19
The Studio

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Figure 19.1 The 16.4 Periphonic Ambisonic Studio at the University of Hull, UK.

In Periphony

You join this *humanoid alien* (Schulze 2018a: 3), at the start of a compositional process. I'm gathering sound materials to exploit in an acousmatic indulgence: the scene starts with muttered inanities—I can't make out exactly what's been said. Some are here for the transit. Perhaps a special punctuating treat as part of their longer ramble. Others for the spectacle, cameras ready. The environment extends out in all directions, but not equally. My *acoustic horizon* (Truax 1999) is distant ahead and laterally, proximate behind: a brick building providing a sort of human-scale delineation to the soundscape. An occasional breeze displaces my hair and the fur on the dead cat at the extremity of my right arm. An elderly gentleman finds the dead cat amusing to an audible degree, but otherwise the soundscape is unfolding with curated finesse. I can feel the heft of the locomotive judder the earth underneath me. This is the sound of the LMS No. 45428 "Eric Treacy," a steam locomotive

pulling into a station on a cloud-peppered but sunny, warm, calm … perhaps even lazy summer afternoon. The action grows in intensity, the horizon closes in, the close detail growing in prominence and angular definition. Suddenly, the immersion is interrupted: it's as though someone has stood up from their seat in the cinema, mid-scene, and carved out a silhouette, subtracting a small but unavoidably noticeable portion of the projection on their delicate escape to the restroom. My focus recedes back into this *studio* environment once more.

Now, I am listening to an ambisonic recording, in a 16.4 periphonic ambisonic studio located on campus at the University of Hull. Ambisonics is an abstract spatial format for *encoding* soundfields, pioneered by Michael Gerzon in the 1970s, liberated after copyright expiration and software proliferation. These *encoded* soundfields are then *decodable* to *n* listening situations. Am I hearing height information? The thought appears and I stare at the *Front Left Up* loudspeaker, azimuth +45°, elevation +35° (we work anticlockwise in ambisonics, by the way). This becomes a tick of sorts that draws my focus when I'm pondering the success of the reproduction of spatial image this studio affords me. I'm the pioneering listener-operator of this studio, still calibrating, tweaking, adjusting, and *adjusting to* the environment. Anyway, back to the projection.

These shuddering clunks, fizzes, hisses and machine grooves are bottled at Grosmont station, in the North Yorkshire Moors national park, as part of a compositional practice of gathering sounds and subsequently altering, sequencing. It goes without saying that I've been anxiously observing recording levels and cursing the breeze, merciful as it is. I'm armed with the almighty electroacoustic black box—the supposedly indelible recording device (Truax 2001: 10)—to allow the bottling of various sound events around the North Yorkshire Moors Railway with a first-order ambisonic microphone capture device. It is said that the microphone never lies, yet it only tells the truth afforded to it (Weidenaar 2002: 66), a dispassionate filter whose intent is shaped by its manner of deployment by the recordist with the untrustworthy ears, opinions, preconceptions, biases, preoccupations, limited powers of attention. And this truth is all around me, forming an apparent *circumspace* (Smalley 2007: 51). There's excitement as the iron horse shudders to a stop and exhales in billows of steam and coalsmoke. I can smell it, see it.

But I'm not there anymore. I must remind myself that those are experiential echoes, I suppose: multisensory traces that are merely reawakened by this enveloping acousmatic moment. I have a privileged, contextualized, multimodal perceptual *sensorium* (Schulze 2018a: 140), with full backstory and accompanying snapshots. After all, listening is an activity "situated in material and personal, sensorial and performative, as well as technological and historical relations to a given listening environment" (Schulze 2018a: 34) and I have a particularly privileged understanding not only of the recorded sonic environment but the immediate environment of the studio. I've seen its construction and know where the levers are, how the illusion is conjured. My attention is pulled strongly in both directions.

