studies recognize the contradictory and problematic nature of fidelity theories in phonographic history. Most incisively, James Lastra has shown how the idea of originality itself springs from, rather than being destroyed by, reproduction; that originality is an effect of reproduction, a kind of fantasy created by the possibility of infinite repetition (2000:150). To apply Lastra’s observation to the case of musical recordings, in the absence of a traditional musical performance as a singular pre-recorded musical event, it is easy to conclude that sound recordings therefore “…record nothing” (Eisenberg 2004:89). The notion that records might be attempts to represent an artistic idea through various spatial and temporal narrative processes, rather than reproduce a real event, has recently begun to take hold, with only a handful of studies that attempt to describe how these narrative processes might work.  

Despite much insistence and writing to the contrary then, I agree strongly with those who argue for music recording as a representational form that has from the outset been concerned with the construction of non-realistic sonic space. Even as practitioners insist on tropes of naturalism and fidelity, I side with those critics who argue that in practice phonography is informed more by a search for aesthetically appealing sonic material,

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22 (Hodgson 2010:154; Doyle 2005). As Lastra suggests, what might have been missing here is a conception of the pro-phonographic more analogous to the profilmic (Lastra 2000 passim).
regardless of musical genre.\(^{23}\) The next question then becomes: what effect has this fractured, dysfunctional discourse had on music recording in particular and music making as a whole?

**Pure aurality and meta-narratives in sound recording**

In discursive terms there are two connected problems facing music recording: one, that theory tends to repress ideas that reflect representational practices (as I show in Chapter 3); and two, that music and sound generally are rather more difficult to discuss than textual or visual media. As Simon Frith has observed of rock music: “One difficulty here is that rock is a song form – there is a temptation to analyze the words at the expense of the sounds. Words can be reproduced for comment with comparative ease, and rhymes are better understood than chords…” (Frith 1983:14). Frith puts his finger on an important discursive problem here, which is the tendency of critics to discuss things that lend themselves to discussion. The problem is compounded in the case of absolute music or sound since by definition they aspire to having no extra-musical elements for critics to latch onto. Struggles against the ‘hegemony of the visual’ in much writing also lead to a desire to weed out any extra musical element in sonic art forms, a kind of perceptual cleansing of the non-auditory.

Perhaps more than is the case with other art forms, music scholarship often relies on analogies and metaphors from other media, usually visual or textual, in order to define or clarify processes and establish critical positions. Similarly, in phonography questions taking the form ‘(how) is sound recording like photography / cinema / language?’ are common (Ashby 2010:4235; Chanan 1995:137; Williams 1980). The need for visual or textual analogs

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\(^{23}\) These would include Moorefield (2005), Zak (2001), Hodgson (2010), Ashby (2010) and Lastra. Of these Lastra is the most thorough, tracing music recording as a representational practice back to the work of Edison (2000, 87-88).
in both sound theory and music demonstrates the general difficulty of talking about sound. I argue that much phonographic discourse, and by extension music criticism, relies on the translation of sonic material into a textual or visual format, since most scholarly enquiry is based around text and images; in other words, before discussing something that is discursively abstract, it is first necessary to convert it into something that can be discussed. In the process of doing this content is necessarily altered or, more interestingly, aestheticized.

The way we perceive musical events, in particular the relationship of the visual to the auditory, certainly changes when representational media like radio or the phonograph are introduced. In surprising contrast to the abundance of textual and visual analogies in musical and phonographic scholarship, much of the writing concerning phonographic technologies either describes or proposes a separation of the auditory from the visual (and presumably the haptic, though this is seldom if ever mentioned). This perceived separation of auditory from other sensations provokes many histories of recorded music to note the ‘disembodiment’ of the performer. In the case of the sonic arts one finds rather an insistence or celebration of pure autonomy of the sonic from the visual. Both views rest on an assumption that sound technologies separate the auditory from the visual, an attitude summarized most forcefully by Dave Laing: “In Freudian terms, the invocatory (listening) drive was separated from (or privileged over) the scopic (looking) drive” (Laing 1991:8). According to these critics one can—and possibly should—only listen to the phonograph.

24 Aside from Laing, Michael Chanan is among the most insistent (1995:18); also recall Waldemar Kaempffert’s vivid description of “disembodied performers under the direction of a discarnate conductor” in his review of the cenno-orchestra (Kaempffert 1933).

25 This is a part of a reaction to a perceived ocular hegemony discussed in Chapter 2. In terms of the sonic arts Kahn’s arguments could be considered representative (1990).
In the midst of these two influential factors – the denial of the extra-auditory in purely perceptual terms, and contrasting proliferation of extra-auditory metaphors and analogies in discourse – one finds creative practices influenced by fidelity theories then leaking into non-auditory elements like the physical design of phonograph equipment and imagery found in advertising material. Sonic artifacts resulting from engineering practices like dynamics processing, spectral / image manipulation, artificial reverberation and carrier noise fall into the category of the extra-musical, and are frequently subject to deliberate creative misuse. Another way to express this might be to say that since the discourse dealing with representational practice is primarily technical or vernacular, this means that aesthetic innovations are driven underground – into meta-narratives, or practices centered around misuse.

In light of this, I argue against insistence on a ‘pure aurality’, noting that similar limitations are not required of more theoretically robust representational forms found in radio, film or photography. I propose instead that various extra-musical elements form sonic, visual and textual meta-narratives that serve a dual artistic / discursive function and literally embody many of the anxieties of the discourses that influence them. The polemic conflicts that have so disturbed phonographic theory, then, may have made music-recording practice more interesting than it might have been.

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26 Radio drama makes frequent and playful use of referential dramatic devices (From Stage Thrills to Radio Drama 1924), while visual media seem more open to the non-visual: varied uses of sound are central elements of cinematic narrative, and theories of photography seem able to accommodate extra-visual elements such as text (Wright 2004, 126; Bryant 1996).
Ideal Listening and the “Two Musics” Problem

Tia DeNora notes that after the arrival of phonographic technologies, music sociology became “…a scholarly and specialist topic, and, as with most scholarly matters, the passion of the subject drained away such that, today, the fissure between ordinary, everyday responses to music and expert accounts of music came to seem both normal and acceptable” (2003:3). As DeNora suggests elsewhere, while ‘unofficially’ music is recognized as a highly influential cultural force (2000:ix), ‘official’ definitions are often characterized by a colorless objectivity.27

This leads to the major point of this study: how did it come to this? Why do ‘official’ definitions of music shy away from the subjective, thus proving contradictory and unsatisfactory at a practical or vernacular level? Recalling the responses of my students to the two questions posed in the preface to this study, why is it that listeners and practicing musicians feel pressure to sustain separate notions of music as a concept and as a practice?

There is a striking parallel here between the vernacular / scholarly schism in music definitions and the discursive conflicts encountered in phonography. In both cases the practical, everyday side of things is fluid, connected and propulsive, while officially conceptions of both are rigidly objective and scientific. There are chronological and discursive coincidences here: at the same time that reproductive technologies became culturally significant, notions about music split into separate vernacular and scholarly understandings; this vernacular / theoretical split is mirrored in phonographic discourse.

I argue that the schism we find in contemporary notions of music is therefore directly related to music technology polemics, and as the most significant meeting point of music and

technology, phonographic discourse has played a central role in polarizing definitions of music. But how?

The lack of a term for the art forms that might be described as ‘phonography’ becomes important here because it enables confusion between these forms and music. Phonographic forms and practices that are often at odds with the notions of performance, composition and even audience that support traditional understandings of music are, in the absence of a better term, described simply as music, with ‘phonography’ seen as a means of capturing and storing that music. In other words, while the types of performing, composing and auditing that happen in the context of musical recordings or broadcasts are – I argue along with Jay Hodgson (2010) – simply different from those involved in other types of music making, the tendency in almost all the relevant literature and criticism has been to regard them as being essentially the same thing, albeit subjected to technical intervention. Hence musical recording—rather than a dynamic, fluid, non-linear cultural practice – becomes a two-stage process: music, recording.

The theoretical polarization of phonography into a linear process comprised of ontologically separate musical and technical phases means that discourse, under the dual influence of classical music culture and dystopian views of technology, is normally concerned with delimiting technology and technological practices, while assuming music – that is, composition, performance, listening (auditing) – as a fixed constant. Through analysis of some major and minor texts of phonographic theory I show how these definitions of the technological conditions of sound recording in given situations also create recursive definitions of music. If music and technology are in practice fluid, interconnected and

28 An admittedly awkward term that I use since it implies more multidimensional involvement than ‘listening’.
inseparable, then defining one ‘half’ necessarily means defining the other—most often involuntarily. These recursive, and hence inaudible, definitions then fold back into scholarly and hence officially sanctioned definitions of music.

The separation of technology from music in phonography can be seen in the larger context of the status of musical technique, arising from a historical tendency in music aesthetics to partition and ‘ghettoize’ the technical in music, particularly musical performance. There are fundamental similarities between phonographic polemics and ideas about technique and virtuosity in musical performance. For the musical performer, technique is a learned behavior, practiced with frequent repetition of ‘correct’ physical habits; with sufficient practice the technique should disappear from the performer’s awareness (Jacobson 2006:155). In a similar fashion, fidelity theorists insist on the non-audibility of sound technologies, demanding they be improved and refined until they become inaudible.

When sound technologies are considered as ‘recording’ devices—machines that attempt to capture a musical performance – phonography too easily becomes either a McLuhanesque extension of performance technique, or an intrusion on performance practice, depending on one’s point of view (Gould 1966; Philip 2004). In musical composition, however, technique has a broader mandate. Compositional technique is often synonymous with musical style (Dalhaus 1983:12), and technique is seen as a generative force more closely tied with creative processes than is the case with musical performance (Lippman 1990:134). Viewing music technologies as opening up new possibilities in compositional technique (Moorefield 2005) helps pave the way for a more cohesive understanding of the role of technology in music making and, as I will argue shortly, possibly a more integrated notion of music itself.

At the same time it provokes a rather more difficult question: if one considers phonography as a unique art form with its own distinct representational narratives, related to
but ultimately different from music (perhaps like the relationship between cinema and stage drama)—especially given the cultural predominance of this phonographic art form over the past 150-odd years—where does this leave music? Arved Ashby notes: “The term ‘media’ is getting pretty dusty for the same sorts of reasons that the word ‘computer’ is, and for the same reasons that the term ‘recording’ itself verges on extinction” (2010:618). In terms of technologies, where eventual obsolescence is perhaps the only thing one can always be certain about, the ‘dustiness’ of these terms is a relatively easy issue to address. What about ‘performance’, ‘instrument’, ‘composer’? What about ‘music’?

These problems present an opportunity: a chance to revisit and revise contemporary notions of music, with a possibility to recapture the vernacular, subjective, everyday meanings that have been lost in scholarly discourse. Some recent studies have proposed alternative notions of music as behavior (Small 1998) or an enactment of cultural relationships (Turino 2008) but much more work is needed here.

The fact that we have only one word to describe such a vast array of artistic and social products, practices and functions may in itself be problematic; if one single term ‘music’ is at present stretched beyond its capabilities, might a variety of terms (one of which could be ‘phonography’) and hence a little more specificity help to reconnect ‘music(s)’ more closely with cultural context, as is the case in many non-western cultures?²⁹

If one balks at the idea that the term ‘music’ in Western cultures might have become a kind of hegemony, then there are bigger problems further up the hermeneutic ladder, problems evident in a striking change in the character of official definitions of music before and after mechanical reproduction came on the scene. While music definitions before the late 19th century usually conceived of music in terms of composing, after mechanical

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²⁹ Western cultures are more or less alone in having a single term for ‘music’ (Bakan 2007:6).
reproduction came about there is a shift towards categorizing music as a kind of sonorous object. This definition enables a useful shift away from the score as the locus of Western art music’s ‘object-ness’, but on the downside it forces music into a subcategory of sound. With nothing to distinguish music from a mere category of sound, it would seem that the notion of ‘music’ itself is badly in need of re-evaluation.

I close with the argument that a more integrated imagining of ‘music’ (or whatever and however many different things we may choose to call it) is only possible with a more fluid, less polarized approach to the technical in music, and its modern manifestation, ‘music technology’. Since in composition we see this fluidity and dynamism in the form of more integrated and varied understandings of musical technique, and since composition in its many and varied forms, the actual creation of musical material, is the quintessential ‘first place’ of musical culture, I believe that musical composition has a vital role to play in a contemporary re-imagining of music(s). Through a renewed recognition of the status of musical composition—including improvisation, guided performance and other activities that might come under the general rubric of music making – within musical cultures, there is an opportunity to revitalize and reconnect the objective and the subjective, binding disparate notions of music together into a more cohesive and socially recognizable whole.
Chapter 2: Phonograph Mythology

“Indeed, the imaginative and the inventive have entered so much even into descriptions of the instrument and accounts of its experimental working, that some matter-of-fact people have been disposed to question its actual existence, and to regard it as a myth concocted by enterprising reporters.”


These words could easily have been written about Thomas Edison’s “spirit-finder,” a mythical device that caused international controversy when the inventor first mentioned it to journalist Bertie Charles Forbes, founder of the eponymous magazine, in an interview in 1920 (Forbes:10). Edison explained to Forbes that the device would allow him to test for the existence of the human soul by providing a means of receiving communications from what he described as the personality-residues of the deceased.

Public reaction to Edison’s revelation was swift and overwhelming, and responses in the international press varied from credulous to cautious to satirical. Was Edison serious, or was he playing a prank on an unsuspecting reporter? Had he turned his back on science and joined other public figures like Henry Ford and Sir Arthur Conan Doyle in the growing spiritualist movement? Or was he really working on a machine that would cross the barrier
between life and death?\textsuperscript{1} The inventor had an unparalleled reputation for having transformed American life with a series of seemingly magical inventions, and the claim that he might soon make contact with the afterlife was not easily dismissed.\textsuperscript{2}

Considering the enormous publicity generated by the revelation of the spirit-finder (or “apparatus” as Edison preferred to call it)—at the time, some even went as far as to declare that it was the most important undertaking in his career (Desmond:162)—it is curious that the incident is practically forgotten today, and what little discussion has taken place in the intervening years has been limited to lingering curiosity on the message boards of various paranormal groups, or the more credible claim from Edison biographers that the device never existed.\textsuperscript{3}

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\textsuperscript{1} It seems even the media-savvy inventor may have underestimated the potential public reaction to his announcement. Some humorously imagined the spirit catcher as a “ghost telephone” with a permanently busy signal, while others expressed horror (\textit{New York Times}, “French Fancy Busy on Spirit Machine” 1920). Edison biographer Paul Israel suggests that the story was most likely one of many jokes that Edison enjoyed pulling on a gullible press (Israel 2009).

\textsuperscript{2} In the summer of 1922, he topped a survey of the greatest living Americans published in the \textit{New York Times} (“Twelve Greatest American Men” 1922), beating out Woodrow Wilson, Henry Ford, John D. Rockefeller, and Elihu Root, among others.

\textsuperscript{3} Several years later the \textit{New York Times} reported a comment from an anonymous associate claiming that “the whole thing was a hoax” (“Edison Now Admits the Soul May Exist” 1926), although it seems Edison himself never publicly disavowed or retracted his statements about the device. According to the Edison National Historical Site, neither the machine nor any plans exist (Israel 2009).
But whether or not Edison ever seriously considered building the “apparatus,” the idea of the spirit-finder captured the public imagination and as such reveals much about the ways in which words and stories shape technologies. Indeed, in the absence of the invention itself, it stands as an example of technology as storytelling—as a narrative rather than a thing or a machine. The public discussion of the spirit-finder and Edison’s role in shaping and directing it is a valuable example of the changing relationships between science, myth, hypothesis, and the inventor in the early modern era, one that reveals much about the other mythical invention referred to by the writer quoted at the beginning of this chapter—the phonograph.

The Spirit-Finder: Echoes of a Phonographic Myth

The spirit-finder and the phonograph had a lot in common. The former was usually described as a type of sound communications device, while the idea of communion with the

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4 Scott Montgomery makes a complimentary point, claiming that science writers assume “that language can be made a form of technology, a device able to contain and transfer knowledge without touching it” (emphasis in original) (1996:2).

5 I use the word myth in its more formal sense, as a single (usually traditional) narrative forming part of a mythology, rather than the more casual understandings of common fallacy or urban myth. As Dupriez and Halsall put it, myth is a “symbolic narrative in which characters, speeches, and action aim to establish a balance in spiritual and social values in which there is room for everyone and which offers an interpretation of human existence” (292).

6 Edison and various other writers compared it to inventions like the megaphone (Shaw 1922:161), radio (Sconce 2000:82), loudspeaker (Armagnac 1927), and telephone (New York Times, “French Fancy Busy on Spirit Machine” 1920). Edison described the apparatus as a
dead was also popular in early writings about the phonograph. Beyond this, the stories of both devices show the emergence of a mythic structure that has originated in scientific writings of the late nineteenth century.

Edison explained his “apparatus” as part of a complete theory of the immortal existence of all living things. Edison filled in gaps in his “theory” that could not be accounted for by scientific knowledge of the time by improvising a complex and fascinating hypothesis of the cycle of life and death—to all intents and purposes, a sophisticated reincarnation myth.

In his theory of “life units” Edison proposed that all forms of life including humans are made up of millions of smaller entities or “intelligences,” each retaining a trace of the personality of the complete individual. Upon death, these intelligences separated from the body, and could then either break apart and go their separate ways, or remain bound together as part of the same individual being. Edison proposed that it might be possible to intercept minute communications from these entities using his ultra-sensitive apparatus.

A powerful valve that would amplify and record messages from the deceased (Scientific American, “Edison's Views on Life and Death” 1920:446), and the principle of amplification recalls the gramophonic device designed by Professor Pschorr in Salomo Friedlaender’s fictional story Goethe Speaks into the Phonograph (Kittler 1999:59-68).

For example Scientific American wrote: "We have already pointed out the startling possibility of the voices of the dead being reheard through this device..." (“The Talking Phonograph” 1877b:300).

Edison explained his theory in painstaking detail in his own writings and a number of public interviews over the course of several years (Forbes 1920; Scientific American 1920; The Strand 1922; New York Times 1926; Rothman 1921). His theory of life units seems to incorporate contemporary developments in science such as the theory of electrons (Lorentz...
The theory is an imaginative blend of scientific fact, hypothesis, rhetoric, mystic symbolism, and metaphor, and as such resembles other narratives found in scientific writings of the early years of the phonograph. As I will show, these narratives are based on a surprisingly cohesive mythic structure and appear to serve a uniquely social function: they form the logical core of a process of cultural negotiation that took place during the tumultuous final decades of the nineteenth century.

A multitude of studies exist into the function and cultural influence of the mythologies of various cultures, but in terms of social function several common ideas emerge. First, through metaphor, allegory, or symbolism, mythologies negotiate changes in societal customs and practices; second, myths define human relationships, relationships to nature, and nature itself (Andrews 2000:xi); third, mythologies offer a worldview, a logical and comprehensive structure for understanding the known universe that can accommodate and explain confusing, frightening, or painful experiences, thus preventing any anxiety these experiences might cause (Hatina 2008:18; Segal 1999:45; Stambovsky 1996:68); and finally, myths offer hope of the possibility of a better form of existence, for example the religious idea of heaven, though like heaven not necessarily one that is presently available (Coupe 2009:9).


9 (Doty 2004:3). James Lastra has described how familiar models help cultures to incorporate new forms of communication in a way that minimizes anxiety. Lastra explains that many of the seemingly far-fetched possibilities that were entertained were part of the process of imagining the social context and reception of the new devices (Lastra 2000:17-21).
Edison’s theory satisfies all of these conditions to an extent. It attempts to incorporate scientific, rational thought into existing human belief systems; defines a natural process (life and death), and explains how humans relate to it; offers a comprehensive theory of existence well beyond that which science of that day (or this, for that matter) was capable, and was in large part an attempt to make sense of the incomprehensible suffering caused by the First World War; and finally it promises the possibility of a particular kind of life after death. In addition to fulfilling these basic functions, Edison’s theory also features a mythic character (Edison himself), a mythological object (the spirit-finder), and a distinctive mythic narrative, one repeated by Edison countless times in various interviews across a period of several years.

The theory of life units is part of a much larger body of works that combine scientific writing with mythic structure. These works include much of the early writing about the phonograph, and in the following pages I examine some of them and argue that they too constitute a kind of techno-mythology.

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Around this time there was a growing interest in spiritualism and survivors of the millions of victims of the war were drawn to the idea of communicating with those they had lost (Israel 2009). Edison himself stated that he looked forward to communicating with a colleague who had recently passed away. His views on the soul changed after the war. In a 1910 interview he steadfastly denied its existence, but after the war he revised his ideas: “I was thinking of the war and the cruelty of nature. Billions of human prayers have been sent up, yet without apparent results. Millions have died. Malignant cruelty was apparent. I thought there might be a way of determining whether nature is as cruel as she appeared... Somebody has to explain this problem. Somebody has to start working on it scientifically” (Rothman 1921:6).
Primary Mythological Texts

Phonograph mythology evolved through articles in science journals, novels, poems, philosophical essays, short stories, correspondence published in newspapers and journals, and interviews with or essays by Edison himself. The phonograph features prominently in scientific texts in the years immediately following its invention to the period between the two world wars, perhaps more than any single invention before it.11

Although phonograph mythology began with Edison’s two widely read essays on the phonograph,12 it was retold and reworked through countless speculative articles and letters in an enormously popular type of publication that emerged during the nineteenth century: the popular science journal. The rise of these journals, which by the 1920s numbered more than ten thousand (Young 2002), meant that hitherto private scientific discussions were now conducted in public for the entertainment of a non-specialist audience, and this changed both the stakes and the nature of the discussion. The reading public—at least those with access to the kinds of publications on offer—now had a direct means of responding to scientific discourse, but more importantly the scientific community, in particular the newly ascendant

11 Less than six months after the first private demonstration of the phonograph, the Chicago Tribune wrote: “Of all the inventions of the present century, not one has created such an interest or attracted such widespread attention as the Phonograph. Magazines have teemed with articles upon the inventor and his invention, and the newspaper press has speculated upon its possibilities clear to the verge of the wildest imaginings” (The Future of the Phonograph 1878).

12 The Phonograph and Its Future (Edison 1878) and The Perfected Phonograph (Edison 1888).
industrialized sciences of which Edison was a figurehead, had a new forum through which to influence public opinion on new inventions or innovations.13

Novels, philosophical essays, short stories, and other non-fiction texts also contributed to phonograph mythology. In Gramophone, Film, Typewriter, media theorist Friedrich Kittler presents a small number of texts in a manner that suggests a kind of anthology of aesthetic and philosophical thinking from the early years of the phonograph.14 Beyond writings that immediately concern the phonograph, a body of works described by historian Howard Segal as “technological utopian” literature deserve mention. Technological utopianism is “...a mode

13 Fredrich Kittler describes Edison as “lord of the first research laboratory in the history of technology” (Kittler 1999:3). Leonard S Reich discusses Edison’s influence on the development of industrial research (Reich 2002:42-47).

14 The texts presented by Kittler are: “Memory and Phonograph” by Jean-Marie Guyau (1880); “Death and the Shell” by Maurice Renard (1907); “Goethe Speaks into the Phonograph” by Salomo Friedlaender (1916); and “Primal Sound” by Rainer Maria Rilke (1919). He quotes at length from Rudolph Lothar’s “The Talking Machine: A Technical-Aesthetic essay” (1924). Kittler criticizes Lothar for commenting that “philosophers and psychologists” of art had previously ignored phonography, which is perhaps unfair. Lothar may have been enviously comparing the state of phonographic discourse to the early film criticism of psychologist Hugo Münsterberg or the very early reviews of Rudolph Arnheim. In any case Lothar is the only writer in Kittler’s “anthology” to tackle the question of phonograph aesthetics head on, as all of the other texts refer to the phonograph tangentially. For example, Kittler’s description of Guyau’s essay as the “first theory of the phonograph” is slightly capricious, as the main subject of the essay is memory; Guyau’s would then be a recursive theory of phonography (Kittler 1999:30-71).
of thought and activity that vaunts technology as the means of bringing about utopia” (Segal 2005:10), and reflects many of the aspirations of phonograph mythology in a broader context.

