

# Ubiquitous Electronics—Technology and Live Performance 1966–1996

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The twentieth century has witnessed a radical transformation of both the mechanics of music production and music's role in society. The first half of the century saw the development of the recording industry and with it an elaboration of the production path from composer to listener and a redistribution of power amongst new personnel and technologies. The second half has seen a similar redefinition of the musical instrument: the physics of plucked strings and vibrating reeds has been overtaken by the electronic manipulation of virtually every link in the sonic chain that stretches between finger and ear. Such dramatic changes have affected the way music is both made and heard, and have altered our very sense of what music is and can be.

## EDISON'S OVERSIGHT

Thomas Edison did not invent the phonograph, contrary to the popular American myth. Rather, as he had for so many other of his "inventions," he recognized consumer potential in an untried machine. Various sound-recording and sound-reproduction technologies had been under development in several countries for years—Edison picked the one that seemed most practical and profitable, tweaked it in his lab and introduced it to the American public. With a foresight worthy of a modern-day computer mogul, he realized that the key to financial success with the phonograph lay in controlling both the hardware (the recorders and players) and the software (the recordings), so he manufactured both. Partially deaf as a result of a punch to the head as a child, Edison claimed to have neither an ear for nor interest in music. He saw the phonograph record as a sonic autograph and the player as a way to hear the speaking voices of famous persons. Musical recordings were initially introduced as a novelty and were not taken seriously by Edison for years: a case of right technology, wrong vision.

Edison did, however, have a canny insight into the effect the phonograph would have on the act of listening. By choosing to record that most personal of sounds, the spoken voice, he anticipated a fundamental change in the social role of music that took place in the twentieth century—the shift from music as a predominately public activity to a predominately private one. If the voice of President William McKinley did not become a valued possession in the home of every American, the voice of Caruso did. Professional music left the concert hall and entered the parlor. Putting on one's own choice of a record to listen to alone replaced attending a concert with the masses, and putting on a record in the presence of friends replaced playing in a quartet with them [1].

The phonograph had a precedent in the nineteenth-century popularity of the piano, which linked the virtuoso on

stage to the amateur at home: the only difference between them was the time each spent practicing. The phonograph was an even greater leveler—a seemingly infinite array of instruments and ghost performers at one's fingertips and no need to practice. Perhaps this was too strong an affront to the late Victorian work ethic, because the phonograph was immediately relegated to the status of furniture rather than musical instrument—a situation that remained unchallenged (with a few exceptions, such as John Cage's *Imaginary Landscapes #1* of 1939), until the rise of "turntable artists" in the 1980s (such as Grandmaster Flash, Jazzy Jeff, etc.). Society split into two distinct categories: a small group of professionals who made music and the large mass of society that consumed it. The phonograph represented a milestone in the gradual distancing of people from the act of making music, a process that had commenced with the rise of art music in eighteenth-century Europe. Edison's invention effectively replaced the Victorian amateur musician with the modern consumer.

## THE RISE OF THE PRODUCER

Recording music is no more "natural" a process than taking a photograph or making a film. Much effort and artifice goes into making a recording seem effortless and artless. Each new generation of recording technology is touted for its verisimilitude, accuracy and transparency. In the compact disc (CD) era, it is hard to believe that anybody took these claims seriously at the time of the Edison cylinder. The ever-savvy Edison, when introducing the phonograph, set up two important support systems: the marketing forces required to convince the public that a seat in front of this small box with a horn was indistinguishable from one in a box at La Scala and the recording technicians who pushed feverishly at the limits of the technology in pursuit of this ideal.

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## ABSTRACT

The author discusses the influence of sound recording on the chain of musical production from composer to acoustic artifact—in particular, the shift of the locus of power from composer to producer. He reevaluates Glenn Gould's predictive 1966 article, "The Prospect of Recording," in light of the current relationship of recording to live performance and introduces strategies for live performance in a post-recording context.

