Journal on the Art of Record Production

What Studios Do

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This essay is focused around a seemingly simple question – what do recording studios do? First, a clarification. I am not primarily asking "what are studios" or "what do people do in studios," two comparatively straightforward questions that are tangentially addressed in academic and trade writing. Rather, I wish to consider some of the ways in which the studio itself shapes the kinds of social and musical performances and interactions that transpire within. I contend that studios must be understood simultaneously as acoustic environments, as meeting places, as container technologies, as a system of constraints on vision, sound and mobility, and as typologies that facilitate particular interactions between humans and nonhuman objects while structuring and maintaining power relations.

Most often, scholars have defined studios solely in environmental terms. Antoine Hennion refers to the studio as a "laboratory" (1989), Paul Théberge describes it as an isolated "non-place" (2004), while Ed Kealy alternates between dubbing the studio an "assembly line for record producers" or "an artist's workshop" (1982), depending on the studio and how it was configured to facilitate – or unfacilitate – particular kinds of work. Let's consider these analogies for a moment. Laboratories, workshops, assembly-lines are archetypal professional workplaces, but ones where the building is often intended to recede from attention and would be typically regarded as comparatively inconsequential on the nature of products produced within. The focus is on the work, and we are led to believe that the products made in such workplaces or the experiments conducted in such laboratories would turn out similar no matter which particular laboratory or assembly-line was used.

Yet, much discourse surrounding recording studios suggests the opposite. Studios are unique; they have a sound, a vibe, and even, in the case of legendary studios such as Abbey Road that become vacation destinations or pilgrimage sites, a transformative effect even on those who never professionally use the studios. Some studios' effects have been so profound that those studios are regarded as synonymous with the "sound" of a city, including Sigma in Philadelphia, or Stax Records in Memphis. Vibe and sound are two things which I wish to tease out in this essay, but I would argue are only a small part of what studios do.

I contend that it is necessary to take account of the field of social practice in relation to the work that studios do. Numerous scholars in different disciplines have argued a similar point following their analysis of different kinds of buildings. For example, sociologist of science Thomas Gieryn has written about Cornell University's biotechnology building and how it enables us to witness "a physicalized architecture of knowledge" (2002, 46).[1] In a subsequent study of the James H. Clark Center for Biomedical Engineering and Sciences at Stanford University (2008), Gieryn explored the contradiction between the center's alleged "placelessness" and the importance of the design of the place itself for facilitating scientific experimentation and innovation. His dual focus, in both studies, is the assessment of the effectiveness of science center buildings in facilitating/unfacilitating social interactions that result in scientific invention, and the instability and constant renovation that characterize such buildings:

> Buildings stabilize social life. They give structure to social institutions, durability to social networks, persistence to behavior patterns… And yet, buildings stabilize imperfectly. Some fall into ruin, others are destroyed naturally or by human hand, and most are unendingly renovated into something they were not originally (Gieryn: 2002, 35).

Architectural critic Kim Dovey clarifies Bourdieu's notion of *habitus* in relation to the constraining and enabling features of buildings, which he describes as "inherently coercive in that they enforce limits to action and enable social practice to 'take place'" (Dovey: 2005, 291). He continues:

> Architects also necessarily shape a representational world [where] certain forms of identity and place are stabilised and authorised through built form… while we may articulate theories of fluidity, transparency, virtuality and ephemerality, architecture has great inertia – it inevitably 'fixes' a great deal of economic capital into built form (ibid, 292).

Gieryn's approach to understanding *how* buildings matter is more indebted to the sociology of Durkheim and Mauss. As such, his claim that "research space mirrors the social organizational units of science" (2002, 46) reveals a social constructivist approach that contrasts with Dovey's characterization of buildings as "coercive" and other gestures to architectural determinism. In thinking through the work that recording studios do, I find both approaches to be pertinent; when recording artists enter studios they enter into spaces that seem by their very nature to constrain social and musical practices and practitioners (the coercive nature of studios); yet, those same studios were the result of a design process which arguably mirrors the social organization of studio work, and perhaps, the broader music industry in which these studios reside.

Following the work of feminist theorist Zöe Sofia, I find it productive to think of studios as *container technologies*. For Sofia, utensils, environments, labs, homes, workshops, wombs, and a Heideggerian standing-reserve of resources all share features of containment, and it is her contention that we have become blinded to the work that such container technologies do due to the primacy of tools and invention in scholarly discourse and the "unobtrusive technics of containers and containment" (2000, 198). She also suggests that this has in part been due to normative gendered readings of tools as masculine and of containers/vessels as feminine:

> To keep utensils, apparatus, and utilities in mind is difficult because these kinds of technological objects are designed to be unobtrusive and, like the environment mother, "make their presence felt, but not noticed." Thus, the analyst of container technologies must constantly work against the grain of the objects and spaces themselves—not to mention the ingrained social habit of taking for granted mum's space-maintaining labors— to bring to the foreground that which is designed to be the background (Sofia: 2000, 188).

In her conclusion, she outlines several provocations related to containment, the most pertinent to this study being:

> There is no such thing as a discovery/invention [apart from the potential space: lab, studio, study, etc.]
>
> There is no such thing as a tool [apart from the workshop, domain of equipmentality (Heidegger)]
>
> There is no thing such as a technology [apart from the standing-reserve (Heidegger)]. (Sofia: 2000, 198-9)

Pushing this provocation further, I argue that recording studios are not always in the background nor environmental in character, as they call attention to themselves throughout the recording process, during musical and non-musical forms of work. Sofia's examples of containers and containment have an additional register of pertinence regarding recording studios, some of which are described as "wombs," as "bunkers" or as "man-caves." These terms themselves suggest a range of gendered kinds of spaces, ranging from the nurturing and maternal (wombs), to the protective and paternal (bunkers), to the male domination of the maternal (man-caves). However, studio-containers (regardless of their gendered readings) are not always designed to be unobtrusive. Studios comprise a system of conspicuous constraints on paths of audition, lines of sight, and the nature of the social and musical action that can transpire within. Furthermore, just as many writers have noted the proliferation of

computer-based audio recording technologies since the introduction of affordable DAW systems in the 1990s (Porcello: 2004; Théberge: 2004), there has been a similar proliferation of amateur acoustics engineering knowledge and DIY acoustic treatments (which I will return to later) – a field of practice which situates the studio-container in the foreground of attention and the forefront of audition.

But I'm getting ahead of myself. Let me outline what to me seem some of the key things that studios do:

1. they affect/effect sound during both tracking and mixing, and may become the focus of audition or the subject of critical listening
2. they isolate studio workers from the outside world, and the world from studio work, while possessing a visual and audible difference from other work environments
3. they constrain lines of sight and focus visual attention on key places or objects within the studio
4. they constrain paths of audibility and precipitate the need for monitoring, talkback, and other technologies of audition
5. they cultivate new practices and shape social interactions
6. they may become pilgrimage sites or even become synonymous with an entire local musical scene

For the bulk of this paper, I will elaborate on these six points with examples I encountered during my observational research in studios in the United States, Greece, Sweden and Turkey, supplemented with published accounts of studios and analyses of studio construction threads on several popular professional audio engineering message forums. I conducted two years of participant observational research at studios in İstanbul during 2005-7 with additional research trips in 2004, 2009 and 2011; during much of this time I worked as a tracking, mixing or mastering-engineer (and occasionally as a studio musician) in medium-sized project and professional studios or in arranger or engineer-owned private home studios.[2] In other publications I have analyzed how these studios are set up to facilitate the creation of arranged folk music, a genre that entails exceedingly complex 24 to 140-track arrangements of parts that are performed by a small number of proficient studio musicians who specialize in Anatolian regional musical instruments (Bates: 2008; Bates: 2013), how some recording projects involve distributed production and work is shared near-simultaneously with studios located in different countries (Bates: 2012), and the emergence of a digital aesthetics specific to this mode of working and the acoustic specificities of the treated concrete structures characteristic of İstanbul's studios (Bates: 2010). Beyond my work in İstanbul, I have conducted multimode research in studios in many other locales from the mid-1990s until the present. In some cases, the studios I have selected could be considered as archetypal or representative of particular historical trends in studio design and use, while others are exceptional or idiosyncratic. For most of this essay I am focusing primarily on studios that entailed an architectural design and dedicated buildout, including ground-up builds and redevelopments of residential, commercial or industrial spaces, as these designed spaces make most explicit the work and effects of studios. In the conclusion, though, I will suggest ways of extending this theory to less-obvious "studios" including untreated home bedrooms and barns.