All of these various publications blended science and myth in novel and entertaining ways, and the boundaries between the two, when they existed at all, were often indeterminate. As Segal shows, “technological utopian” writers all described similar kinds of utopias, whether fiction or non-fiction. All used the same matter-of-fact, rational voice, and presented their ideal societies as entirely plausible, even the most fanciful ones (Segal 2005:19-21). For their part, popular science journals, along with mainstream newspapers and periodicals, did much more than publish news and information about scientific discoveries. They also contained a large amount of speculative or outright fantastical material, and became the primary forum for disseminating, discussing, and reinventing techno-mythologies.\(^\text{15}\) As writers of this era freely incorporated myth and science as part of the same narrative vision, they invited the reader to “believe” all of it in equal measure.

\(^{15}\) One such article published after Edison’s death in 1933 shows the kind of unscientific content that could appear in such magazines. It describes a test of the “apparatus” that allegedly took place in Edison’s laboratory in 1920. Intricate illustrations show Edison operating a complex construction of infrared beams and electrical equipment in an attempt to “lure spirits from beyond the grave” (Modern Mechanix and Inventions 1933). While the content of this story seems fabricated, Edison did hold beliefs and conduct experiments that would almost certainly be labeled pseudoscience today, for example his investigations into telepathy (Conot:428).
The Techno-Mythic Voice

Like pre-modern mythologies, phonograph mythology had its own distinctive voice, that is to say, its own narrative strategies and literary devices. In addition to their use of symbolism and nature metaphors, writers of this era often displayed a detailed knowledge of classical mythology.¹⁶

One of the most significant literary tools was the “observer,” a detached, impersonal presence who appeared in scientific texts of the eighteenth and nineteenth centuries. Modestly communicating “facts” to the reader, the observer formed part of a style of writing that Scott Montgomery has called the “scientific voice.” Constructions like the passive voice (“it will be shown,” “as can be seen”) and the universal pronoun “one” constitute a “range of first-order, nonnegotiable grammatical codes [that] also serve as conventions for the blank face of the narrative persona” (Montgomery 1996:13). With these constructions writers obscured their own voice, a process Montgomery describes as the “literary nullification of the self” (1996:106). This obfuscation of the individual narrator created a powerful sense of authority, allowing techno-mythmakers to present observations or opinions as inherent truths purged of “any overt traces of both a private and a social process”; the reader was presented with “Truth, not a claim for it; the Scientist, not a particular individual; Data, not writing” (1996:13).

As William Stahl shows in “God and the Chip,” the bland rationalism of the scientific voice tends to obscure an ideological process, a deeper structural engagement with myth and

¹⁶ Frequently invoked themes or figures classical mythology include the Veil of Isis (New York Times, “Phonomine, Autophone, and Kosmophone” 1878), and Prometheus (Landon 2002:42), or creation myth as in Morse’s announcement of the telegraph: “what hath God wrought?” (Morton 2000:2).
mysticism than the superficial references to classical mythology in these texts suggest. On
closer examination of scientific texts, coherent themes emerge. These mythic themes are not
expressed as “stories” like the theory of life units or traditional myths, but appear fragmented
across multiple sources and texts. Some themes recall existing mythologies, while others are
peculiarly modern, unique to the age of technology and the phonograph. It seems that techno-
mythmakers adapted existing myths but also made up new ones to respond to various cultural
currents and questions of the era; for example humanity’s relationship with nature
experienced a period of upheaval during the late nineteenth century, and new types of myths
may have helped to redefine this relationship.  

In the same way that Edison biographers downplay stories like the spirit-finder, the
mythic structure underlying stories about the phonograph pass by largely unrecognized
(Stahl:2); as stories like the spirit-finder are forgotten, the mythic aspect of technology
discourse is de-emphasized and obscured. Along with Stahl, I argue that a better
understanding of technological culture requires demythologizing, that is, understanding and
decoding the myths surrounding the early years of the phonograph as a first step to
uncovering mythic patterns in technological conversations of the present day. What kinds of
stories were told about machines like the phonograph and the spirit-finder? How did these
stories shape understandings of those devices? And does it ultimately matter that Edison’s
spirit-finder never materialized?

\footnote{The elaborate artificial mythologies of William Blake and W. B. Yeats also suggest a trend
towards seeking new mythic structures to deal with new cultural challenges.}
As W. Bernard Carlson remarks, during the 1870s, under the influence of a combination of factors including the aftermath of civil war, the strains of adjusting to the occupation of new territories, a shaky political situation, and general strikes and labor unrest, the American public “may have shifted their hopes for progress from social and political institutions to invention and science.” Around this time, the invention of the phonograph seemed to stoke confidence in the ability of science to overcome social upheaval. As one commentator remarked: “The invention has a moral side, a stirring optimistic inspiration. ‘If this can be done,’ we ask, ‘what is there that cannot be?’ ” (Carlson:44).

As part of this trend, inventors too became a source of inspiration for a society dogged by economic and political problems (Collins and Gitelman:11), and a principal force driving America towards the territorial, military, economic, and social aspirations expressed in the popular concept of “manifest destiny.” As Collins and Gitelman note, “In the context of such strife, the figures of inventors like Edison and Bell sounded a reassuring note...Their dazzling achievements suggested a better, shared future, guaranteed by technological change, which was dressed up and saluted as ‘progress,’ a hopeful abstraction to answer any doubts about the future” (12). They enjoyed an unprecedented celebrity and found themselves frequently asked for their opinions on a range of topics on which their words were “taken as gospel,” despite being far removed from their own field of expertise (Segal 2005:172). At a

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18 In 1870 the United States became the world’s biggest economy, and achieved the highest per capita income by 1900 (Bodvarsson and van den Berg 2009:243). This went along with territorial and military expansion in the years leading up to the Spanish American War (Tucker 2009:339; Healy 1976:43). For further discussion see David S. Heidler & Jeanne T. Heidler Manifest Destiny (2003).
time of frenetic technological change—the modern idea of “technology” itself was barely decades old (Marx:562)—anything seemed possible, and engineers were invested with divine powers: “Americans... regarded engineers as demigods who performed feats previously deemed impossible... One engineer, when asked about his work draining the Florida Everglades, said, ‘God didn’t finish his work down here so we are doing it’ ” (Miller et al.:144).

Myths require mythic actors, “beings who embody ... forces of nature, aspects of genius or of the human condition” (Dupriez and Halsall:293). Inventors became the actors in their own techno-mythologies, and among all of them Edison reigned supreme. A “master of public relations” who in his youth ran his own successful newspaper business, Edison skillfully engineered his public persona, presenting himself as a self-educated hero who pushed the boundaries of science but still embraced old-world values. Edison followed stories of himself and his inventions closely, and read newspapers for several hours every day (Baldwin:287).

19 Neil Baldwin writes that “no article on Edison is constitutional without an allusion to the theft of fire from heaven” (Baldwin 2001:398), and summarizes some of the many mythic references from eulogies written for the inventor following his death: “One of our Immortals”; “Conqueror of the Unknown”; “Foremost Among Creators”; “By his work we know him”; “If we had a mythology, Mr. Edison would be placed in that gallery of gods which includes Prometheus”; “Prospero is dead” (408-409).

20 (Executioner's Current: Thomas Edison, George Westinghouse, and the Invention of the Electric Chair. :xviii) Richard Moran also notes that he is far less well remembered for the Electric Chair, rather more chilling evidence of his skill in public relations.
Following the invention of the phonograph Edison underwent a transformation from famous and respected inventor to mythic hero, a kind of apotheosis in popular imagination. As the “Wizard of Menlo Park,” he began to resemble certain archetypal mythic characters like the alchemist or *homo faber*, a character in metallurgic societies who is granted divinity after manufacturing tools or weapons for the gods. For historian of religion Mircea Eliade, the apotheosis of the *faber* or divine smith “presages his supremacy in the industrial ages to come” (Eliade:101). Edison was seen as a civilizing, modernizing figure, but at the same time was associated with “…vivid images of the hidden, the mysterious, and the arcane, of dark laboratories and wizard-like figures bent over glowing fires and bubbling cauldrons” (Principe:1).

*A Story Without an Invention*

In the months following its invention, the phonograph did not exist in the public ear or eye much more than the spirit-finder would decades later. Although news that Edison had successfully recorded sound began to circulate during the summer of 1877, for a while the only way to witness the phonographic miracle outside of Edison’s laboratory was by private exhibition, and was thus limited to a select group of scientists, journalists, politicians, businessmen, or other people of influence. Limited public exhibitions of the phonograph, which began gradually during the first half of 1878 under the organization of the newly formed Edison Speaking Phonograph Company, were tightly controlled events hosted by traveling showmen, and relatively few exhibition instruments were built. After initial interest in the novel new invention died down, it languished for another decade before Edison
announced his “perfected phonograph” in 1888, meaning many more years passed before the machine became a familiar fixture in public life.\(^\text{21}\)

Hence at a time when many of the formative myths of phonography were taking shape, the machine itself was to a large extent publicly invisible and inaudible. From the very first reports of the phonograph’s invention, public curiosity was piqued, prompting a slew of articles, letters, and essays, many of which were written by people with only technical descriptions, newspaper articles or word of mouth accounts of the phonograph on which to formulate their opinions. In the absence of the machine itself, most of this writing was necessarily speculative and set the tone for much of what followed. Even after Edison’s first phonographic device materialized, much commentary remained devoted to imagining future developments, uses, and impacts.\(^\text{22}\) Skepticism and disbelief in the phonograph were expressed just as they were for the spirit-finder, and were not confined to the layperson.\(^\text{23}\)

Even after it began to proliferate in public life during the 1890s, the phonograph was a machine that never seemed to be finished—there were always further developments waiting just down the line, final technical improvements or proposed uses that would at last deliver all that had been promised. Up to the present day the lure of unknown future potential, of as-

\(^{21}\) Regular public “concerts” and the proliferation of coin-slot phonographs did not begin until the 1890s. Charles Musser surveys the early exhibition history of the phonograph in *The Emergence of Cinema* (56-62).

\(^{22}\) For example the *New York Times* stated in November 1877 that “this invention will lead to important changes in our social customs,” and predicted that “both book-making and reading will fall into disuse” and that public speaking would decline (The Phonograph 1877).

\(^{23}\) I discuss M. Bouillard’s skeptical objections to the “talking machine” at the Paris Academy of Sciences in 1878 later in this chapter (*Nature*, “Not a Thinking Machine” 1878).
yet-unrealized perfection, appears in all kinds of writings about the phonograph and sound recording.\textsuperscript{24}

Strangely enough, despite all the lofty predictions of how it would transform society, unlike the telephone or the incandescent light, initially the phonograph wasn’t particularly useful.\textsuperscript{25} It was in fact a half-finished invention: the first half, capturing and storing sounds, was supposed to be completed with another device that would transcribe those sounds into written language. After the problem of speech transcription proved more difficult than anticipated Edison satisfied himself with a device that recorded and played back sound (Morton:1), so the phonograph entered the public sphere as an incomplete machine without a clear function—an invention in need of a story. A public that had been expecting something more like a modern speech-to-text application now had to be convinced of the utility and relevance of an essentially different device.\textsuperscript{26}

Edison himself initiated this process of imagining new uses for the phonograph by publishing two essays that responded directly to public speculation about the device: \textit{The }

\textsuperscript{24} In 1922, Edison was still claiming that his mechanical phonograph was “close to perfection” (Milner 2010:978). See also Milner’s own poetic description of unrealized perfection in analog sound systems (3932).

\textsuperscript{25} Even after it pervaded everyday life, the phonograph lacked the immediate utility of the light bulb, steam engine, electricity, or the telephone. This lack of a clear practical use seems to have fueled speculation into what it was, what it might be used for, and how it might affect society.

\textsuperscript{26} David Morton describes Edison’s attempts to construct the complete transcription device (2-3). \textit{Scientific American} noted after the first demonstration of the phonograph that the transcription part of the device was yet to be added (\textit{Scientific American} 1877b).
*Phonograph and Its Future* and *The Perfected Phonograph* (Morton 2000:3). With these two essays, Edison pushed the phonograph to the center of the complicated negotiations between science, culture, the human subject and nature that dominated the late nineteenth century. Edison carefully tracked the dissemination and readership of these articles by cutting out copies from various publications and keeping them in scrapbooks. The *Phonograph and Its Future* first became one of the most widely read and syndicated documents written by a scientist or inventor in history (Miller et al.:144).

*Edison’s Essays and the Fundamental Phonographic Myths*

Edison’s *The Phonograph and Its Future* is an entertaining mixture of science and colorful rhetoric. One clue as to the purely mythic function of the essay is that it proposes little in the way of new information, technical or otherwise; Edison had already described most of the possible uses for the phonograph in interviews and other articles published well before May 1878. Faced with the problem of merely restating the phonograph’s mechanical principles, Edison sets a reverential tone by presenting his technical description as a series of

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27 The scrapbooks can be viewed through the digital archive of the Thomas Edison Papers, for example see the *Miscellaneous Scrapbook Series 1876-1878* (The Thomas Edison Papers 2010).

28 Compare to Edison's two rather prosaic essays about the incandescent light, published during the same decade ("The Success of the Electric Light" 1880; "The Dangers of Electric Lighting" 1889).

29 Precise descriptions of the mechanics of the phonograph, as well as all of Edison’s proposed social applications, are found in three interviews with *Scientific American* (*Scientific American* 1877a; *Scientific American* 1877b; *Scientific American* 1878).
catechistic question-and-answer statements. Although promising to focus on actualities, the essay is mostly concerned with possibility, of what the phonograph might be capable of or what it might enable society to accomplish.

Edison cleverly tackled the issue of the phonograph’s apparent lack of utility by suggesting that it was not a machine in the usual sense but rather a mechanical realization of a “universal principle” with almost limitless applications. Released from the social specificity of the unrealized telephonic transcription device, the newly imagined phonograph could be used for anything and threatened to appear everywhere, invading public and private life (Morton:3).

Ten years later, with the publication of the second essay Edison announced the arrival of the “perfected phonograph.” But the new article contains only a single paragraph describing improvements upon the earlier, less-perfect phonograph, and proposes no new uses or functions. Instead, in triumphant style Edison connected the phonographic principle to everything from the most contemporary topics in science, to philosophy, mathematics, music, and ancient history:

“Since the time of Lucretius, the movements of atoms have been invested with an intense interest for philosophers and scientific students, and the wave-motions of light, heat and sound have engaged, with a constantly increasing degree of importance, the attention of modern investigators.

30 Like a catechism, the questions could only be posed by one with an already intimate knowledge of the phonographic principle, or if they had been memorized.

31 The two main improvements were an electric motor, and a return to the wax cylinders used in the original experiments instead of tin foil (Edison 1888:644).
When we consider the relation of these motions to mathematics and to music, the conception of Pythagoras that number and harmony constituted the principle of the Universe does not seem to be very far out of the way. In the phonograph we find an illustration of the truth that human speech is governed by the laws of number, harmony and rhythm. And by means of these laws, we are now able to register all sorts of sound and all articulate utterance—even to the lightest shades and variations of the voice—in lines or dots which are an absolute equivalent for the emission of sound by the lips; so that, through this contrivance, we can cause these lines and dots to give forth again the sound of the voice, of music, and all other sounds recorded by them, whether audible or inaudible. For it is a very extraordinary fact that, while the deepest tone that our ears are capable of recognizing is one containing 16 vibrations a second, the phonograph will record 10 vibrations or less, and can then raise the pitch until we hear a reproduction from them. Similarly, vibrations above the highest rate audible to the ear can be recorded on the phonograph and then reproduced by lowering the pitch, until we actually hear the record to those inaudible pulsations” ("The Perfected Phonograph":641-642).

By recording and reproducing in the audible range sounds previously inaudible, the phonograph was to reveal to human ears the very inner workings of the universe. Edison elevated the machine above the everyday uses proposed in *The Phonograph and Its Future*, and the perfected phonograph emerges as no less than a means of re-defining humanity’s relationship to nature. Elsewhere Edison used metaphor and symbolism to underscore his argument for the phonograph as a universal principle: recording sound waves was like “...the
tide in recording its flow on a sand beach,” and in recording music and the speeches of great men, the phonograph captured the “poetry” of sound waves (“The Perfected Phonograph”:645-646).

Three central themes stand out in Edison’s burgeoning mythology of the phonograph. First, by stating the “...almost universal applicability of the foundation principle,” a principle so fundamental and simple that it he came across it “almost accidentally” (Edison 1888:642), and emphasizing the mechanical simplicity and connection to the “natural” phenomenon of sound waves, the essays suggest primordial origins for the phonographic principle. Second, the title of The Phonograph and Its Future itself suggests anthropomorphism, an attribution of human qualities to the phonograph. It became an entity with its own destiny, inventing itself through its own speech: “The indentations on the cylinder, when rapidly revolved, caused a repetition of the original vibrations to reach the ear through a recorder, just as if the machine itself were speaking.” Third, the machine offered the means for society to fulfill its destiny: “...will not the necessities of man surmount trifles in order to reap the full benefit of an invention which practically brings him face to face with whom he will...” (Edison 1878:536).

These three ideas—primordial origins, anthropomorphism, and transcending societal conditions—are expressed repeatedly in phonographic discourse. In the following pages I

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32 This tendency is similar to the romantic personifications of nature that John Ruskin criticized as “pathetic fallacy” several decades earlier (Rosenberg 2000:61-72).

33 (Edison 1888:643). Mircea Eliade has noted the importance of song and speech in creation myth (Eliade 1978:98).
trace the development of these three fundamental mythic themes, which I will call primacy, surrogacy, and transcendence.\textsuperscript{34}

\textit{Primacy}

Myth “sanctions phenomena of all kinds, not merely rituals, by giving them a primeval origin” (Segal 1999:44). Similarly, Edison sanctioned the phonograph by describing it as an elemental process waiting to be unlocked; it was not invented but discovered, a mechanical embodiment of a natural process.\textsuperscript{35}

The primacy myth is built on several underlying ideas: the inherent simplicity of the phonographic principle; the notion of sound as a kind of physical substance; and the idea of phonography as “sound writing,” an autographic transcription of nature.

\textsuperscript{34} My mythic themes of “primacy” and “surrogacy” owe much to James Lastra’s tropes of phonographic “inscription” and “simulation” (2000:16–60).

\textsuperscript{35} As Renard’s narrator notes: “Nature frequently delights in anticipating science, which in turn often merely imitates it” (Kittler 1999:53). The tendency of more recent sound theorists to defend a particular technology or practice on the basis of its closeness to nature draws on the logic of the primacy myth. Since the scientific principle of phonography springs from nature, the logic goes, any challenge to this technology or practice is a challenge to nature itself, as for example in Eric Rothenbuhler and John Peters’ comparison of digital to analog technologies: “…digital recording is as fundamentally arbitrary as analog recording is fundamentally natural” (1997:250).
The phonographic mechanism was simple enough for almost anyone to understand, so much so that many questioned why it had not been invented earlier. Writers made much of the fact that sound recording was a simple mechanical process that didn’t even require electricity. Journalists could describe the mechanical logic of the phonograph to readers without resorting to specialized language, unlike the telephone, which required detailed technical explanations. A simple working phonograph could easily be constructed without access to a scientific laboratory using readily available materials, as Rainer Maria Rilke described in his essay “Primal Sound” (Kittler:43).

Sound was understood as a natural substance like water or air that could be gathered and stored up for future use. Early newspaper articles spoke of “bottling up” speeches or other types of sounds, and one humorous description of connoisseurs collecting oratories in sound-cellar prefigured post-war audiophile culture (New York Times 1877b). Sound waves were an audible part of a larger primordial phenomenon described by wave theory, as early phonograph theorist Rudolph Lothar wrote: “Rhythm is the most supreme and sacred law of the universe; the wave phenomenon is the primal and universal phenomenon” (Kittler:71).

Just as understandings of early forms of photography grew out of autographic models like Nicéphore Niépce’s “sun-writing” (Marien:9), the phonograph was a tool for a divine process of sound-writing, an idea expressed in Theodore Birnbaum’s illustration “The

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36 This description from Scientific American is typical: “The instrument is so simple in its construction, and its workings so easily understood, that one wonders why it was never before discovered. There is no electricity about it. It can be carried around under a man’s arm, and its machinery is not a fiftieth part as intricate as that of a sewing machine” (The Speaking Phonograph 1878).

37 See for example “Telephones and Their Use” (New York Times 1877d).
Recording Angel,” the Gramophone Company’s familiar trademark of the late 1890s.\textsuperscript{38} Rainer Maria Rilke took this idea a step further, suggesting that any physical pattern or texture was a trace of nature waiting to be decoded: “what variety of lines, then, occurring anywhere, could one not put under the needle and try out? Is there any contour that one could not, in a sense, complete in this way and then experience it, as it makes itself felt, thus transformed, in another field of sense?” \textit{(Kittler:41)} Primal—first, original, primeval—sound was nature itself, and Rilke’s phonograph was its fundamental mode of expression.

\textit{Surrogacy}

In October 1878, more than a year after the invention of the phonograph, a certain M. Bouillard invited ridicule from his learned colleagues when he contested its existence at a meeting of the Paris Academy of Sciences. After the principle had been demonstrated for him, Bouillard retorted that still the machine could not be described as a talking machine, since talking also implied thinking \textit{(Nature 1878)}. The idea that the sound of the voice could be detached from the act of thinking was evidently a strange one, and the intuitive association of the sound of the voice with thought lies behind the surrogacy myth.

Like photography, phonography was presented as first an imitation then an “improvement” on human senses.\textsuperscript{39} But physiological simulation was only one aspect of

\textsuperscript{38} (Martland:55). James Lastra also discusses the similarity between autographic descriptions of phonography and photography (73-76).

\textsuperscript{39} Jonathan Sterne notes an analogous change in fortunes for the human middle ear in various telephonic experiments in the late 1870s: The telephone initially appropriates a real human
phonographic surrogacy; through a carefully crafted repertoire of quasi-human behaviors, exhibitors of the early phonograph, including Edison himself, presented it as a distinctly social entity that could appropriate various human functions. During demonstrations the phonograph sang, listened, talked, memorized, joked, told stories, and while at home in Edison’s laboratory played jokes on unsuspecting skeptics. Theatrical anthropomorphist tricks seemed to be standard practice from the very first demonstration of the device to the writers at Scientific American: “...and the machine inquired as to our health, asked how we

middle ear, then copies it mechanically, and finally improves upon it, rendering it redundant (2003:84-85).

When first unveiled, Edison’s phonograph drew direct comparisons to Professor Faber’s automaton (Lastra:24), and the exhibition history of automata may have informed his approach to presenting the phonograph, as well clever marketing strategies in the later years of the phonograph industry like the “Tone Tests.” The phonograph was no mere music-reproducer, but an instantiation of a performer that the listener was trained to interact with as if it were a human: “Like many other phonograph companies, and like the constructed nature of fidelity as a concept associated with reproduced sound, Edison’s advertisements assigned a value to its products by collapsing the cultural distinction between machine and man...” (Wurtzler:124).

An assistant of Edison described an elaborate joke played on a visiting clergyman, which involved using a prepared phonograph disk with various pre-recorded insults directed to said clergyman. When invited to recite a passage from scripture into the machine, to his astonishment the machine spoke back (Scientific American, “The Speaking Phonograph” 1878). Patrick Feaster cites this as an early example of overdubbing (Feaster 2001:74).
liked the phonograph, informed us that it was very well, and bid us a cordial good night” (Scientific American 1877b).

Transcendence

Techno-mythologies do not promise heaven, or hope for a better future—they insist that the future has already arrived, or will very soon, and that science is about to transform society in the here and now. Howard Segal identifies what I call the transcendent theme in the “technological utopian” texts of the late nineteenth and early twentieth centuries:

“Simultaneous with the taming of technology is to come the taming of nature. Wind, water, and other natural resources will be harnessed—into electricity above all, its supreme cleanliness and quiet befitting its supreme power. The mastery of nature is regarded as the fulfillment of man’s destiny, the beginning of a new epoch for mankind, and the elevation of man to a status only slightly short of omnipotence” (Howard Segal 24).