The technicians included design engineers who sought to improve the existing technology and recording engineers and producers who made the best of what they had. The latter two rose rapidly in importance and profoundly changed the distribution of power within the chain from composer to consumer. They were to recorded music what the conductor was to orchestral music, and not since the conductor emerged as a charismatic figure had the composer's singular authority been so seriously undermined. The engineer and producer were responsible for making the recording sound like the "original" music—the composer's auditory vision—but they also influenced the kind of music that made it to the record's surface as well as many of its formal and structural details. They became the orchestrators of recorded music because they knew what sounded good on record, and for the same reason they became its censors. And because the producer also was "the man who wrote the checks," he soon became the single most important person in the recording chain.

The film composers of the 1930s and 1940s were the first to learn the technique of "studio scoring": they wrote music that was only heard over loudspeakers. They were followed by the Tin Pan Alley songwriters, who understood that a 2½-minute song on one side of a 78-RPM record represented a much more effective use of the medium than a symphony chopped up on a dropping stack of 10 and redirected some portion of their flow sheet music from the parlor to the recording studio. But it was Phil Spector [2] who perfected the art of making music for vinyl. By positioning himself as a producer first and foremost in the middle of the recording chain, Spector extended his power and influence over the entire production process: he wrote and arranged the tunes and lyrics, picked the musicians and singers, invented new recording techniques and owned interest in the companies that pressed and distributed the disks. Not until a record had proven itself a hit did he bother to assemble a group for live shows to match the name on the label. In this way, Spector retained total control.

Or did he? The recording age saw the emergence of two other significant new powers in the musical machine: the disk jockey (DJ) and the consumer. Thanks to radio, the record may have been one of the first products to act as its own advertisement [3]; but records did not play themselves on air, DJs did. One DJ was

worth a thousand listeners, more or less, depending on personality, wattage and demographics, and thus was a force to be reckoned with, courted and—if necessary—bought. On radio (and later in a booth or on stage) the DJ was acknowledged as the virtuoso of the turntable, as much for an encyclopedic knowledge of recorded repertoire as for a physical touch. Any vestige of the musical instrument that remained in the phonograph was appropriated by the DJ.

For the manufacturers, the downside of making records, record players and radios affordable to the masses was that the masses could pick and choose with careless ease amongst a myriad of musical offerings. Taking off a record midway through a side or scanning the radio stations had none of the social stigma or economic recklessness of walking out on a concert. The phonograph and radio may not have matched the piano in terms of musical expressiveness, but they did give the user an unprecedented degree of control over his or her musical environment. Feedback from listeners to record companies was quickly formalized into the "charts" that continue to drive record marketing today. Baroque and classical composers survived by winning the patronage of a wealthy few; now the fickle buying habits of the man and woman on the street held sway over composers and steered musical style.

By 1960 the traditional, pre-recording model of musical production and transmission had been exploded. The locus of power had shifted away from the composer, and the germ of the musical idea was distributed amongst specialist technicians and middlemen (arrangers, producers, engineers, disk jockeys, A&R men) and consumers. The "British Invasion" of popular music in the early 1960s killed off the American Tin Pan Alley/Phil Spector tradition of producer-centered authority and established a new class of composers who recognized the importance of recording studio literacy. The Beatles and the Rolling Stones may have started out as bar bands but they came of age in the studio under the guidance of such gifted producers as George Martin. Production vision became as essential to a songwriter as melodies and lyrics, studio technique as critical for a band as instrumental competence. Recording technology evolved quickly, and experimentation extended its application beyond the direct, accurate transference of sound to tape. The recording studio became both a musical instrument in its

own right and a compositional tool. By the time the Beatles released their paradigmatic album *Sgt. Pepper's Lonely Hearts Club Band* in 1967, the challenge was not how to replicate a live performance on record, but how to replicate the record in live performance [4].

