

FROM FACTORY TO HEADPHONES: THE AURAL ENCLOSURES OF WORK

by

Shobun Baile
Bachelor of Science (Dual), University of Michigan, 2008

Thesis

Submitted in Partial Fulfillment
of the Requirements of the Degree of
MASTERS OF FINE ART in ART
at Carnegie Mellon University,
Pittsburgh, Pennsylvania

APPROVED BY:

James Duesing, Project Advisory Committee Chair

Erin Cosgrove, Project Advisory Committee Member

Jesse Stiles, Project Advisory Committee Member

Lawrence Abu Hamdan, Project Advisory Committee Member

Jon Rubin, MFA Program Director

Charlie White, Head of the School of Art

Dan Martin, Dean of the College of Fine Arts

Date Degree Conferred: May 2018

TABLE OF CONTENTS

Abstract

3

Introduction: *You are wise to listen*

4

Motion-Time: *Now you ask yourself what listening used to mean to you*

6

Enclosure: *The palace is a construction of sounds that expands one moment and contracts the next*

10

Rhythm & Leisure: *At times it seems to you that the transmitted message has a rhythm*

13

Noise: *Do not become obsessed with the noises of the palace*

21

Muzak: *Since you mounted the throne, it is not music you listen to*

24

Headphones: *Your palace remains unknown to you and unknowable*

28

Extimacy: *Is it a bodiless you that listens to that bodiless voice?*

36

Conclusion: *The body seated askew on the throne is no longer yours*

40

Bibliography

42

ABSTRACT

This thesis is a historical and critical consideration of headphones. From the early introduction of the stethoscope to the various roles of music within the workplace, labor and its architectural enclosures have shifted with post-industrial work. This essay uses Gilles Deleuze, the history of workplace efficiency, and Muzak to describe the aural shift from a disciplinary society to a society of control.

You are wise to listen, not to let your attention lapse even for an instant; but you must be convinced of this: it is yourself you hear, it is within you that the ghosts acquire voices. Something you are incapable of saying even to yourself is trying painfully to make itself heard. . . . You are not convinced? You want absolute proof that what you hear comes from within you, not from outside? Absolute proof you will never have.

- Italo Calvino, "A King Listens"

These ghosts confuse the interior and the exterior, thinking and hearing. Just as any loudspeaker can easily and quickly be converted into a microphone,¹ Italo Calvino turns the king's speech into a paranoid act of listening. Where he would once proclaim his acts of generosity and power to the listeners of his empire, all standing below his balcony, for Calvino, the king only hears his internal voice echoed in the sounds of his kingdom. He is unable to know what is born from the interior, and what from the exterior. I start with Calvino's story because it is both influential for my creative practice, and it encompasses a deeper sense of what makes sound a spatial phenomenon, where space is simultaneously architectural and cognitive, public and private, aural and visible. Calvino's story will continue as a touch point throughout this essay, and serves as structure for investigating the relationship between sound, space, and control. I will explore the role of audio in relation to

¹ <https://arxiv.org/pdf/1611.07350.pdf>

the production of space and labor production, arguing that these two aspects of reproduced sound go hand-in-hand.

The Industrial Revolution altered the soundscape of daily life. Noisy infrastructure projects increased in urban centers, trains rumbled across the country, and machines with metal, moving parts took over workplaces. People began to work alongside tools and machines that were loud and rhythmic. At this same time, audio recording and reproduction was taking off, also as a result of new, mechanical tools. Sound could be reproduced without the need for a human voice or body, and widely distributed, inviting the question of how sound might be used as a tool. These facets of sound play out on the factory floor, which was becoming a laboratory for social control, focusing largely on worker efficiency. Sound and music in 20th century labor directly informed the way that sound and noise would be regulated and used in sites beyond the physical architecture of the workplace. I will consider these ideas within the context of the theorist Gilles Deleuze and his concept of the “societies of control,.” I propose the idea that sound reproduction and worker efficiency have continued their entanglement in the 21st century through the popularization of headphones, and their relationship to neoliberal ideas of self-motivated productivity and private space.

Now you ask yourself what listening used to mean to you, when you listened to music for the sole pleasure of penetrating the design of the notes.

- Italo Calvino, "A King Listens"

In 1915 labor scholar and labor rights advocate Robert F. Hoxie published a text titled *Why Organized Labor Opposes Scientific Management*. This text was a direct response to the widespread institution of the motion-time studies, introduced by Lillian and Frank Gilbreth, as a process for tracking industrial worker movements in space. The goal of the motion-time studies was to find the most efficient physical movements for workers, as well as to establish a process to ensure worker safety and track processes that were overworking workers.



Film still. *Motion and Time Study*, Frank and Lillian Gilbreth, 1914.

Using a film camera and a stopwatch, the Gilbreths could record the movement of several workers doing the same task, and then time which movement was most efficient, and which required the least expenditure of energy. The result was a set of movements for any repetitive form of work, but also a metric to compare the motivational qualities of higher wages with higher outputs. A seemingly complex equation arose that would allow the manager to calculate minimum wage for maximum output, all based on an absurd measurement of worker movements. Hoxie considered payment methods based on the motion time studies as anti-union and pro-individual. He writes that "...efficiency methods of payment tend to center the attention and interest of each workman on his own affairs and thus to lessen the feeling of mutual interest and common dependence among the workers."²

Though Lillian and Frank Gilbreth publicized their new management principals as a worker-centric version of Frank Winslow Taylor's original ideas regarding scientific management,³ Lillian Gilbreth's text from 1915, *The Psychology of Management*, directly affirms Hoxie's concerns. She troublingly writes, "Incentives are individual both in the cases of rewards and punishments, and, finally, it is the welfare of the individual worker that is considered, without the sacrifice of any for the good of the whole."⁴ Taylor's time studies from the years before focused on a "scientific" method of measuring how quickly a worker was

² Hoxie, Robert F. "Why Organized Labor Opposes Scientific Management," *The Quarterly Journal of Economics*, Vol. 31, No. 1 (1916), 83.