Acoustic Environments And The Focus Of Audition

At one level, the "sound" of any room can be represented as a complex set of transfer functions. Simple transfer functions can take any source signal (e.g. the acoustic sound of a viola) and break it down into a set of discrete sinusoids (frequency-amplitude pairs, which for the viola would include the fundamental tone, each overtone, and the many frequencies caused by bow hair friction). Each discrete sinusoid can then be individually altered, and the altered set is summed back together to make a new waveform (Hoffman: 1997). Room sound in any specific position can also be approximately represented by a transfer function, since every material surface in a room, in principle, reacts to discrete sinusoids, reflecting and/or absorbing them in a consistent manner (Figure 1). But room sound is not the only kind of transfer function, as most digital effects – digital EQ, spectral analysis, artificial reverberation – are also sets of transfer functions. The room behaves for all intents and purposes simply as an effect – but one that affects both raw sound (the viola performance) and sound playback.
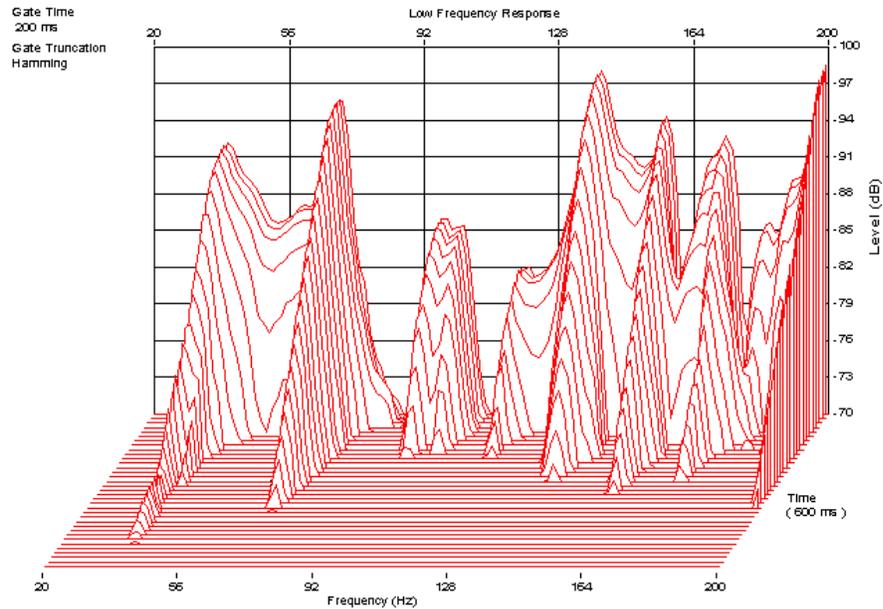
Figure 1. Waterfall plot, which shows a room's response to pink noise changing over time.

Room sound itself is typically subdivided into two separate components: early reflections, which include all of the first order reflections of sound off of walls and other objects; and reverberation, the sound of those reflections further bouncing off of walls and objects (Figure 2). In a medium sized room (~300ft2 or 30m2), early reflections occur within the 20ms from the moment of sounding, while reverberation (particularly of low frequencies) may last for over two seconds. Through a host of signal processing techniques, including dynamic range gating and transient shaping, it's often possible to reduce or remove the entire reverberative part of the room effect while keeping the "raw" sound and its early reflections. I described the sound of any room, though, as a complex set of transfer functions, as the effect of the room on sounds produced within changes with any change of the position of the sounding object (instrument or loudspeaker) or the listening subject (human ears or microphones). Even when attempting to remove the "room sound" in any recording, recordings continue to be strongly positional and maintain audible traces of their original acoustic environments.
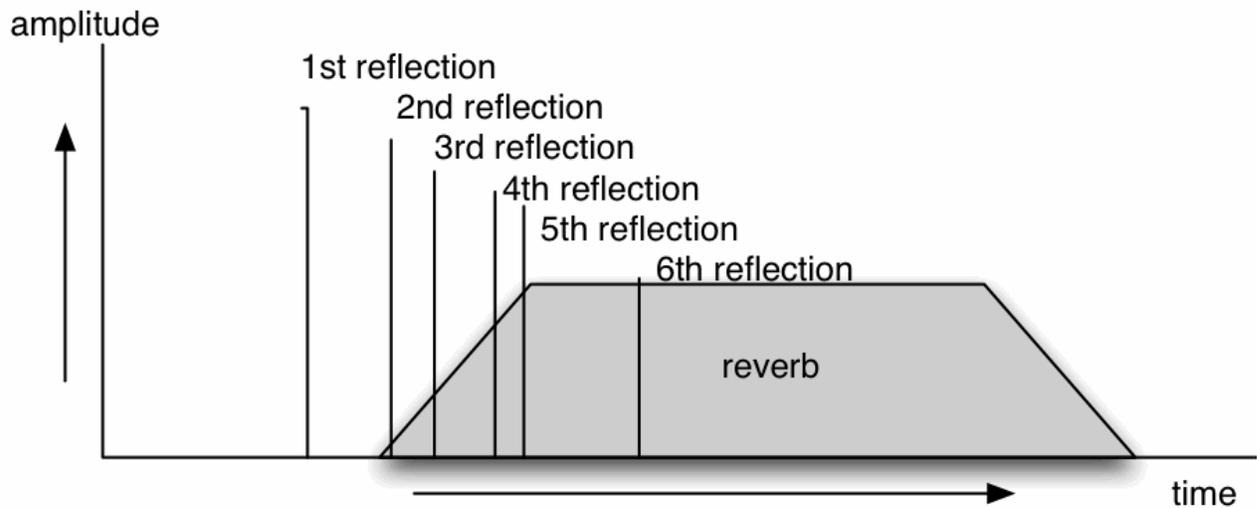
Figure 2. Basic diagram showing the temporal unfolding of early reflections and reverb.

All of this gets subsumed into the idea of studios having "a sound," despite the multiplicity of transfer functions. Studio guitarist Jimmy Johnson (of Muscle Shoals fame) dubs this the "fingerprint sound" of a studio (Simons: 2004, 14), while LA Times staff writer Bob Pool wrote "Capitol fears for its sonic signature" when nearby construction threatened the historic Hollywood recording landmark (Pool: 2008). Susan Horning traces the origins of such conceptualizations to the 1947 remodeling of NBC's Radio City Studio 3A, where "the acoustic treatment incorporated reflective surfaces as well as absorbant [sic] areas, movable panels, drapes, polycylindrical surfaces, all of which could be adjusted for 'optimal acoustical results'… the studio itself had become 'the final instrument that is recorded'" (Horning: 2002, 165, emphasis in original). Fingerprints, signatures, and final instruments suggest an acoustic reality whose significance far exceeds a simple transfer function.