## GLENN GOULD

The preceding 10 paragraphs are from an essay I wrote in 1993 on the influence of the distribution and democratization of power in post-recording music on the development of electronic musical instruments [5]. Subsequently, in March 1996, I read Glenn Gould's essay "The Prospects of Recording," originally published in April 1966 in *High Fidelity* magazine and recently reprinted in a collection of his writings [6]. It was sobering to discover that by 1966, he had rather fully thought through the substance of what I had written about in 1993. Reading his essay, I was struck not only by his legendary insight into the aesthetics of recording technique, but also by the odd contrast between accuracy and failure in his vision of the future of music. I would like to summarize his central observations, highlight the strengths and weaknesses of his thesis and then extend the confluence of his essay and mine.

In "The Prospects of Recording," Gould predicts (as he did throughout the 1960s) the "death of the concert": no one will go to concerts in the future. He discusses the influence of recording technology on the production, composition and consumption of music, and maintains that the shift of the modern public's consumption of music from the concert hall to the record led to a revival of specific genres of music, categorizable as "Hausmusik im Haus" (literally, "chamber music for the home"). Certain periods of music do not lend themselves well to the concert hall, such as the Late Renaissance and Early Baroque. This is, after all, "pre-concert-hall music," and making records of this music essentially puts it back *in situ*. Gould also addresses the music of Schönberg and his followers, claiming that Schönberg's music is essentially about clarifying very minute connections—the kinds of connections one simply cannot hear in concert, but that speak most clearly through the pristine medium of the recording studio [7].

Gould regards the technique of much post-war music, even in purely acoustic form, as being not only dependent upon but derived from recording technology:

[T]he reiterated note pattern, with measured crescendo and diminuendo; the dynamic comparison between close-up and far-distant statements of the same configuration; the quasi-mechanical ritard or accelerando; above all, the possibility of controlled attack and release of sound. . . .

Gould traces these all to the experience of editing recorded tape. He points out that these techniques have been incorporated into the style of many composers who avowedly abhor electronic technology [8].

He contrasts what he regards as the obvious debt that both producers of Baroque music and composers of modern music owe to the recording process with the tremendous hostility towards studio recording displayed by consumers of classical recordings in the 1960s. They distrusted the "trickery" of studio technique, which Gould puts in the context of what he calls the "Van Meegeren Syndrome," after the infamous Vermeer forger [9]. As Gould describes it, we depend upon chronological and historical information to evaluate the merits of what should ideally be a direct aesthetic experience. Like painting, music is not judged phenomenologically but rather by attribution, pedigree and provenance. In his example, a composition known to be a genuine Haydn has a certain generally accepted value. An early Haydn that sounds like a late Haydn is worth more. A composition that sounds just like Haydn but was written 50 years earlier by a pioneering (if heretofore unrecognized) composer is worth even more. But one written by a mere follower 10 years after Haydn's death is worth nothing. Gould proposes that recording culture is in the domain of Van Meegeren, an invitation to forgery: although the notes on a record jacket say that it was recorded on a specific date and without edits, there is no incontrovertible proof. Ultimately, the recording must be evaluated on purely sonic properties—on its surface character, like Van Meegeren's fake Vermeers. The wary public suspects that there is a Van Meegeren lurking behind every long-playing (LP) record, hence its preference (at the time Gould wrote) for a live concert recording over one done in the studio.

Gould suggests that the nineteenth-century goal of an unlimited public accommodated in ever-larger concert halls is being replaced by the notion of a limitless number of private consumers of musical recordings that constitutes a far larger and more widespread audience than could sit under a single roof.

Gould traces the failure of the first generation of electronic music to its glorification of the machine, quoting Marshall McLuhan: ". . . [T]he meaning of experience is typically one generation behind the experience" [10].