This *studio* is a listening machine that has an inherent contradiction. It's designed to reproduce sound in 360 degrees at a level of precision, with technical characteristics that afford *critical listening*, a specialized tool of sonic experience. But it is also just an arbitrary

context, with no essential role in the formulation or execution of the sonic endeavors of the listener-operator. This studio has a primary function of enabling the audition of periphonic ambisonic signals. These signals are curious as they are abstract, not only as all digital sound signals inherently are, but also as the paradigm of ambisonics is spatially abstract, *speaker-agnostic*, realized in essentially any context in any geometric configuration that happens to be adopted. This studio is one of many, *any* contexts that such a sonic endeavor can be realized in, either in terms of execution or reception. I'm back in Grosmont, hearing the LMS No. 45428 "Eric Treacy" once more. I look up from the computer screen. I don't see angles and loudspeakers this time. I see my office. The scribbles on the whiteboard, the old video cassette recorder that a student has been experimenting with, some of my late father's artwork on the shelves. I'm wearing my headphones. The smell of the coalsmoke is as strong as before.

Before we interrogate that notion, it's back to the *studio*. I'm staring at the *Front Left Up* loudspeaker again, still unconvinced of the spatial image I'm served up. Rinse and repeat this ritual of listening and reflecting enough times not to bother counting. Recalling Michel Chion, I realize I'm in danger of succumbing to the safety of repeated listening, something that is "not in itself enough to vouchsafe better attention" as I am likely to *prehear* what is going to happen and subsequently not really pay attention to the actual stimuli, wanting to "listen less and less," tending to merely recall, with a waning accuracy (Chion 2016: 215). I do another pink noise test of each loudspeaker as both a technical exercise to test the balance across the array and as a sort of sonic palate cleanser for my attention. Enough trains for today.

Apologies, I'm an *acousmatician* and I arrive at this discussion as a composer preoccupied with the medium(s) I work with and the method of reception that is consequently afforded to the listener. The listening experience is my output, I suppose, with my fixed-media compositions merely blueprints for the listener to digest, comprehend, navigate, and find meaning in an assumed, shaded gamut of ambiguity. This trajectory means I am to value the information contained in the black box highly, demanding as much of Weidenaar's *truth* encapsulated in the soundfields captured as possible, during their reimagining across an array of loudspeakers. My mode of listening is shaped by the context of my endeavors: to compose, to *work* in this space. As I listen in the studio, I actively try to leave behind the current *actual* spatial, temporal situation I find myself in to taste an alternative, suggested, virtual moment in another: a situation in-between this actual location and that of the presented sonic moment. The illusory mind's eye. *Cinema for the ear* as either Chion (Landy 2007: 89) or Bayle (Kane 2014: 51) might concede, loaded with promise and appeal. A *generated space* (Schulze 2018a: 142), a *liminal workspace* (Order 2016: 429) across the actual and virtual, perhaps neither fully leaving nor arriving at either at any moment. This listening requires some effort.

Despite teasing, and later exploring, that this studio is potentially made anonymous through the abstract paradigm around which it orbits (is the studio my office or this listening edifice?), this studio space is peculiar, unlike many other spaces but not wildly dissimilar to other studios dedicated to experimental creative practice. Located in a basement complex surrounding a concert hall, through double doors, down a corridor, it's a room erected

within an outer shell, a true *inner world* full of potency and mystery. It has a science-fiction aura: you enter a platform and are raised via lift into the stare of the loudspeaker array. The angles and colors that the designers conceptualized and constructors realized give the space a future-retro tinge. It encourages a mode of listening simply by looking like it does. It *looks* exciting, surely it *sounds* exciting? The lights are exclusively from above, low in luminosity, save for the glow of the screens visualizing and subsequently objectifying, triangulating a relationship with the sound signals I see and hear. The door is behind and below me as I face the screens. There's a glow of light from the integrated window that invites a sporadic glance to see if anyone is there, looking in. Otherwise, the environment feels calm, cocooning, and isolating, with a visual sharpness and an absorptive acoustic softness.

But this is an environment in delicate balance between the comfort of reliable, repeatable precision at the behest of the listener bestowed with ultimate control of behavior and operation, and the possibility of sonic hostility from this machine edifice, with its inherent ear-splitting potential. Early in its life, the custom-built monitoring amplifier coughs out a jagged impulse as it fails, heralding an atmosphere of jeopardy and lurking sonic menace. Moreover, the decoding software had developed a tendency to stutter and glitch with an occasional deafening beep or genuinely terror-inducing digital machine-scream. It's like the studio is resisting attempts to tame it: a terrible progeny of piecemeal machines, software packages, theories, imaginations, and graft, squealing into existence. Concrete, metal, wood, wire, fabric, and furniture form a cavity that houses a complement of loudspeaker teeth, ready to bite. I'm in the mouth of the machine, surrounded by teeth! All pointed at my head! Perhaps this is enough vivification. These encounters are the first of many symbiotic exchanges, as I, one of many listener-operators, react to the behaviors of the machine, which in turn reacts to the agency and actions of the listener-operator. A cumulative familiarization and adaption. The teeth seem more like humble loudspeakers every time. *But now the HVAC is making things tropical.* It's breathing fire.