In the digital signal processing technique known as convolution, a source signal is modified by an impulse response.[3] Convolving reverbs (hardware and software) often come bundled with sampled impulse responses from famous studios and concert halls, and allow any recordist to simulate the placement of any sound and any simulated listener within specific locations in Ocean Way Studios, the Concertgebouw, Cathedral St Alain de Lavaur or numerous other spaces. Returning to the early reflections/reverberation divide, more often than not a sound stripped of its reverberations (but not its early reflections) is given the reverberation character of this simulated space. More specifically, most simulated reverb technologies allow the user to add any mix between the early reflections and reverberation of a simulated space. Therefore, it is possible to add the early reflections of any simulated space to the early reflections present in the source recording. The sound, quite literally, is split between its origins in a small tracking room and its destination in a wholly different acoustic environment, but retains traces of both. This split relates to Murray Schafer's concept of schizophonia, "the split between an original sound and its electroacoustical transmission or reproduction" (1977, 90; see also Feld: 1994), or Jason Stanyek and Benjamin Piekut's concept of rhizophonia, "the fundamentally fragmented yet proliferative condition of sound reproduction and recording, where sounds and bodies are constantly dislocated, relocated, and co-located in temporary and aural configurations" (2010, 19). Yet, I would argue most theorizations of these technology-mediated -phonias exclusively emphasize the split or fragment (which is never complete) rather than the trace (which always remains) – the placelessness of recorded sound rather than the indelibility of place in all acoustic recording.[4] I will return to this when considering the relation of studios to cities in the section "studios as pilgrimage sites".

The act of critically listening to music in any studio space is something that requires a lot of practice, and engineers learn how to negotiate around the sound of their rooms. For example, all of the studios where I worked in Turkey were redevelopments of concrete structures that featured what in Euro-American terms might be regarded as untenable flutter echoes, standing waves, null points and excessive low frequency buildups. In these rooms, engineers developed idiosyncratic room-specific listening

strategies to help ascertain if the mix was done. For example, at ZB Stüdyo, engineer Metin Kalaç would listen back to a mix while smoking a cigarette in a special spot in the hallway outside the control room; only from there could he accurately hear if the bass and low midrange frequencies in a mix were in proper balance. Everyone else in the studio thought Metin was just on a smoke break, but for Metin that moment was when critical listening happened. I wrote earlier of the techniques that San Francisco-based producer Ron K. used to mix bass in his studio, where he would "hear" when the bass was in the pocket through vibrations felt through his right forearm coupled with the Sound Workshop 34-series console (Bates: 2009). But these kinds of idiosyncratic strategies can lead to problems when the client, the label or the singer enters the control room for critical listening. Outsiders don't know what to listen for or how to listen in the room, often precipitating substantial miscommunications about perceived discrepancies between the mix at hand and the desired mix aesthetic. Such miscommunications relate to problems in translation, but there's a second sense of translation that is discussed by many recording engineers, which is the idea that a mix produced in a studio should sound good when played back in any acoustic environment.[5]

Studios therefore create hierarchies of listening proficiencies and a plethora of listening strategies (like hallway or car stereo listening, and even haptic and bone conduction techniques like Ron's right arm). This is only compounded when we consider the heterogeneity of acoustic environments that have come to be used for audio recording work. Perhaps the greatest black art of all in the recording milieu, at least in the early twenty-first century, is acoustic design. It is comparatively easy to change a sound during tracking by changing or moving a microphone, and engineers are well versed in a host of signal processing techniques for changing the sound of a track or a mix – techniques which have a somewhat obvious cause-effect relationship. Most signal processing capability is contained within boxes or software that provides a user interface that renders invisible the internal circuits or signal processing algorithms. Yet, when it comes to figuring out how to remove low mid buildup in a control room, how to increase the STC between rooms, or how to make the RT60 times (see below) more even across the full frequency spectrum, one enters into the seemingly impenetrable and counterintuitive world of acoustics.

The impenetrability of acoustics comes from the lack of an established system whereby nonexperts can learn to hear the effect of individual treatment types, and the extensive mathematical calculations that are necessary to plan and realize an acoustic design. The counterintuitive elements include the ways in which the same treatments can exhibit opposing properties when used in small or large rooms (for example, Helmholtz resonators which primarily act as broadband absorbers in small rooms but additionally act as diffusors in large rooms), or why the successful installation of adequate bass trapping (a treatment designed to minimize the buildup of bass frequencies) can result in a room where bass frequencies seem to be much louder. During the early 2000s a number of the United States' and England's largest studios, including many of the studios that included a live room large enough to track a full symphony orchestra, closed down due to the sharp downturn in the recorded music industry.[6] Besides obvious concerns about the vitality of the sector, many engineers and musicians were most upset about the loss of some of the best-sounding rooms in the world, noting that small project studios (no matter how well stocked with gear) could never replicate the experience or sound of tracking an instrument in a large, well-designed space. In the words of producer Rick Rubin:

> Most of the studios I [work] in were built in the '50s or '60s and they sound amazing. Modern recording studios sound horrible. It's not just the equipment; it's the room itself. Now, like the cd, they are spec'd out properly. Before they were kind of magically, with smoke and mirrors, made to sound good by people with good ears. Now everything is computer generated. Now it's perfect, but there's no vibe at all (R. Brown: 2009. 11).

Yet, in the same way that discussion of engineering technique has become public through web forums, acoustics has become another site for intensive online DIY communities. A visit to John Sayers' acoustics forum or the several acoustics subforums of gearslutz.com (moderated by Jay Frigoletto) and ProSoundWeb (moderated by Thomas Jouanjean) reveals a rich discourse between a new generation of audio professionals and amateurs who are now obsessed with RTA (real time analysis) and measuring RT60 (the amount of time it takes for a sound produced in a room to decay to a level 60dB below its peak), generating waterfall diagrams and learning how to hear what specific acoustic treatments sound like.[7] Within this generation of acoustically-treated DIY amateur project studios, there is a culture and practice of listening to rooms or room treatments as much as a culture of listening to recording gear or music. This shift I believe is a significant one, for the studio no longer is regarded as a passive environment, but rather as the subject of analysis – you listen to the studio or to the womb, the container

becomes the message. In the interest of finding unique acoustic spaces within their own recording spaces, some engineers even have taken to miking the toilet (Figure 3).

*Figure 3. At **SplitSecondSound**, an Amsterdam facility, even the toilet was subjected to analysis for its acoustic qualities, then outfitted with a wall panel with XLR jacks.[8]*

Yet such practices aren't new. Emily Thompson narrates accounts of the experimental methodologies of scientist and acoustician Wallace Sabine (1868-1919). As part of his process of redesigning the Fogg Lecture Room at Harvard, Sabine carted hundreds of absorbent seat cushions from Sanders Theatre and experimented with their placement and the ensuing effect on sounds (Thompson: 2002, 36-7). These experiments resulted in his first formula for reverberation. As the initial formula was specific to the properties of the amber-colored cushions, he later revised the formula to include a more universally applicable coefficient of absorption, which ultimately led to the formulas used today to calculate RT60 times.