The utopians did not consider themselves romantic dreamers and insisted that their predictions were valid and inevitable: “all are fundamentally serious—some almost deadly so—about not just the shape of technological utopia but also the route leading to it ... The technological utopians aimed at accurate prediction of the future, not at idle visions of a world someday somewhere” (Segal 2005:21).

Phonograph mythology is full of similar prophecies where technology enables power over nature and a more orderly society. One New York Times columnist predicted an “age of the phones” where phonographic devices were “...destined to give us a complete mastery
over all the sounds of nature.” According to this columnist, these new technologies would
unlock the secrets of the universe by recording previously inaudible sounds like the
movements of the smallest insects, the motion of atoms, the sounds of environmental
processes such as the growing of grass, or mythical sounds like the music of the spheres and
the sounds of heaven and angels. As the Gramophone Company’s angelic scribe suggests, the
phonograph would “mediate between the realm of the sacred and the profane realm of time
and space” (Doniger:55). The revelation of the secrets of nature would be a joyous
celebration—the writer describes how the sounds of nature would be gathered up,
recombined in musical form and transmitted “by wire from every direction to some grand
hall in the busiest metropolis.” Sound would also become a means of social control,
performing somewhat less joyous functions like noise management, punishment, and torture

Replying to this column, a correspondent proposed that the “era of the phones” justified
an entirely new branch of scientific inquiry, which he named “kosmophonics.” In one of
many mythic references, the writer claims that with the birth of this new scientific discipline
Edison has “removed the veil of Isis from one of the innermost shrines of nature’s temple.”

In a similar vein, technological utopian authors “assumed that technology would solve other,
more recent and more psychological problems as well: nervousness, rudeness, aggression,
crowding, and social disorder, in particular...utopia would be a completely technological
society, one run by and, in a sense, for technology” (Segal 2005:21).

Like the other fundamental mythic themes, phonographic transcendence rests on
several sub-myths: Immortality, the potential of the phonograph to preserve the voice after

\[42\] (New York Times 1878b). The Veil of Isis is a mythic concept that represents the mysteries
of nature (Hadot:vii-vix).
death, enabling the living to hear the voices of the dead, thus granting a kind of immortality to the speaker; universality, the idea of the phonograph as a universal civilizing force that could cross social boundaries; and faithfulness, the belief that the phonograph would exert a moral force and improve the human soul.

The idea of immortality begins with the very first announcement of the phonograph in the letter of Elridge Johnson to *Scientific American*, which the magazine echoed in the title of the article that announced the invention to its readership: “Speech has become immortal.” Immortality became one of the most potent phonographic myths, and for generations of listeners “Phonographic devices offered not an encounter with a machine, but a kind of spiritual communion” (Wurtzler 2009:124). Advertisements for various gramophones and phonographs often featured ghostly performers or singers standing next to them (Schwartzman 1993:65).

Phonographic demonstrations made use of multiple dialects or languages, as well as musical numbers (Feaster 2001:82), and in its attempt to record and reproduce equally well all of these different utterances the phonograph expressed the familiar democratic hope of technology transcending inequality and unifying across social and national boundaries (Burnett, Senker, and Walker 2009:15). Sound technologies were to provide universal written languages too; from the first articles about the phonograph up until the work of Theodor Adorno, various critics claimed that with practice it would be possible to read the grooves inscribed in the record.\(^{44}\)

\(^{43}\) Both original letter and article appear in “A Wonderful Invention” (*Scientific American* 1877a:304).

\(^{44}\) *Scientific American* wrote optimistically that "there is no doubt that by practice, and the aid of a magnifier, it would be possible to read phonetically Mr. Edison's record of dots and
“Faithfulness” in early phonography was a subtler concept than “fidelity” as it is understood today, and was related to the idea of the phonograph as a moral touchstone. Edison predicted that the phonograph “will teach us to be careful what we say—for it imparts to us the gift of hearing ourselves as others hear us—exerting thus a decided moral influence by making men brief, businesslike and straightforward, cultivating improved manners, and uniting distant friends and associates by direct vocal communication” (Edison 1888:650). Faithfulness was thus understood as the prevention of deceit: Birnbaum's recording angel was more than a neutral autographic scribe, and recalls the Islamic belief in “personal angels who record [one's] good and evil deeds.”

Even in silence, the phonograph was admired for its “spirit of modesty” and the “example it sets many garrulous and wearisome individuals” (Harper's Weekly 1878:249); it did not engage in small talk or say anything foolish or unnecessary. This moral aspect reflects Edison’s own attitudes to social intercourse. Technical mediation, for Edison, provided an

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45 The modern idea of fidelity as literal perceptual correlation between a sound recording and an “original” sound event probably derives from the theories developed by electrical engineers in the 1920s, for example see H. F. Olson and F. Massa, “On the Realistic Reproduction of Sound with Particular Reference to Sound Motion Pictures” (1934:64-65).

46 (Doniger:56). Edison suggested that the phonograph could be used for surveillance in business, romance, legal proceedings, or to expose political scandals and financial scams: “Political secrets and the machinations of Wall Street pools might be brought to light ... and the account charged to the devil” (“The Speaking Phonograph” Scientific American 1878).
opportunity to improve upon the manner and content of social communications, rather than merely duplicate or facilitate them. He described his deafness as a blessing that filtered out undesirable noise or conversation:

“From the start I found that deafness was an advantage to a telegrapher. While I could hear unerringly the loud ticking of the instrument, I could not hear other and perhaps distracting sounds...
It may be said that I was shut off from that particular kind of social intercourse which is small talk. I am glad of it. I couldn’t hear, for instance, the conversations at the dinner tables of the boarding-houses and hotels where after I became a telegrapher I took my meals” (Runes 1968 [1948]:48).

For Edison, the simple ticking of the telegraph represented an ideal, stripped-down form of communication, thus his ideas about morality and dislike of frivolous social intercourse informed his approach to sound and communications technologies. With the help of the phonograph, he promised, “We shall now for the first time know what conversation really is…” ("The Perfected Phonograph":648-649).

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47 Before their marriage, Edison taught Morse code to his future wife Mina, and proposed to her by tapping on her knee (Runes 1968 [1948]:54-55). He also maintained that in business dealings, telephonic conversation (provided there was a phonographic record) might have advantages over face-to-face communication (Edison 1878:535).
Anxious Reactions to Phonograph Mythology

While Edison’s phonograph mythology is relentlessly optimistic, the public response was not as consistently positive. Anxieties about the phonograph causing general social breakdown appeared in articles or correspondence in newspapers and journals, while essays or fictional works explored more specific anxiety-producing themes like the confusing issue of phonographic immortality, often developing their own phonographic counter-mythologies.

Like the phonographic myths, negative reactions and predictions of the possible harmful future effects of the phonograph often came before the critic in question had either seen or heard the device, for example this letter to the editor of the *New York Times*, written several weeks before the first private demonstration of the phonograph at the offices of *Scientific American*:

“When the phonograph, that marvelous instrument for bottling speeches and preserving them for any length of time without injuring their tone, was invented, the public began to grow uneasy. What, with the telegraph, the telephone, and the phonograph, it seemed as if electricians had lost all self-restraint, and there was a general feeling that this habit of constantly inventing improved methods of electrical communication was being carried altogether too far” (*New York Times* 1877a).

Others followed. A syndicated editorial which began in the *San Francisco Post* advised readers that the phonograph was “the latest insidious blow directed by science against the whole framework of society, and this paper would deem itself recreant to its duty if it did not
warn the public in advance of the danger in encouraging the introduction of this last and
doubly infamous invention” (*San Francisco Post* 1878).

As the counter-mythology developed, the veracity of the phonograph began to emerge
as its most worrisome feature. The moral “faithfulness” of the machine would betray its
subject: “This little instrument records the utterance of the human voice, and like a faithless
confidante repeats every secret confided to it whenever requested to do so” (*Harper's Weekly*
1878:249). Suddenly, the machine that Edison had hoped would raise society above pettiness
and deception and provide a new standard for truth was not to be trusted. Phonograph
doubters argued that, should the phonograph become ubiquitous in daily life and reveal
human deceit as Edison hoped, rather than foster a new utopia it would irreparably damage
trust and confidence in social relations. In Edison’s utopia there would be no escape from the
prying ears of the phonograph, and ironically its “faithfulness” would destroy society by
revealing human infidelities:

“This machine will eventually destroy all confidence between man and man,
and render more dangerous than ever woman’s want of confidence in
woman. No man can feel sure that wherever he may be there is not a
concealed phonograph remorseless [sic] gathering up his remarks and ready
to reproduce them at some future date. Who will be willing, even in the
bosom of his family, to express any but most innocuous and colorless
views? ... In the days of persecution and espionage it was said, though with
poetical exaggeration, that the walls had ears. Thanks to Mr. Edison’s
perverted ingenuity, this has not only become a literal truth, but every shelf, closet, or floor may now have its concealed phonographic ears.”

Even the value of the record as a historical document was questioned: Since it removed the interpretive layer of the historical narrator, the phonograph was “rather hard on posterity, and besides would inevitably destroy that tinge of fairy tales, veracity, that is the chief mainstay of the historian” (San Francisco Post 1878).

Other phonographic myths quickly turned inside out. Immortality proved to be a cruel trick; as Ivan Kreilkamp puts it: “For a voice to gain immortality is, then, decisively not the same as for a whole person to do so, and in some cases the immortality of a voice after the decease of its speaker might seem less reassuring than horrifying” (2005:189).

Claims for phonographic inscription as a universal language were vulnerable on both scientific and empirical grounds. In one of the first scientific articles about the phonograph, Alfred M. Mayer argued that spectral inconsistencies in the traces of the recorded waveform rendered it impossible to interpret:

“These facts also show how futile it is for any one [sic] to hope to be able to read the impressions and traces of phonographs, for these traces will vary, not alone with the quality of the voices, but also with the differently-related

48 (The Aerophone 1878). The theme of male infidelity appears often in correspondence and editorials in newspapers and popular magazines in the first decade after the invention of the phonograph, raising the question of what kind of society these writers believed to be under threat.
times of starting of the harmonics of these voices, and with the different relative intensities of these harmonics” (Mayer 1878:723).

In purely auditory terms, the quality of recorded speech varied according to language, and those including guttural sounds like Arabic, German, or French tended to suffer (Jessup 1879). The phonograph’s mother tongue was English after all; it was culturally predisposed, and at times even racist. 49

The Human Phonograph and the Crisis of the Human Subject

The phonographic perfection of humanity through the physiological, mental, and moral improvements predicted in the surrogacy myth provoked a chain of corresponding existential crises that began with the body and moved through the brain and mind to the soul.

Perceptual inadequacy is a common theme in nineteenth century discourses of media technologies, where media like photography and phonography were seen to outstrip human physiology. As Lastra notes: “Time and again, representational technologies are described as ‘more perfect’ than human senses, able to ‘make up for’ previously unnoticed ‘deficiencies.’ ” (Lastra 2000:23).

49 Phonographic universality was undermined by crass cultural stereotypes. See for example the comparison between lyric goddesses and “Arab vernacular” in “The Phonograph” (Harper’s Weekly 1878).
Many writers invoked imagery that broke the body apart, their language almost violent in its anatomical coldness.\textsuperscript{50} The idea that the body could be dismantled and interchanged in part or whole with machines was as much a part of the public imagination in the 1870-80s as it is today. For example it would have been common knowledge to readers of popular journals that Bell’s telephone used a real human ear as a prototypical microphone.\textsuperscript{51}

As the machine appropriated the human, it also made better use of it. When incorporated into the telephone or the phonograph, the eardrum could be a sender and transmitter—it could speak as well as listen:

“Thus the disk is either a tympanum or diaphragm, as the case may be, the first when it listens, and the second when it talks. Herein the phonograph seems actually to have got ahead of that other marvellous construction, the human body. In our anatomical economy the contrivances by which we are enabled to hear and talk are not only separate and distinct, but are also much

\textsuperscript{50} For example the metal-on-bone image of the phonograph needle tracing the coronal suture in Rilke’s “Primal Sound” (Kittler 1999:40-41). More recently Kittler described phonograph-machine interchangeability with similar imagery: With the telephone, science coupled “technology with physiology, steel with flesh, a phonautograph with body parts” (1999:75). He also quotes Wolfgang Scherer on the role of anatomy in early sound studies: “Thus the real answered from dismembered bodies” (1999:74).

\textsuperscript{51} Scientific American reported the "preparation of the human ear made by Dr. Clarence J. Blake, of Boston, for Professor Bell, the inventor of the telephone. This was simply the ear from an actual subject, suitably mounted and having attached to its drum a straw, which made traces on a blackened rotating cylinder" ("The Talking Phonograph" 1877b).
more complicated than the method by which the phonograph accomplishes
the same results” (Harper's Weekly 1878).

Not only did the phonograph speak more efficiently—it spoke better. Upon playback,
the phonograph seemed to “correct” pronunciation of the recorded voice, rectifying the
flawed human physiology that caused improper articulation:

“Indeed, the articulation of some individuals has been very perceptibly
improved by passage through the phonograph, the original utterance being
mutilated by imperfection of lip and mouth formation, and these mutilations
eliminated or corrected by the mechanism of the phonograph” (Edison
1878:528).

Phonographic anxieties moved quickly beyond the physiological. In his 1880 essay
Memory and Phonograph, Jean-Marie Guyau argued that the phonograph was the latest and
most perfect in a series of technological models for human memory (Kittler 1999:30).
Compared to the brain, the phonograph lacked only one thing: the ability to recognize its own
memories, a capacity for conscious thought. It could not experience wonder or surprise at its
memories, could not tell its own voice from that of another, Guyau explains—thus its
memory is purely mechanical, the physical storage of vibrations. The phonograph lacks the
two things that enable the human brain to interpret and respond emotionally to its memories:
a mind and a soul. But Guyau’s sentiment, repeated somewhat obsessively throughout the
essay, seems like an anxious reassurance. The idea of remembering without thinking was
probably just as difficult to grasp as the idea of a talking machine that could not think, as M.
Bouillard of the Paris Academy of Sciences had argued to perhaps unfair ridicule.
A contemporary of Guyau, the French symbolist writer Villiers de l’Isle-Adam, made the logical mythic jump that if the phonograph can have memories, and if it can talk and listen, then with a little help from science it can surely think and feel too. In his novel *L’Ève Future*, it is no surprise that Villiers chose the grand alchemist of modern science, Thomas A. Edison, as the protagonist who invents what might be the first android in literature. Hadaly, the fictional Edison’s remarkable creation, not only has a mind and a soul—which incidentally are comprised of two miniature phonographs installed in the android’s torso—but Edison had managed to perfect the soul as well as the body and the mind (Willis:183), and offers Hadaly to the character of Lord Ewald as a perfect romantic companion.\(^{52}\)

One by one the things that were held to be essentially human—the body, perception, memory, self-awareness, and finally the soul—the phonograph first imitated, then undermined. Like myths, anxieties have their own logic: When a perfect soul can be synthesized with a pair of phonograph players, then the very idea of the soul becomes suspect. Or, as the real Edison reasoned, if the brain is like a phonograph, then both are “Machinery, pure and simple”:

“The brain immortal? No; the brain is a piece of meat-mechanism—nothing more than a wonderful meat-mechanism … The brain, like the phonographic

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\(^{52}\) It is not difficult to see a connection between the disturbing misogyny in *L’Ève Future* and Edison’s all-female phonographic dolls, which he manufactured from as early as 1878 (Herlocher:72), along with his somewhat disturbing description in his diary where he mentally creates a perfect composite woman “à la Galton” (presumably Francis Galton, the founder of eugenics) by substituting his fiancée Mina’s less perfect features for those of two other female acquaintances (Runes 1968 [1948]:3).
cylinder, is a mere record, not of sounds alone, but of other things which have been impressed upon it by the mysterious power which actuates it. Perhaps it would be better if we called it a recording office, where records are made and stored. But no matter what you call it, it is a mere machine, and even the most enthusiastic soul theorist will concede that machines are not immortal” (Marshall 1910).

By making itself interchangeable with the phonograph, the human subject quickly becomes redundant. Without the existence of a soul, humans are left only with physiological inadequacy, requiring the help of science to achieve even a compromised state of perfection. In the technological utopian texts, Segal notes that:

“…the inhabitants of utopia remain flawed by nature—save where, as in some utopian fiction, they are perfected through genetic engineering. Utopian society must maximize their virtues and strengths and minimize their vices and weaknesses. In discussing a utopia, the particular objectives and the means devised to obtain them define the particular perfection that is sought. Perfection, like beauty, is an empty word unless it is given specific contents” (Segal 2005:11).

Phonographic anxieties culminate in their own Promethean myths. Nature cannot be controlled, as Rilke demonstrates when trying to imagine hearing “primal sound”:

“What would happen? A sound would necessarily result, a series of sounds, music...
Feelings—which? Incredulity, timidity, fear, awe—which of all feelings here possible prevents me from suggesting a name for the primal sound which would then make its appearance in the world?” (Kittler 1999:41).

The sound encoded by nature’s stylus is too overwhelming to be described, and too powerful to hear. Ambitions of mastery over nature through science end in tragedy, as the composer Nerval in Maurice Renard’s story Death and the Shell discovers when he attempts to transcribe the song of the mythical sirens that he hears repeating endlessly from a mysterious seashell. Nerval fails to be a good phonograph and dies:

“‘You see, you see…not even when I am dictated to can I transcribe the choir!...’

He slumped back into his chair, and despite my efforts, he continued to listen to the poison of this Paean.

At four o’clock he started to tremble. I begged him to lie down. He shook his head and seemed to lean over the invisible maelstrom.

At half past five Nerval fell against the marble chimney—he was dead” (Kittler 1999:54).

Myth, Anxiety, and Belief

Fidelity turns to betrayal, nature annihilates humanity, immortality extinguishes the soul. Dystopic nightmares stalk the utopian aspirations of late nineteenth century science. Rather than relieve anxiety, techno-mythology seems to have provoked it—but how?
Claude Lévi-Strauss argued that myths attempt to create a logical model that can overcome contradictions in order to alleviate anxiety (Fiske 1990:122). But phonograph mythology rests on a logical contradiction, because science and myth operate through radically different and conflicting modes of belief. Science aspires to describe the actual, the real, the rationally plausible, whereas myths are works of powerful imagination.

Scientific belief requires intellectual recognition but also proof. In the practical world, belief in a principle of science is often tied to immediate experience: As David Knight writes: “Beliefs are not abstract and untestable convictions, but concern how things should be done” (Knight and Eddy:10). Most importantly, the scientific worldview acknowledges doubt and encourages skepticism; without elaborate proof it leaves phenomena unexplained.

By comparison, mythic belief is adaptive, accommodating, and comprehensive. The extent to which certain myths are believed, in what senses they are “true,” has been the subject of continuing discussion and revision since the known origins of myth making (Frye and Macpherson:275). While myths literally contain fantastical claims or narratives, their structure often relates to real issues through allegory, metaphor, or symbolism, and do not necessarily require literal belief in the “facts” of their narratives. Some go as far as to say that “mythology is a religion which we do not believe” (Abrams and Harpham:230), in other words that accepting the structure of the myth is more important than believing the literal “facts.” One can believe in the essence of the myth of Prometheus—that interfering with nature can have disastrous consequences—without literally believing that a living being of that name stole fire from the gods.

Science writers after the 1870s appear to use mythology as a way of filling in areas of scientific doubt, with myths stepping in to explain the unexplainable. But this mixture of

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53 Conversation with C. R. de Lautour, December 2012.
belief systems creates problems, and Edison’s theory of life units is a case in point. The structure of the myth provided a logical (if not particularly rational) explanation for the existence of the soul, at least enough to offer hope in the idea of life after death. But the mythic “spirit-finder” never appeared, and however more “rational” and scientific in its voice, without the ultimate proof that the spirit-finder would provide, scientific belief in Edison’s theory is impossible. Myths must provide only the hope of a better life “just beyond the present time and place” (Coupe 2009:9), but if science promises heaven it must deliver it in the here and now.

Phonograph mythology encounters similar conflicts, which cause anxiety because they require the reader to simultaneously maintain two conflicting notions of belief. While insisting, like the technological utopian writers, that the type of society he presents is completely rational and plausible, Edison’s phonograph mythology requires both scientific belief as an intellectual recognition of its plausibility, but also a much more active and adaptive mode of mythic belief that requires participation in the promised utopia before it can be realized.

In the latter part of The Perfected Phonograph, Edison paints a colorful picture of a society transformed by the phonograph. Like Segal’s utopians, he insists that this ideal future will soon be available to anyone who owns a phonograph (649). But the various functions that Edison describes—exchanging phonograph cylinders between continents, phonographs attached to telephones as proto-answering machines, phonographic “pay booths” for those who did not own a machine themselves, the ability to record phonograph cylinders while using public transportation—would require significant infrastructural and societal adaptation
before they could be realized. More than rational acceptance or intellectual recognition is expected of the citizens of a phonographic utopia—belief would require financial as well as emotional investment. Utopia tacitly assumes the cooperation of the pre-phonographic society, suggesting something more like devotion or religious faith.

Both machines and utopias must be brought to life through human participation. Lord Ewald is denied ideal love when the android Hadaly perishes in a fire at the end of *L’Eve Future*—but the machine is only able to “die” because it has been invested with the soul of Edison’s mysterious assistant Sowana. And as Howard Segal notes, in technological utopian literature the only link from the existing world to the utopian turns out to be through the supernatural—protagonists arrive in the perfect society “through mystical rather than practical means: dreams, hypnosis, death, prophecy, and time capsules” (22). When science stumbles, myth takes over. In all cases—the never-quite-perfect phonograph, the theory of life units, science fiction stories—science can envision utopia, but it requires our faith to get us there.

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54 Edison also suggested that the phonograph would protect authors from breach of copyright, a notion that seems amusing in the context of present day digital rights management ("The Perfected Phonograph" 1888:646-649).

55 For example Edison imagines the speeches of famous men & preachers will be available on demand in every home, but this assumes the cooperation of those who will be recorded, not to mention that every home should purchase a phonograph ("The Perfected Phonograph" 1888:647).

Just as fictional works of the technological utopians tended to reflect the same mythology and anxieties of phonograph discourse, the existence of similar themes in recent science texts and popular culture suggest a link to the present day.\textsuperscript{57} This is a coincidence that warrants serious consideration, since it suggests that the kinds of narrative strategies that Edison and other science writers adopted, and the anxieties that arose in response to those contradictory modes of belief, may well have set the tone for discussions of the relationship between culture, nature, and science that followed.\textsuperscript{58} Ultimately it may indeed matter that Edison’s spirit-finder never materialized.

\textit{After Phonograph Mythology: The Emergence of the Phonographic Real}

While there is insufficient space to investigate the connection between phonograph mythology and present day utopian / dystopian technology narratives here, it is within the scope of this study to examine how sound theorists, phonographers, and musicians thereafter were influenced by the phonograph mythology of the late nineteenth century.

Sound theorists from the post-Edison era up until today often employ a similarly dispassionate scientific voice to articulate their theories, but at the same time their writings

\textsuperscript{57} Recent titles from magazine articles like "Will the internet become conscious?" and "Will men and machines merge?" recall the theme of surrogacy (\textit{BBC} 2012a; \textit{BBC} 2012b). Science fiction films frequently include human / nonhuman themes typical of phonograph mythology (Pyle 2000:124-137).