³ Brian Price. "Frank and Lillian Gilbreth and the Manufacture and Marketing of Motion Study, 1908-1924." *Business and Economic History*, Second Series, Volume Eighteen, 1989.

⁴ Lillian Gilbreth, *The Psychology of Management* (Sturgis & Walton, 1914), 27.

producing a specific item, which was known as a “work unit.” The motion-time study was a more detailed, microscopic view of the worker. The Gilbreths introduced the possibility of an evidential process and a data collection method that would prove that the individual body of the worker could be optimized. A worker’s movements could be recalled and through this recollection, influenced.



Still from the Lumiere Brothers’ *Workers Leaving The Lumière Factory*, 1896.

Frank and Lillian Gilbreth were not the first to document factory life in the moving image. In 1896 the Lumiere brothers used the first film technology to record their own factory. Their film *Workers Leaving The Lumière Factory* captured workers leaving after the factory bell was rung and the workday was over. The film used early filmic technology to capture the movements caused by the bell at the end of the workday, but the Gilbreths’ motion-time study was a technology unto itself, mediated through the camera and the stopwatch.⁵ And where

⁵ Frank Gilbreth. *Motion Study: A Method for Increasing the Efficiency of the Workman*. (D. Van Nostrand, 1921), xviii.

F.W. Taylor's ideas about scientific management were focused on the efficiency of production of the factory and corporation as a unified body⁶, the Gilbreths were looking closely at the joints of the literal human body. Frank and Lillian Gilbreth introduced the idea that efficiency was not in the regulation of the workday, but rather through precise, almost robotic control of the second-by-second movements of individual workers.

⁶ Gilbreth, *Motion Study*, 4.

The palace is a construction of sounds that expands one moment and contracts the next, tightens like a tangle of chains. You can move through it, guided by the echoes, localizing creaks, clangs, curses, pursuing breaths, rustles, grumbles, gurgles.

- Italo Calvino, "A King Listens"

Gilles Deleuze published "Postscript on the Societies of Control" in 1990, nearly 80 years after Scientific Management and the Gilbreths changed the way the industrial work setting functioned. In this text, Deleuze attempts to contrast a new social organization different from the disciplinary societies of Michel Foucault⁷. Deleuze writes:

"The factory constituted individuals as a single body to the double advantage of the boss who surveyed each element within the mass and the unions who mobilized a mass resistance, but the corporation constantly presents the brashest rivalry as a healthy form of emulation, an excellent motivational force that opposes individuals against one another and runs through each, dividing each within."⁸

Deleuze contrasts the corporation with the factory as a way to explain how atomization of the union occurred through competition. However, Robert Hoxie viewed this competition as beginning not in the corporation, but in the factory itself. Deleuze further associates discipline with the "enclosures" of the factory, the school, the barracks, writing that "enclosures are

⁷ For a clear explanation of Foucault's concept of the disciplinary society see "Docile Bodies", *Discipline & Punish*, trans. Alan Sheridan (New York: Division, 1995).

⁸ Gilles Deleuze, "Postscript on the Societies of Control," *October*, Vol. 59, Winter (1992): 3.

molds, distinct castings.” In contrast he writes, “controls are a *modulation*, like a self-deforming cast that will continuously change from one moment to the other.”⁹ Control can change its form and does not stop when an individual leaves the factory, the office, or the school.

Throughout “Postscript on the Societies of Control”, Deleuze uses spatial metaphors as a way to contrast Foucault’s emphasis on the architectural sites of discipline. Deleuze shows that space itself is altered by the way the workplace is managed. Foucault was concerned with the architectural enclosures that allowed the disciplinarian to actively discipline the bodies and minds of soldiers, students, and workers through physical proximity. Similar to the Gilbreths’ motion-time studies, Foucault viewed the enclosures of discipline as ways to surveil, reform, and test. But, the camera and the stopwatch allowed the Gilbreths to abstract efficiency away from Foucault’s disciplinarian and toward atomized forms of measurement. The motion-time studies begin the process of converting these measurements into a culture of self-regulated efficiency. Deleuze describes particular instances of this decentralization of control, from house arrest to the use of risk analysis in medical care. In each instance, the direct engagement between the individual and the source of control dissolve; the room where one can look their master in the face is gone. The disciplining voice of the manager begins to sound like, at first, the rhythm of the machines in the factory, and

⁹ Deleuze, “Postscript on the Societies of Control,” 4.

then like the mental voice of the workers themselves. I will explore these last two ideas in depth.

At times it seems to you that the transmitted message has a rhythm, as in a musical phrase: this would also prove a wish to attract your attention, to communicate, to speak to you. . . . But this is not enough for you: if the raps follow one another with regularity they must form a word, a sentence.

- Italo Calvino, "A King Listens"

Rhythm binds the body to the song. In *The Psychology of Management* Lillian Gilbreth makes brief mention of the role of music: "On the other hand, feelings, such as happiness and contentment, and even hearing rhythmic sounds, music, etc., are an aid toward increasing output."¹⁰ The psychological effects of music and rhythmic sounds are not explicated, rather there is a vague reference to some belief or idea about rhythm and productivity. An earlier text by Frank Gilbreth, *Motion Study: A Method for Increasing Worker Efficiency*, mentions the idea of music as a useful form of entertainment.¹¹

The relationship between work and rhythm is seemingly intuitive, and perhaps so is the relationship between rhythm and music, but Karin Bijsterveld's historical work on industrialization tracks down the popularization of this idea to Karl Bucher, and his belief that work itself derived from the same "rhythmical character" as music. While his logic and evidence was rooted in a now arcane understanding of "primitive" peoples, this belief

¹⁰ Gilbreth, *The Psychology of Management*, 27.