Finally, Gould extols the benefits of background music, or Muzak; quite a heretic stance, given the late-1960s paranoia about the Orwellian threat of that genre (Leonard Bernstein was once quoted as saying "I will not eat in a restaurant that plays Muzak"). But Gould finds two virtues in easy listening music. First, it pays no respect to the concept of chronology or historical conventions: an arrangement might segue from something Debussy-esque to something Chopin-esque to early-Schönberg-meets-Hollywood-film-soundtrack—perfect Van Meegeren music. The only critical factors are the musical connections: does it follow the expectations of functional harmony? Is there good voice leading? Can the same tempo and orchestration be maintained across thematic changes? Second—and more profoundly—he predicts that constant, widespread exposure to this kind of functional use of musical material will cause the general public to become far more literate with respect to musical clichés and that by constant exposure to the mechanism of music at so widespread (and base) a level they will achieve a real understanding of the workings of music.

This last point suggests a possible factor in the crisis of stagnation that exists in most contemporary classical music: we have reached a situation where the average audience member is more literate, more "broadly listened," than the average composer. The listening pool of the general public grows, while most composers remain specialized; the composer's field of possibilities is now considerably smaller than that of the consumer. Whereas "high art" music used to be an umbrella under which a composer encompassed the dominant cultural viewpoint, it now serves a niche market at a time when there is no dominant culture, and most composers do not realize this.

### "ACOUSTIC SPLENDOR"

Gould and I concur that the recording industry has introduced a new class of musical technician and has changed the very nature of music. He presages the struggle between live and recorded music that took place in the 1970s and

1980s—with pop music in particular—and the growing controversy surrounding issues of copyright, originality and ownership as the pivotal role of the composer is slowly subsumed within a larger musical machine. His insight is incisive and his predictions uncannily accurate, except for the very crux of his argument: the concert is not dead yet. Although recordings have increased in all aspects of musical market share, the live concert is still very much present. Perhaps Gould's personal career crisis—and the power of the polemic—pushed him to take a rather dogmatic and extreme stance, but in the cracks of his argument I find the roots of some important post-recording performance practice.

When he discusses the role of recording in the promulgation of both early music and post-Weberian music, Gould refers to "detail" otherwise lost in the large acoustic environment of a concert hall. He uses a lovely expression to describe the concert experience: "acoustic splendor" [11]. Indeed, if one closes one's eyes for a moment, stops reading this text and considers the difference between listening to a late-Romantic orchestral work in a large concert hall and a Webern string quartet in one's own living room, one must conclude that there is a profound difference between the "acoustic fingerprint" of those two experiences. Gould, perhaps unwittingly, exposes a critical dividing line in musical evaluation, one that falls right on the border between "splendor" and "detail." The two terms seem to refer to opposed musical goals. Serial music, by Gould's definition, is about degrees of control and specification that go hand in hand with the primacy of detail, and he sees much twentieth-century music as concerned with controlling small things that were previously left rather loosely specified. Subsequently, as he points out, the acoustically dead environment of the recording studio—and the freedom to edit the tape—gives the artist a tremendous amount of control.

Acoustic splendor, on the other hand, encompasses everything irrational about the experience of listening to music that would seem to be beyond the control of either composer or performer—or of anyone but the architect, perhaps. It has to do with the way sound behaves after it leaves the instrument. One could say that large-force late-Romantic music was concerned with exploiting acoustic splendor and creating a spectacle that was not just visual or tonal, but psychoa-

coustic—unscorable, unanalyzable, unreproducible but splendid nonetheless. This experience cannot be perfectly replicated in the living room, no matter how sophisticated and expensive the recording or playback technology; the acoustical dispersion of sound in space was the one detail the serialists could not specify, and even today Institut de Recherche et Coordination Acoustique/Musique (IRCAM) cannot do it for its founder Pierre Boulez. Gould's "solution" is Hausmusik im Haus: record the music "without acoustics" and play it back in the living room, with the acoustics of any home serving as the best approximation of an "Urhaus" (a "generic house," i.e. a typical acoustic space); dispense with the concert hall entirely, because it is the great uncontrollable element and it stands in the way of clarity.