\textsuperscript{58} Scott Montgomery describes scientific writing as the “grand master narrative of modernism,” noting the influence of the scientific posture of accuracy and objectivity on all kinds of writing (1996:1).
can be oddly superstitious and include appeals to the mystic, the mythic, the natural, or notions of some transcendent phonographic truth.\textsuperscript{59}

The clash of science and myth, of differing notions of belief, is also evident in the rise of the idea of phonographic “reality” in the sound theories of the early twentieth century. During the 1920s, a more scientific model of fidelity superseded Edison’s idea of phonographic accuracy, as electrical engineers worked to develop comprehensive theories to replace previously empirical methods.\textsuperscript{60} The doxa of faithfulness hardened into the dogma of “high fidelity,” the idea that sound recordings were a “mirror of sonic reality” (Katz:1), a simulacrum of a perceptual experience. But in order to reproduce this experience theorists first had to define what it was, and as various commentators proposed their own differing versions, pitched battles ensued over whose “reality” would provide the dominant model for sound recording theory and practice.\textsuperscript{61}

Like scientific utopia, the phonographic real was a mythic one, a tantalizing mirage of perfection lying just beyond reach. Sound theories invested various practices with ritual significance, and discussions of classical music production, audiophile culture, and musical


\textsuperscript{60}Chief engineer of the Victor Talking Machine Company S. T. Williams described the change in methods as follows: “A complete theory connecting the great series of disjointed facts was still lacking. Development along empirical lines had reached its utmost and the art of sound reproduction had come practically to a standstill in its progress” (Gelatt:220).

\textsuperscript{61}See Oliver Read and Walter Welch’s discussion of changing recording practices and notions of phonographic reality in the early years of the electrical recording (From Tin Foil to Stereo:238-253).
performance often have an air of reverence about them; theorists describe idealized listening conditions and concert experiences that are either literally out of this world or at least seem to be a uniquely post-phonographic development.62

This development in sound theory makes an interesting comparison with the aesthetic development of other nineteenth century media. Photography and cinema began with similar models of perceptual simulation, but after a decade or two, filmmakers, photographers, and critics began to show that these media could interpret and represent rather than merely duplicate perceptual experience; in other words, they argued—successfully—that photography and cinema were “art.” Art photography developed only a couple of decades after the invention of the first daguerreotype, and cinema achieved the status of “seventh art” even more quickly.

I argue in the next chapter that these debates in photography and cinema constitute a demythologizing of discourse and practice in those mediums; art functions as a kind of social rationalization of technological media, and led to more nuanced modes of cinematic and photographic seeing. Phonography experienced a number of similar debates—“is it art?” moments—but the results of these debates have been far less decisive than with the other two media, and the question of whether phonography is an art form in its own right remains unresolved.63

62 Stan Godlovitch’s “twin earth” scenario is a case of a literally out-of-this-world model of musical performance ("The Integrity of Musical Performance":584); I discuss the phonographic origins of the ideal concert experience described by Adorno in “The Radio Symphony” (Adorno 1941) in chapter 4.

63 Douglas Kahn has shown how artistic understandings of phonography have lagged behind the photographic arts (Kahn 1990).
How did phonograph mythology shape arguments during these “is it art” debates, and how have these responses affected recording theory and music-related phonographic practices that followed?
Chapter 3: The Aesthetics of Original Sound

If we try to understand and to explain the means by which music exerts its powerful effects, we do not reach our goal by describing the structure of the piano and of the violin, or by explaining the physical laws of sound. We must proceed to the psychology and ask for the mental processes of the hearing of tones and of chords, of harmonies and disharmonies, of tone qualities and tone intensities, or rhythms and phrases, and must trace how these elements are combined in the melodies and compositions.

—Hugo Münsterberg (1916).\(^1\)

Disenfranchised German-American psychologist Hugo Münsterberg’s last published work, “The Photoplay: A Psychological Study,” came at a pivotal moment in the debate over film’s status as an artistic medium (Carroll:1). Two features of Münsterberg’s statement form the central concerns of this chapter: his emphasis on subjectivity, and his strategy of using a comparison to another art—music—to articulate his point.

Analogies and comparisons between media and the more traditional arts, as well as between media themselves, have proven popular in discussions of cinema, photography, and phonography. Cross-media comparisons began long before Edison announced that he was “experimenting upon an instrument which does for the Eye what the Phonograph did for the

\(^1\) From “The Photoplay: A Psychological Study” (Langdale:65). For a brief summary of Münsterberg’s career and controversial final years see B. R. Hergenhahn “An Introduction to the History of Psychology” (347-350).
“Ear” and have been a staple of media theory ever since. Comparisons with photography have
framed theoretical and practical approaches to music recording throughout its history
(Day:32; Ashby:4920), and contemporary theorists continue to rely on such analogies as a
way of defining the perceptual or philosophical profiles of phonography, photography, and
cinema. As James Lastra notes, such comparisons are intuitively appealing (Lastra 2000:16),
but they also reveal both the confusion and the chaotic interdependence of theories and
practices of sound representation.²

Given the broad jurisdiction of theories of sound reproduction, it is perhaps surprising
that cross-media comparisons tend to support fairly unanimous conclusions about the
philosophical or aesthetic qualities of phonography vis-à-vis photography or cinema. To
summarize a few of the most common: Phonography, when compared to the visual media, is
typically seen as reproduction as opposed to representation; technical/scientific, as opposed
to artistic/aesthetic; linked to the real as opposed to the imaginary; and is also characterized
as artistically underdeveloped (Kittler 1999; Carroll 2008:9; Symes:59; Kahn 1990).

But such claims are suspect purely on the grounds that, as I argued in chapter 1, sound
theories tend not to reflect sound practices, meaning that popular assumptions like “recording
is a kind of sound photography” fail to tell the whole story. This can be illustrated by
deliberately misquoting one such comparison from musicologist-come-media theorist Arved
Ashby (I include Ashby’s original words in brackets after each of my substitutions):

² The fact that Lastra is required to spend a good part of a study devoted to film sound
unraveling philosophical tangles that, practically speaking, have little to do with classical
cinema sound space—music recording aesthetics, symphony and opera concerts, telephone
research—is itself an indication of this confusion.
Phonographers (filmmakers) managed to create an entirely new art form amid the collapse of the aura, and did so using the very sort of reproductive technology that had caused the breakdown in the first place: they developed a way to manufacture thousands upon thousands of sounds (images), link them into a new manner of narrative sequence that engages attention and awareness in a novel way, and then produce enough copies of the record (film) to thoroughly pervade society with its message. In short, phonography (film) is the art form designed by and for a time of cultural “overproduction” (Ashby:536).

Despite his intention, with little effort Ashby’s words can also describe phonography as well as they do cinema, suggesting that in terms of artistic practice there is little to distinguish between the two. Moreover in terms of their history and culture, cinema and photography, both of which managed the transition from medium to art within a few decades of their invention, have much in common with phonography. All were invented during the nineteenth century, and their scientific histories are interconnected; all three media faced early struggles for recognition as art; they all share an interesting and sometimes combative relationship with a prior art form; and on top of this, cinema and phonography share an inventor.

Comparing audio and visual media beyond the immediate perceptual and philosophical concerns preferred by most media scholars can turn up interesting things; for example, Colin Symes notes that, despite phonography’s similarity to cinema, it lacks any significant body of equivalent aesthetic theory (Symes:34). If from a practical point of view cinema and phonography are as similar as it appears they might be, one might ask, why not?

In this chapter I consider comparisons of the second kind (as occurred between cinema and theatre, photography and painting, and phonography and music) as complex cultural
interactions, in the hope of answering a basic question: How did “photoplays” and “sun
drawing” evolve into cinema and art photography, while the phonograph remained a machine?
I use the term “evolve” deliberately since it describes a kind of reductive artistic progress
narrative that, I will also show, was a powerful discursive tool in what I call the “is it art”
moments, periods of debate and somewhat forced aesthetic consolidation that occurred in the
early decades of photography and cinema.

The ramifications of these early encounters and negotiations are evident in clear
differences between cultures of audio and visual media today. A quick survey of pedagogical
approaches to phonography, photography, and cinema reveals some telling practical and
aesthetic distinctions. Aspiring sound recordists are taught to treat the microphone as a
surrogate ear, and learn stereo recording techniques that supposedly mimic aspects of
binaural audition; students of photography, on the other hand, learn how the camera differs
from the eye. Many photography manuals begin with comprehensive sections on visual
aesthetics based on principles of graphic design and layout; sound engineering textbooks,
while many refer to sound engineering as “an art and a science,” tend to do a much better job
of explaining the science than the art, beginning instead with general descriptions of the
“fundamentals” of acoustics (in more or less the manner that Münsterberg describes above),
and offering little in the way of aesthetic guidance.⁴

I believe that the divergence in these pedagogical approaches to media, among other
things, can be explained largely by their initial encounters with music, theatre, and painting.

⁴ Compare for example the first few chapters of “The Art of Recording: Understanding and
Crafting the Mix” (Moylan 2002) with “The Art of Photography: An Approach to Personal
Expression” (Barnbaum 2010). In sound engineering books, music is usually at the center of
discussions of artistic or aesthetic issues.
In the following pages I examine how these encounters played out and which factors most influenced their outcomes. Through a comparison of selected discursive and aesthetic features of cinema, photography, and phonography, I will show that quirks like the absence of coherent aesthetic theories of sound recording are products of the professional and cultural interests of those who were involved in their formative debates, rather than anything specific to the media themselves.4

While my understanding of “phonography” is not necessarily restricted to music recording, I acknowledge the pivotal influence of musical culture on the subsequent development of phonographic discourse, so by necessity much of what follows is more closely related to the interactions of phonographers and musicians. Music recording became the dominant phonographic practice by the second decade of the twentieth century (Smith:5), and after the First World War classical music culture in particular heavily influenced both technological and professional developments in sound recording generally (Morton:32-47).

During the early years of electrical sound reproduction, there was a clear shift in phonographic practices and ideals, one that was not entirely positive for advocates of a phonographic art. As phonograph historian Patrick Feaster has shown, creative practices in early “acoustical” phonography were significantly more complex and extensive than has been assumed by historians of sound technologies to date (2011:196). The fact that both these early creative practices and any discussion of them has been suppressed for the best part of a century is evidence of a sustained period of discursive impoverishment, one that begins simultaneously with electrification and the dominance of classical music recording. A large portion of this chapter is devoted to investigating what happened to phonography between the

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4 I do however emphasize the importance of the discourse of medium specificity in this professional genealogy.
two World Wars, and how the influence of cultures of music and technology at this critical juncture can explain many subsequent quirks and contradictions in the years that followed.

To address these two questions—how did classical musicians and sound professionals manage their often fraught encounters during the 1920s and 1930s, and how have these encounters affected approaches to aesthetic and subjective issues in phonographic thinking and practice—I divide my discussion into two sections. In the first part of this chapter, I compare the professional and artistic cultures involved in early debates and formation of standards and practices in each of the three nineteenth century media, trace the emergence of the “is it art” debates, and compare the responses of critics and practitioners in each medium.

In the second part of the chapter I focus on one key difference between canonical theories of sound and film that I believe is central to solving the phonography-as-art dilemma. The visual and phonographic arts have very different ways of addressing the relationship of the unmediated to the mediated; that is, the events that happen in front of cameras or microphones during the process of filming or recording, as opposed to a completed film as viewed from the screen, or a sound recording as heard from speakers. Film theorists speak of this relationship in terms of the “pro-filmic” (unmediated) versus “filmic space” (mediated) (Kuhn & Westwell: 165, 333). By comparison, only a couple of sound theorists have used the term “pro-phonographic” (Altman 1992; Lastra 2000), while the overwhelming majority express the relationship of mediated to unmediated sonic events as copy-versus-original.5

The copy / original discourse holds that phonographic space, quite unlike filmic space, is no more than a window to the pro-phonographic; in other words, we are encouraged to

5 While it seems therefore fair to say that there is no commonly accepted concept of the pro-phonographic or phonographic space in recording discourse, I will use the term “pro-phonographic” in this chapter to avoid value-weighted terms like copy and original.
listen to mediated sonic events as if they were unmediated. But far from simplifying recording aesthetics and keep recording technology out of the way of music-making, as seems to have been the goal, the copy / original distinction caused a kind of romantic yearning for unmediated acoustic events, of which all recordings are heard as degraded versions (Lastra: 150). The phantom of the original hovers around recording discourse and listening practices, often accompanied by a sense of nostalgia and genuine loss.

I argue that this sense of nostalgia and loss amounts to a socially and technically constructed pro-phonographic ideal, which I will call “original sound.” While at a theoretical level it is contradictory and problematic, nonetheless phonographers (that is to say sound engineers and producers) have developed sophisticated and aesthetically powerful sonic strategies based on the concept of original sound, ones that speak to what Hugo Münsterberg might have called the “psychology of the listener.”

A Professional Genealogy of Representational Media

The first photographers, filmmakers, and phonographers were primarily responsible for the initial practical and theoretical developments of the media arts, and in light of this their own professional interests and backgrounds deserve some scrutiny. There are several important differences between those who were involved with the visual media and those with sound reproduction; for the general case, there seems to be a greater degree of both professional specialization and diversity in the case of cinema and art photography than there was for phonography, and this trend begins with the inventors themselves. In addition to this, the strength and diversity of the cultures of criticism that grew along with all three media had a profound impact on practice and theory.
As I showed in chapter 2, inventors can shape the reception of their innovations to a considerable degree. Edison dominated the scientific, commercial, and artistic spheres of his phonograph business, keeping strict control over everything from exhibition and marketing to artist and repertoire selections, musical arrangements, performing style, and the choice of instruments for bands and orchestras. In the words of John and Susan Edwards Harvith, Edison “proclaimed himself dictator of all musical decisions in his company”. Trusting his own musical instincts above those of his staff and even famous musicians, he once publicly quarreled with John Philip Sousa over the musical worthiness of Mozart (Harvith and Harvith:3-6).

Photography, on the other hand, had as many as twenty-four different inventors (Marien:15); and when it came to moving pictures, Edison was artistically uninvolved, allowing employees like Edwin S. Porter and George S. Fleming to innovate in terms of script, scenario, scenery, lighting, and camerawork (Collins and Gitelman:22). In France, the other inventors of moving pictures, Auguste and Louis Lumière, soon lost interest in the cinema business and instead devoted their attention to color photography (Abel 2005:571).

The first theorists of visual media also had diverse professional and social backgrounds, and there was a clear intellectual and professional division of labor in both disciplines. Photography and cinema had full-time critics who contributed substantial theoretical defenses of these media as art. These critics were able to draw on their own areas of professional or

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6 In the words of John and Susan Edwards Harvith, Edison “proclaimed himself dictator of all musical decisions in his company”. Trusting his own musical instincts above those of his staff and even famous musicians, he once publicly quarreled with John Philip Sousa over the musical worthiness of Mozart (Harvith and Harvith:3-6).

7 These included Sadakichi Hartmann, a writer, poet and critic; photographer and promoter Alfred Stieglitz; the playwright George Bernhard Shaw; photographer, novelist, and journalist Nadar (real name Gaspard-Félix Tournachon); and art critic Charles H. Caffin. In addition to devoted theorists like Ricciotto Canudo, Rudolf Arnheim, and Rollin S. Sturage,
academic training, as in the case of Münsterberg and Rudolf Arnheim, who both grounded their arguments in their knowledge of psychology (Abel 2005:65; Arnheim:2).

Early photographers, cinematographers, and directors were a similarly diverse bunch. Cinema pioneers Georges Méliès and George Albert Smith, known for their innovations in trick photography, shared an interest in magic. Méliès’ experiments before his involvement with cinema led him to purchase a theatre troupe specializing in magic tricks in 1888 (Lanzoni:32), and Smith had enjoyed a successful career as a mesmerist (Shail:196).

After early innovators like Porter, Smith, and Méliès, specific job descriptions in film production started to clarify around the same time as the “is it art” debate gathered momentum, with the familiar roles of director, cinematographer, and editor all clearly distinguished by the time of D. W. Griffith’s Birth of a Nation in 1908; furthermore this professional specialization seems to have been crucial to the commercial and artistic success of the early Hollywood years (Monaco:6-17).

In contrast, debates about phonograph aesthetics took place on the smaller discursive canvas of scientific articles, or editorials, articles, reviews, and correspondence in the pages of audiophile magazines like The Gramophone and High Fidelity. Sound professionals of the 1920s-1930s were all “sound engineers,” a term that made no distinction between the very different areas of music recording, mixing, studio acoustics, film sound recording and editing, cinema also found advocates in psychologist Hugo Münsterberg, poet Vachel Lindsay, and literary critic and film educator Victor Freeburg.

8 Although Friedrich Kittler upbraids early phonograph critic Rudolph Lothar for his “not-very-informed premise that ‘philosophers and psychologists have hitherto written about the arts’ and ‘neglected phonography’” (45), Kittler’s own selections in early phonograph philosophy discuss the phonograph only tangentially (30, 38, 51, 59).
or for that matter pure research disciplines like psychoacoustics. At the same time, these engineers, who were solely responsible for technical and practical innovation, were active in scientific and professional discourse.

This failure to recognize the degree of specialization in the sound community led to some awkward miscalculations, as when in 1928 film director Roland West of United Artists summoned acoustical scientist and recording engineer J. P. Maxfield of Bell Laboratories to Hollywood to advise on the difficult transition to sound film. West had been impressed by Maxfield’s knowledge and skill in orchestral recording, and figured that the methods with which Maxfield achieved his outstanding results in orchestral recording would apply equally well to the radically different demands of dialogue recording, an assumption that was proved emphatically wrong on the first day of testing, resulting in Maxfield’s swift return home (Bernds:68-75).

The role of music producer, analogous in many ways to that of the film director (Ashby:4660), did not exist as such in the 1920s. Fred Gaisberg, after Edison probably the most influential figure in music recording in the first few decades of the twentieth century, was known for his diplomacy and popularity with musicians (Day:38; Gronow and Saunio:16), and this along with his representational model of “sound photographs” suggests that his artistic relationship with musicians was probably much less intrusive than Edison’s. “Record producers” as such didn’t achieve a professional designation until it was forcefully claimed by Gaisberg’s successor at EMI, Walter Legge, several decades later (Day:40).

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9 Consider the absurd corollary “light engineer,” which quite apart from its kitsch science-fiction connotations, might justifiably be confused with the science of optics.
Sound Engineering and Classical Music

The 1920s saw a changing of the guard both in terms of methods and professional involvement. As Edison’s influence in the phonograph industry waned and finally ended with the closing of the Edison Company in 1929, a new generation of scientists and inventors engaged with the adoption of electrical recording methods took up the mantle of developing the practical possibilities of phonographic mediation (Read and Welch:237-273). Along with these developments a new professional expert exclusively devoted to the craft of electrical recording emerged: the “sound engineer.”

The first sound engineers came from research institutions sponsored by corporations like Bell, the American Telephone and Telegraph Company, and General Electric. While it is unclear who first coined the term “sound engineer,” it probably arose as a combination of the research interests of the two groups who were responsible for the bulk of phonographic research in the 1920s and 1930s, acousticians and electrical engineers. The primary concern of the first sound engineers was to bring scientific rigor and standardization to the previously empirical, rule-of-thumb practice of mechanical sound recording. During a decade when directors and critics were consolidating cinema’s new status as the “seventh art,” historian Russell Burns summarizes the phonographic ambitions of contemporaneous sound engineers as follows: “The time was ripe for the art to be replaced by science” (Burns:92).

Along with sound engineers, classical musicians had a significant impact on phonography in the post-Edison era. Historian David Morton notes that leading up to the 1920s the cultural status of classical musicians improved markedly, and this coincided with the changeover to electrical technologies (Morton:24-26). This improved cultural status, along with other factors like the loyal buying habits of classical music listeners in the face of a radio-inflicted slump in the recording industry, gave classical music culture an
The first encounters between the culturally empowered musicians and the new generation of sound engineers did not go altogether smoothly. Musicians expressed a range of fears and doubts about the phonograph, arguing that records would undermine concert culture and lead to a decline in musical standards (Symes:60). As Colin Symes puts it, during these early years “recording faced enmity from musicians” (Symes:86). Musicians were suspicious of sound engineers as well as studios and the phonograph (Harvith and Harvith:xii), and those with enough status could even fire engineers for what they viewed as excessive interference, for example unwanted tampering with volume levels (Day:34). The age of electrical phonography thus began with musicians fearing the phonograph, as painters and illustrators had feared the camera (Symes:45-49; Gernsheim:11-12), and is best understood as a combination of new and older forms of culture (Morton:13).

The “Is it art?” Question

Cinema and photography experienced similar clashes between new and established professional groups, but these encounters were in part the result a clever and deliberate discursive ploy. Unlike sound engineers, early photographers and filmmakers were eager to prove that they were “artists,” and seem to have decided that the best way to show this was to compare their new “art” with an established and related one. Photographers and filmmakers established competitive but ultimately productive links to painting and theatre, as

10 In addition to their broader social objections, musicians pointed to a range of practical and psychological problems with studio recording (Symes:38-45).
photographers, directors, cinematographers, picture editors, and critics developed strategies for incorporating the prior art in comparative practices or theories that attempted to distinguish cinema and photography as “art.”

Although the case in phonography is not nearly as clear-cut, it seems that the closest thing to an “is it art” moment came in the 1920s. Factors such as heavy investment in the phonograph industry from telecommunications corporations combined with the invention of first-generation electronic instruments like the Theremin, Ondes Martenot, and the Trautonium contributed to a thirst for experimentation, and composers and sound artists sought novel uses for the phonograph and incorporated mechanical themes in their creative output (Randel:289; Symes:50-52). At the same time, the appearance of audiophile culture brought an educated and articulate class of consumers eager to debate aesthetic as well as musical or technical matters, and the establishment of *The Gramophone* by British author Compton Mackenzie in 1923 provided a forum for their debates (Symes:66-67). Various notions of phonographic artistry, from Mackenzie’s warning against a “platonic” gramophone-specific music (Mackenzie) to a wholly “autonomic ‘gramophone’ art” (Cramwinckel), were defended or dismissed intermittently from the first years of the magazine’s publication through the mid-1930s (Cramwinckel).

Each medium faced similar challenges during the “is it art” debate. Photography and phonography struggled with the issues of representation and skill, both of which faced opposition due to the idea that each was a kind of autographic apparatus; in other words, 

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11 Works that are considered “art photography” date from the late 1850s (Sandler:58), though there is some disagreement among historians as to exactly when in the late 1800s photography became a “fine art” (Wells:251). Defenses of cinema as the “seventh art” begin around 1908 (Bordwell 1999:29).
there could be no skill involved in photography or sound recording because the
camera/phonograph recorded the images/sounds itself. Media were thought of as neutral,
objective modes of seeing and hearing, which meshed well with nineteenth century notions of
empiricism (Marien:23).

Early defenders of photography responded by showing that it required professional
training, just as illustration did (Goldberg:218). French directors faced a similar standoff with
scenarists in the early 1900s, and had to fight hard for recognition of their artistry (Abel:19).
In contrast, the idea of skill in phonography merits only occasional mentions in scientific
articles—for example, the difficulty of microphone positioning and live mixing of broadcast
music (Hanson:86). More often, subjective, aesthetic, or pragmatic interventions in the
recording process were downplayed in order to project a guise of scientific detachment.12

The issue of creative exploitation also distinguishes photography and cinema from
phonography. Photographers and filmmakers used their artistic output as applied defenses of
technical mediation-as-art. Art photographers played up to the existing comparisons to
painting by cleverly appropriating painterly subjects, themes, and techniques. Since painting
was recognized as the highest form of art, early innovators like Oscar Rejlander and Henry
Peach Robinson adapted photographic techniques to create a painterly visual aesthetic,
mimicking chiaroscuro and the textures of various materials and techniques used by painters
(Sandler:57). Photographers of the pictorialism movement of the 1880s-1920s used selective
focus, soft mid-tones, and sentimental subject matter to highlight the expressive capabilities
of the photographer (Marien:171-172). Photography also adopted the landscape/portrait

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12 Recall also the ceno-orchestra experiments I discussed in chapter 1, where the musician
Stokowski was given control of the mixing equipment, despite his obvious lack of skill.
distinction in its frame dimensions and subjects, and by the turn of the century, photographs were framed and hung on walls like paintings (Giblett:15; Sandler:59-60).