¹¹ Gilbreth, *Motion Study*, 48.

perpetuated itself amongst industrial psychologists and even Thomas Edison, who first attempted to play music on the factory floor.¹² Bijsterveld further elaborates:

“Although work had once been rhythmical, the introduction of modern machines had brusquely unbalanced the sound coming from the shop floor. The beat of the machines was more rapid and fixed than human rhythms...rhythmic sound was the thing to strive for, whereas the absence of unambiguous rhythm—the most dangerous form of noise—was the situation that needed to be avoided.”

It is from this place that studies into using music on the workshop floor were introduced, and they paralleled the work of the Gilbreths.¹³

Prior to the industrial revolution, and even in its early stages, rhythm was already a tool and a collective social experience within work. While Bucher discusses the popularization of the work-music relationship, Ted Giola recounts the vast history of songs sung during work. Work songs are documented in cultures from every part of the world, yet Giola’s work notes that in virtually every instance, including slave songs, music organized work through the voice of the workers.¹⁴ In most instances, the work song was a way to quell monotony and organize workers at the behest of the workers themselves. Work songs are a

¹² Karin Bijsterveld. *Mechanical Sound: Technology, Culture, and Public Problems of Noise in the Twentieth Century*. (The MIT Press, 2008), 83.

¹³ Bijsterveld. *Mechanical Sound*, 84.

¹⁴ Ted Giola. *Work Songs*. (Duke University Press, 2006), 12.

unifying force and they strengthen bonds between workers. Work songs are not listened to, but rather, they are sung.

In opposition, early industrial labor followed a disciplinary approach. In their essay on Muzak, architects Robert Sumrell and Kazys Varnelis write, "The structure of work in this new situation was also hostile to song. The nineteenth century factory boss and the twentieth century manager replaced the song-leader in the field, but instead of working in concert with their fellows, ordered them around, expecting no response except obedience."¹⁵ In fact, Henry Ford forced his workers in the early days of car manufacturing, to work in silence.¹⁶ Once workers were listening to music, rather than participating in producing music, American businesses became amenable to the uses of rhythm on the factory floor.

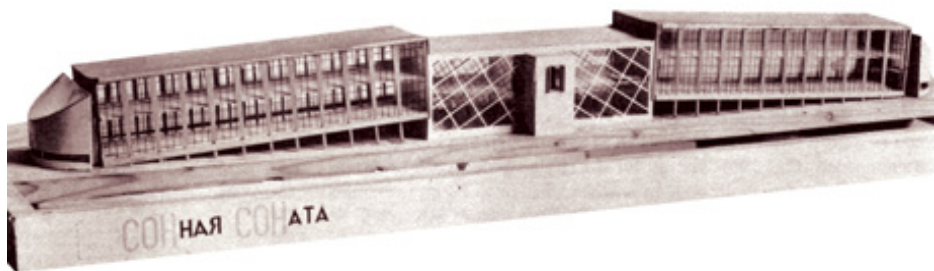
Bijsterveld recounts various instances of music being used as both a rhythmic, as well as an attentional tool, on the noisy factory floor. Music is a type of entertainment and a type of leisure activity outside of the factory. The oppositional relationship between music as a tool and music as entertainment seemed to matter less as work and leisure time were beginning to meld. The use of leisure activities in pursuit of productivity was not exclusive to music on the work floor: Andrew Carnegie, Henry Ford, and other industrialists actively pursued an increase in quality of the workers life, of aesthetic entertainment to enrich "the soul" and thus to delegate management to leisure activities. As the approach to efficiency in the workplace become a dominant idea in the American industrial workplace, psychological methods for

¹⁵ Robert Sumrell and Kazys Varnelis, *Blue Monday* (Actar, 2007), 103.

¹⁶ Sumrell and Varnelis, *Blue Monday*, 103.

increasing the quality of the life of the worker also became the concern of management. Lillian Gilbreth considered the happy worker, a hard worker. Industrialists like Andrew Carnegie and Henry Ford considered leisure time an important part of the infrastructural development to support their workers, and similarly, and to distract from union empowerment.

Interestingly the Soviet Union closely watched worker-centric labor methodologies used in the United States. A specific instance of close attention to the role of leisure in the worker's life was a proposed project by the architect Konstantin Melnikov known as the "Sonata of Sleep." Melnikov proposed the Sonata of Sleep within a proposal for the "Green City", an architectural competition to devise a suburban respite outside of Moscow for the growing proletariat. His plan focused on bringing workers in groups to this city in order to give them an extremely controlled form of relaxation.



Architectural model for the Sonata of Sleep. Starr, *Melnikov*, 178

The Sonata of Sleep was a planned building that would integrate many facets of environmental control into the architecture. At the far ends there were to be control booths used to regulate all sensory aspects of the experience within the building. From temperature,