But this would deprive the listener of that acoustic splendor that Gould, in his pursuit of recording perfection, fails to realize cannot be so easily dismissed. Among the developments in experimental music that began immediately after the publication of his article, one finds compelling work by composers exploring the physical acoustics of sound in space and the behavior of sound after it leaves the instrument, beyond the last stage of traditional musical control. The aesthetic stance differs greatly from that of serialism—the movement of sound waves cannot be "controlled," but attention can be drawn to it, and the post-Cagean aesthetic embraces this attitude. Here we find a style of music built on the very conundrum that Gould thought would spell the death of the live concert.

Alvin Lucier provides a superb illustration of this genre. Shortly after Gould wrote his article, Lucier composed *Vespers* (1969) [12], in which four performers carry "Sondols," flashlight-shaped devices that emit sharp clicks for purposes of echolocation. (The Sondol was developed for the blind, but failed in that market, presumably due to its conspicuousness.) The performers in *Vespers* use echolocation to follow simple paths across the performance space. The delay time of an echo gives the user an indication of the distance between him- or herself and a wall, while its timbre reveals something about the surface texture of the wall—an experienced performer can hear the difference between wood and plaster, for example. One can adjust the speed of the click-train and can turn it on and off—these are the only "instrumental" variables. *Vespers*

presented the phenomenology of acoustics in an unprecedented way. Lucier took much for granted (such as the pitch, rhythm and timbre of the outgoing clicks) but focused on what happens *after* the sound leaves the instrument rather than what happens before—a complete inversion of normal compositional practice. The performers try to accomplish an inherently non-musical task—making musical decisions solely to aid the act of navigation—and the music is merely the by-product of this task. What the audience and performers share is one of the most extraordinary acoustical experiences available outside the world of bats and whales. *Vespers* is about as "splendid" as music gets.

Lucier and other composers who work with physical acoustics present one example of Gould's shortsightedness, but there are others. Gould essentially predicts the CD-ROM and other interactive media and proposes that these will make everyone an artist. He says we will buy recordings that combine versions of a Beethoven symphony conducted by Wilhelm Furtwangler, George Szell and Leonard Bernstein and that we (as amateur musicologists) will be able to splice a measure of one to that of another. If one can do all that at home, he asks, why go to a concert? But as Andy Warhol once said, people do not go to movies to see the film, but to stand in line. In addition to dismissing acoustic splendor, Gould fails to recognize aspects of the concert that have nothing whatsoever to do with sound: the social element, the fundamental distinction between voyeur and practitioner, the desire to be entertained, the lure of the unexpected, etc.

An element of chance exists in live performance that is absent when one plays recordings at home. Oddly enough, when Sony and Philips (hardly the two greatest proponents of the avant garde) got together to specify the CD format, they chose to include a quasi-Cagean button (labeled "shuffle") that generates random sequencing of tracks; but even shuffling the CD pales beside the variables of a live concert performance—even of deterministic music. Gould was on the right track, however, in suggesting that the recording would become a performance medium. He would have been fascinated by the rise of the DJ as a performing musician who fills a niche between virtuoso professional and skillful amateur. And the DJ is only the tip of a wider musical wedge: so much of the "post-modern" practice of recycling and reusing materials has long been the

DJ's domain, the aesthetic of which nurtured a whole style of music that developed in the 1980s (of which John Zorn, Christian Marclay and John Oswald are among the most obvious practitioners). Certainly the roots of this style can be traced back further to Ives, Gottschalk and a few other marginalized composers, but it took the saturation of recording culture in order for it to proliferate.

Gould published his essay in 1966. In 1967, the Beatles released *Sgt. Pepper's Lonely Hearts Club Band*, and Robert Ashley, David Behrman, Alvin Lucier and Gordon Mumma founded the Sonic Arts Union. This was a pivotal date in the development of "electronic music" (in the largest sense of the term): pop bands were leaving the stage for the studio, while "avant-garde" composers and ensembles were leaving the studio for the stage. Thirty years on, we can see that pop—with which Gould had virtually no contact—has followed Gould's predicted path rather neatly (with conspicuous counter-movements), while experimental music has veered directly into the very performance environment he shunned.