All of these elements are additive, cumulative, and contribute to the overarching *press* (Rhodes 1961: 308) of the situation: a term encapsulating the relationship between a *humanoid alien* and their total environment, coined for Rhode's interrogation of creativity. The *press* of this studio is immediate. The horizon, visually and acoustically, is inherently proximate, but not claustrophobic. I'm in a space designed specifically for one single *humanoid alien*. I have ultimate control over the sound pressure levels. The lighting is attuned to my desires. I'm stood today and I reconfigure my posture and shift my weight every now and then, sometimes leaning on the desk. I look—or listen—around me from time to time, auditioning different directions in the space, sometimes rotating my frame to face arbitrary directions on the azimuth. The *press* generally feels plastic, tamed, or *congruent* as Rhodes might suppose. But there is the wider *press*, the broader political, cultural, societal context of this studio. There's a peculiarity to this environment, existing within a higher education institution, with its Russian doll layers of organization, multifaceted sense of purpose, the febrile, instable political direction of the sector. The *press* alters with your frame of mind. At once I'm in the studio as composer-practitioner, suddenly as teacher, trouble-shooter, listener, student. The *studio* can feel open, safe, exciting but it can also feel

oppressive, dangerous, a burden. The *press* can be *dissonant*, too. In any of these contexts, I'm reminded of my privilege by this edifice of exclusivity.

It's back to the office environment with its natural light. I'm working on the same project. I have the same software environment at my disposal, with the same plug-ins, the same familiar sound objects in my virtual arrangement timeline. From a technical perspective, all that has changed, the only thing that is identifiably contrasting, is my method of audition. I've got those headphones on again, but I can still hear a *circumspace* (Smalley 2007: 51). I still have periphonic privilege. This speaker-agnostic characteristic of ambisonics introduces the notion of an abstract spatial definitive of a work: the b-format domain of ambisonics is only realized during a decode, so a version can and may need to function in any number of contexts, including one with the affordance of user-controlled reorientation and possibly even distortion of the spatial image. This varied geographical locating of practice coupled with adoption of virtualized software environments is theorized neatly as an "abstracted liminal workspace between the geographical physical environment and the virtual technological environment" (Order 2016: 429). This liminal workspace adds precarity to the significance, purpose, function of such a studio environment, inviting interrogation of how we can relate to and experience such a listening machine.

Be Sonically Like Any Other Environment!

This loosely narrated process reflects some of the sensations experienced when *working*, as I seem to invariably be doing, in this peculiar space. The contexts of previous or further engagements are inevitably shaded with variation and would produce respectively varied accounts of experience. But we must start somewhere in our consideration of the studio and its character: how they are relational experiences, meaningful in ways beyond the typical technical treatise they are afforded, casualties of our great "desire to quantify" (Schulze 2018a: 22). It is beyond the intended scope of this discussion to encapsulate studios of various configuration and function, so we are to keep steady our focus on the peculiar, experimental studio spaces, designed in some way to feel for the edges of technical or aesthetic potential, for some sort of creative, ultimately experiential dividend. A contemporary preoccupation that seems to thread together many experimental studio spaces is a pivot around sonic space and its presentation. That preoccupation is reflected in this discourse. Why do we pursue such an endeavor? Why should we? Who is this space for? The idioms associated with the experimental studio lean towards accommodating an *expert listener* of some kind, but is it a creative space? A clinical space? A transformational space? Or merely, as Meintjes suggests, a technical *fetish*? (Meintjes 2012: 267)

The march of technology appears to be a primary definer of developments in studio research, catalyzing new practice through incremental evolution of means and ideas. Perhaps this is a case of the tail wagging the dog? Is this technological development the route to new fertile ground? Is this the best way to define a studio space? These potentially complex listening edifices are measured in the currency of immersion, realism, or some

sort of accuracy, with all of the caveats and jeopardy of quantifying and arguing the inherent value of technical performance, sometimes at the cost of the experiential. But isn't the pursuit primarily of some sort of experiential dividend? It seems instinctively so.