Cinema’s relationship to theatre was different; since fictional narrative films were already considered photographed theatre (Bordwell 1999:26; Carroll 2008:10; Abel 1988:19), a simple appropriation of theatrical methods would not work; unlike photography, cinema had to prove that it was different from theatre (Abel 1988:20). Rollin Summers argued that the absence of spoken dialogue in silent film had forced cinema to develop a new language of visual representation (Bordwell 1999:29-30), while other critics and directors promoted the concept of medium-specificity, which maintained that practices like editing and cinematography were uniquely cinematic hence beyond the possibilities of theatre (Bordwell 1999:26; Carroll 2008:42).

As David Bordwell and others have noted, one of the most problematic aspects of early theories of cinema is the idea of medium-specificity (Bordwell 1999:31). Medium-specificity, the idea that the inherent properties of the camera and the cinematic process—lighting, lens choice, camera angles—comprised an inimitable “language of cinema” that distinguished it from theatre, was a hastily thought out but highly effective response to the charge that the camera recorded reality. In the case of phonography, however, the corollary assumptions about phonographic “realism” emerged from the period of change in the 1920s not merely intact but invigorated. As Gramophone columnist Cedric Wallis wrote: “Realism, then, is in the saddle, and likely to remain there” (Wallis).

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13 In the United States before the 1920s films were often referred to as “photoplays” (Langdale 2002; Freeburg 1918; Sargent 2010[1913]).

14 Noël Carroll makes a similar point in his analysis of medium specificity (Carroll 1996:3-24).
The issue of whether phonography was art was never addressed with the urgency seen in the visual media, yet versions of the “is it art” question have troubled recording discourse since the 1920s. Interestingly enough, technical inadequacy—the shortcomings of cameras, microphones and so forth—distinguished approaches to representation among phonography and cinema perhaps more than anything else.

Mediation Failure and the Reality Trap

One of the central features of the medium-specificity argument, articulated by Rudolph Arnheim, was the acknowledgement that cinema did not do such a good job of recording reality after all—that its failure as a pure medium permitted it to represent rather than reproduce (Carroll 2008:11). In phonography, the issue of mediation failure appears in the “romantic versus realist” debate of the 1920s, which turns out to have been the closest thing to an “is it art” debate in phonograph history. The phonographic romantics argued that absolute accuracy in recording could be sacrificed for aesthetic appeal, while realists maintained that any divergence from the goal of strict fidelity to the musical performance would lead, in the words of Gramophone editor Compton Mackenzie, to “worshiping a falsification of music” (Mackenzie:4). At its most extreme, for example as expressed by Gramophone contributor Cedric Wallis, the romantic argument was more or less identical to Arnheim’s. Wallis used a cross-media analogy, comparing an imperfect phonograph recording to the representational quality of a painting: “…out-dated recordings, by their very

15 Colin Symes describes this discourse as “idealism vs. Realism,” citing various recording controversies throughout the past century such as Glenn Gould’s experimental editing practices in the early 1960s or John Culshaw’s productions of Wagnerian opera (Symes:84-87).
unrealism, have the quality which goes to make a great painting transcend its subject-matter” (Wallis 1936).

The only problem with the romantic argument was, as phonograph historians Oliver Read and Walter Leslie Welch pointed out some years later, that the mediation failures that Wallis et al. described in phonograph recordings were not deliberate (Read and Welch:386). Since the admittedly charming shortcomings of these recordings lacked the intentionality of, for example, early trick photography, they could not be considered legitimately artistic. While cinema and photography were released from the responsibilities of recording reality, phonography was only permitted to fail involuntarily.

The issue was further complicated by the fact that, since it happened around the time of complicated transition to electrical technologies, the romantic versus realist debate was conflated with separate arguments about the merits of mechanical versus electrical phonograph apparatus. Thus by the 1930s, “romanticism versus realism,” was synonymous with “acoustic versus electric,” and the combination of these two already charged debates resulted in the protracted polemical exchange that Greg Milner described as the “original recording dialectic” (Milner:250).

The ultimate result of this conflation and the ensuing polemical exchange was to forever link subjective qualities like realism and romanticism to technological processes, thus pushing technology to the center of phonograph aesthetics, where it has remained ever since. The idea that phonographic technologies have inherent “romantic” or “realistic” tendencies or other built-in consequences seems to have informed debates between engineers or

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16 Trick photographers of the 1870s took advantage of the inconveniently long exposure time of their photographic equipment to produce the first “ghost” photographs (Fineman:128).
audiophiles arguing the relative merits of analog versus digital technologies, as well as the work of media theorists like Friedrich Kittler.

Kittler’s “Gramophone, Film, Typewriter” deserves special attention because it is perhaps the most thoroughgoing attempt to sustain such links, and uses a sophisticated a cross-media comparison to support historical, scientific, and philosophical claims for the inherently “real” qualities of the phonograph and the “imaginary” tendencies of film. Kittler develops the notion of mediation failure by arguing that the phonograph could “keep up” with low-frequency acoustic amplitude fluctuations, while the camera was “unable to trace the amplitudes of its input data” (118-119). This means, Kittler maintains, that the phonograph is more closely connected to reality than the film, which since it slices time into segments is predisposed to the cut, therefore technologically predestined to trick photography and representation of the imaginary (119). For film to correspond to the real as phonography does, Kittler argues, it would require technology capable of capturing stereoscopic visual data flows at “frequencies in the terahertz range.” But most significantly, Kittler also notes that the technological a-prioris of phonography and film “can be seen as a fundamental difference in terms of our sensory registration” (117-118), in other words that phonography as a process also mimics more closely the human perceptual apparatus; for Kittler, phonography is linked both to the real and the way we perceive it—it corresponds to how we hear as much as what we hear.

This argument rests on the assumption that perception, like a phonograph recording, is basically a continuous, uninterrupted data flow, and ignores temporal grouping behaviors such as the Haas effect, or concepts like temporal integration, which models perceptual

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17 Kittler notes that Meliès discovery of the jump cut was accidental, adding force to the idea that cinematic unreality is an inherent technological feature of cinema.
temporality as a resizable context-dependent window within which auditory and visual stimuli above a certain perceptual threshold are grouped and perceived as single events (Schwartz:51). Tracing the amplitude of data flows in the terahertz range, while a colorful and philosophically appealing notion, could in fact be perceptually meaningless.

Linking phonography to the real is suspect on historical as well as scientific grounds. There were also trick phonographies: early phonographers used practices such as overdubbing, montage, pitch shifting, and reversing to produce highly unrealistic sound scenes that recalled Meliès’ special effects or Rejlander’s early composite photographs (New York Times “An Evening With Edison” 1878). In addition to constructing the unreal, phonographers of the pre-musical era also engaged in the more familiar, corollary practice of faking the real. Phonograph enthusiasts were encouraged to record “fake” musical performances, where each part was overdubbed by rewinding and recording over the same cylinder (Allis).

Understanding the phonograph as a trace or link to the real also poses recordings as transhistorical, transcultural, standalone artifacts of pro-phonographic events. Apart from the obvious inconvenience to the theory posed by the necessity of playback equipment, in order to be heard phonograph recordings also require subjective interpretation, specialized knowledge, and a degree of skill before the sounds they “store” can be heard in a manner resembling their pro-phonographic origins. Unlike a bottle storing water that could release its

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18 Schwartz also discusses the effects of retinal after image on temporal perception. For a survey of the problems with models of perception that assume “a continuous translation of the external world into explicit perception” see VanRullen and Koch (Is Perception Discrete or Continuous? 2003).
contents if accidentally dropped or punctured, phonograph recordings cannot disgorge their traces of the real without a complex socio-technical playback mechanism.

“Hearing” recordings depends on a number of cultural, epistemic, and empirical a-prioris. For example, in addition to the records storing musics and sound artifacts of various human cultures, the phonograph players on the Voyager craft also included detailed instructions on how to play the records back (Kouvelis:554), without which a hypothetical listener would be unable to access their contents.

The fascinating “First Sounds” project, in which researchers converted graphical traces from Édouard-Léon Scott de Martinville’s phonautograms into sound, is a more complex example of the same point. The “eduction,” as Patrick Feaster describes it, of Scott’s phonautograms is least as much painstaking detective work and subjective interpretation as it is transcription. Hearing something even close to the sounds that Scott “recorded” with his phonautogram required first untangling the philosophical dilemma of exactly what to try to reconstruct (the waveform as recorded, the movement of the membrane, or the actual acoustical sounds) (Feaster 2010:47), and a detailed knowledge of music and acoustics necessary for interpreting Scot’s primitive “timecodes”—reference waveforms recorded with a tuning fork. Perhaps most significantly, when Scott’s explanation of how to interpret the tuning fork waveforms proved to be unclear, subjective judgments based on a deep familiarity with the characteristic sounds of pitch-shifted audio were critical in choosing the correct base playback rate: the researchers found the right speed only after deciding that certain speeds sounded “far too slow,” “very much like a tape played back at twice the proper speed” and “plausible (though lugubrious),” (F 2010:48).

Recordings, therefore, store neither sounds nor traces of them. Sound recording is an intricate social process of representational abstraction of sound, a delicate system that under very specific conditions can be coaxed into producing sounds that may or may not be
meaningful to someone with knowledge of an expected culture of listening appropriate to those sounds. In different ways, both examples reveal a conundrum of the phonographic real: how can the trace of the real stored in sound recordings have any meaning if one is in any way unfamiliar with the original?

Phonographic reality gains its authenticity from the social context of various instances of sound representation, rather than any concrete relationship to an actual pro-phonographic event, and outside of this context its “originality” loses meaning. Even with direct access to the original, its relationship to the reproduction is so confused by social contingency as to render that relationship suspect. Gramophone technical writer P. Wilson addressed just this issue in an article entitled “Reproduction and the Real thing,” where he described attending an opera performance at Covent Garden, then listening to a radio broadcast of the same production the following evening. Wilson was surprised and discomforted to note that the “original” bore little relation to the “copy”; listening at home felt like an unrelated rather than a degraded experience and did not recall the sensation of being at the concert, even in a compromised form. Worse yet, with apparent shame Wilson confided that in some ways he preferred the copy to the original, and offered in his defense an expert description of the differences in rendering of sonic space between the performance and the broadcast.19

Struggling with a discourse that expected that “gramophone users will attend actual performances as often as they can, that they may not lose touch with the tonal truth”

19 Wilsons noted a change in general balance and perspective, with the listener placed in the middle of the ensemble rather than listening from the hall; and welcomed the appreciable increase in sonic detail: “the effect, as I see Newman describes it, as of ‘delicate small veinings that branch out from the central line of a leaf,’ were more easily appreciated in the reproduction” (50).
(Chapman), the experience appears to have caused something of an existential crisis for Wilson, who finished his article with an appeal to gramophone critics to mount “a more careful analysis of the purpose of musical reproduction” (Wilson:50). Some years later, Oliver Read and Walter L. Welch responded by dismissing his claim that there could be two different versions of an “original”: “The concept of two different kinds of ‘reality,’ is a purely romantic concept” (385).

One of the most interesting things about this exchange is that neither Wilson nor Read and Welch seem bothered by the fact that the live and the broadcast performances were in point of fact different originals. The “reproduction” that Wilson listened to at home was a live broadcast, meaning the performance was not the same one he had attended the previous evening. While the musicians and location, and presumably the gist of the interpretation, were the same, these were quite literally two different spatio-temporal “realities.”

Given the obsessive nature of the discourses of reality in audiophile and engineering culture of the time, and the emphasis on the uniqueness and unrepeatability of the original, this raises the question: if not to insist on consistent identification between a specific copy/original pair, then what was the purpose of these discourses of reality?

Which Reality? Fidelity Theories and Musical Performance

Discourses of reality appear in paradigmatic form as “fidelity theories,” models of literal perceptual correlation proposed by sound engineers. These theories start to appear in scientific articles in the mid 1920s, and grew out of an apparent desire to standardize the previous generation’s more fluid approach to sound fidelity. As S.T. Williams, chief engineer at the Victor Talking Machine Company put it: “A complete theory connecting the great series of disjointed facts was still lacking. Development along empirical lines had reached its
As I will show, fidelity theories are also linked to the rise of classical music culture and its interaction with sound engineering. The formation of fidelity theories around classical music recording seems to have happened quickly and with little logical dissonance with the earlier notions of fidelity; perhaps the moral overtones already present in the pre-war notion of fidelity harmonized with the morally uplifting status accorded to classical music. Fidelity theories, while often problematic or simply irrelevant in practice, have dominated all scholarly discussions of sound representation since the 1920s (Lastra 2000:123-128). The changing standards and practices that accompanied this new notion of sound fidelity were, however, a rather more contentious matter, as I will discuss shortly.

But even in the abstract, perfect sound fidelity is contradictory. Fidelity theories establish a clear and value-weighted distinction between original and copy (original good, copy bad), at the same time that they insist that copy and original be as similar as possible—in the ideal case indistinguishable, so much so that any trace of mediation disappears. What examination of the practical contingencies of sound fidelity show without question, is that the

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20 As I showed in chapter 2, the discourse of fidelity in the Edison era understood “faithfulness” as morality rather than correlation.

21 Contrary to the smooth acceptance of the new notion of sound fidelity, emerging practices based on electrical technologies caused considerable upset in both the hifi and musical communities—see Read and Welch (353-372).
crucial part of the sound fidelity equation is not to maintain fidelity to the original, but to obscure the traces of mediation.\textsuperscript{22}

Emily Thompson notes the desire to efface the artifacts of mediation in the Edison tone tests: “In order to efface the machine, the machine had to become inaudible” (Thompson:144). Starting in 1915, the tone tests were one of the first examples of a trend towards further inaudibility and invisibility of both medium and mediators. Just as framed and wall-hung photographs had mimicked paintings in homes and galleries, mechanical phonographs of the early 1900s had entered the home styled like pianos or in the guise of other mechanical musical instruments like player pianos and music boxes; like the photograph, a new medium contained in the domestic and physical frame of an older, culturally familiar and high status art (Eisenberg:13; Symes:31; Gronow and Saunio:5).

Along with the changes in models of sound fidelity that began with the tone tests, the phonograph began to disappear into the domestic interior (Thompson:144). This trend peaked during the high-fidelity boom of the 1950s, and seems aesthetically related to the introduction of stereo. For many listeners, stereo meant the removal of another sonic barrier to the experience of being at a live concert. Phonograph historian Roland Gelatt described how “stereo seemed to dissolve the walls” (1977:314); but before this it was already dissolving into them, a trend that is illustrated quite literally in “Make Music Live,” an interesting audiophile manual published some years earlier. The manual contains advice in the form of explanations, pictures, and diagrams on how to conceal phonograph components like speakers behind pictures, doors, and walls, and also shows how to modify cabinets or any other available domestic space (Green, Radcliffe, and Scharff 2012[1951]). The dominant

\textsuperscript{22} See also Jonathan Sterne’s discussion of sound reproduction as a “vanishing medium” (283-285).
aesthetic is one of complete transparency; the equipment is completely hidden from sight and according to the author’s should not interfere with the normal functioning of domestic space.\textsuperscript{23}

In summary, the fidelity model of the 1920s and onwards, rather than being a continuation or standardization of an existing model of fidelity as scientists and critics of the time insisted, marked a significant departure. What caused this change, and what prompted the rise of the aesthetic of inaudibility and concealment?

Contrary to the progress narratives of engineers like S. T. Williams and the scientific community, I believe that sound engineers constructed fidelity theories first and foremost as a response to their social interaction with classical musicians. In the early years of electrical recording, the first generation of sound engineers found themselves in unfamiliar aesthetic territory, their scientific aspirations hampered by slippery subjective concepts like “naturalness” and “quality” (Lastra 2000:165; Morton:26). Their main professional interaction was with thoroughly trained, high-status classical musicians, who were assumed to be more articulate in subjective and artistic matters. Lacking either Fred Gaisberg’s musical expertise or Edison’s pathological self assurance, sound engineers simply decided it would be best to leave all aesthetic, artistic, and subjective matters to musicians. As J. P. Maxfield put it:

\begin{quote}
Successful broadcasting of artistic musical entertainment involves the cooperation of artist and engineer. In the present state of the art, the best results are being obtained where all of the artistry is controlled by the artist,
\end{quote}

\textsuperscript{23} The authors note an “ideal” placement of a speaker hidden inside a cupboard (14), and also that closets can still be used to store clothes after installation (160).
and the broadcast engineer furnishes the technical means of transmitting the
entertainment to the listener’s home (Maxfield 1932:122).

Fidelity theories were also a result of the sound engineer’s desire to get out of the way
of the artistic process, an attempt by the mediators to erase any audible trace of the medium,
or themselves, from the recording process. One of the first such theories, which James Lastra
dubbed the “invisible auditor” model, imagined an ideal recording apparatus as an inaudible
and invisible eavesdropper at a concert. The “invisible auditor” is a lot like an ideal sound
engineer: a discreet, inaudible, invisible listener that exists in the realm of hypothesis and
does not interfere with the sanctity of the musical “original.”

Theories like the “invisible auditor” model, then, were a kind of philosophical
abstraction of the sound engineer’s aesthetic deference to the musician. Sound engineers
since the 1920s in many ways continued this habit, and apart from their reliance on musicians
for artistic evaluation and guidance, developed other ways of outsourcing subjective
evaluation to third parties; two such examples of this would be the popular use of subjective
tests using large groups of participants to formulate general models of hearing and subjective
preference, and the crucial evaluative role in high fidelity culture played by the “golden eared”
audiophile.24

24 H. D. Arnold stated that a panel of musical experts should be convened to evaluate the
ceno-orchestra system (McGinn:48). Arnold also discussed the role of organized subjective
testing in the introduction to “Speech and Hearing” by Harvey Fletcher (Fletcher:xii). The
tendency to favor organized testing over empirical subjective evaluation increased during
20th century; for example in the 1920s engineers were happy to evaluate reverberation time
in studios and halls for themselves (Maxfield and Harrison:244; Bernds:78), but after 1950
There is a telling similarity here to the “self-effacing” stance that Mary Warner Marien identified in the early photographers, which as she argues hampered the progress of art photography for decades (23). Like those photographers, the status of sound engineers suffered, leading to criticisms that they lacked artistic sensibility. As Read and Welch lamented, “Unfortunately, for the most part, the new electrical recording experts were not musicians” (374). 25

Whose Reality? Fidelity Theorists and Musical Preference

In practice, both audiophiles and sound engineers diverged from the literal idea of fidelity to a singular performance. For engineers, making the copy and original indistinguishable sometimes meant modifying the original to make it more like the copy by repositioning the musicians and strategic microphone placement (Lastra:166, Bernds:78). 26

While subscribing doggedly to the notion that phonograph recordings defer to live events, audiophiles celebrated the utility of the phonograph in very un-concert-hall-like situations: Joseph Campbell of High Fidelity magazine wrote that the high fidelity method this was also abandoned in favor of standardized subjective tests (Barron:404). In the latter decades of the century, the engineering community often deferred to “golden eared” audiophiles (O’Connell:14). One of the first published definitions of “golden ear” appears in Life magazine in 1953 (Life:147).

25 Even today it is common for musicians to hold the final authority on aesthetic matters over the sound engineer (Yakabuski:188).

26 Edison Company singer Anna Case made a similar modification of the original—herself—when she mimicked the phonograph in the Edison tone tests (Harvith and Harvith:13).
strove to “package” the concert hall so that it could be unpacked and enjoyed again somewhere else (Campbell:27), and Compton Mackenzie wrote that he liked to use the phonograph to match music to moods or occasions not connected to the concert hall experience (LeMahieu:377).

What then is the meaning of the concert-hall reference that is the base of fidelity theories? If audiophiles are happy enough to unpack a concert recording “anywhere, anytime and enjoy it” (Campbell:27), and sound engineers are comfortable modifying the original to suit the demands of the copy, what explains the value placed on the concert hall?

One thing seems clear enough: like the discourses of reality, fidelity theories allowed musical preferences to enter incognito into technical debates. Classical music culture gained an early advantage in these debates after sound engineers adopted common practice era concert music, specifically the opera and the symphony, as their prototypical “original sound,” using the experience of the concert listener as the theoretical reference against which all other instances of sound reproduction were measured.27

Stinging critiques of musical genres disguised as eloquent technical disquisitions quickly followed. In Gramophone magazine, popular musics bore the brunt of much anti-electrical-recording vitriol; jazz was particularly prone to criticism, and the general tone of the magazine often recalled “the familiar linkage between high culture and human reason, and popular culture and the animal instincts” (LeMahieu:376-377).28

27 James Lastra discusses the concert hall model as a basis for sound representation (2000:163-165); Colin Symes calls this model the “keystone discourse” of recording (Symes:60-87).

28 E. T. Canby in Gramophone described a new catalog of impressively recorded jazz bands on the Edison label “an expense of spirit in a waste of shame!” (Canby:3).
The most sustained criticism of this type came from Oliver Read and Walter L. Welch. Like their predecessors at *The Gramophone*, these author’s protests against the false standards and practices of electrical reproduction were a thinly veiled assault on popular musics of the time like crooning and jazz:

What would Mr. Robinson or Mr. Kellog say today about the use of echo-chambers in recordings, which are cut in or out like the grand swell of the pipe organ; or of the layering of one recording over another recording repeatedly to simulate echo and orchestral effects with but one voice and/or instrument? What would these gentlemen say about Montovani [sic] ? Suppose the instrument to begin with is an already electrically amplified guitar and the alleged singer is crooning softly into the microphone—perhaps using a throat contact mike—just what is reality? (Read and Welch:253).

Instead of evading the “constraints produced by the real” (Kittler:118) as photographers and filmmakers managed to, fidelity theorists of the 1920s-1930s constructed a pro-phonographic “reality” that was used as a cover to promote particular musical preferences.\(^29\)

\(^29\) Greg Milner reveals a different but equally consistent musical preference in his argument against digital technologies. Milner lends moral heft to his thesis by incorporating powerful descriptions of his revelatory experience of listening to the music of artists such as Steely Dan, Roy Orbison, Elvis Presley, Elvis Costello, Shellac, the Smiths, Bruce Springsteen, the Rolling Stones, XTC, the Clash, and Nirvana on audiophile Michael Fremer's extravagantly expensive analog playback equipment (258-266).
But this is not to suggest that the musical recording practices that followed were devoid of any artistic dimension—quite the contrary.

*Imagining the Pro-Phonographic*

Recent critical approaches to sound fidelity have emphasized the dependence of the original on the copy, arguing, to paraphrase James Lastra’s elegant explanation, that ideality depends on repetition (Lastra 2000:150-153), or to put it another way, that originals could not exist without copies (Sterne:219). In these long overdue analyses, deconstruction of the copy/original binary helps to explain how ostensibly technological debates like the discourses of realism and sound fidelity were used to express aesthetic and cultural preferences (Sterne 221, 276-279).

But stopping here tells only half the story. “Original sound” evolved into an elaborate aesthetic construction as well as a social one, and to dismiss it as a theoretical contrivance would be to ignore its artistic value. In the following pages I trace the transformation of “original sound” into a more general category of pro-phonographic ideality, and examine themes and sonic strategies common to all kinds of recorded music. Finally I argue that all recorded musics construct an aestheticized pro-phonographic sound space, and examine some sonic strategies common to all forms of music recording.

Beginning in the 1920s fidelity theories quickly increased their discursive reach, as engineers attempted to apply the model of symphonic concert recording to every other imaginable instance of sound reproduction, from telephony to film sound (Lastra 2000:162-166). This program of theoretical expansion is reflected in the fact that by the end of the past century, there was scarcely a branch of scholarly inquiry into sound that did not incorporate some form of the copy/original paradigm (Lastra 2000:124).
As fidelity theories assumed a broader reach, so too did the notion of original sound, and by the 1930s, audiophiles and sound professionals no longer spoke of specific instances of sound reproduction, of discrete and tangible copy/original pairs, but referred to general categories of the real versus the reproduced (Chapman 1934; Wilson 1934). In this context, the seemingly contradictory problem of Gramophone writer P. Wilson’s substitution of one live opera performance for another makes more sense. Both performances were equivalent for Wilson and his readers because, although they took place on different nights, they were both part of the same pro-phonographic ideality, that is to say the same culture of concert performance and reception.