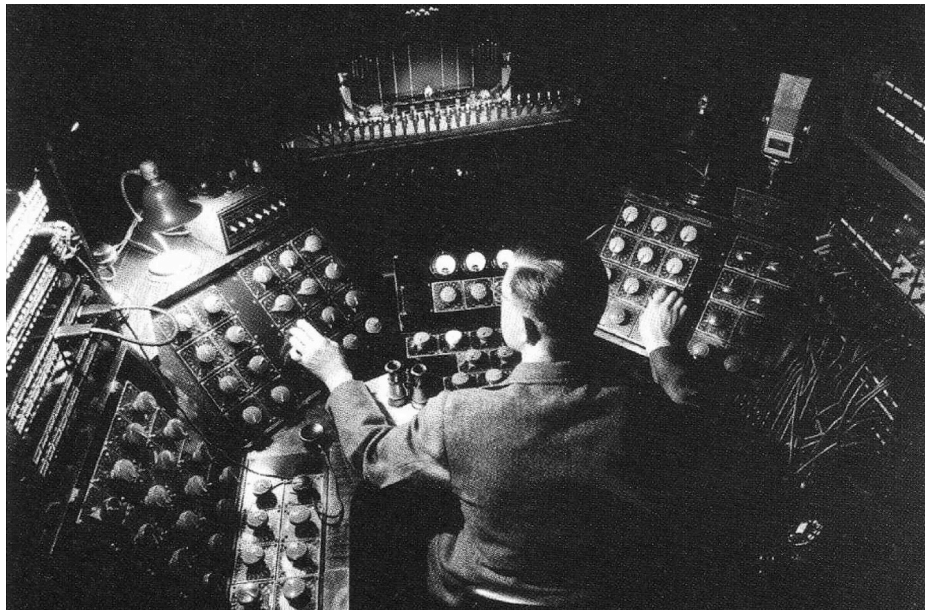
to humidity, to (perhaps most importantly) sound, the control booths would ensure a perfect night's rest. The audio aspect of the project was notable because of Melnikov's adoption of current scientific ideas about the role of sound in aiding relaxation and rest. Frederick Starr, in his monograph on Melnikov, writes, "The rustle of leaves, the cooing of nightingales, or the soft murmur of waves would instantly relax the most overwrought veteran of the metropolis."¹⁷ Melnikov was an early adopter of the controlled ambient environment, but his route of influence makes this history most interesting. In 1931, Samuel "Roxy" Rothafel, the man in charge of research for John D. Rockefeller's upcoming plan for Radio City Music Hall, came across Melnikov's proposal. From the project he specifically adopted the use of the control booths as a mechanism for controlling all ambient aspects of the environment in Radio City Music Hall, from ozone¹⁸ in the air to the background music. The original press release for Radio City Music Hall mimicked Melnikov's language, stating "A visit to Radio City Music Hall is as good as a month in the country." Leisure time is compressed and weaponized. Tony Wood's article on Soviet sleep experiments notes, "While Rothafel's enthusiasm stemmed from a desire to manipulate consumers, Melnikov's original impulse had been much more far-reaching."¹⁹ However "far-reaching" Melnikov's total system of leisure control was, Rothafel recognized that the psychological control of the masses through ambient sensory experience could reach beyond the "worker." Rothafel and Rockefeller may have been piping in

¹⁷ Frederick Starr. *Melnikov: Solo Architect in a Mass Society* (Princeton: Princeton University Press, 1978), 179.

¹⁸ Ozone is chemically similar to oxygen and was used as a calming tool prior to knowledge of its health effects.

¹⁹ Tony Wood. "Bodies at Rest." *Cabinet Magazine*, Issue 24, Winter 2006/2007.

relaxation gases and sounds to create the ultimate respite in the center of Manhattan, but they were instituting a much broader idea: leisure time as a site for control. Deleuze emphasizes the corporation as a “gas” in opposition to the factory as a “body,” referring to the ephemeral quality of control that extends out into the immaterial sounds and airs that permeate space. A song sung in public, by no one, and for everyone.



Control booth at Radio City Music Hall, *Delirious New York* by Rem Koolhaas, pp. 212

Returning to the American factory, an entire industry grew out of war-time efforts to induce productivity amongst workers. The famed history of Muzak and its insidious role in constructing environments is aptly recounted in Herve Vanel's *Triple Entendre: Furniture Music, Muzak, Muzak-Plus* (and will be discussed further later in this essay). Of note, is the way in which Muzak's history directly intersects with birth of radio, but also that the concept

for piping music into the factory came from a military signal operator, George Squier.²⁰ 20th century radio programming was born from music used to induce worker efficiency. Squier's need to monetize his broader concept of sharing sounds across space was what drove the use of piped music and entertainment as a tool for creating efficiency in the workplace.

Vanel notes a key, opposing idea to that espoused by Karl Bucher, regarding rhythm and worker efficiency. A 1937 British study titled *Fatigue and Boredom in Repetitive Work* proposed that it was not that music in itself aided in efficiency by means of reliance on rhythm, or even any of its melodic qualities or biological effects, but rather because it can "appeal to the ear rather than to the eye." The concerns were pragmatic and fundamentally about the fact that entertainment can be experienced through the ears while simultaneously using the eyes and hands for work. While this study is notably problematic by contemporary scientific standards, it inspired an important cultural landmark in the field: BBC's radio program titled *Music While You Work*. From 1940 until 1967 the BBC ran this program in the morning and, in the evening for shift-workers. Its popularity far surpassed the factory and it became a staple of popular radio at the time. Each episode until 1963 was transmitted live with music of a distinct tempo, without lyrics.²¹ Melnikov's control booths, Radio City Music Hall, and the radio in the mid-century factory were all held together by the notion that workers require entertainment, that their mental states directly contributed to the quality of their work. It also recognizes that much of industrial work was monotonous and distractions

²⁰ Herve Vanel. *Triple Entendre: Furniture Music, Muzak, and Muzak-Plus* (University of Illinois Press, 2013), 46.

²¹ Control of tempo and a lack of lyrics are also qualities of Muzak.

were necessary, but distractions could only distract the mind, not the body. In each stage of this narrative, the reach of the control booth extends further and further, its relationship to the physical site and enclosure of the workplace becomes obscured.

Do not become obsessed with the noises of the palace, unless you wish to be snared in them as in a trap. Go out! Run away! Rove!

- Italo Calvino, "A King Listens"

In step with the history of music and labor efficiency was another acoustic phenomenon: noise. The rapid explosion of urban centers alongside the introduction of cars, as well as other mechanical devices, created a resounding noise problem. At the very same time that music was being explored as a method of improving worker efficiency, noise was seen as a cause of labor inefficiency. Emily Thompson's *The Soundscapes of Modernity* introduces several studies produced by industrial psychologists that implicate sound in the reduction of productivity.²² A direct result of this concern was an investment in noise abatement, a control over the acoustic landscape. Thompson writes, "An engineered soundscape promised not only to recover lost dollars and to reinvigorate tired workers, but also to constitute a thing of modern beauty in and of itself."²³ She argues that the efficiency being popularized in that era was itself expanding beyond the bounds of efficiency as a form of cost-saving, but that it would influence everything from flapper style to EB Strunk's now famous writing guide *The Elements of Style*.²⁴ Whether or not these claims prove to be true,

²² Emily Thompson. *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933* (MIT Press, 2004), 118.