Is this a clinical space for audition or is it a creative haven, then? It is appropriate to consider how we might define the notion of the studio. It is easy to resort to a technical monotone when describing these spaces, a reflection of tendencies to demarcate such technologies as tools to be operated and little else. Conversely, studios can be recognized as more broadly significant to degrees that exceed the scope of discussion here, with due consideration made to the wider cultural reputation of some spaces. For our present purposes, the interest lies in the immediate environment of the studio.

Studios can be described in rather cool, utilitarian language as "laboratories" (Hennion 1989), "workshops," or even "assembly-lines" (Kealy 1982). This is language that Bates suggests are "archetypal professional workplaces" focusing a context of operation, going further to suppose that this architecture is "often intended to recede from attention and would be typically regarded as comparatively inconsequential on the nature of products produced within" (Bates 2012a: 1). These terms revolve around a notion of potential, for things to happen within, to somehow facilitate an output of some description: the immaculate ideas of the creative, uncontaminated by the environmental context. This consideration invites a comprehension of the studio as a container or conduit. Bates goes further to draw upon Sofia's conception of *container technologies* and the contention that there is a tendency for myopia when considering the contribution to activity such *containers* make. This is a consequence of what Sofia suggests could be the "unobtrusive technics of containers and containment" (Sofia 2000: 198) and their feminine gendered reading, in contrast to the tools and utilities within and their typically masculine interpretation (Bates 2012a: 2). Drawing upon demonstrable use of the label by practitioners, Bates furthers this notion to imagine the studio environment as womb, with connotations of envelopment, nurture, and maternal relationship for the *humanoid alien*. We can suppose that the nature of this *containment* is a definer of the studio as a place, environment, or *press*. But to what degree? Do we prioritize the acoustic performance of a studio to the detriment of the *congruent press*? The shiny technology may feast on the lion's share of our attention.

This thread of *container technologies* leads temptingly to the Japanese concept of *ma*: literal translations read something like *gap, void* or *space between two things*, but it is more akin to a concept of negative space—that portion of space unoccupied by object(s) that, in duality, simultaneously defines the object as much as the object's perimeter itself. In poetic exertion, Lao Tse illustrates the concept variously as the gap between spokes in a wheel, the void in the pot-vessel, the space in the rooms of a house as the "essence" of these things, not the materials or delimitations (Fletcher 2001: 369).

The studio is necessarily as much the volume it surrounds and contains as it is the physical walls, furniture, and tools. The volume, then, is special to these places as we tend to displace, evict the sonic activity through their construction, carving out our quiet, private niche, forcing the sonic environment away from us in our comfortable acoustic bubble, enrobed in layers of material mitigation, the environment tamed to our whim. It's a wipe of the slate that subsequently allows for the creation of a new sonic environments with the

hope of an optimum fidelity, with no competition from the invasive outside. The broader tendency of carefully curating an acoustic tempted Théberge to suggest a notion of "non-space" (Théberge 2004: 763): an acoustic blank slate, free of peculiarity. This theoretical blankness has obvious advantage, offering the possibility to reference sonic activity in a controlled, reliable manner that enables the potential of insight through critical listening, of focused creative endeavor; indeed, "in this vision we are not confronted with an acoustic problem but with the plans for an idealised microcosm of creation" (Hennion 1989: 408) in our "fantastically-regulated sonic environment" (Meintjes 2012: 273). Expectation grows.

These studios are time and space machines: a translocation of sonic environment that exploits the human spatial register by presenting in full periphony. The requirements are onerous: *Be sonically like any other environment I dictate!* The veracity of sound reproduction appears to be the essence of the studio: all that matters, it seems, is that point in the middle of the loudspeaker array to which you need to carefully offer up your head as the bullseye on your anatomical sponge-baffle. All the accumulated precision of acoustic research, loudspeaker design, digital-to-analogue convertors, the psychoacoustics-informed, compensated, and calibrated decoders is handed as sonic baton to you, with your unique anatomical topography, to interrupt the acoustic patterns for the final spatial sampling of the environment. The weight of expectation is almost coercive: you'd better appreciate it and believe that you are hearing something special.