Studios are built to be listened to, and unlike other acoustic environments, their sounds (and not just the soundings within) circulate outside their confining walls. In this regard, studios complicate definitions of the term acoustic, particularly as the term has been employed in the emerging discipline of sound studies. In Bruce R. Smith's The Acoustic World of Early Modern England (1999), the term acoustic is a stand-in for thousands of sounding objects and sounding moments in effectively unrelated acoustic environments. Acoustic, here, is not a subject but rather a methodology that involves an attention to sound. A different sense of acoustic can be found in Brandon LaBelle's Acoustic Territories. His book is structured around a "topography of auditory life" (2010, xx) and attempts to follow "the sonic self as a special figure embedded within a sphere of cultural and social habits, what Richard Cullen Rath calls 'soundways,' or the ways people come to express their relation to sound and its circulation" (ibid). I share with LaBelle a concern for the local, for the topographical. Yet LaBelle's acoustic concerns don't extend towards analyzing differences between topographically similar spaces, for example comparing the "echoing acoustics" (ibid, 11) of different underground environments where street musicians perform. I will return to the concept of difference in a moment, but now wish to turn to one of the key ontological properties of studios – their isolation.

Isolation And Difference

Isolation is a key trait of many studio designs, but one that is typically talked about solely in relation to acoustic designs that keep outside sound from intruding into the studio, or inside sound from polluting the outside world. In the case of residential studios located in the remote wilderness, we might be inclined to think of the isolation of studios in social terms as well, as something that isolates the studio's inhabitants from society, or protects the inhabitants of studios from outside scrutiny. This

latter sense relates to what Irving Goffman describes as the "backstage" component of the process of "impression management" in his analysis of the performance of self. Goffman cites examples of workers (ranging from Simone de Beauvoir to hotel restaurant workers to gas station mechanics) where as part of their work they sometimes must "buffer themselves from the deterministic demands that surround them" (1956, 71) and subsequently perform very differently than they would in a public, "frontstage" setting. Accounts of pianist Glenn Gould in the studio certainly support this sort of reading. Gould himself compared the studio to a "cloister" (Gould: 1983, 57), and Tim Hecker describes how Gould "viewed the studio as a sort of embryonic insulation from the world, a laboratory of the late night that rewarded experimentation, sheltering him from the external pressures that stifled creative development" (2008, 82). Following Goffman and thinking through Gould, we might be tempted to compare the "contradictions" between frontstage and backstage performances, or even to uncover backstages within the already isolated recording studio setting.[9]

Sound and social isolation are key properties of many studios for sure, but I wish to bring up two seemingly oppositional terms that imply qualitatively different kinds of isolation: the studio as a womb, and the studio as a bunker. Discussion of studios as wombs proliferated in the early 2000s through web forums for discussing the diaries of Mixerman, aka Eric Sarafin.[10] The diaries narrated the adventures of a major-label engineer working with a dysfunctional rock band, and their publication constituted a watershed moment for online recording engineer communities: the first extensive public confessional of the kinds of deceptive and gut-wrenching practices that many knew or imagined to be the case in the Los Angeles commercial music industry but never openly discussed. Additionally, the diaries transcended the normative isolation of studios from public discourse, exposing the backstage of the backstage, if you will. Mixerman talks about the womb in relation to his practice of bringing carpets, soothing tapestries, lava lamps, and other decorative items that effectively pad the control room, creating a nurturing environment in which he can work. Producer Rick Rubin takes a similar approach to transforming the control rooms in which he works. According to Red Hot Chili Peppers' Anthony Kiedis, Rubin "basically goes into the engineer's booth, removes everything in the room and has his people bring in the most comfortable couch-bed-type object that you'll ever see. Then he'll cover it with pillows and blankets, and that becomes his station" (Brown: 2009, 11). However, in Mixerman's accounts, the womb is always pitted in opposition to the social world of the music business. Mixerman enters the womb to get away from the A&R reps, from the band's groupies, or even from the band itself.

In contrast to this nurturing aspect, we find quite a few newly built mastering studios, and here the recently opened Amsterdam Mastering is an excellent example, where the studio is described as a bunker. Like wombs, bunkers also protect, but they typically protect from a different sort of feared intrusion – military force, bombs, war, etc. Amsterdam Mastering, one of the most elegant examples of Thomas Jouanjean's "front-to-back" control room design, features a totally sealed, steel-encased, thick-walled structure floating within a large warehouse, an architectural feat that clearly sets apart the space from other workspaces (Figures 4, 5). Owner Darius van Helfteren additionally describes his facility as having a cockpit (yet another kind of confined and isolated space), highlighting the relation of technical implements, visual indicators and tactile controls to the bunker environment.[11]

*Figures 4 and 5. **Amsterdam Mastering** and the studio-as-bunker*

While both wombs and bunkers protect and isolate, they also contain, and here I want to recall the work of Zöe Sofia where she considers the containment aspect of two technologies often conceived of as phallic/masculine: skyscrapers (a "womb with a view") and cars (with their "womby comfort and storage space" (2000, 188)). A third studio topology that warrants some attention is the man cave, a common term for men-owned home studios including basement and attic studios and converted garages and barns. Wombs, bunkers and man caves are built environments that constitute a co-opting of women's labor and nurture for the purpose of furthering men's creative work and social interaction – and to this list, we could add high-fidelity "enclosures" and listening rooms (Keightley: 1996) or ham radio labs. Subsequently studios, for the most part, have become part of what Turkish female session violinist Neriman Güneş described to me as a "world ruled by men" (erkek hakim olduğu bir dünya). Whereas in most other facets of professional musical life in Turkey – radio orchestra musicians, conservatory professors, rock bassists, etc – gender ratios are typically 50-50, there are only a handful of female studio musicians, engineers, arrangers or producers. This is not specific to Turkey and appears to be near-universal. Some women who do attain a significant professional place in studio cultures (including Neriman Güneş in İstanbul and legendary bassist Carol Kaye in Los Angeles), rather than emphasizing gender differences describe themselves as "one of the boys" (Erickson: 2005).[12]

I would argue that through this co-opting process studios come to maintain gendered divisions of labor and practices which exclude the majority of female musicians from long-term participation in the studio environment, or perhaps isolate the world of studio work from women's worlds. While studios can be redesigned (see "studios as pilgrimage sites"), rarely are women included in the design or redesign process, and thus studios continue to be spaces where, in the words of interior design and urbanism researcher Jos Boys "inequalities are thus produced and reproduced" (1998, 208). Singer and ethnomusicologist Ayşenur Kolivar, a prolific studio choral arranger and background vocalist (and one of the very few female studio professionals in Turkey), talked at great length about the aesthetic differences of studio rooms and cited the problems inherent with a bunch of Turkish men doing the interior design on studio rooms. Things like oddly colored acoustic treatments hanging from the wall (Figure 6), the cold and hard floors, the angular features or other unusual forms of interior design (Figures 7, 8) all came to discourage women from entering or participating in such environments. Neriman Güneş too noted oddities in the environment, especially the darkness (karanlık) and odd lighting (Figure 9). But Ayşenur Kolivar used the term fark (difference) repeatedly – it wasn't just that the spaces were ordinary men's spaces (like the coffeehouse, a quintessentially male institution throughout Turkey and the Arab world), which in and of itself might be unremarkable or unproblematic, but it was in this difference that attraction/repulsion worked. This difference suggests that studios are not simply masculine spaces, but rather are spaces (unlike coffeehouses) with ambiguous rules, and spaces that couldn't be remade.[13] In contrast, she talked about how in eastern

Black Sea villages, women did the majority of construction (of houses and agricultural buildings) and thus had a key role in the construction of built environments that fostered a sense of women's collective participation in work. Difference, then, as a practice that isolates as it protects.

Figure 6. Broadband absorbers hanging in the tracking room at Duru Kayıt, İstanbul.