²³ Thompson, *The Soundscape of Modernity*, 157.

²⁴ Ibid, 157.

there was a unique relationship growing in how the control of environmental sound in the early 20th century was being directly framed, from music to noise, as a problem of productivity in capitalist production.



Teletypists working in the acoustically treated New York Life Insurance Building.
From Thompson, *The Soundscape of Modernity*, 203.

According to Thompson noise abatement in this period was an utter failure. The cost and organization required, in a place like New York City, to decrease the volume of the city, to enforce laws regarding public radio playing was impossible. Acousticians began to quantify the levels of noise. They published op-eds citing the important role acousticians could play in urban planning, but their efforts were futile. Instead, "By manipulating and controlling private space, by turning inward and creating acoustically efficient refuges from the noises of public life, acousticians offered a compelling alternative solution to the problem of noise."²⁵ Initially

²⁵ Ibid, 168.

the “private space” Thompson refers to is the various interiors of office buildings in New York City, and in particular the New York Life Insurance Company. But homes in New York City soon followed and the ability to pay for acoustic privacy became a class demarcation. Deleuze’s notion of the move from the factory to the corporation, as a move from discipline to control, is similarly reflected in the dematerialization of the methods for efficiency. The factory brought the addition of music, and the teletype office²⁶ brought the removal of noise; both became tools that reached beyond sites of labor.

²⁶ Teletype was an early form of transcribed communication that was early to the use of headphones and arguably the first instance

Since you mounted the throne, it is not music you listen to, but only the confirmation of how music is used: in the rites of high society, or to entertain the populace, to safeguard traditions, culture, fashion.

- Italo Calvino, "A King Listens"

Though noise control and functional music have their origins in the workplace, Muzak binds the 20th century history of worker efficiency to the daily acoustic environment. As noted earlier in this text, George Squier was the army engineer who both popularized radio and work music, eventually inventing the corporation that would sell functional music under the name Muzak.²⁷ Muzak was marketed and eventually became the corporate face of music on the factory floor, creating music specifically for this purpose.

Muzak began in the factory but quickly moved into the broader acoustic world. Functional music evolved to engage both workers *and* consumers. By the time Muzak reached shopping center and elevators, it was a full-fledged form of social control, openly marketed as a way to regulate the masses.²⁸ Interestingly, Muzak was considered to be so integral to new office buildings that a centralized speaker system, controlled from a single point was built into new buildings throughout the country, exclusively to "pipe" music into the workplace. Muzak was becoming environmental and infrastructural, and through this, it was abstracted from its initial purpose as a work place tool. Steven Goodman explores this idea

²⁷ Vanel, *Triple Entendre*, 46.

²⁸ Sumrell and Varnelis, *Blue Monday*, 116.

at length in his seminal text, *Sonic Warfare*. Goodman ties Muzak and Deleuze together, coining a new idea related to Deleuze's concepts: "quantum modulation." Like the self-molding casts from Deleuze's "Postscript on the Societies of Control," quantum modulation is the atomized act of control that does not necessarily act directly. Goodman writes, "Quantum modulation affects mood rather than just trying to manipulate attention."²⁹ Muzak that is piped into public spaces does exactly this. Rather than acting directly on workers while they work, Muzak used pseudo-scientific concepts³⁰ to control emotions and environments at work (and later in the shopping center). Quantum modulation controls individuals more directly, but does so through means that are not apparent and do not read as "control."



Advertisement "Wired for Sound by Muzak,"
Architectural Record (July 1965): 217.

²⁹ Steve Goodman. *Sonic Warfare: Sound, Affect, and the Ecology of Fear*, (The MIT Press, 2009), 144.

³⁰ Goodman, *Sonic Warfare*, 144.



"Time Out for Lunch," illustration from Barbara Elna Benson, *Music and Sound Systems in Industry* (New York: McGraw-Hill, 1945).

Through this possibility of piping music into architectural enclosures, Muzak moved from the factory floor, to the corporate office, and finally into the shopping mall. Jonathon Sterne writes:

Programmed music³¹ in a mall produces consumption because the music works as an architectural element of a built space devoted to consumerism. A store deploys programmed music as part of a fabricated environment aimed at getting visitors to stay longer and buy more. Other commercial establishments may use programmed music to other ends, but in all cases its

³¹ Muzak is a type of programmed music. Sterne uses the term "programmed music" because the material difference between pop music and music sold by the Muzak corporation was negligible by the 1970s.

use is primarily concerned with the construction of built and lived commercial environment.³²

For Sterne, programmed music turns the non-place of the shopping mall into an actual place. It reconstitutes the enclosure, making it a site that can be visited and experienced like an environmental space. Moreover, stimulus progression, the process at the heart of Muzak, that intends to control emotions through various rhythm, speed, and volume factors, could also apply to consumers in a shopping mall.³³ In essence, Muzak similarly regulates the producer and the consumer, all through reproduced sound in shared, open spaces.

³² Jonathon Sterne. "Sounds like the Mall of America: Programmed Music and the Architectonics of Commercial Space," *Ethnomusicology*, Vol. 41, No. 1 (Winter, 1997), 25.

³³ Sterne: "In a shopping center setting, stimulus progression could be justified-to pick up visitor movement during the middle of the morning and afternoon, and to slow people down after lunch and at the end of the day."

While your palace remains unknown to you and unknowable, you can try to reconstruct it bit by bit, locating every shuffle, every cough at a point in space, imagining walls around each acoustical sign, ceilings, pavements, giving form to the void in which the sounds spread and to the obstacles they encounter, allowing the sounds themselves to prompt the images.