When fidelity theorists described any and all reproductions of any type of sound as absent, synthetic, false, past-tense, “dead”, they recursively—and inaudibly—constructed a general pro-phonographic sound space that is present, real, authentic, present-tense, “live.” Uniqueness and unrepeatability became signatures of any category of unmediated sound—a mythic ideality, “original sound” writ large.

Other examples of pro-phonographic idealities recursively constructed from assumptions of technologically compromised sonic cultures might include R. Murray Schafer’s concept of the hi-fi and lo-fi soundscape (with their respective associations to the natural and the technologically corrupted) (Rodaway:88), or Stanley Godlovitch’s philosophy of musical performance, in which he proposes a set of “integrity conditions” that are more or less un-mediatable properties of musical performance (Godlovitch:49). Godlovitch’s integrity conditions, presumably intended as a kind of philosophical armor against the corruptions of recording technology, emphasize the essential traits of original sound, unrepeatability and uniqueness.

These pro-phonographic qualities of unrepeatability and uniqueness logically tend towards nostalgia. According to John Shepherd, nostalgia was already a common theme in
popular music of the late eighteenth and nineteenth centuries, coming about as a result of migrant populations reminiscing about their homelands.

But beginning in the late nineteenth century, coincident with the age of recorded sound, a different theme starts to emerge; nostalgia for a bygone era, a lost golden age, or the vanishing traditions of an older society (Shepherd:293). The link to media discourse is hard to ignore; because sound communications technologies were imagined as substitutes for person-to-person communication, they came with a built-in sense of lost presence. As Jonathan Sterne notes, the telephone was marketed as a substitute for physically present communication in much the same way that the phonograph was imagined as a substitute for live musicians (Sterne:263-265).

Musicologist Robert Philip echoes this link between lost modes of communication and music making in his study of the history of performance style in recordings. According to Philip, music before recording was “also a matter of physical presence, social interaction, and direct communication between musicians and audience” (Philip:4). Inverting the technological utopian fantasy, Philip writes: “If we could transport ourselves back to the late nineteenth century, before the existence of recordings, we would find ourselves in a deeply unfamiliar world,” and goes on to describe a lost age of informal social music making before the age of the phonograph (ibid.). 30 In Philip’s account, live music making is a powerful

30 It is worth noting that the society Philip describes is hardly typical of the kind of musical life available to ordinary Europeans before the age of the phonograph; in fact he describes an elite group well connected Viennese intellectuals, composers, performers, and business people such as Max Graf, a prominent musicologist and close friend of Sigmund Freud (Federn 2005).
metaphor for all that is good and “phenomenologically coherent,” to borrow Sterne’s locution (20), in interpersonal communications of the technologically unmediated society.

In the case of recordings, “original sound” symbolizes both music making and socializing as they existed before the invention of the phonograph, and is particularly evocative for Philip: “There is, too, an element of nostalgia.... The surface noise helps…it is like an old sepia photograph of a gentleman with whiskers, wearing a top hat, and it carries the same aura of a glimpse into a vanished world” (Philip:248). In the case of historical recordings and recordings generally, the pro-phonographic elicits nostalgia for the pre-phonographic.

**The Pro-phonographic Conceit**

Phonograph recordings are inherently misleading because they deliberately obscure the extent to which the sound space has been constructed. In music recording, fidelity theories were the starting point for an elaborate social construction of a pro-phonographic conceit. Sound engineers and theorists, musicians, audiophiles, musicians unions, and radio broadcasters all contributed in different ways.

Colin Symes notes that in classical music recording, studio practice creates a sonic picture that is close enough to reality to be plausible, inviting the listener to believe that its acoustical construct is “real.” Robert Philip claims traces of actuality in even highly edited recordings (249). Another way to put this might be that sound representation, rather than being compared to live performance, is presented as sound reproduction; the tendency of sound media and mediators to erase themselves, to render inaudible both sonic and social artifacts of the recording process, helps to maintain the conceit that the recording was “performed live.”
This is rather different from “suspension of disbelief,” where audience or reader are presented with something unbelievable, and temporarily choose not to disbelieve it in order to enter into the diegetic world. The phonographic conceit does the reverse: It presents an essentially contrived sound space as a plausible, real world event.

The reality of the phonographic conceit is evident from the fact that phonograph historians often feel the need to inform their readers that some recordings of popular music “cannot be performed live at all” (Chanan:9,18) or that studio recordings do not necessarily refer to real events (Eisenberg:89). Unsolicited explanations like these anticipate the common non-specialist assumption that popular music groups “perform live” when making studio recordings.

As opposed to suspension of disbelief, a better description might be “plausible affirmability”: that is to say, a listener will assume that the recording was performed live unless otherwise instructed. This seldom happens because, to borrow philosopher Étienne Souriau’s useful terminology, phonograph theory does not distinguish between the a-phonographic and the pro-phonographic, meaning the listener usually has no interpretive

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31 In a more recent example New York Times writer Jon Caramanica, discussing vocal producer Kuk Harrell, made a similarly unsolicited explanation of studio editing technique: “[The vocal performance] happens in parts. In the studio, rarely, if ever, does a star sing a song the whole way through. Instead Mr. Harrell builds a gleaming whole from granular bits” (Caramanica 2012).
framework for distinguishing between sonic narratives that were invented specifically to be captured by the microphone, and those that “really happened.”

While in concert music there is a certain logic behind the pro-phonographic conceit—after all, recorded works of classical music do exist in recognizable unmediated forms—in popular musics it is counterintuitive because from the beginning they were studio-based arts that first reached their audience via radio broadcasts rather than live performance (Zak:12). Yet even though many popular music recordings have no “originals” in the sense that a recording of a symphony might, they are still constructed in accordance with the phonographic conceit. As Lars Nye points out, early rock and roll recordings up to the time of Elvis Presley were sophisticated studio-dependent sound collages that retained enough hints of the actual to be accepted as such: “In sum the listener is presented with a highly realistic impression of something impossible...” (Nye:121).

This deliberate confusion between the a-phonographic and the pro-phonographic is supported by an asymmetrical relationship between practice and discourse—that recordings are not what they purport to be—one that began with Edison’s tone test campaign. Recording before the tone tests was a less standardized, empirical affair, and the concept of

32 For a discussion of the various categories of unmediated events proposed by Souriau, see Frank Kessler “What You Get is What You See: Digital Images and the Claim on the Real” (Kessler:192).

33 Peter Doyle notes that Elvis Presley “was in a sense invented at Sun [Studios]” (Doyle:191).

34 For a more detailed discussion of the tone tests, see Emily Thompson's “Machines, Music, and the Quest for Fidelity: Marketing the Edison Phonograph in America, 1877-1925” (Thompson 1995).
“fidelity” was more fluid (Sterne:216). With the tone tests, Edison reworked his earlier notion of fidelity to suit the new purpose of the second generation of phonographic devices that followed Emile Berliner’s gramophone, which was primarily to record music. Edison’s “perfected fidelity” was a clever dupe; he tricked the public into thinking that recordings were copies of performances, when in fact tone test artists imitated either their own or other’s recordings to make the artifice more convincing (Harvith and Harvith:13).

Given the limitations of mechanical phonographs, many commentators have expressed doubt as to the possibility that anyone could have actually “failed” the tests, and therefore conclude that the tone test campaign was more about persuading consumers to accept the phonograph as a legitimate alternative to live music (Thompson:160; Sterne:264), along the way associating it with elite culture (Wurtzler:80). At any rate, the tone tests, as far as Edison was concerned, were pure marketing and had little to do with phonograph recordings. In the studio Edison largely ignored the distinction between original and copy (Lastra 2000:127), and freely adapted both musical performances and works to suit the phonograph (ibid 88).

At the same time, the impact of the tone tests on popular assumptions about recorded sound should not be underestimated. By 1920 the Edison Company estimated that approximately two million people had attended tone tests (Thompson:153). The tone tests embedded the idea of fidelity in popular thinking about sound recording, and helped to establish a public discourse of liveness that supported the pro-phonographic conceit. At various times since, this discourse of liveness has gained additional support from sound engineers, audiophiles, musicians unions, radio broadcasters, and musicians themselves.

Sound engineers aestheticized the “live” classical music concert, where the goal of recording or broadcasting “was acoustically to transport the listener from his home to the orchestra hall” (Maxfield 1932:122). Audiophiles had similar ideas: As Andrew Goodwin puts it: “It is clear that high fidelity is the very embodiment, in consumerism, of the
fetishization of original performance” (Goodwin:270). Timothy Warner notes that “The very idea of ‘live’ music only evolved as a result of the radio; broadcasters needed to differentiate between recordings and ‘live’ performances for listeners” (Warner:42). Musicians unions of the 1950s, according to Sarah Thornton, used the term “live” as opposed to “recorded” in a campaign to protect rights of “live,” as in “living,” musicians, and later the term “soaked up the aesthetic and ethical connotations of life-versus-death, human-versus-mechanical, creative-versus-imitative” (Sterne:221). Musicians too, as Colin Symes observes, have throughout the age of recording advocated the superiority of live over recorded music (59).

Andrew Goodwin goes on to equate liveness with a similar “discourse of authenticity” in popular musics up to the late 1980s, citing a number of factors such as chart-topping bands of the 1970s and 1980s putting disclaimers on their albums promising fans that no synthesizers or sequencers had been used; the practice of certain electro-pop artists announcing fake tours even when live performance did not seem that relevant to their musical style; the trend of putting “recorded live” on album covers; and artists using interviews as a kind of meta-discourse to frame their concerts as “real” performances in case fans doubted the musical “truth” of their recordings. According to Goodwin the popular music concert itself is an auratic spectacle, the purpose of which is to validate the pro-phonographic (Goodwin:268).

*An Aesthetics of Original Sound*

If “liveness” in musical recordings is an elaborate conceit, one might then ask how is the conceit maintained in purely sonic terms? Colin Symes speaks of “techniques of deception” that trick the listener into “thinking that [the recording’s] musical representation is
real,” leading ultimately to a “deliberate idealization of music” (Symes:62-71). What are these techniques of deception, and what power do they derive from being so cleverly hidden?

Of course, the phonographic conceit only works because discourse does not reflect practice, and there are several factors that have helped to keep the “art” in recording from being discussed or theorized. One of the biggest stumbling blocks is that the most artistic forms of phonography occurred in popular rather than classical music (ashby 503, symes 87), whereas recording discourse was dominated by classical music.35

Another problem is that, as Patrick Feaster notes, practices require cultural legitimization before they are accepted as “art” (Compass 196), and popular music itself has struggled for such critical and institutional recognition. Before and after the early attacks by The Gramophone magazine, popular music faced unfavorable comparisons to “high” culture music (Beard and Gloag:133-134), and only began to receive serious attention from academics in the 1970s (Shepherd:72). Popular music was not culturally sanctioned like classical: jazz, crooning, and other popular genres faced especially heavy institutional criticism and resistance up to the end of the second world war.36

On a more abstract level, the convenience of discussing lyrical or extra-musical elements like image and marketing over sonic ones due to the ease of writing about words

35 Michael Chanan's back-to-back analysis of popular and sound art music is particularly revealing; most if not all the techniques employed by would-be sound artists existed in popular music, but Chanan links these rather to professional changes and the shifting of authorship in popular music making, seeing them as evidence of a process of musical dilution and fragmentation (138-150).

36 See for example Christina L. Baade's account of the BBC’s complex and ambivalent approach to popular music programming during the Second World War (Baade 2012).
and images has also inhibited recording discourse (Frith:12-14; Doyle:4), while in classical music, there is the obvious tendency to discuss music, the composers, and performance style before considering recording.

As Hugo Münsterberg argued in the case of film, perhaps it is the absence of an evaluation of the subjective aspects of music recording, the way that the listener perceives and relates to sonic material at a phenomenal level, that are most needed. To return to Münsterberg’s observation that I quoted at the beginning of this chapter, he argues, essentially, that the key to an effective defense of art lies in exploring its subjective dimension, thus his study is a psychology of the viewer.37

What then of the psychology of the listener? What are the subjective sonic signatures of “original sound”; that is to say, how do listeners describe their experience of the pro-phonographic? Although specific references to the pro-phonographic are sparse, what does exist is encouragingly consistent.

Evan Eisenberg describes the pro-phonographic as a mythical image perceived as the result of an elaborate, multi-layered sonic construction: “Pieced together from bits of actual events, [studio recordings] construct an ideal event. They are like the composite photograph of a minotaur” (Eisenberg:89). In a similar vein, James Lastra explains how the assumption of loss and absence in fidelity theories means that “...the sense that there is something more primordial than the traces or recordings persists” and leads to “misty assumptions of the ineffable, unattainable” (Lastra 2000:152-153). References to a platonic state or the “ideality”

37 Münsterberg’s criticism of previous works on cinema as being overly concerned with “technical or physical or economic [aspects] of the photoplay industry” (Langdale:64) is applicable to many histories of the phonograph.
of the pro-phonographic are common (Lastra 2000:151, Symes:71); and Greg Milner writes simply: “What came out of the speakers was an ideal world” (Milner:287).

In addition to ideality, for many, recordings seem to evoke a sense of timelessness—what Peter Doyle calls the “... synchronic ecstasies of rock ‘n’ roll”...” (Doyle:234). Doyle notes how the lyrical content of early rock-n-roll records works with sonic approaches to space to create a fleeting but universally accessible “utopian” space, songs that are about “no-place” (233), and describes the sense of present-tense in rock recordings as follows: “The rock ‘n’ roll record itself subverts the relentless exigencies of linear progression by creating an infinite, transcendent now that may be accessed by placing oneself (in the right company) within earshot of any jukebox stacked with the right records” (Doyle:234).

This space seems to provoke a particular kind of nostalgia, an odd longing for a lost, timeless present; but it also invokes the similarly dialectical pairing of absence/presence, creating an ideal sound space that the listener yearns to inhabit. As Greg Milner expresses it: “If there was a way to inhabit the music, to live in it, this was it” (265).

*Intrinsic / Extrinsic Sound Space*

What are the sonic strategies behind subjective qualities like “ideal” or “mythic”? In the practical domain, ideality is anything but a romantic concept. The “absent/present, present tense” of the pro-phonographic is created through pragmatic and often painstaking techniques, which help the listener to imagine a particular kind of socio-temporal relationship with the pro-phonographic.

These are difficult to talk about for a number of reasons, not least of which because phonography doesn’t have exact analogies for common filmic distinctions like
diegesis/mimesis or a-filmic/pro-filmic. But there is at least a clear starting point for a discussion in that, at a practical level, phonographers tend to distinguish between sounds that are part of the internal narrative of the sound world, and sounds that point to the existence of the physical conditions of sound production. Denis Smalley’s terms *intrinsic* and *extrinsic* seem a good intuitive fit for this distinction, and at least not too far from his intended meaning (Smalley:110).

For the purposes of my argument I will define *extrinsic* sounds are those that might be considered separate from the content or primary narrative of the recording, for example carrier noise, edit points, clicks and pops, background room ambience, extraneous instrumental or vocal sounds like the clicking of keys on a saxophone or breath noise and throat-clearing, or false notes in a musical recording; and *intrinsic* sounds as being, for the most part, synonymous with “content”—the “music” in a recording, or the “speech” in a radio announcement.

The technical discourse of recording tends to describe extrinsic sounds as one or other type of noise, which can be either cleansed from the recording or foregrounded for deliberate artistic effect, as for example, in music sampling practice, vinyl, turntablism, or the deliberate use of media malfunction by sound artists (Kelly 2009). In these cases, extrinsic sounds are presented as artifacts of the creative process, a deliberate creative use of mediation failures. In a different case, accumulation of surface noise is often heard as a historical index (recall Robert Philip’s nostalgic reaction to the vinyl noise on old mechanical phonograph

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38 Arved Ashby notes that pop music producers make comparisons to photography much less often than classical musicians or producers (Ashby:4301).
recordings), and points to the age of the recording (Kelly:71-72), an effect used to advantage by audio effects processors that add vinyl noise to recordings.39

But this characterization of such sounds and practices, that extrinsic sounds are “noise” to be either exploited or cleansed, ignores the fact that the signifying power of sounds—their representational chemistry—is heavily interdependent, and that changing one sound affects the intrinsic/extrinsic balance of all others. This could apply to either a complex audio montage, with many layers of sound objects, or to discrete elements of one sound object; for example, the balance of hammer to string noise in a piano recording.

Katherine Norman makes a similar argument in her analysis of postproduction techniques in radio announcement. Norman notes how the removal of extrinsic sounds (“noise”) in radio post-production, where everything except the voice of the announcer (“content”) is excised from the recording, including edit points, breaths, throat clearing, background noises, and performance errors, creates a spatio-temporally suspended speaker, a trusted voice of authority. Norman links these practices in radio postproduction to popular music sound space, arguing that they are an attempt to “erase all signs of a space other than the one created by the music” (Norman:114-115).40

The “crooning” singing style is also a result of a manipulation of the intrinsic and the extrinsic. Close microphone and dead studio technique erase the acoustical ambience of the a-phonographic while at the same time emphasizing other intrinsic details of the singer’s voice—the vibration of the vocal folds, tiny details of articulation and utterance usually lost

39 Some of these effects allow the user to choose a particular decade, applying different levels of noise and band-pass filtering to mimic the sonic imprint of playback media of that era.

40 She also notes that this practice of hiding is itself hidden; while sound editing is understood to be about sequencing material, it is really about concealing itself.
beneath the ambient noise floor—creating the sense of a voice at once intimate but absent from the physical world.

This analysis sheds some light on the curiously and similarly fastidious practice of classical music editing. In contrast to the discourses of liveness that inform classical music, phonograph historians note a trend towards ever more note-perfect, highly edited recordings during the age of the phonograph (Philip:42, Day:156). The removal of “errors” began because, so the story goes, producers like Walter Legge maintained that they became annoying on repeated listening (Day:40). But classical editing, like radio announcing, seems more an attempt to create a godlike, idealized pro-phonographic space than creating technically perfect performances (or to put it another way, technical perfection is only the most mundane aspect of a far more interesting aesthetic approach). Wrong notes are “cleansed” from the performance not because they digress from the score, but because they help to shift the listener’s apprehension of the score further towards the intrinsic; like the radio crooner, the musicians hover in the absent-present, playing “just for you” (Curtis:18-19). One is left not merely with a platonic interpretive form (Symes:71), but with the sense of a larger pro-phonographic ideality from which that form springs.

Of course this is not to say that everything in a highly edited classical music recording tends towards the intrinsic. The aesthetic power of the pro-phonographic conceit is that sounds do not necessarily have to be one or the other, are free to move between the extrinsic and the intrinsic. Unlike cinema, where a suspension of disbelief is mandatory whenever a superhero plunges off a building or aliens run amok in sleepy suburban hamlets, in phonography it is never completely clear whether a sound is predominantly extrinsic or intrinsic. The theatrical extravagances of popular music also come into play: A curious spatial effect that evokes a mystical space like the King’s Chamber of the Great Pyramid of
Giza could be the result of a convolution reverb processor—or it could be because the recording was made in the King’s Chamber of the Great Pyramid of Giza.\textsuperscript{41}

\textit{Sounds to Live Inside Of}

Spatial effects are particularly evocative and have a rich history since they are theoretically and perceptually linked to the acoustical properties of real-world spaces. These real world spaces are often physically large, and come with religious, ceremonial, or mystical associations—valleys, imposing natural landscapes, cathedrals, churches, or forests. John Shepherd also suggests that large reverberant spaces have prehistoric, mythic, and ritual associations with caves (Shepherd:219).\textsuperscript{42}

Spatial effects provide rich extrinsic/intrinsic resources because in recording and mixing practice they are understood to replace or stand in for a lack of recorded or “real” ambience (Hurtig and Sharp:53).\textsuperscript{43} The invocation of these spaces adds to the mythic, ceremonial, hyper-real space of music recordings.

\textsuperscript{41} British band Killing Joke recorded the vocals for their 1994 album “Pandemonium” in the King's Chamber of the Great Pyramid of Giza (Plummer).

\textsuperscript{42} The character “Echo” appears in a number of classical myths, where she plays various musical instruments. Her voice is taken away by Hera, so that she can only repeat what others say. The myth attempts to explain the natural phenomenon of sound reflections or echo (Littleton:458).

\textsuperscript{43} Presets on reverberation units are often named after real acoustic spaces like “cave, canyon, large hall, church, room.” The first reverberation units were real rooms.
One of the most subjectively complex of all phonographic strategies is in a practical sense one of the most banal: the fade out. The fade out is a peculiarly phonographic phenomenon; unlike spatial effects such as reverberation and echo, it has no real world precedent (Warner:32). The fade out has existed almost from the beginning of recorded music. Perhaps the first example appears in an advertisement for the Aeolian Vocalion phonograph from 1919. The machine was unusual in that it included a crude volume control, with which the listener could “play” the phonograph, adding their own layer of interpretation on top of the existing music. The specific recommendation of the manufacturers however, was that the listener use the graduola to fade the music out at the end of a song:

Gradually, tenderly, toward the end of the verse, the lovely voice melted away as if the singer, having lulled her little one to sleep, was moving slowly out of the room (Schwartzman and Brod:65).

The fade out appears as an avoidance of an ending, and elides both the musical signature (the final cadence) and social exchange (applause, bowing, encores, discussion) that normally mark the end of musical performances (there is no fade in). In popular music, fade outs usually occur during moments of high sonic intensity, or over repeating chorus sections (Warner:32), giving the impression that the music continues after we cease to hear it. This leaves the impression of an everlasting, perpetually repeating present, momentarily accessible through the record, a fact that John Shepherd recognizes when he notes that the fade out enhances the feeling of nostalgia in pop songs (132).
The Inconvenient Usefulness of Progress Narratives

What were the “is it art” debates all about, and given the aesthetic appeal of the pro-phonographic conceit, does it matter that phonography never had a decisive answer to the question? In hindsight, the comparisons with painting and theatre that the “is it art” debates revolved around seem like deliberate discursive ploys rather than real cultural struggles. Mary Warner Marien notes that the “photography versus painting” debate has been exaggerated, and in reality “few painters saw photography as a threat” (Marien:28). For Noel Carroll, early philosophies of the moving image were attempts to articulate how cinema fitted “into our scheme of things…our biggest picture of the way things are” (Carroll 2008:54). According to David Bordwell, these burgeoning philosophies of the “seventh art” were overstated and prone to “polemical exaggerations,” ignoring many complex issues to form a reductive “emergence of art” narrative borrowed from existing histories of the visual arts, one he describes as the “basic story” (Bordwell 1999:12-45).

Such narratives are appealing however because the histories of art they borrow from are also invariably histories of the rise of civilization (Janson and Janson 2003), thus the “emergence of art” also connotes the simultaneous emergence of a sophisticated culture. Cinema or art photography could then be understood as “developing” along with familiar and reassuring patterns of (usually high-culture) production, criticism, spectatorship, and exhibition.44

44 Sandra Gilbert notes that World War One was the first technologically enabled war, and compromised the previously utopian status of technology (Mackaman and Mays:xi-xii). Perhaps not coincidentally, four of the first extensive works defending cinema as art, by Hugo Münsterberg, Vachel Lindsay, scenarist Epes Winthrop Sargent, and Victor Freeburg
But despite their reductiveness and polemicism, there was a practical upside to the “is it art” debates in visual media, in that they helped to demythologize the camera. After the representational innovations of the early art photographers, photography lost its inherent link to nature and the real. It was no longer possible to think of the camera as merely a surrogate eye, and instead photography became the locus of a plurality of context-dependent modes of seeing and interpreting. Thus the “is it art” debate caused a rational evaluation of the capabilities and limitations of the camera, a “social rationalization” of a technical medium.

In contrast, recall the problem of the universal application of fidelity theories, which carried along with them a more uniform (though admittedly colorful) notion of the pro-phonographic. Ken Pohlmann’s call two decades ago for a greater variety of end user technologies to reflect the differing sonic demands of various musical styles spoke to this issue (Pohlmann 1990), but after more than two decades of rapidly evolving digital delivery networks nothing along these lines has yet come to pass. This is because it fails to address the root cause of the problem. Listeners lack the kind of meta-perceptual toolkit—a context-dependent set of identifiers that determine representational boundaries—that exists for visual media. Thus all recorded sound is heard on a similar basis, consequently there is no awareness of a need for any innovation that might distinguish between different styles of sound representation.