Figure 7. Angular features in the Stüdyo Yekâre tracking room.
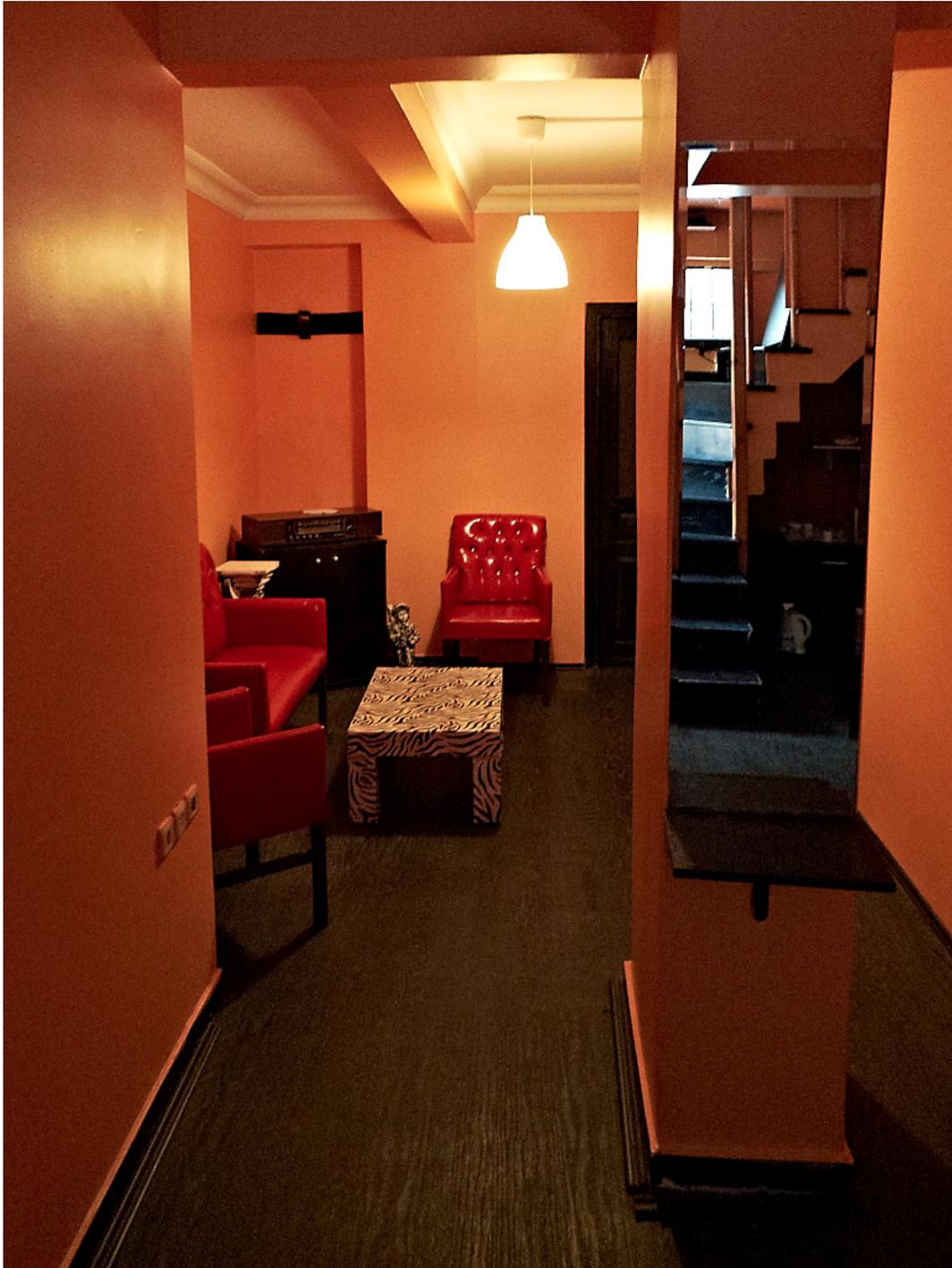
Figure 8. Leopard print and red vinyl adorn the Stüdyo Arica lounge.

Figure 9. Blueish tint to the control room lighting at Kalan Stüdyo, İstanbul.

Constraints On Vision/Sight

The field of view within studios is a set of contrasts – between technical objects situated at the center of the work environment that become the objects of focus, and on musical work that happens in other rooms that recedes nearly to invisibility due to strategic lighting and other restrictions on the field of view. The control room glass, an iconic studio feature, sets studios apart from other kinds of work environments; it is a technology designed to acoustically separate rooms while permitting some amount of inter-room visually-aided interaction, but from either side of the control room glass the view of the other side is usually doubled, blurred and chromatically indistinct. The control room glass is not just iconic but ironic as well: it hints at the importance of real-time social/musical interaction in studio work while exposing the extent to which interaction has been curtailed in the interest of isolation.[14] Some studios do away with the control room glass and use a system of video cameras and monitors, exacerbating these visual distortions even more. In nearly all subdivided studio complexes, subtle gestures or small movements would be near-imperceptible between rooms, and subsequently when engineers want to cue a musician to start playing they will often make exaggerated, dramatic motions with their arms. I'm not the first to note the strangeness of the control room glass. Alan Williams notes that in some of the earliest recording studios the use of curtains and frosted or smoked control room glass reinforced a "musician-centric hierarchy", but moreover that "obscuring the actual tasks being performed by the technicians supports the mythology of technological mystery, while providing a shield that masks their reactions to the performances they are recording" (2007, 2).

Yet, there is much to look at in studios. Figure 10 is a picture shot from the point of view of a studio musician in İstanbul's Kalan Stüdyo.[15] The Neumann U87 mic is at the forefront of the musician's vision in the darkly lit tracking room, while the musical-

technical work of the arranger and engineer in the control room appears as a distant apparition. As the sound of any captured recording changes substantially with even a one-inch change in the distance between instrument and microphone, maintaining an even distance is crucial to maintaining a consistent timbral quality. Subsequently, I noticed that many studio musicians in Turkey would stare intently at the mic while tracking, while others would perform with their eyes closed, actively listening to the mic-instrument distance instead.

Figure 10. Picture taken from the studio musician point-of-view at Kalan Stüdyo (İstanbul).

Engineers and arrangers have different visual needs than tracking musicians, including keeping track of the location in the song, looking to see what sorts of nonlinear editing may need to be done to correct rhythmic discrepancies, and continuously scanning meters to make sure that levels are optimal. Figures 11 and 12 were shot from close to where a project arranger would sit at Stüdyo Yekâre and Stüdyo Arica,[16] showing the arranger's perspective on both the engineer's computer-focused work and the musician's performance in the tracking room. Notice the prominence of the DAW monitor and other technical objects within the field of view; these fill the attention of the engineer especially and secondarily everyone else in the control room. Alan Williams wrote quite convincingly about the effect of computer displays in the control room. He notes that analog recording environments were to the uninitiated a "unfathomable sea of knobs, faders, meters and cables" (2012, 2), and helped to maintain the sense that musicians were peripheral to the recording process. In contrast, the computer monitor, a kind of visual display much more familiar than Dorrough Meters or oscilloscopes, "makes private knowledge public, invites active participation, and serves to educate the viewer in the myriad possibilities of sonic manipulation" (ibid). Computer monitors may change the power dynamic of studios as noted by Williams, increasing the agency of musicians and diminishing the power of engineers and other kinds of technicians, but I did not find this to be universally the case in Turkey. Instead, studio musicians who were avid computer users, I found, took much more interest in the DAW's display than those who rarely used computers. Some arrangers grew to increase their dependence on engineers since they found the excess of information and near-infinite array of choices provided in the form of plug-in settings to distract and detract from their handle on the feel of a song.