- Italo Calvino, "A King Listens"

In the age of widespread use of loudspeakers, the interaction between space and sound occurs on a social, or architectural level. Loudspeakers are directly engaged with the container in which they project sound, and, with the exception of rare directional speakers, they construct shared listening experiences, as evidenced by their use on the factory floor and in the shopping mall. However, the birth of sound reproduction can be traced to a much more private spatial experience of sound: the stethoscope in the early 19th century. Jonathon Sterne explores this history in extensive detail in his book *The Audible Past*. He notes that the ear trumpet, as an aid for hearing, had been around for years before the stethoscope, but a key difference existed. While the ear trumpet was intended to simply amplify existing sounds, the stethoscope was in fact a tool for capturing typically inaudible sounds and would do so through the process of amplification and isolation (this technical process was known as mediate auscultation). That is to say, early stethoscopes were designed to carry the vibrations from the end of the stethoscope while also having earpieces that would block out other environmental sounds. Sterne writes, "By providing sound to both ears, [the stethoscope]

further helped isolate physicians from other sounds and concentrate their auditory fields. It also held itself on the physician's head, thereby freeing both hands for use on the patient."³⁴ Already the idea of listening as freeing up the hands for other work, is beginning to materialize.³⁵



An early example of the stethoscope

But the key part of Sterne's text is the notion that through the control of attention in the stethoscope, an interior and exterior acoustic space was constructed. In the stethoscope this acoustic space is a translation of the human body: "In rendering the interiority of the body available to the physician's ear, mediate auscultation was geared toward the spatial

³⁴ Jonathon Sterne. *The Audible Past: The Cultural Origins of Sound Reproduction* (Duke University Press, 2003), 111.

³⁵ On pp. XXX I discuss this relationship briefly, and perhaps too briefly. The popularization of headphones in the work place is directly tied to how they sit on the head. imagine holding an ear trumpet like monacle.

decomposition of the body and its surface.”³⁶ There is a level of intimacy inherent in the experience of listening through the stethoscope but also in relation to the body at the other end, revealing invisible truths of its internal workings. Sterne also writes about the role of the voice in relation to these new forms of access provided by the stethoscope: “In diagnosis, the voice became one sound among many contending for the physician’s attention in the audible world. Frequencies were frequencies.”³⁷ The Gilbreths accessed the body of the worker as a way to skip over the subject, and away from communication, toward a data-driven approach to efficiency. Similarly, the stethoscope turned the patient from a subject into a producer of a variety of signals. In a way, this is an act of removing the Other, of turning a subject that will always be either oppositional (in terms of the worker and their unions) or only partially accessible (in terms of the patient expressing their symptoms through the voice) into controllable and knowable objects.

Sterne directly argues that the ensuing rise of headsets for telegraphy in the late 19th century, as a tool for train conductors or office workers to isolate sounds and hear communication better, lead to the primacy of mediated listening as an individuated experience *before* the idea of collective listening through the speaker. Moreover, early headsets were used to access live feeds of performances at opera houses in London. The hearing tubes in the image below are one of Sterne’s fantastic examples of the way that

³⁶ Sterne, *The Audible Past*, 128.

³⁷ *Ibid*, 123.

mediated listening was becoming a collective experience through addition, a clear indicator of how early recorded music was not exclusively a shared experience.

The stethoscope as a tool for concentrated listening and early headphones as tools for individual, but shared entertainment, create a strange world: the headset is at once an attentional tool for work as well as an isolating tool for private leisure activity.



Early headsets for a gramophone. Sterne, *The Audible Past*, 154



Headsets used for military work. Sterne, *The Audible Past*, 152

Headphones hold a primary place in the history of reproduced sound, but their social role has rapidly expanded in the 21st century. Headphones have exploded in production and purchasing in coincidence with mobile media, from the Walkman in 1979, to the iPod in 2005. And with this, our understanding of acoustic space and social space began to change. The history of acoustic space, efficiency, noise, and Muzak all amount to what pre-eminent theorist of acoustic ecology R Murray Schafer would consider a description of “soundscapes.” While this term is contested in sound studies, for the purposes of analyzing headphone sound production, it is effective. Schafer describes the soundscape as an environment of heard events, of which there are two modes: Hi-Fi and Lo-Fi.

1. Hi-Fi: “The Hi-Fi soundscape is one in which discrete sounds can be heard clearly because of the low ambience noise level. The country is generally more hi-fi than the city; night more than day; ancient times more than modern. In the hi-fi soundscape, sounds overlap less frequently; there is perspective—foreground and background.

”³⁸

2. Lo-Fi: “In a lo-fi soundscape individual acoustic signals are obscured in an overdense population of sounds. The pellucid sound—a footstep in the snow, a church bell across the valley or an animal scurrying in the brush—is masked by broad-band

³⁸ R. Murray Schafer. *The Soundscape: Our Sonic Environment and the Tuning of the World* (Rochester: Destiny Books, 1993), 43.

noise. Perspective is lost. On a downtown street corner of the modern city there is no distance; there is only presence.”³⁹

The way that Schaffer differentiates the idea of distance and presence in lo-fi sound might be an entry point into how impressive it must have been to first hear a Walkman playback through headphones on a street corner. William Gibson realized his idea of cyberspace through his first encounter with the Sony Walkman in the 1980s, prior to writing his famous novel *Neuromancer*. In an interview in 1999, Gibson states “I thought, if there is an imaginary point of convergence where the information this machine handles could be accessed with the under-the-skin intimacy of the Walkman, what would that be like?”

His phrase “under-the-skin” resonates well with the very origins of the headphones within the stethoscope. Certainly headphones were able to expand the world through listening, to turn the distance-less lo-fi soundscape of the city into the mediated but hi-fi soundscape of the portable media player. The promise of headphones is not only tied to its privacy but also to its ability to construct a totally new type of space, one of intimacy as well as mobility (in some cases).

Mack Hagood’s text “Quiet Comfort: Noise, Otherness, and the Mobile Production of Space” explores noise-cancelling headphones in relation to work, class, and space. Hagood uses the phrase “soundscaping” to describe the act of controlling the soundscape one hears. From early on, Bose, the inventor of contemporary noise-cancellation in

³⁹ Schafer. *The Soundscape*, 43.