The platonic ideal of the pro-phonographic is as “live” as it ever was, and musical performance continues to be a powerful authenticating symbol; reactions to the recent

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were published during the years 1913-1918 (Langdale 2002; Lindsay 2000[1918]; Sargent 2010[1913]; Freeburg 1918).
Beyoncé lip-syncing scandal are a case in point. With phonography still very much tied to notions of reality, truth, and plausibility, an urgent question then arises: that of addressing how—or as whom—we listen.

As Sasha Weiss points out, the physical fact of lip-syncing, which itself requires a degree of performative skill, wasn’t the problem; rather, it raised the anxiety that the artificiality of public spectacles like the Presidential Inauguration hides human failings (Weiss 2013).
Chapter 4: Music and the Phonographic Listener

As I showed in the previous chapter, theoretical dialogues and artistic experiments surrounding the “is it art” moments in photography and cinema led to a de-mythologizing of the camera, which in turn fostered a higher degree of visual literacy in film and photography. When we look at photographs or watch movies, our notions of reality or truth are conditioned by our knowledge of specific cultures of mediation; our interpretation of and reaction to the pro-filmic changes depending on whether the image appears in a narrative film, documentary, or news footage.

In terms of listening the situation is rather different. There is no corollary concept of “phonographic literacy,” and consequently very little study investigating how the social conditions of sound reproduction affect the interpretation of sound recordings or sound and music generally. In this chapter I argue that scholars of both music and sound recording assume an ideal listener with a relatively uniform mode of relating to recorded sound, with a knock-on effect for unmediated musical performance; in other words, modes of listening based on assumptions about the “liveness” of the pro-phonographic condition responses to all sounds.

The ideal listener originates in the early nineteenth century, arising through a confluence of advances in acoustics, approaches to the human sciences and their influence on music pedagogy, and changing socio-economic conditions in Western Europe. As I will show, the ideal listener subsequently made its way into various branches of music scholarship in the mid to late nineteenth century, appears frequently in music and media studies throughout the twentieth, and continues to influence approaches to music scholarship and pedagogy in theory and analysis, history, ethnomusicology, and composition up to the present day.
The questions I address in this chapter are: How did this mode of listening form, how can it help to explain the complex relationship of music and sound recording, and how has it affected scholarly vernacular approaches to music making?

Reproducing an Ideal Listener: Adorno’s “Radio Symphony”

Studies of the technological mediation of music often present an “ideal case,” against which the “effects” of recording can be measured. These ideal cases reveal much about the underlying assumptions about the social relations of music, performance, and the listener. Theodor Adorno expressed one of the most precise and influential of these ideal cases in his essay “The Radio Symphony.”

Adorno’s article begins from the assumption that radio culture (and by extension any culture of mediation with same socio-technological structure) and concert culture are fundamentally different, and that the radio listener and the concert listener have different and in many ways incompatible interests. His article is in large part a criticism of the programming policies of American radio stations between the two world wars. Although Adorno is careful to limit his argument specifically to radio broadcast and its effects on the classical symphony, many of the transformations that he describes apply equally to phonograph recordings, so his notions of symphony and listener can be extended to include phonographic technologies as well as radio.

Classical music was a kernel of between-the-wars radio programming on both sides of the Atlantic (Baade:20; Drowne and Huber:217; Day:73). According to David Goodman, classical music served a dual purpose in American radio culture, both legitimizing radio as a medium while functioning as part of a larger civilizing and educational project, which he calls the “civic paradigm” (Goodman:117). Classical music was “...indisputably highbrow,
sacralized, high status, and self-evidently in the public interest. [It] was a crucial part of the
civic paradigm, and its ambition to create modern citizens with a developed capacity to
absorb information, empathize across cultural borders, experience and control emotion, and
arrive at reasoned personal opinions” (118).

As part of this trend, the Princeton Radio Research Project (PRRP) was established in
1938 to study the social aspects of radio and examine the relevance of radio programming
policies (Levin and von der Linn:320; Saettler:242), and recruited Theodor Adorno as one of
its researchers. Almost immediately his work sparked an amicable but heated difference of
opinion with program director Paul Lazarsfeld, which continued until 1941 when the
Rockefeller Foundation terminated Adorno’s funding (Goodman:174). His essay “The Radio
Symphony” is part of a larger body of unfinished work, which attacked what Adorno saw as
the capricious and falsifying use of classical music on radio, such as in popular programs like
Walter Damrosch’s “Muisc Appreciation Hour,” and concluded—to the evident
disappointment of the program director and sponsors—that radio was a wholly inappropriate
medium for such an educational undertaking (Goodman:166; Levin and von der Linn:321).

Adorno expresses his most focused critique of the effects of radio transmission on
classical music. He supports his argument against the popular ethos of “spreading” great
music via radio by developing a fascinating argument about the trivializing effects of
mediation by radio on symphonic form. Due to these transformations, there can be no
educational value in getting to know “great music” by radio since the music is trivialized by
the mere fact of its technical mediation. The spreading of “high culture” via radio is doomed
to fail because the radio symphony “…cannot...have the same cultural effect as the live
symphony” (Adorno 1941:139).

Adorno argued that even if radio listeners insist that they enjoy the symphony,
researchers should not be convinced that this alone justifies radio listening, or conclude that
radio is good for the symphony (ibid.135-136), and it was this conclusion that appeared most
dissonant with the objectives of the PRRP and its director Paul Lazarsfeld. As David
Goodman writes, Lazarsfeld

....had to believe—in line with the dominant civic paradigm—that listener
opinions were foundational to, if not sovereign in, the broadcasting
enterprise. Radio was supposed to help shape articulate, opinionated
listeners…Lazarsfeld had to treat opinions and opinion formation as
important topics in radio research, while for Adorno such opinions were
merely epiphenomenal and hence of little interest” (Goodman:170).

Adorno however insisted that the only reliable way to assess the usefulness of radio as
a means of spreading knowledge of great music is to examine how the process of mediation
by radio affects the music in question. He evaluated these “radio effects” in terms of
symphonic music, in particular the Beethoven symphony, by defining a set of essential
qualities of the symphony—its “inherent constituents” (ibid.117)—then describing how radio
transformed (and ultimately degraded) these essential qualities.

For Adorno, radio mimicked an undesirable shift towards romanticism of the post-
Beethoven symphony by encouraging a “retrogressive” mode of listening, “one where
musical ‘thinking’ vanishes and listening becomes more ‘sensual’ ” (ibid.134). Attempting to
spread symphonic music via radio would achieve the opposite of its intention, Adorno
warned, because “Great music is not music that sounds the best” (138)—in other words, since
“inferior” music (for Adorno, Wagner, Debussy, Richard Strauss, or Gershwin) could
actually sound better over the radio, listeners might be misled and fail to recognize the
distinction between musical greatness and mediocrity (138-139).

Despite his inglorious exit from the PRRP, Adorno’s essays proved highly influential on subsequent generations of sound theorists. As James Lastra notes, Adorno skirts the question of a general category of sonic originality (Lastra 2000:128-130), but the original that he is nonetheless compelled to define—the Beethoven Symphony—warrants attention. The key element of the Beethoven symphony according to Adorno is its “integral form” (Adorno 1941:113). The integrity of this form is dependent on ideal social and perceptual conditions, and it is here that the ideal listener is invoked. The resulting vision of the symphonic ideal—how a symphony should be presented, mediated and listened to—presents a fascinating paradox that is common to most theories of the technological mediation of sound.

“Absolute Symphonic Dimensions” and Phonographic Listening

In order to show how the quality of symphonic listening depended on precise social conditions, Adorno invented a new understanding of symphonic structure-as-experience. Traditional analytical techniques based on thematic opposition or sonata form were too general and “too easy” (ibid.114-115), and Adorno instead wanted to emphasize the “...meaning and function of symphonic form,” the inter-relationship of development and structure in the Beethoven symphony. He went on to invent what amounts to a radical new model of the symphony-as-perceived, a kind of massive sonic object that is larger than the listener, like a cathedral or another large architectural structure. This sonic largeness had two main parameters: “absolute dynamics,” and “auditory perspective” (117-119). In a separate passage Adorno described a third parameter as the “sound colors” of the work, noting that
“these colors are...integral parts of the composition” and along with dynamics are fundamental to the expression of musical structure (124).

Sonic fullness of these three dimensions is essential to the “surrounding quality” necessary for the symphony, for allowing the listener to become absorbed in it, to live in symphonic space. These qualities also articulate the compositional structure, the most inspired compositional achievement of the Beethoven symphony, and any reduction or loss of absolute symphonic dimensions corrupts this structure and destroys the essence of the work.

Adorno proposed that maintenance of “absolute symphonic dimensions,” therefore, is even more important than symphonic theme, which he compared to ‘sententious’ passages in drama. Themes are the most general and banal elements of the symphony, “…mere material for self-development” (130). Theme is of such low priority that Adorno goes as far as to suggest that since all themes are basically triadic, they could actually be interchanged without adversely affecting the experience of the symphony. In his view only a radio listener—not a true symphonic listener—would be bothered by the substitution of, for example, the famous second theme from Schubert’s “Unfinished” symphony with any other generic triadic theme (130), because more than a mere succession of themes, the “Beethoven symphony is essentially a process…” (132). Radio elevated the importance of symphonic themes by exaggerating their sententious character, thus the symphony via radio becomes a trivial, romanticized series of disconnected quotations, rather than one integral developmental process (128). This trivialization and emphasis on theme over form amounts to, as he colorfully described it, the “…electrocution of the symphony by radio” (131).

Thus for Adorno the essential qualities of the Beethoven symphony are not the familiar musical sections of the sonata form (exposition, development, recapitulation), thematic dialectics, or much less the themes themselves. these elements are all of decidedly secondary importance to the “absolute dimensions” of the symphony, namely dynamics, auditory
perspective, and sound color. These three attributes correspond more or less precisely to the three parameters of sound space defined by the sound engineers from the Bell Laboratories experiments of the 1920s:

Three distinct accomplishments which had never before been possible were noted in this system of wired transmission, according to Dr. Harvey Fletcher, director of acoustical research in the Bell Telephone Laboratories. They are: “auditory perspective,” or the absolute control of sound so as to make it appear to come from any part of the stage; perfect control of the overtones, so as to give them just as they come from the various instruments of the orchestra, and an equal control over the intensity or the volume of the tone without loss of quality.¹

Adorno described his ideal symphonic form using the concept of sound space developed by the Bell sound engineers, which reveals the paradox of his theory of technical mediation: The most important qualities of his ideal “live” symphony are, in fact, phonographic. In his attempt to enshrine the non-mediatable qualities of the Beethoven symphony, Adorno imagined a symphony that is wholly dependent on that mode of mediation; the ideal symphony was a sonic object much like the generic “original sound” created by the fidelity theorists of the 1920s and 1930s. But Adorno went much further. The

¹ Adorno uses these terms with apparent knowledge of their technical origins. He refers to the “technical discussion of auditory perspective” (119), comparing the ‘monoaural’ radio broadcast to the true experience of symphonic space (119), and explains “absolute dynamics” as the “range between minimum and maximum sound” (118 n10).
critical feature of the essay is the emphasis on the listener: the “live symphony” was one perceived rather than composed or performed.

Auditory perception and skilled listening are central to Adorno’s new understanding of the Beethoven symphony. He describes a mode of “symphonic listening” that demands a purity of concentration not required for chamber or light music (115). The apprehension of symphonic structure above and beyond superficial coloristic or thematic details, its distracting musical “trivia,” should be the primary concern of the symphonic listener. This structure comes from an ideal relationship of detail to the whole: a “...unity within the manifold as well as this manifoldness within that unity which constitute the antiphonic work finally terminating in the suspension of time consciousness” (121). The listener must also retain a degree of emotional detachment, as “stubborn and spiteful adherence to one’s private emotional sphere tends to build a wall against...the very experiences by which alone a Beethoven symphony can be properly understood” (138). Under ideal conditions and with proper concentration, symphonic listening is a transcendent experience where everyday concerns and the empirical experience of time are “annihilated”:

It is this very power of symphonic contraction of time which annihilates, for the duration of the adequate performance, the contingencies of the listener’s private existence - thus constituting the actual basis of those experiences which, in commentator phraseology, are called the elatedness of an audience as a result of the sublimity of the symphony (117).²

² The curious use of the word “annihilate” recalls Edison’s words in “The Phonograph and its Future,” where he stated that the phonograph would “annihilate time and space” (Edison 1878:536).
Not only must the listener remain emotionally detached, they must also absorb the entire structure before truly apprehending the work, a single transcendent moment when the first and final measures are perceived simultaneously. He states that “...one has the feeling that the movement does not take seven or fifteen minutes or more, but virtually one moment” (117), and that “Structurally, one hears the first bar of a Beethoven symphonic movement only at the very moment when one hears the last bar” (116). As the whole symphony can only be completely understood at the final moment, listening is thus a two step process: First the structure is perceived, and then in the final moment grasped as a single perceptual entity, superimposed on itself outside of empirical time.

To summarize, Adorno’s ideal listener is sensitive above all else—even symphonic theme and traditional descriptions of structure—to absolute dynamics, tone color, and auditory perspective. This listener, forced to obey the laws of the concert hall (126), is physically static and emotionally detached. Symphonic listening “annihilates” the listener’s “private existence,” who faithfully registers the integral form of the work, which is recalled and appraised in “virtually one moment,” only when the final measure has been reached. Perceptually, the two stages of ideal listening are then somewhat analogous to listening and seeing; the symphony as sound form is absorbed from a fixed perspective without sentiment or the wrinkles of empirical time, then perceived in a single moment of visual clarity; the sonic object is stored up and melded into a single, temporally static object.

To put it plainly: Adorno’s ideal listener is a phonograph.

The question then is: How did an analysis of the adverse effects of phonographic mediation on the live symphonic concert create what is, effectively, a “phonographic”
Anecdotal descriptions of the premiere of Beethoven’s Fifth Symphony—the work that forms the centerpiece of Adorno’s essay—provide a clue.

The premiere of 1808 took place in a concert lasting well over four hours in freezing temperatures, marred throughout by sub par orchestral performances (Jones:100). Various anecdotal descriptions of the event are worlds away from the ideal conditions that lead to the “suspension of time consciousness” described in The Radio Symphony, and suggest rather a scene of evolving chaos, in which, during another item (the premiere of the Choral Fantasia Op.80), Beethoven stood up and shouted at the orchestra after one section came unstuck, forcing them to play again from the beginning (Thayer et al.:448-449). In fact, the phonographic listener would not have fared particularly well at many concerts of the early nineteenth century, as the conditions required for ideal listening did not begin to emerge until the latter half of the century.

It is no coincidence that phonographic technologies were developed around the same time; because the phonograph, the ideal listener, and the symphonic concert as understood today all sprang from a specific series of cultural and scientific events that occurred earlier in the century.

**Origins of the Phonographic Listener**

Rather than being a result or an “effect” of the phonograph, phonographic listening emerged at the same time as the concept of the ideal modern symphony concert; in a sense the phonographic listener is also the ideal concertgoer. Phonographic listening predates the invention of the phonograph itself, springing from contemporaneous developments in acoustics, the academy, and music pedagogy. I will discuss several specific developments, beginning in the early nineteenth century with Chladni’s autographic vibrational patterns,
continuing through the publication of the second edition of Hanslick’s “On the Musically Beautiful” in 1858, and concluding with the first scientific experiments into human reflexes roughly a decade before the invention of the phonograph.

The customs and culture that we recognize in the symphonic concert of today began to develop during the two decades leading up to the European revolutions of 1848, and were consolidated in the latter part of the nineteenth century. These decades saw the establishment of the concert as an occasion in its own right, independent of other social functions, in contrast with prevailing conditions up until at least the end of the eighteenth century. Many of the behavioral norms that we take for granted in the modern concert—staying silent, remaining seated, arriving and leaving at a particular time—were simply not as important before the late nineteenth century as they would become later. Earlier generations of concertgoers would arrive at various times, stand and walk around, and interact directly with the musicians during the performance by offering verbal encouragement (or opprobrium). This is assuming that they listened to the music at all, which was sometimes considered of secondary importance to talking and socializing (Weber:1-3). As Craig M. Wright puts it, the “modern, more dignified classical concert was a creation of the nineteenth century” (7).

Myles W. Jackson notes that in the early 19th century the study of music, which throughout history had most strongly related to mathematics and physics, began to mingle with some of the more recently developed human sciences like physiology and acoustics (Jackson:207). According to Jackson, by the beginning of the 1850s, other lines of scientific inquiry that later coalesced into psychoacoustics provided the intellectual framework for new models of sound and listening. Two essential features of phonographic listening emerged during these decades: The representation of sound waves as autographic images, and the recognition of perception as both an object and an empirical tool of study. These
developments took place during the years 1820-1850, predating Leon Scott’s experimental phonautograms.

Visual representations of sound have a long history in acoustics, dating at least from the late seventeenth century, but Ernst Chladni’s method of producing visual patterns of the vibrational nodes of membranes and plates was significant in that it was the first of many types of autographic sound representations. Autographic representations of sound were central to the study of acoustics; scientists hoped that these colorful new shapes and patterns would reveal hitherto hidden information about the nature of sound. According to Jonathan Sterne, autographic sound representation was both an attempt to, and a result of, turning sound itself into an object of study (Sterne:42-44). With Chladni’s research, an elusive temporal event became a static, observable one. Chladni’s patterns could be taken in in a glance; like Adorno’s ideal listener, they fixed a temporally unfolding event as a static object.

A second significant change in thinking about acoustics began in the late 1820s when perception became a serious object of research, while at the same time hearing an empirical tool in the study of sound. Both ear and eye became part of an emerging phonographic sensory apparatus.

Charles Wheatstone’s Kaleidophone of 1827 encapsulates the fascination with intermodal perception. Historian Brian Bowers describes the invention as follows:

In its simplest form the Kaleidophone is a metal rod clamped at one end and having a small reflector fixed on the free end. If the rod is struck with a padded hammer or excited with a violin bow, and the bead observed by

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3 The process was so novel that the images it produced became known as simply “Chladni patterns.”
means of a point source of light, such as a candle, then regular patterns can be seen as the rod vibrates, carrying the bead with it. Because of the persistence of vision the observer sees a pattern of lines, not a moving point of light (Bowers:22).

Wheatstone’s device marks a significant change from previous intermodal investigations of sound because it demonstrates an aspect of sound by playing on a perceptual quirk of vision. By giving his device a similar name to Sir David Brewster’s Kaleidoscope, a device of primarily artistic value (Brewster 1858), Wheatstone seemed to emphasize the novel perceptual experience of watching the tiny mirror trace vibrational patterns of the rod as much as the scientific value of the patterns themselves.

Perhaps the most significant developments in the area of perception, ones that show most clearly the concern with perception entering into the study of acoustics, can be traced through the invention and development of the siren. The improved siren was first invented and the name coined by Baron Charles Cagniard de la Tour (no relation), the name a reference to the Sirens of Greek mythology as the machine, unlike those before it, also worked underwater (Flügge:24). The siren was used in a range of experiments that were both related to and informed by auditory perception. Félix Savart modified de la Tour’s siren in the 1820s-1830s to establish the frequency range of human hearing, and Pierre Louis Dulong used it to calculate wind speed and confirm the speed of sound in air in 1829.

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4 For a brief history of the siren and its significance as a precursor of psychoacoustics see Myles W. Jackson “From Scientific Instruments to Musical Instruments: the Tuning Fork, the Metronome, and the Siren” (Jackson 2012).
Perception as an object of study in itself, as well as part of an empirical branch of scientific methodology, received the ultimate boost from August Seebeck, in his well-known exchange with Georg Ohm regarding certain perceptual inconsistencies in Fourier’s theory of sound waves. Seebeck noted that the perceived sound intensity of partials were not always consistent with their predicted intensity according to Fourier’s theorem. While Ohm was content to write these off as perceptual anomalies and maintain the importance of mathematics over perception—”The ear…performs the same Fourier analysis that the physicist carries out mathematically, revealing at once the mathematical order of the organ of hearing and the power of mathematical methods in physics and in physiological acoustics”—Seebeck argued that any meaningful understanding of sound must account for such anomalies, thus placing hearing itself at the center of the study of sound: “...the ear is all we have to tell us what belongs to a tone, and without it there is no tone, only the motion of air...” (Jungnickel and McCormmach:268). As David Cahan puts it, Seebeck considered the perception of sound equally important to the study of acoustics as the theory of waves (Cahan:264). Although Seebeck’s ideas did not gain immediate recognition from the scientific community, they paved the way for later work by Helmholtz and the Bell Laboratories scientists of the 1920s, prefiguring what became the separate study of psychoacoustics.

5 In his most conclusive and probably best-known experiment, Seebeck removed the first few harmonics from the spectrum, including the fundamental, and showed that that fundamental could still be heard with a different color. This was the principle behind periodicity pitch, also known as the “missing fundamental effect” (Gelfland:96).
Eduard Hanslick and Phonographic Listening

Several years later, the decisive link between music and the idea of hearing as both a tool and object of scientific study came through the work of music critic Eduard Hanslick in his influential study “On the Musically Beautiful.” I will consider Hanslick’s work in the context of a larger pedagogical project that aimed to inject scientific standards and rigor into the humanities. As part of this trend, the University of Vienna hired Hanslick in the hope that he would “foster a revolution in music study comparable to that already well underway in other fields of humanistic inquiry” (Karnes:35).

In his autobiography, Hanslick recalled how as a young man he had been distressed by studies of music aesthetics that seemed to him to focus too much on emotional or subjective responses to music (Karnes:29-30). In “On the Musically Beautiful” Hanslick argued that music aesthetics should follow the trend set by the other human sciences and proceed according to more rigorous and objective standards (Hanslick and Payzant:1).

Hanslick’s model of music scholarship was grounded in perception and scientific inquiry. As Kevin Karnes puts it: “…Hanslick laid out a program for listening to and discussing music that stood in deliberate contradistinction to the idealist modes of musical inquiry that reigned throughout most of mid-century German-speaking Europe.” This emphasis on listening and discussing reflected the contemporary scientific concerns with auditory perception and sound as an object of inquiry.

A new understanding of music as something to be listened to and discussed also required a new type of listener. It was natural therefore that Hanslick proposed and taught the
first ever music appreciation course at University of Vienna starting in 1856 (Karnes 29). Following his appointment at the University of Vienna, his ideas were widely disseminated. By linking the idea of sound-and-hearing-as-science to music pedagogy and music appreciation he set in motion a line of musical scholarship that favored an objective mode of listening:

Hanslick pleaded for a reasoned, dispassionate discourse on the art that focused upon the empirical description of musical structures rather than abstract philosophizing about music’s supposedly inherent qualities. And he implored his contemporaries to avoid confusing their subjective responses to the musics they heard for universally valid critical judgements (Karnes 30).

Hanslick’s famously oblique definition of music as “sounding form in motion” (Karnes 30) is perhaps the first phonographic definition of music. Like Adorno’s symphony, music for Hanslick was best understood as something listened to and studied, rather than composed or performed. After the publication of the second edition of “On the Musically Beautiful,” little by little Hanslick began to abandon the strict Herbartian ethic of the university. But this remained his most influential work, one that cemented the link between music, acoustics, and the natural sciences.

By the end of the 1860s then, a decade before the invention of the phonograph, the essential elements of phonographic listening were already in place: The notion of

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6 Karne’s account of Hanslick’s appointment to the university leaves a slight suspicion of opportunism, as he extensively revised the second edition of “On Musically Beautiful” after his appointment, excising portions that were too idealistic for the taste of the University.
intermodality or sound-as-form, of hearing as a part of the scientist’s investigative apparatus, and the idea of the worthiness of listening as a form of study. Perhaps most ironically, the American civic paradigm of radio broadcasting that Adorno railed against, and the equivalent practice of programming morally “uplifting” music undertaken by the BBC in the years between the first two world wars, were both continuations of civilizing projects that began around the middle of the nineteenth century. Especially in the United States, as a result of “the taming and disciplining of the concert audience to sit in reverential silence before great performers of great works,” the concert began to assume the behavioral codes that characterize its current form (Goodman 127).