Figures 11 and 12. Pictures taken from the arranger's perspective at Stüdyo Yekâre and Stüdyo Arica (İstanbul).

Constraints On Paths Of Audibility

All recording studios regulate performances, soundings and modes of listening, but it is useful to consider the specifics of such regulating effects in recording facilities. Studios are distinguished from other kinds of workspaces by the acute need to restrict most potential flows of sound while precisely shaping the audible aesthetics of other sounds. Some acoustic materials increase the sound isolation between the studio and the outside world and between rooms within a studio (for example, a two-leaf wall construction or isolated concrete foundation), while many room treatments are designed to minimize the negative audible effects of room acoustics on musical sound (including many types of diffusors, and bass traps or other types of absorbers). The result of such treatments, however, is a space that requires additional technologies to become fully usable (Gervais: 2011). In the control room, the engineer (along with the producer, arranger, and any clients or guests) needs to be able to critically listen to recordings-in-process through a stereophonic or multichannel speaker system. In the tracking room, the musician(s) or singer(s) need to be play in tune and in time, in relation to a clicktrack and/or other parts in the recording. People in both rooms need to communicate with each other, and considering the limitations of vision and gesture, aural communication becomes especially important. Sundry microphones, speakers, headphones, headphone amplifiers, cables, and other devices work together as part of a system that enables everyone to hear what they need to hear, while the computer "hears," if you will, a digital representation of an electrical transduction of acoustic energy. I call this loose assemblage technologies of audition.

It is vital to understand that within this assemblage not everyone typically hears the same thing. Engineers often create different mixes for the control room monitors and tracking room headphone feeds, and in some sessions where multiple musicians perform simultaneously, different mixes for each musician. During the tracking of a particularly rhythmically challenging or precise part, a musician might feel they need a large amount of clicktrack in their mix (or the engineer may decide that for them), while the engineer would hear much less, focusing their listening instead on the timbre of the part and how it fits into the mix. In most tracking room monitoring setups, musicians at most could control the volume of their headphones or perhaps adjust the balance of high and low frequencies, while the engineer has ultimate control of what parts are sent and in what balance, and can at will engage the talkback mic and communicate through the headphone feed (while musicians are only audible to the control room if the engineer has chosen to monitor their microphone feed). Thus, an attention to technologies of audition reveals one facet of the asymmetrical power relations of the studio, and asymmetrical listening practices contained within.

With the proliferation of digital recording platforms starting in the 1980s, and especially with the shift from console/tape-based systems to computer-based DAWs, the practice of studio musicianship has accumulated even more technical challenges as digital recording systems introduce audible delays in the form of latency. In exclusively analog systems, the amount of time that it takes for signal to get from tape to headphones is negligible, so the only source of latency is the time sound travels through air, from instrument to microphone or from studio monitors to listeners (roughly 1ms per foot). But analog-digital conversion and digital-analog conversion each incur between 1.5 and 6 milliseconds of latency, and additional latency may be incurred if DSP-intensive effects plugins are used. In other words, studio musicians hear their own acoustic sound 6 to 23 ms before they hear their sound again coming through their headphones, listening to themselves in the past in order to synchronize their performance in the present. This is just one facet of the sensorium of studio work that sets studio musicianship apart from musicianship in other sites, and one of the interesting effects imparted by the studio and the technologies of audition contained within.

Cultivating New Practices And Shaping Social Interactions

I have already hinted at several ways in which studios attract and repel (through difference and through their normative architectural features), structure or shape the possible forms of musical and social interaction, and isolate studio workers from the outside world or even from other parts of the studio. Subsequently, two underarticulated threads in my analysis have been power and agency. Again, my primary concern in this article is not to articulate all of the ways in which issues of power play out in studio environments; many have written about the ways in which record labels conduct surveillance of recording studios (Negus: 1990, 91), how musicians gain agency through controlling the mic (Wong: 1994, 164) or engineers articulate power through their use of echo (Doyle: 2005, 193), and of the disenfranchisement of female singers in South Africa's Gallo Studios and disembodiment of their voices (Meintjes: 2003). Perhaps the most oft-cited trope is the so-called "democratization" of music or technology that transpired from the shift to cost-cutting just-in-time manufacturing techniques (Théberge: 1997) and the widespread availability of affordable home computers. Within this journal, Phillip McIntyre suggests a way of theorizing individual agency and creative decisions within the social structures of studio environments, and following Giddens suggests how power can be a productive force in studios (2008, 10). Alan Williams, as I noted earlier, analyzed the complicity of control room glass and talkback systems on studio power relations in the studio (2007).

Power is much more nuanced, pervasive and complex than simply owning or controlling the means of production, and many of its effects are at the register of the architectural. One of the key ethnographic problems that motivated Pierre Bourdieu's development of practice theory emerged during his study of the effect of Berber architecture on Algerian individuals and society. In Algeria 1960, Bourdieu concluded that interior architecture and village planning reflected the whole cosmology of Kabyle with it structure of binary oppositions (1979[1960], 121), but in a later article depicts architecture as itself enforcing the gendered power dynamics of Berber society (1970, 169). Michel Foucault's discussion of the panopticon (and by extension, his development of a theory of disciplinary power) hinges upon the Panopticon's effect: "to induce in the inmate a state of conscious and permanent visibility that assures the automatic functioning of power" (1991, 201). Steve Woolgar has written about how buildings themselves, and he singles out the entire University of Oxford, can be exclusionary and elitist (2002, 263), and Michal Murawski writes of how Warsaw's Palace of Culture and Science is able to cast an air of abjectness over the entire city (2011, 10). I am similarly motivated to question issues of power in relation to what studios do.

I find it fruitful to question what it means to be a technology-user, and to use that question to open up an analysis of different kinds of studio practices. For example, although engineers are typically depicted as the sole technology users, and certainly one can find a plethora of pictures showing the engineer behind the mixing console or the computer-based DAW, I would argue that everyone involved in the recording process is a form of mixing console user or computer user: what changes is the interface. In digital audio-based recording systems, for example, there is a fixed limit on the maximum amplitude that can be captured or produced, and nothing can exceed 0dBFS (0 decibels below full scale). Thus, professional musicians often adjust their playing styles so that they don't produce sounds that exceed this level. In my field research in Turkey, I found numerous such examples. Studio percussionist Soner Akalın developed his own darbuka (goblet-shaped drum) technique that produced a sound that was so consistent in amplitude, it sounded as if it had been compressed through a dynamic range compressor and made into a sample library loop. Studio clarinetist Serkan Çağrı produced a similar dynamic consistency, but through moving his body and subtly altering the distance and angle between mic and instrument with each note. Both musicians developed these techniques in the 2000s as a response to the experience of working in computer-based recording studios, and neither musician used this studio technique when performing in a live concert. Studios, therefore, have a constitutive force in producing new kinds of musicianship and new kinds of musicians. To understand "studio musicians" or other occupations it is not sufficient to map unprefixed musicianship onto a studio environment; we must take account of the ongoing effect of the experience of working within studios.

Likewise, the studio has been the site of numerous new techniques for working with recorded sound, including many modes of visualizing sound, and transduction between sound pressure, electrical impulses and digital representations. In this way, studios are effectively identical to scientific laboratories as described by Karin Knorr-Cetina:

> Laboratories use the phenomenon that objects are not fixed entities which have to be taken as they are or left to themselves. In fact, laboratories rarely work with objects as they occur in nature. Rather, they work with object images or with their visual, auditory, electrical, etc., traces, with their components, their extractions, their purified versions" (Knorr-Cetina: 1992, 116).