The Sound of Silence

There's a direct correlation between aircraft roar and fatigue on a long flight, and a screaming child or a chatty seatmate doesn't help, either. That's why we fly toting Bose's QuietComfort Acoustic Noise Canceling headset (right), "the first consumer headset to provide full-spectrum noise reduction." In the "low" setting this battery-powered gizmo cuts aircraft drone to an almost inaudible level. The "high" setting significantly improves the sonic quality of a personal cassette, CD or DVD player, as well as the plane's sound system. Price: about \$300, from bose.com.



51

A Bose headphones advertisement for their first set of noise canceling headphones

headphones, directly targeted business-class airline travelers, employing their images in advertising. Hagood describes the act of using noise-cancellation, and headphones in general, in tight quarters as a process of "dematerializing" other bodies. The construction of privacy through this means indicates essentially a mode in which there are no walls, no enclosures of power (or freedom), but, to return to Deleuze, everyone turns into air. As in Schafer's Hi-Fi soundscape, distances suddenly grow and the wearer of the headphones is in an empty airplane. Hagood ascribes this isolating quality to the ways in which headphones also constitute a neoliberal ideal of self.

Thinking of the role of Muzak and *Songs While You Work*, the early periods of Deleuze's society of control still attempted to regulate consumption and production through a direct access to the minds of the consumer/producer. In both cases, the source of the efficiency-drive, while not clearly disciplinary, still relied on an Other. But the neoliberal self is a subject dealing in a space without unions, without security for work, without a time clock, but instead many workers must construct and self-manage daily activity. Earlier attempts at targeting the enclosure of entertainment (i.e. Radio City Music Hall) as a way to influence productivity in workers were no longer necessary. For Hagood, noise-cancelling headphones are a cancellation of Otherness and a signifier of ownership over valuable attention, all which establish a "reflexive relationship in which every self is meant to contain a distance that enables a person to literally be their own business."⁴⁰ Each individual's ability to self-manage is through a tool that privileges their attention, that uses listening, and often listening to music, as a process to focus away from the world, but not necessarily inward. A simple Youtube search yields hundreds of thousands of music playlists to use for working⁴¹. In an age of infinite choices, a huge subset of musical "entertainment" is devoted to songs for productivity. The neoliberal self chooses the work song, and listens to it, isolated from potential distractions and impediments to success. Production mediated by consumption, again and again.

⁴⁰ Mack Hagood. "Quiet Comfort: Noise, Otherness, and the Mobile Production of Personal Space," *American Quarterly*, Vol. 63, No. 3 (2011), 582

⁴¹ "The Best Electronic Music to Concentrate and Work At Office: Music to Focus and Work Fast - 2016" or "BEST Music to Help Study and Work to (from Study Music Project)" are examples of Youtube playlists focusing on work and music.

Is it a bodiless you that listens to that bodiless voice? In that case, whether you actually hear it or merely remember it or imagine it makes no difference. And yet, you want it to be truly your ear that perceives that voice, so what attracts you is not only a memory or a fancy but the throbbing of a throat of flesh.

- Italo Calvino, "A King Listens"

Is there a poetic import to headphones that challenges their role in self-management and Otherness-cancellation? The sound artist Janet Cardiff began to explore these possibilities in the early 1990s with what became known as "audio walks." Cardiff began the process of constructing guided audio walks using mobile media players and headphones. The audio would be a voice guiding the listener through a specific physical place. The listener was invited to follow a path suggested by Cardiff's recorded voice, and during the walk they would be seeing the real world, while experiencing a separate audio world.



Janet Cardiff, Skulptur Projekte Muenster, 1997.

Her work became most interesting when she began to collapse the recorded audio world with the actual soundscape of the space where the walk was taking place. Using a binaural recording device,⁴² Cardiff and her collaborator George Bures Miller would record various sounds and events within the acoustic space where the walk was taking place. The viewer is listening to a past recording in the same place they are walking in the present.



Janet Cardiff using a binaural recording device

The headphones in the work reproduce a hi-fi audio soundscape at the same site that a real-time lo-fi soundscape leaks in from outside the headphones, both soundscapes with related acoustic qualities (as a result of the binaural recording process highly simulating the experience of human listening). As headphones were slowly becoming a tool to escape one's surroundings through music, Cardiff and Miller were pushing back against the virtual possibilities envisioned by William Gibson. Rather, they were laying bare the construction of interior space in relation to the public acoustic realm.

⁴² Binaural recording is a type of audio recording that uses two microphones placed at the same locations as the inner ears on a plastic molded human head. It can create audio recordings that highly mimic human hearing when listened to through headphones.



Janet Cardiff & George Bures Miller, *Alter Bahnhof*
Video Walk, documenta (13), 2012.

Cardiff and Miller presented a walk for documenta 13 in Kassel, Germany⁴³ that is highly relevant to this discussion. For this work, they used the same process of recording an audio narrative with a guiding voice, but also recorded a video for the walk. The work presents an audio-visual narrative of the public space of the train station alongside the intimate private voiceover from Cardiff. Train stations are highly timed spaces, where people are often in a rush. Thinking of the history of efficiency and music tied to headphones, Miller and Cardiff instead use headphones as a way to linger and to map a different speed onto the present. Viewers would be confronted with the real happenings of the train station while attempting to experience the presented, intimate narrative.

The conceptual artist Charles Stankieveh writes that Cardiff and Miller's sound walks construct an uncanniness between the recorded and the real-time, the interior and the

⁴³ <https://www.youtube.com/watch?v=sOkQE7m31Pw>

exterior. He proposes an idea to understand how Cardiff and Miller work: extimacy. Lacan proposed this neologism in Seminar VII⁴⁴ as a way to describe the experience of simultaneously feeling like something is fully in one's psyche while also being Other.⁴⁵ When the world disappears but one still hears a voice, must it not be their own? Muzak introduced music without lyrics to increase productivity, to function as a manager without the literal managers voice. Cardiff inserts her voice into a guided tour, as the type of control that can be easily ignored, that always stands in contrast to the exterior acoustic space. Cardiff and Miller are able to use the attentional quality provided by headphones to create an acoustic space that is neither hi-fi nor lo-fi. They confuse the interior and the exterior while keeping both legible and separate. They heighten our understanding of how headphones can, in fact, re-materialize the enclosure and allow us to hear how presence and distance are constructed.