The Phonographic Listener in Recent Music Scholarship

Evidence of the phonographic listener in music scholarship since the mid nineteenth century comes in the form of changing scholarly definitions of music. As Bruno Nettl shows, during the nineteenth century these definitions gradually shifted away from the context-specific or genre-related: “The tendency in many treatises from Boethius up to the 18th century (e.g. Johann Walther’s Musicalisches Lexicon) to concentrate on complex classifications of music by function and genre shows a shape of the music concept contrastive with that generally held in the 20th century and the early 21st” (Nettl:428). Instead, modern definitions of music tend to describe it as a sonic-object-perceived, as in this recent example from Webster’s New World Dictionary of Music: “In present terms music may be defined as a meaningful succession of perceptible sounds in temporal motion” (Slominsky:341).

Foundational texts in music analysis and ethnomusicology also show a similar trend. Often beginning with some version of the question “What is Music?,” these texts offer definitions that lean towards the phonographic. For example, Michael Tenzer describes music
analysis as a technique of “structural listening,” where a series of “sound patterns” are “observed” (Tenzer:6). Like the phonograph, Tenzer’s listener “records” auditory events and converts them to visual ones; structural listening is a two-step process where the sounds of the work are first absorbed, then “understood” post-factum:

Analysis ... is the encounter between the hierarchy-seeking mind and the music-sound event, often...inscribed in some way so as to fix it for study. The encounter consists of structural listening—listening with explicit attentiveness to musical design and architecture—followed by reflection and synthesis... as we define it, the central result of analysis is the identification and grouping of manifest sound patterns and their relationships to governing schema in a work... (Tenzer 6).  

Analyzing music means considering it “...independent of its political, geographical, or cultural distance from the analyst or reader,” and “[becoming] absorbed in music’s sound, conceiving of it as if in isolation from the world” (Tenzer 5); as Tenzer states, it then follows quite logically that it is valid to do so for all musics, regardless of their culture of origin.

“Humanly Organized Sound”

Ethnomusicologist John Blacking’s canonical definition of music as “humanly organized sound” has become a standard point of departure for most scholarly discourse. As

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7 Schencker’s graphical analyses are also phonographic in that they represent musical form on one page for visual appraisal in a single moment.
with phonographic listening, Blacking’s conception of music stresses the centrality of listening as a means of interpreting sonic hierarchies, the transcultural existence of these hierarchies, and the primacy of listening as central to all musical activity:

Music is a product of the behavior of human groups, whether formal or informal: it is humanly organized sound. And, although different societies tend to have different ideas about what they regard as music, all definitions are based on some consensus of opinion about the principles on which the sounds of music should be organized. No such consensus can exist until there is some common ground of experience, and unless different people are able to hear and recognize patterns in the sounds that reach their ears. Insofar as music is a cultural tradition that can be shared and transmitted, it cannot exist unless at least some human beings possess, or have developed, a capacity for structured listening. Musical performance, as distinct from the production of noise, is inconceivable without the perception of order in sound (Blacking:10).

Present day introductory texts on ethnomusicology echo Blacking’s basic conception. Michael Bakan formulates a series of “propositions” for evaluating whether or not something is music, which emphasize sound, perception, and formal organization: “The basic property of all music is sound”; “The sounds (and silences) that comprise a musical work are organized in some way”; “Sounds are organized into music by people; thus, music is a form of humanly organized sound”; “Music is a product of human intention and perception”; “the term music is inescapably tied to Western culture and its assumptions” (Bakan:2-6).
Texts such as Bakan’s and *Worlds of Music* (Titon et al. 2009) promote transcultural understandings of music, despite noting an ethnocentric bias. Two examples from these primary texts help to illustrate this contradiction. In *Worlds of Music* Jeff Todd Titon relates an anecdote where ethnomusicologist Jim Koetting described recording two Ghanian postal workers making a rhythmic pattern and whistling in time as they stamp envelopes in the central university post office in Legon. Koetting noted that “it sounds like music and, of course, it is; but the men performing it do not quite think of it that way. These men are working, not putting on a musical show; people pass by the workplace paying little attention to the ‘music’…” (Titon et al.:8).

This is in apparent conflict with the notion of human intentionality common to canonical definitions of music as expressed by Bakan; that something is music if the creators and listeners deem it so (Bakan:4). If the Ghanian postal workers and their “audience” intended that their performance is “not-quite-music” then according to the canon, Koetting should agree with them—yet he insists that this must be music because it *sounds like* music to him.

In another example, Titon recalls an anecdote of a “famous musician from Asia” who “mistakes” the sounds of the orchestra tuning up before a symphony concert for music. While it is clear that this person enjoyed that section of the program more than the rest, he never specifically says that it is music; moreover, as Bruno Nettl shows, while at least in present day China and Japan there is arguably a similar concept of music, there is no single word in Mandarin, Cantonese, Japanese, or Korean, that corresponds exactly to the English term “music,” and understandings of music in these cultures, while some scholars from within those cultures may accept the Western definition, tend to prioritize genre and social context in a way quite unlike the canon’s more universal notion of “music as humanly organized sound” (Nettl:428).
As Blacking states, the “humanly organized sound” definition assumes that behind practices like the rhythmic stamping and whistling of the Ghanian postal workers lies a common agreement that recognizing and structuring sounds is the primary goal of these practices. But this is by no means the only way to understand these sounds; for example they could also be artifacts of a satisfying physical process, or expressive of some emotional relationship to the work at hand. More than sound is being organized here. Does the “music” of these men exist without the work that they do? For Koetting and Titon, it seems conceptually at least that it does; but one must assume that outside of their workplace they do not perform it. Ironically then, for ethnomusicologists like Titon and Koetting, the canonical description of music severs the connection between a particular musical practice and its social conditions.

To put it another way, when Blacking describes music being a product of the behavior of human groups, would that not by extension include the act of defining the social function and cultural significance of this behavior? The act of deciding what—or what not—to call it?

Bakan attempts to address this problem when he notes that “...many of the peoples do not even have a word equivalent to music in their languages. Furthermore, even in languages that do possess a term closely akin to music, such as Arabic, the term may not always apply where we would expect it to...we are apparently doomed to a certain measure of ethnocentrism”, but rejects an approach that would “avoid dealing with these problematic phenomena of sound in musical terms altogether” (6). It is not entirely clear why; most if not all of the cultures that Bakan discusses have terms and explanations for the types of practices that appear musical to Western ears. Would it be so difficult to simply continue using those terms and explanations, noting similarities to Western notions of music where they arise?

Interestingly, in these anecdotal justifications for a transcultural understanding of music, the “musicians” themselves—the “Ghanian postal workers,” the “famous musician from
Asia”—remain anonymous. Like the unwitting speaker whom Edison describes in The Phonograph and its Future, their sounds are held captive, and can be reinterpreted “with all their original characteristics at will, without [their] presence or consent” (Edison 1878:530). Along with their “music,” they are phonographed.  

The “Two Musics” Problem

While definitions of music based on agreement of a certain mode of listening have been useful to an extent in academic discourse, the phonographic listener has not fared so well in the everyday world; outside of scholarly circles this listener struggles for relevance, causing a rift between academic and vernacular understandings of music.

I offer three types of evidence for a schism in vernacular and scholarly understandings of music: First, it is implied in popular introductory texts to music history or music appreciation; second, scholars proposing new definitions of music-as-behavior or music-as-society/culture implicitly or explicitly reject the notion of music as a “thing”; third, my own decidedly unscientific inquiries about the thoughts and feelings on the subject of my own graduate students.

To begin with the latter, I will quickly restate here the results of a somewhat unscientific social experiment, mentioned in the preface of this study, which I conducted

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8 I should note that the use of the phonograph in ethnomusicology caused something of a revolution in transcription practices; but this revolution only came about after ethnomusicologists decided upon the primacy of the sonic artifacts of various cultural practices, the study of the sounds of cultures severed from their social conditions (Jairazbhoy 1977).
during a music technology survey class that I taught for a number of years. In this experiment, I first ask the students “What is music?”, then follow this with a second question, “Why do you make music?”. Here again are the most common answers:

—What is music?

“Music is sound organized into textures.”

“Music is a sum of notes and silences.”

“Music is sound organized as frequencies and amplitudes.”

“Music is organized sound.”

“Music is variations in frequency, duration and amplitude.”

“Music is humanly produced sound.”

—Why do you make music?

“I can express things with music that I cannot express with words.”

“Music enables me to influence the feelings of others.”

“Music is the most effective medium for communicating emotions.”

“Music has greater intensity of expression than language.”

I would characterize the very obvious distinction in their answers to these two questions as “objective” versus “subjective.” The first set of “objective” definitions are perhaps predictable responses to the “what is music” question posed by the ethnomusicology texts, which most of these students know; they are the definitions of well educated phonographic listeners. The second category of answers however shows the significance of cultural context and subjective connection. This is perhaps the most striking example of the
rupture between subjective and objective approaches to music, between the vernacular and the official.

Contemporary music studies textbooks or study guides often unwittingly reinforce this rupture. One popular college textbook begins with a vivid description of the cultural and subjective relevance and power of music, but immediately follows this by defining music as “the rational organization of sounds and silences passing through time” (Wright:2). In the equally popular “Music Listening Today,” Charles R. Hoffer identifies three “modes” of listening: the sensual thrill of pure sounds, emotional connection or expressiveness, and “sheerly musical” listening, which “consists of listening for what happens in the music.” While he acknowledges the value of all three modes, and that listeners can switch back and forth between them, the third mode alone is the one that reveals “the skill and imagination that musicians bring to creating interesting combinations of sounds,” and developing this mode is the primary pursuit of the book (Hoffer:4).

Like Adorno, Hoffer insists that in “sheerly musical” listening there is no room for everyday concerns: “Don’t just let the sounds wash over you; don’t stop with just being aware that some music is playing. Don’t daydream or think about things or visualize scenes while listening to the music.” For Hoffer, too, listening is the universal aspect of music: “...hearing what happens to sounds is the very essence of music” (ibid.). Concert music, for Hoffer, elicits the most rewarding type of musical listening: “Music created for the intellectual and psychological satisfaction it provides is referred to as art music or concert music, or by most people as “classical” music” (Hoffer:3, boldface in original). Popular music for Hoffer is “ordinary” music, “here today and gone tomorrow.” Concert music is “extraordinary” and requires dedication and specialized listening (ibid.).

The idea of emotional detachment, familiar in the nineteenth century notion that the noblest appreciation of music is linked to study, informs descriptions of music-as-cognition,
as a cerebral activity (Serafine 1988). Recent studies have expressed a degree of frustration with the sheer dryness of these kinds of approaches, and offer alternate descriptions of music as society, culture, or behavior (DeNora 2000; Turino 2008; Small 1998). When music is cut off from the social, the behavioral, the tactile—when it becomes little more or less than a sonic object—it loses its potency. Music scholars from a variety of fields, or at the very least the students who have participated in my informal “studies” over the past few years, might well identify with Tia DeNora’s description of the fate of music sociology in the twentieth century, which I discussed in Chapter 1 (DeNora 2003:3).  

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I see a parallel between the sense of frustration that DeNora expresses and one that I see frequently in students of composition, who suddenly experience a lack of motivation and disturbing emotional disconnection when approaching the task of writing “serious” music, a disconnect that seems quite uncorrelated to other potential causes like an inappropriate or incompatible compositional style.

The Legacy of the Phonographic Listener

If I am correct in assuming a link between this emotional disconnect with music studies and the simultaneous construction of a phonographic listener, then deconstructing this listener, allowing for greater flexibility in models of listening, might also pave the way for a more cohesive relationship of the scholarly and the vernacular in music. But where to begin?

Latterday instantiations of the phonographic listener have several effects on phonographic literacy, which in combination help to perpetuate a singular model of music audition. First, listening is conceived as a purely sonic concern. I call this “pure aurality”:

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music is only sound, and the best way to listen is to only listen.\textsuperscript{10} Invitations to listen to music in a multitude of contexts are often preceded by the suggestion to close one’s eyes.\textsuperscript{11} Listening guides or music textbooks frequently feature images of prototypical phonographic listeners: serene looking subjects wearing headphones, listening with closed eyes,\textsuperscript{12} and an internet image search with the keywords “listening to classical music” will probably return similar results.\textsuperscript{13}

Second, listening does not adapt to social context; all sounds are in some way equivalent, separate from behavior or social context. Perhaps most importantly, by promoting a particular listening stance at the expense of all others, phonographic listening de-emphasizes emotional engagement and subjectivity. Critics like Ola Stockfelt and Adorno himself have argued that different modes of listening are required for different social contexts, however there is considerable evidence that listening is a considerably less flexible or “literate” than observing, and that when it comes to music scholarship one model of listening tends to inform all approaches to sound.

\textsuperscript{10} In relation to the phonograph, see for example Dave Laing “A Voice Without a Face” (Laing 1991).

\textsuperscript{11} I will refrain from excessive citations here: suffice to say that a simple internet keyword search will support my point.

\textsuperscript{12} See for example the cover of Tia DeNora’s “Music in Everyday Life” (DeNora:2000), and images of “phonographic listeners” in contemporary listening guides (Wright:3; Hoffer:1).

\textsuperscript{13} The results of such a search, made on Wednesday April 3\textsuperscript{rd} 2013 using the Google engine, returned prototypical images of “phonographic listeners” as I describe above in about thirty of the first hundred results.
This suggests a need for new models of listening, and new types of listeners. Formation of these models requires work on several fronts. Broadly speaking there are three areas that seem to require special attention in order to promote phonographic literacy: developing a better lexicon of recorded sound; confronting the “reality trap”; and gaining a deeper understanding of the social relationships underpinning phonographic practices.

Towards a Phonographic Lexicon

The first and most obvious part of a program in phonographic literacy would be developing a more comprehensive and commonly understood lexicon for talking about raw sound. Maxfield’s three “dimensions” of sound, developed as part of an attempt to standardize acoustic terminology in the 1920s, are a good place to begin, but lack specificity and rely too heavily on audio-visual inter-modalities. Probably the biggest gap in our language for describing sound is in the realm of timbre, as Cornelia Fales remarks: “The classification and study of timbre is, vis-à-vis the history of music a relatively recent development” (Fales:156).

Though there are many useful terms and techniques for describing timbre, theses are scattered amongst disciplines and need to be collated and elaborated. Feld et al. identify five common strategies for discussing timbre in the recording studio: verbalizations that resemble a particular type of sound; onomatopoeia; by synaesthetic metaphors (light, dark, dull, warm); by referring to a commonly known sound; or by simply evaluating sounds as desirable or undesirable (Feld et al.:324-325). To these we can add two other methods common among sound specialists: naming exact numerical frequencies, or using relative terms like “high, low, mid” and variations of these.
All of these methods have their problems. Most of the vernacular practices are either inaccurate, slow, or otherwise error prone; opinions and standards differ widely in terms of thresholds for frequency bands like “low, mid and high”; and naming frequencies numerically, apart from requiring a high degree of training, can be non-intuitive due to the logarithmic scale of pitch perception. The task of describing how timbre evolves over time is still more challenging and unexplored. Dennis Smalley’s language of “Spectromorphology” is useful but needs expansion since it applies to a fairly narrow range of musical styles (Smalley 1997).

**Escaping the Reality Trap**

Another important step in addressing phonographic literacy is confronting the “reality trap” (see chapter 3). Of course sound recordings, like photographs and movies, can still refer to actual events, and thus play a part in “truthful” interpretations of these events—but to do this effectively, sound theorists and phonographers need to establish more specific ways of thinking about referentiality, that is, non-auditory frames of reference based on the social conditions of mediation that can guide interpretations of sound recording.

Since the most literal notions of phonographic reality tend to arise in what Colin Symes describes as the “keystone discourse” of classical music recording, this might be a good place to explore a more flexible notion of phonographic truth. I propose two very different starting points for reassessing phonographic truth apropos classical music recording: first, adopting a concept of phonographic *mise-en-scène*, and second, challenging the idea of compositional authority as enshrined in the musical score.

Audio and audio-visual documentaries are similar to classical music recordings in several respects. They do not use actors, in other words like classical musicians characters.
“play themselves;” as classical music production generally aims to give a sense of a real performance space, documentaries are shot on location; and in that documentary refrains from prefabricated sets or elaborate lighting, it is similar to the more restrained use of effects and sound space in classical recordings.

Technique in the cinema documentary is a more pragmatic affair than in classical recording however. As Jack Ellis and Betsy McLane observe, while “any manipulation of images or sounds is largely confined to what is required to make the recording of them possible,” the intention is “to make the result seem closer to the actual than inadequate technique might,” rather than literally reproduce “reality.” Also, documentaries differ from classical recordings in that they have a more fluid approach to mediating their content. Documentary truth is very different to the precise moment-for-moment model of reproduction in classical music. According to Ellis & McLane, directors seek both an aesthetic and an “effect on attitudes.” Beauty, albeit in a more “functional, sparse, and austere” form, does exist in the documentary; the director, while “undercover”, is nevertheless an “artist.” Also, directors can express their opinions about the subject material, rather than attempting to take a neutral approach to events (Ellis and McLane:3)

As these differences between cinema and classical music recording suggest, a concept of phonographic mise-en-scène would be useful to phonography in that it requires an admission that “reality” must be staged, that mediation always presents a particular view of events. Mise-en-scène is part and parcel of the viewer’s interpretive stance towards documentary: from the very first of the Lumière’s actualités, La Sortie des usines Lumière à Lyon (Workers Leaving the Lumière Factory), the workers were evidently told to assemble behind the factory gates and exit when directed by the camera operator, and seem to have been instructed not to look at the camera; moreover the scene was shot multiple times over a
period of months, suggesting that one or more of the versions of this particular “reality” were artistically unsatisfactory (Elsaesser:239; Ellis and McLane:293).

The score has proven to be something of a stumbling block to the creative aspirations of classical music phonographers—as Arved Ashby puts it, “lingering notions of text and works have compelled musicians to classify recording as a technological rather than artistic-aesthetic process” (Ashby:504). Here too cinema provides a useful model regarding the idea of the score as the ultimate authoritative source in classical music recording (and for that matter live performance). John Culshaw’s production of Elektra in 1968, which touched off a famous row in the pages of Gramophone magazine, is a good example of the kinds of issues involved in such a challenge. As Evan Eisenberg explains, gramophone critic Conrad L. Osborne took exception to what he perceived as excessive sonic liberties that took the recording far from the experience of a live opera performance (Eisenberg:98-99). Culshaw’s counter argument, that recording can get closer to the composer’s intentions as evident in the score, can realize the complexities and scope of the music in a way that is simply not possible in the opera house, is more or less the same as that of the 1920s phonographic platonists so despised by Compton Mackenzie (see chapter 3). The “platonist” view of phonography was shared by Glenn Gould, Herbert Von Karajan, and Leopold Stokowski (Symes:55), and more recently musicologist Arved Ashby. Culshaw reinforced his argument with the dubious statement that Strauss might have intended it this way; that he looked forward to a future of the kind of sonic possibilities Culshaw had provided.14

But the Culshaws and the Osbornes, the realists and the platonists, all seem to agree on one thing: the musical score is sacrosanct, the unimpeachable word of the composer. In his

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14 As Eisenberg points out: “Where would the composer prefer to find his listener? Most operatic composers could not have posed the question” (Eisenberg:99).
description of the debate, Eisenberg notes that Culshaw “monkeys with the microphones”because he cannot touch the score. But why not? The first silent cinematic adaptations ofShakespeare were obviously adapted without spoken dialogue. Part of the challenge to earlydirectors, and their way of proving cinema as an effective narrative medium, was to show thatthese stories could still retain their narrative relevance without Shakespeare’s exact text.Judging from the large number of adaptations of Shakespeare for silent film, this was achallenge that these directors relished.15

The idea of literal faithfulness to the score is itself a phonographic one (Philip:137).Phonographers could relieve this situation by embracing ‘unrealistic’ phonographic practices,rather than excusing them, as a way of moving towards a more flexible notion ofphonographic narrative and truth, or by embracing more daring adaptations of scores.16

Popular music also has a role to play, as the center of the most “hyper-real” (to use KenPolhmann’s expression) phonographic practices. Theorists writing about popular musics, inaddition to discussing the sociological dimension of lyrics and imagery, could help byreflecting on the extravagant soundscapes of popular music.

15 From 1899 onwards, adaptations of Shakespeare began to be made; about 500 in total. Theobvious challenge, how to convey the narrative without the language, retain the story withoutthe script, presented exactly the type of challenge that early directors were looking for: byeliciting a direct comparison to the great canon of theatre, directors probably hoped to make acase for cinema as art, by showing how narrative could be conveyed with purely cinematicdevices like lighting, cinematography, editing, staging, and silent acting (Rothwell:1).

16 Herbie Hancock’s recording of Ravel’s Second Piano Concerto stands practically alone asan example of a non-literal interpretation of a canonical repertory work (Hancock 1998).
Phonographic Communities

In support of the challenge to the reality trap, sound theorists could pay closer attention to the social context of sound recording. A good start would be by increasing general knowledge of the various types of sound practitioners and what they do, be they sound artists, composers, sound engineers, or music producers. More reflection of professional specialization in the sound engineering community in the form of more specific and descriptive job titles—and possibly dropping the problematic title “sound engineer” altogether—would help to legitimize this degree of specialization.

Better understandings of the intricate relations that exist in the sphere of popular electronic music could help in reassessing the role of communities in composition and sound production. An example of such a reassessment might be the way that electronic rhythm tracks are produced, for example in dance music. The use of drum machines and samples by dance or pop music producers, so the argument goes, represents a major break in the relationship of musicians to material; rather than composers, musicians are now consumers of prefabricated materials (usually loops or samples), and reorganize them into different types of music, effecting a radical change in the relationship of musicians to instruments and compositional materials (Théberge:7).

There are two problems with this interpretation. First, someone made—composed, in fact—those loop and those samples, and someone designed that instrument, so to label this process as musical consumption, while the Marxist rhetoric is appealing, devalues the essentially creative role of those individuals. Second, composers have always made use of prefabricated material, either by direct quotations or conventions like common harmonic progressions, melodic figures, musical forms, or textural devices.
Music is More Than Sound

Such re-imaginings of social relationships and roles might help to remind us that, like phonography, music is both contingent and expressive of social relationships. Music is unlike painting or sculpture in that it requires a higher degree of artistic collaboration, and an altogether different type of participation from audiences. It takes up to several years for an amateur performer to gain the necessary skills to perform music of even moderate difficulty, whereas training at a level required for a professional career takes decades. Listening to music in a concert setting also requires a different type of time commitment by a listener; even in the compromised and not-very-phonographic settings of pre-Beethoven Europe, concerts still required that concertgoers remained more or less in one place for a number of hours on a specific date.

Most importantly, phonographic literacy could help with a general redefinition of the listener, and encourage more plasticity and flexibility in modes of listening by allowing for subjective, context-sensitive responses to both recorded and “live” sound, and thus promote greater awareness of the plurality of listening. The biggest problem with phonographic listening is that it turns everyone in a musical community into the same “auditor”: composers, performers, listeners, and phonographers all operate from a similar relationship to sound. “Audition,” “auditor,” or even “audience,” all imply objective, passive evaluation, and emphasize absence from the sound event. Somehow, Harry F. Olson and Frank Massa’s “absent auditor”—the phonographic dummy that stood in for a hypothetical listener in their theory of sound fidelity—has become the preferred listening stance of the music scholar.  

Phonographic literacy could form a crucial and heretofore ignored dimension of the welcome re-thinking of music scholarship that has already begun in the studies mentioned

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17 (Olson and Massa 1934). I discuss this model of sound fidelity in chapter 3.
previously in this chapter. Above all, phonographic literacy might help to reaffirm that music is more than listening, and much more than sound.

Music requires more from us than audition: music is a social process that requires *participants*—be they listeners, composers, performers, phonographers, or some combination of all of these—that are present, subjective, and connected. If nothing else, music is *collaboration*. 
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164


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