Similarly, Bruno Latour and Steve Woolgar write of scientific phenomena: "It is not simply that phenomena depend on certain material instrumentation; rather, the phenomena are thoroughly constituted by the material setting of the laboratory" (1979, 64; emphasis in original). Yet, studios and studio cultures do differ from laboratories. Latour and Woolgar post that "once the end product, an inscription, is available, all the intermediary steps which made its production possible are forgotten. The diagram or sheet of figures becomes the focus of discussion between participants" (ibid, 63). In contrast, a key issue throughout recording history has been the repeatability of mixes, the documentation of mic positions, and the development of further layers of automation technology (either on mixing consoles or within software) that allow near-infinite undo of any mistake that may have transpired during a recording project. This has been a driving force in the development of whole genres of studio technologies. Also, the nature of recorded genres depends, largely, upon a host of similar techniques during intermediate stages, and thus there is a rich discussion of the process of recording work. Such discussion comprises nearly all the content of articles and interviews in magazines such as Tape Op, and appears to be the central organizing force for all audio engineering web communities.

The physical layout of studios can have a significant effect on social interaction aside from the obvious work of making recordings. All commercial studios that I visited in Turkey had several lounge areas and a kitchen designed for preparing tea. Tea is an essential part of the work of hospitality, which I have argued before has a significant role in maintaining the social networks of the İstanbul recorded music industry and providing the ideal apprenticeship path for aspiring engineers (Bates 2008:144). Yet, none of the recording spaces was large enough to comfortably accommodate more than four musicians at a time. Thus, studios were not spaces where groups came to experiment or where through collective jamming new arrangement ideas were developed. Qualitatively different kinds of social/musical interaction are possible at some multi-room facilities (meaning, facilities with multiple control rooms that can accommodate multiple unrelated projects simultaneously). I worked at Hyde Street Studios in San Francisco in the late 1990s; the hallways outside of studios A, C and D, and the lounge connected to the numerous subleased smaller rooms served as meeting places for the many musicians and engineers that might be working in the facility at any given time. The hallway scene was amplified by the walls, which were covered with framed record jackets that provided visual evidence of the great albums that had been produced in the studio in the past – all this contributed

just as much to the vibe of Hyde Street as the unique acoustics of the main recording rooms.

Returning to the subject of hot beverages, tea was a defining characteristic of professional workspaces in Turkey (including but not limited to studios) but also seemingly was important in English studios. Phill Brown's accounts of Olympic Studios and working with Roxy Music and the Rolling Stones mentions tea drinking as often as illicit substance consumption, and the idea of starting as a tea boy and working one's way up to becoming an engineer or producer seems to be a career pathway shared between English and Turkish studios (P. Brown: 2010, 2). Hot beverages can even come to be a defining feature that sets studios apart from their competition. For example, one of New Zealand's premier studios, York Street, includes a lengthy section about their coffee prowess in a promotional walk-through video. The following transcript between studio manager Jeremy McPike and producer Clint Murphy transpired in the large tracking room:[17]

> **Jeremy**: Mr. Murphy, your coffee is ready – check this one out, that's a 9 1/2 out of 10.

> **Clint**: Look at that!

> **Jeremy**: York street is known – famous indeed – for its coffee.

> **Clint**: Exactly, that's another great reason to come to York Street, because the coffee is…

> **Jeremy**: Fair trade organic beans

> **Clint**: Delicious, delicious!

The importance of coffee and tea encompasses many registers, from the effects of caffeine on the nervous systems of individuals to a calming social ritual that punctuates an otherwise nonstop intensive work environment, from a symbol of pride in the service a studio provides to a defining element of the identity of an individual studio.

Until this point I have treated studios as somewhat static entities, but it is important to understand that, like scientific laboratories, studios can be redesigned in ways that fundamentally alter the potential kinds of social and musical interaction that can transpire within. When I visited audio engineer Ola Sonmark in Karlstadt, Sweden in 2006, the city's premier recording facility was being dismantled and transformed. RFM Studios, once a hub in the city's music scene featuring a live room that could record a chamber orchestra, was being converted into small songwriter booths. This redevelopment signified a symbolic shift – from a live-music, group-centered music economy into an atomized office complex where aspiring songwriters hoped to pen the next Britney Spears or Hannah Montana hit (these two stars were singled out by one songwriter I met for no apparent reason other than the fact that they had top-10 singles in 2005). Yet, beyond the symbolic significance, the redesigned RFM fundamentally altered the nature and form of social and musical interactions. What had been a Hyde Street-like space no longer actively facilitated random interactions or spontaneous jams. Experimentation and innovation was now privatized, individualized, and its interface limited to the singular mic, guitar and keyboard found in each of the songwriter booths.

The redesigned RFM was certainly not unprecedented and immediately suggests a parallel to the Brill Building, "a remarkable group of songwriters who huddled in cubicles within a couple of blocks of each other in midtown Manhattan in the late 1950s and early '60s (Emerson: 2006, 1), which Timothy Scheurer further historicizes as "the last bastion of Tin Pan Alley" (1996, 90). Ian Inglis provides a striking account of the Brill Building where the social structure of the workspace and its creative output folds into the building itself. He credits the Brill Building with precipitating a demographic shift in the nature of popular music production. As many of the songwriters were women, the Brill Building created the possibilities for "women to make forays into the male-dominated world of the studio" (Inglis: 2003, 217), and facilitated a "routine union of white songwriters and producers with black performers" (ibid, 227).

Studios As Pilgrimage Sites And Markers Of Place

In 2010, EMI announced it was planning on selling Abbey Road Studios in order to raise money to offset EMI's massive debt (N. Smith: 2010), an announcement that resulted in a massive outcry from musicians, music critics and fans alike, and even an

offer from Andrew Lloyd Weber to buy and preserve the property. Abbey Road, iconically represented on the Beatles' album by the same name, was one of the first dedicated studios designed for recording rather than radio broadcast purposes. It opened in 1931 to a session conducted by Sir Edward Elgar, was the site in 1958 of Britain's first rock 'n' roll single (Cliff Richard's "Move It"), and later housed the Beatles, Pink Floyd and many other bands. While the three-room complex featured distinctive acoustic spaces, little of the technology that had been used for the Beatles or Pink Floyd albums continues to be in use at Abbey Road, and in fact many of the rooms have been routinely redesigned.[18] Yet, despite the changes, Abbey Road never lost its surrounding mythology and in 2010 was granted English Heritage Grade II status "for its role in shaping British music" (BBC News: 2010). Interestingly enough, Abbey Road is a significant tourism site even though they are not open to the public and do not routinely offer tours of the facility.

Abbey Road was not the first studio to become a pilgrimage site or to be regarded as having a vital role in shaping a nation's music. Susan Horning writes of guided tours of NBC Radio City, at that time arguably the most sophisticated radio broadcast facility, as early as 1933 (2002, 153). In the 1960s many British rock/blues bands, inspired by the recordings of Muddy Waters, Howlin' Wolf, B.B. King and others, made their pilgrimage to Chess Records in Chicago and Sun Record Company in Memphis to see the site of the now-legendary American blues recordings. The Rolling Stones recorded at Chess in 1964-5, and The Yardbirds recorded at both Chess and Sun in 1965. In the mid to late 1970s, similarly, numerous British musicians traveled to Kingston, Jamaica to see (and try to record in) Lee Perry's Black Ark Studio, which had produced a wealth of dub reggae that had become popular in the U.K. (Veal: 2007, 155; Katz: 2000, 288). Today, Chess continues to be synonymous with "the Chicago sound" and Sun with "the Memphis Sound," even though both studios are nonoperational and are open to the public for guided tours.[19]

The musician-driven pilgrimages aren't enough to account for the extent to which certain studios become regarded as iconic. Maria Hanáček (2011) argues that music videos and other widely circulated films that depict musicians in studio environments contributed to the iconicity of Ireland's Windmill Studios (an important site for Irish rock band U2) and Germany's Hansa Tonstudio (similarly important for Depeche Mode and Iggy Pop). Furthermore, studios became more of a part of the public imagination in the British Isles and United States, at least, when they started to feature more prominently in television and movies. Engineer Phill Brown writes about one of the very first music videos, the Rolling Stones' 1968 video for "Jumpin' Jack Flash," which was filmed in Olympic Studios' Studio One (2010, 16-7). Rather than lessening the studio's relative isolation (as discussed earlier), such instances rather romanticized studios and reinscribed their isolation (albeit as an isolation that perhaps could be, even if only temporarily, transcended through media).