## STRATEGIES FOR POST-RECORDING PERFORMANCE

While Gould was accurate in some of his predictions and misguided in others, he raised issues that are still valid not only in analyzing the evolution of current musical practice, but also in second-guessing future trends—which brings me back to the speculations with which I concluded my 1993 essay. Despite the record's transformation of the music industry and its influence on the development of musical style in this century, there are still links in the chain of musical production that have remained relatively unchanged since the turn of the century—most notably the architecture and audience of the concert hall (instruments of the "splendor" dismissed by Gould), the audience at home (Gould's preferred audience) and the nature of the chamber ensemble itself. Can these elements be developed in order to foster new musical forms?

Architecture is the final "instrument" in the acoustic chain from performer to listener, imposing its own acoustic signature on the music played within it; but unlike every other stage in that process it is invariably inflexible. With the exception of the rather underutilized performance space at IRCAM in Paris, no public concert halls exist that permit the

real-time transformation of architectural acoustics (except by crude electronic simulation). There are obvious economic reasons for this in addition to the fact that little music has been written for such architectural instruments. But such music will not be written until appropriate performance spaces become more readily available. If music institutions encouraged the construction of malleable concert spaces—with real-time remote control of shape, reverberation time, frequency response and other physical characteristics—it would provoke the creation of music of a truly monumental scale.

Architectural development for music has closely paralleled the gradual disappearance of participatory musical events within the community. Accordingly, the modern concert hall places a passive audience in fixed seating. Despite the fact that music is a three-dimensional, moving medium (as Lucier so eloquently demonstrated), “serious listening” has become a motionless activity. Attempts to change this behavior through interactive audio installations and non-traditional concert hall design have been generally unsuccessful. We are faced with a fundamental, attitudinal difference between the passive and active consumption of music, with the latter reserved for pop dance music, a small sector of the experimental fringe and musics outside the European classical tradition. But just as the availability of halls with variable acoustics might inspire new forms of “architectural music,” alternative listening environments might encourage more audience activity. Like the nightclubs of the 1980s, a concert hall could be built not as a single “optimum” space, but as a sequence of acoustically and electronically linked rooms, each with its own character and social function. One space might cater to focused listening and direct visual contact with the players (as in a traditional concert hall), while another might present the music at an ambient or even subliminal sound level [13]. More active listeners could interact directly with the music in “re-mix rooms,” by adjusting loudness, mix and balance to suit individual taste, or wander through a labyrinth of corridors and small rooms that would acoustically transform the music with every architectural stage [14].

A similar passivity problem exists with “home audiences.” Listener activity has increased little since the advent of the record and radio gave the consumer the

basic power of selection. Interactive media such as CD-ROMs are still commercially insignificant compared to the music CD, the major selling point of which is not sound quality but the fact that one does not have to turn it over [15]. Even the music CD itself boasts a degree of interactivity unknown with records or tapes, but what percentage of listeners bother to program their own sequences or listen in “shuffle” mode? Once beyond passive listening, we enter the realm of activities where satisfaction is based on short-term, competent task-fulfillment. Where is the fulfillment in an alternate sequence of familiar songs? Interaction with home electronics typically consists of playing computer games or scanning TV channels with a remote control. The games emphasize the speed of hand-eye coordination, usually in competition with the computer itself rather than with other players. Scanning lets the viewer edit broadcast material to the exact length of his attention span while pursuing a futile desire to miss nothing.

Neither of these two activities seems innately musical, but could one develop a new form of “parlor music” based on their motivation: a task that sits somewhere between the passive appreciation of music, the active decision-making of channel surfing and the accessible (if competitive) satisfaction of games? TV scanning could serve as a useful model. Multi-channel broadcast media carry tremendous amounts of information that can be used directly in a musical work as sound material, or can be transformed into structural elements—for example, translating the “value” of a given station’s programming into the amount of time one stays on it before moving on is not far removed from certain practices of improvisational music [16].