According to Maurice Merleau-Ponty, our bodies are perceptual instruments with intention for acquiring *equilibrium* within a given situation, as ambiguity instils a *disequilibrium*. Our corpus instruments are striving for information to resolve phenomena, across our *perceptual sensorium*. This degree of resolution is sought through the *grip* of a given perceptual situation, tempered in part the *distance* of perspective to given phenomena. The strengthening of this *grip* is the aspiration of the body, striving for *maximum grip*. In a relation of Merleau-Ponty's concepts to binaural compositional and listening aesthetics, Emam states that a "*maximum grip* refers to the best possible context for perceiving a work or concept that is idiosyncratic to the work, and the intentions of the artist" (2013: 3, emphasis added), highlighting that Merleau-Ponty suggests "distance is what distinguishes this loose and approximate grip from the complete grip which is proximity" (2011: 305). This helpful relation of acousmatic sonic experience to the tendencies of the *humanoid alien* to resolve a *grip* on the material, through perceptual means, can be aligned to the studio context. The raison d'être of these adventurous, experimental studio spaces seems to satisfy the pursuit of experiential dividend, primarily in the direction of immersion in the sonic experience. The presentation of sound in surround is seemingly in line with our natural mode of audition as binaural. There is an inherent sensitivity to artificial or unnatural spatial behavior that doesn't resolve with our perceptual intake. Merleau-Ponty suggests there is a tension in a sensation of deviation from the point of *maximum grip*, so with any shortcomings to the sense of immersion, a lack of success of these listening machines could perhaps be more keenly felt. To put it another way, are these listening machines less plausible if the experience never affords *maximum grip*, because they are striving to bring the listener-operator closer to it, with comprehensive, detailed stimuli? Are they flying too close to the sun? A motivation toward an optimal grip seems risky.

Again, the weight of expectation is almost coercive: you'd better appreciate it and believe that you are hearing something special.

We can suppose at least that the act of listening in a studio space such as this, in contrast to listening via the framed presentation of stereo or especially headphones, is actually one that affords more participation in the act by default. Your corpus is the organic apparatus that ultimately curates the sonic experience. A studio that presents sonic information in an envelopment is one that is consequently more sympathetic to your humanness. Your dynamic sponge-baffle is altering, displacing the medium of air, distorting the *ma* to create a personal niche, a personal negative space (Barnard 2010: 40). In danger of reifying an exteroceptive indulgence, it seems an observation of a spatially summative, sculpturally analogous effect of our full selves is seemingly inescapable when contemplating and experiencing such listening devices and environments. As Schulze, channeling Merleau-Ponty, contends: "corpus creates space" (Schulze 2018a: 142).

The studio is a steer, then: a funneling of agency and action. These spaces rely upon being within a spectrum of expectation, attuned sympathetically to your methods and tolerances of experiencing a space, sonically and otherwise. But, they are *coercive* spaces, defining the boundaries or "enforcing limits to action" (Dovey 2005: 291) as part of Dovey's *silent complicity of architecture*, which ultimately catalyzes certain agency, attitude, creative endeavor, and listening approach—even posture and your direction of gaze. Perhaps a pursuit of these spaces is as much a hinderance, with its experiential friction of contradictory sensory information—seeing one thing, hearing another—as it is facilitator to the listener-operator?

So is this studio just a formalized, calcified context of listening? An otherwise fleeting, arbitrary arrangement of loudspeakers now immortalized in architectural permanence, its configuration and situation of no specific consequence beyond perhaps looking good on university open days? If the studio was more exclusive in its technical approach, with a bespoke spatial language and unique paradigm, it might be straightforward to delineate its significance. In one sense, it could be casualty of the *ubiquitous listening* habits of modernity, with the very same material projected over loudspeakers, quite straightforwardly auditioned via smartphone, anywhere and everywhere (Kassabian 2013b: 3), with a parallel ubiquity of the means of production. The speaker-agnosticism of the ambisonic method and the possible relinquishment of oversight upon the ultimate presentation method of material means this context of creativity is particularly loaded with risk. There is always some phonographic risk, isn't there? Sonic ideas committed to fixed-media, distributed on the format-du-jour, experienced by *someone*, *somewhere* on *some listening machine*, probably in traditionally non-ideal conditions. But let's double-down. In this approach there is second-order phonographic risk.