⁴⁴ Lacan introduces "extimité," or extimacy to describe several different psychical feelings, but I will limit this discussion to the one used by Stankievich.

⁴⁵ Stankievich. "From Stethoscopes to Headphones: An Acoustic Spatialization of Subjectivity", 57.

The body seated askew on the throne is no longer yours, you have been deprived of its use ever since the crown encircled your head; now your person is spread out through this dark, alien residence that speaks to you in riddles.

- Italo Calvino, "A King Listens"

Headphones are both a symbolic and functional factor in how the ideology of efficiency and individual privacy reproduce continuously in Western neoliberal capitalism. While Deleuze broadly generalizes about a shift from discipline to control, a close look at the role that music and soundscape play in the organization of society reflect a slightly more complex story. Deleuze's understanding of a control society is rooted in a shift away from the enclosure as an architectural space, where the master's method of control is legible.

Instead, the enclosures of labor from the 19th century turn into a broad "quantum modulation" that conflates work time and leisure time, exploits free time for productivity, and turns consumption itself into the act of production. Headphones reflect this through their relationship to music for productivity, and the creation of isolating experiences in public places. But in a way, they also simply reconstitute Foucault's enclosures, and the private experience within headphones opens a possibility for intimacy.

Headphones reproduce architectural experience not only metaphorically, but through the very history of sound and music in the factory, noise abatement in the home, and the environmental control of enclosed architectural spaces. As factories turn into nightclubs and

shop floors become headphone-filled open offices for new tech companies⁴⁶, music and industrial labor continue their history together. Headphones have become ubiquitous and play a continued role in the troubled borders between work and leisure. Because of this, headphones demand critical attention and poetic exploration.

⁴⁶ Martti Kalliala explores the repurposing of industrial space into nightclubs and tech startups, in his essay "Club Ruins."

BIBLIOGRAPHY

Bijsterveld, Karin. *Mechanical Sound: Technology, Culture, and Public Problems of Noise in the Twentieth Century*. The MIT Press, 2008.

Calvino, Italo. *Under the Jaguar Sun*. trans. William Weaver. New York: Harcourt Brace Jovanovich, 1988.

Deleuze, Gilles. "Postscript on the Societies of Control." *October*, Vol. 59, Winter, 1992, pp. 3-7.

Foucault, Michel. *Technologies of the Self*. University of Massachusetts Press, 1988.

Foucault, Michel. *The Government of Self and Others*. University of Massachusetts Press, 1988.

Foucault, Michel. *Discipline & Punish*. trans. Alan Sheridan. New York: Division, 1995.

Hagood, Mack. "Quiet Comfort: Noise, Otherness, and the Mobile Production of Personal Space," *American Quarterly*, Vol. 63, No. 3, pp. 573-589.

Hedlam, Bruce. "Origins; Walkman Sounded Bell for Cyberspace." *New York Times*, July 29th, 1999.

Hoxie, Robert F. "Why Organized Labor Opposes Scientific Management," *The Quarterly Journal of Economics*, Vol. 31, No. 1, 1916, pp. 62-85.

Gilbreth, Lillian. *The Psychology of Management*. Sturgis & Walton, 1914.

Gilbreth, Frank. *Motion Study: A Method for Increasing the Efficiency of the Workman*. D. Van Nostrand, 1921.

- Giola, Ted. *Work Songs*. Duke University Press, 2006.
- Goodman, Steve. *Sonic Warfare: Sound, Affect, and the Ecology of Fear*. The MIT Press, 2009.
- Kalliala, Martti. "Club Ruins," *Flash Art*, Issue 311, 2016.
- Kittler, Friedrich. *Gramophone, Film, Typewriter*. Trans. Geoffrey Winthrop Young. Stanford Univ. Press, 1999.
- Lefebvre, Henri. *The Production of Space*. Trans. Donald Nicholson-Smith. Oxford: Blackwell, 1991.
- Price, Brian. "Frank and Lillian Gilbreth and the Manufacture and Marketing of Motion Study, 1908-1924." *Business and Economic History*, Second Series, Volume Eighteen, 1989.
- Schaefer, R. Murray. *The Soundscape: Our Sonic Environment and the Tuning of the World*. Rochester: Destiny Books, 1993.
- Siisiainen, Lauri. *Foucault and the Politics of Hearing*. Routledge, 2012.
- Stankieveh, Charles. "From Stethoscopes to Headphones: An Acoustic Spatialization of Subjectivity." *Leonardo Music Journal*, Vol. 17 (2007) pp. 55-59.
- Starr, Frederick. *Melnikov: Solo Architect in a Mass Society*. Princeton: Princeton University Press, 1978.
- Sterne, Jonathon. *The Audible Past: The Cultural Origins of Sound Reproduction*. Duke University Press, 2003.

Sterne, Jonathon. "Sounds like the Mall of America: Programmed Music and the Architectonics of Commercial Space," *Ethnomusicology*, Vol. 41, No. 1 (Winter, 1997), pp. 22-50.

Sumrell, Robert and Kazys Varnelis. "The Stimulus Progression: Muzak," *Blue Monday: Stories of Absurd Realities and Natural Philosophies*. Actar, 2007.

Thompson, Emily. *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900–1933*. MIT Press, 2004.

Vanel, Herve. *Triple Entendre: Furniture Music, Muzak, and Muzak-Plus*. University of Illinois Press, 2013.

Wood, Tony. "Bodies at Rest." *Cabinet Magazine*, Issue 24, Winter 2006/2007.