Computer games stress competition for its own sake, and only secondarily (if at all) do they have any aesthetic content. A better game model for music might be bridge. Although competitive, bridge has certain characteristics that are similar to those of chamber music and improvisation: it is a group activity (which sets it apart from chess, the other game commonly linked to music) and it has a social value beyond pure competition, with a tradition of a foursome playing together on a regular basis. There are styles, strategies, and “classic games,” all contributing to a tradition of theory and analysis.

Imagine a form of home music evolving like a weekly bridge game: a cable scanner, an interactive CD or a com-

puter program could provide elements of chance, topicality, score and sound material. Performances could take place at many different levels of skill and could be played back later for analysis or passive listening. The game-like competitiveness could provide the initial hook for pulling a listener off the couch and activating him or her as a performer, while the social factor would encourage the reintegration of musical performance into everyday life.

Whether this ever happens depends, of course, not on the will of any one composer or any four bridge players, but on the constellation of technology, economy, social norms and zeitgeist that governs all cultural developments. Edison’s genius, after all, lay not in invention, but in a gift for being in the right place at the right time with the right machine.

## References and Notes

1. In launching the “autograph record,” Edison also anticipated the value of a recording as a limited-edition multiple that would have an intrinsic value as a collectable object quite divorced from its sonic content.
2. Phil Spector was a very successful American record producer of the late 1950s and early 1960s who revolutionized the recording technique of pop music. By setting the precedent of the recording studio as a laboratory and musical instrument, he had a tremendous influence on his peers and subsequent generations of producers, most notably Brian Wilson (of the Beach Boys) and George Martin (for the Beatles).
3. In the age of MTV, the video that was originally intended as an advertisement for the music often supplants it as the primary product, suggesting that the CD, cassette or record is merely the affordable memento of a multimedia experience.
4. The relationship between composer and studio remained ambiguous, however. As popular music took over the recording studios and exerted an ever stronger influence on the design of recording equipment and facilities, it became difficult to say whether the production chain was being optimized for the demands of rock music or if rock music was evolving to suit the environment of the recording studio.
5. Nicolas Collins, “Exploded View—The Musical Instrument at Twilight,” in catalog for De Zoetgevooidse Bliksem festival, STEIM/Balie Theatre, Amsterdam (1993); also published in *Resonance* 3, No. 1 (London) (1994) and in Spanish translation in *La Revista de Suena* (Bogota) (May–June 1995). This essay had its roots in a lecture I presented in July 1993, for HyperKult III at the University of Lüneburg, Germany.
6. Glenn Gould, “The Prospects of Recording,” in Tim Page, ed., *The Glenn Gould Reader* (New York: Vintage Books, 1990).
7. Especially via Robert Craft, the exemplary recording conductor/archivist of the 1960s.
8. Gould [6] p. 345.
9. Han van Meegeren was a very successful Dutch forger who flourished during the 1930s and 1940s.
10. Gould does not give a specific reference for this quote, and I have been unable to locate the primary source.

11. Gould [6] p. 333.

12. For the score of *Vespers* and an interview with Lucier about the piece, see Alvin Lucier, *Reflexionen—Interviews, Notationen, Texte* (Reflections—Interviews, Scores, Writings) (Cologne, Germany: MusikTexte, 1995) pp. 72–83, 312–313.

13. Within months of writing this portion of my 1993 essay, “chill rooms” became a standard feature of clubs catering to ambient music.

14. I have certain records that I prefer listening to when I am in a room adjoining the room with the stereo, rather than sitting directly before the speakers; to my ear they are improved by a few stages of acoustic filtering.

15. Witness the success of car CD players: compensation circuits compress and re-equalize the “perfect” CD sound to adapt it to an imperfect listening environment, thereby reducing sound quality to not much better than cassette—but the 10-CD

magazine in the trunk offers the convenience of hours of uninterrupted play.

16. My LP *Devil's Music*, Trace Elements Records (1985) consisted entirely of instantaneous sampling and processing of live scanning radio, following a similar strategy.

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