Concluding Remarks

Studios resist reductive analyses. Although isolated, they have their own frontstages and backstages, and like the laboratories studied by Knorr-Cetina, function as more than simply "internal environments." The placeness of studios leaves both audible traces (the early reflections of sounds) and visible ones, if we think of those studios that become shrines or pilgrimage sites, or photo or video documentation of studios that provide the outside world a brief glimpse into the interior isolation of recording studio life. It would seem that major facilities such as Abbey Road, Ocean Way or Sun Records are emphatically not "placeless place[s]" (Gieryn: 2008, 798; Kohler: 2002, 6), nor are they decontextualized from their immediate geographic surroundings.

Although atomized project studios (including bedroom studios, garages, and barns) may not immediately appear to be embedded within the social relations of a bounded local culture (see Giddens: 1990, 18-21, 52), many such studios are embedded within the social relations of specific online networked cultures,[20] as is evinced by the vibrant online recording engineer communities that support everything from amateur acoustician pedagogy to advanced mixing techniques and even online mixing/remixing competitions. Such studios can be considered as "local anchoring points in the cultural metropolises of the global urban network" (Watson, Hoyler and Mager: 2009, 867). Knorr-Cetina suggests something similar when she discusses how laboratories function not just as "internal environments" but rather as "a link between internal and external environments, a border in a wider traffic of objects and observations" (1992, 129). Like their larger counterparts, project studios are acoustic environments isolated from various perceived outsides, use the very same technologies of audition to make up for the constrained paths of audibility, and similarly shape the kinds of musical and social practices that can transpire within (even if this shaping process effectively restricts the studio's usage to a single musician at a time).

I argue that the more we wish to understand the vibe and sound of the studios, the more we may wish to consider the studio as an active agent in the process of recording production, an actor in the social worlds that inhabit its very wombs and bunkers.

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Acknowledgments

Notes

1 The original quote comes from Peter Galison, Image and Logic (Chicago: University of Chicago Press, 1997), 785.

2 Studios I observed or worked at included Stüdyo Sistem (in the Taksim neighborhood), Stüdyo Sound (Taksim), ZB Stüdyo (Galata/Tünel), Mavi Stüdyosu (Çamlıca), Stüdyo Yekâre (19 Mayıs Mahallesi), Duru Kayıt (Çiftehavuzlar), Kalan Stüdyo (Galatasaray), Arica Stüdyo (Bağlarbey), Ömer Avcı's home studio (Arnavutköy), MIAM (on the campus of İstanbul Technical University), Fono Film (Sultanahmet) and Babajim (Galatasaray).

3 Convolution is actually a multiplicative function. Albeit a bit reductive, it's not wholly inaccurate to say that convolution multiplies sound by an impulse, multiplying the original acoustic space by a new acoustic space.

4 One notable exception is Nick Prior, who studied the mobility of laptop musicians such as OK Computer and concluded that their recordings result in a "complex layering of spatial domains, both virtual and face-to-face, local and global" (2008, 919).

5 For more on audio engineer discourse and the issue of translation see Porcello 2004 and Mixerman 2010 (chapter 4); on engineer listening and cognitive processes see Horning 2004.

6 Major studio closures in the early 2000s included the Hit Factory (2005) and Sony Studios (2007) in New York, the Record Plant in Sausalito (2008), Emeryville Recording Company (2011), and Eden Studios (2007), Townhouse Studios (2008) and Olympic Studios (2009) in the UK.

7 Also of note has been a host of DIY acoustic treatments that have been popularized on the internet through the active contribution of Ethan Winer and Glenn Kuras to numerous message forums. Ethan and Glenn went on to form RealTraps LLC and Gik Acoustics, corporations that sell similar but professionally-manufactured treatments.

8 from http://www.gearslutz.com/board/showthread.php?t=373484 (Accessed: March 2012)

9 I thank Trevor Pinch for suggesting Goffman's work.

10 Originally, the diaries were an occasional feature on ProSoundWeb, but later became the cornerstone of Mixerman's forum called The Womb. For an expanded version of the diaries, see Mixerman 2009.

11 http://www.amsterdammastering.com/ (Accessed: March 2012). See also the studio construction thread at http://www.gearslutz.com/board/showthread.php?t=304215 (Accessed: March 2012)

12 The Women's Audio Mission, a San Francisco-based non-profit, has been very active in creating pedagogical programs and professional placements that create careers for women in music production.

13 I thank Jennifer Stover-Ackerman for suggesting this reading of the concept of difference.

14 Afro-Peruvian singer Susana Baca is a well-known critic of studio environments and the control-room glass. Her second album Eco de Sombras (Luaka Bop, 2000) was recorded at her home in Lima, which necessitated flying in hundreds of pounds of recording equipment (including a multitrack tape machine). For her third album, Espíritu Vivo (Luaka Bop, 2002), she sang in a studio but in front of a live audience: "I realized that I'm much happier when I have an audience close to me, so I can look into peoples' eyes [when I sing]. Perhaps it's something in my subconscious, but I feel I communicate much more that way. Studios usually feel 'cold' to me, as you're facing the glass window of the recording booth" http://luakabop.com/photobio/SusanaBaca /susana_baca_bio.htm (Accessed: March 2012)

15 Kalan Stüdyo, founded in 2007, is one of two studios owned by Kalan Müzik Yapım, the largest independent record label in Turkey and the Turkish diaspora. Kalan Stüdyo primarily records arranged rural folk, urban art and Anatolian ethnic musics, both for album releases and for TV and film soundtracks.

16 Studio Yekâre is a private home facility owned by percussionist/engineer Yılmaz Yeşilyurt, while Stüdyo Arica is a commercial facility that typically records Karadeniz (Black Sea arranged folk) album projects and fantezi artists.

17 "York Street Studios VIDEO tour", http://www.recordproduction.com/york-street-studios.html (Accessed: March 2012)

18 Most recently, the control room in Studio Two underwent "extensive modifications" in 2011 to accommodate the new AMS Neve 88RS mixing console. See http://www.abbeyroad.com/News/Article/156/Excitement-for-our-newly-refurbished-Studio-Two (Accessed: March 2012)

19 For a listing of other studios that are synonymous with the musical identity of specific cities, see Gibson 2005. The list on page 201 contains several inaccuracies; Chess Studios was in Chicago not Detroit, the Record Plant was in Sausalito not San Francisco, and WSM Studios arguably made a bigger impact on perceptions of the "Nashville sound" in its capacity as a radio station than as a recording studio.

20 I have observed that engineers and studio owners tend to gravitate to one or two message forum communities while avoiding (and often publicly disparaging) others.

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Ola Sonmark, February 26, 2006 (Karlstadt, Sweden)

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