Do you hear what I hear? I'm reminded of the adage: "In mix, nobody can hear your screen" (Johnson 2018). *Do I hear what I hear?* The composer's privilege is understanding the component parts, *the acousmatic insight* afforded by constructing the sonic illusions, our hands on the levers. This idea is relatable to the listening machine of the studio, which can provide a forensic interpretation of sonic materials which is typically never experienced by the listener of the final compositional artifact. These materials have a potentially unknown

destination when distributed and an indeterminate spatial presentation, possibly in partial form. Couple this risk with a potential for reorientation of the inherent sonic space of a composition and a direct challenge to the traditional authority of the phonographic artist is made. This is in a vein similar to that of using an equalizer to alter the spectral balance of a work, but seeming more catastrophic in its potential, considering the preoccupation with the presentation of sounds in space that is a pivot-point of the acousmatic-leaning idioms. Are these studios functional, helpful in this regard? Are they folly? They become unique listening situations, but isn't a translation outside of said situation part of the point?

Container Technologies for Musicking

The motivation for the creation of an experimental studio space is de facto shaped by a culmination of ideas and factors, an interrelation between numerous aspirations to be tempered by the practicalities of the environment and context one works in, and the contemporary research and idiomatic landscape providing thrust to the project. We have begun to delineate the function and purpose of such a space from the fundamental sonic technology underpinning its design to some extent. Concerning the studio at the University of Hull, the approach is dictated through a broad collaboration of stakeholders and their necessary respective concerns. The studio was conceived as an ambisonic-focused, 360 degree sound reproduction space to be utilized as a creative compositional and production environment. The form factor of the loudspeaker array was dictated, through consultation with technical experts in the field, by the staff with interest in its compositional and production exploitation. This desire was then implemented by an external construction- and separate studio design-contractor who realized an architectural and internal formation. This information is deemed a necessary context to which the following motivations can be related. A broad methodology that shaped the final approach adopted was informed by four primary concerns that are, for the purposes of this discussion, convenient to delineate to some extent.

These four primary concerns are defined as needs for: a potential for abstraction of process from the studio; a focused environment for reproducing sound in 360 degrees with some precision; opportunity for meaningful pedagogical engagement; and universality of access and exploitation—a listening machine that is adaptable to the user in an anatomically meaningful manner. These needs have driven a design and methodology that informs the interaction with the space, how the listener-operator can relate to it idiosyncratically and how the studio can represent a peculiar context that is both anonymous and strikingly anomalous.

In answering the need for abstraction of process, we have established that the ambisonic paradigm is a fundamentally abstract spatial language, with potential for realization in a fluid dynamic of context and the studio must sit somewhere in this spectrum of possibilities. Echoing the concept of *container technologies*, this suggests that the space is destined to host, unobtrusively, the *musicking* (Small 2011b) of the composer-operator

that is conceptualizing the work in abstract: in a liminal, unanchored, pure, immaterial *non-space*. This proposition drives a philosophy of approach to the studio in this context, with a software ecosystem that is freely accessible across the institution workspaces and for use on personal computers. This philosophy offers potential insight into the relationship of studio to artifact in such contexts. To be clear, this is not a naïve pursuit of some creative purity, unburdened by predetermined *press*, but a desire to ponder the spatial-compositional process as somehow abstract-able, as a praxis divorced to an extent from the physical location or immediate environmental listening situation: a glorious succession of spatial iterations is enabled, unfurling with every decode in *n*-space and receding until the next. As Slater suggests, when discussing a sense of localization in compositional endeavor that involves working in varying spaces, including an account of that virtual space, there appears to be a duality of effect that such technology engenders: that of *locational dissonance* and a sort of simultaneous resolution (Slater 2016: 194). In every unique spatial decode there is a relocating of the activity, a node on the wider map of musicking. This denomination of the space as mere locatable node invites gentle relation to what Augé denotes as a *non-place: a* "space which cannot be defined as relational, or historical, or concerned with identity" surrendering instead "to solitary individuality, to the fleeting, the temporary and the ephemeral" (1995: 77–78). Although initially aimed at a sense of anonymity imbued by modern spaces such as that of supermarkets, the internal space of vehicles, and so on, Théberge draws its focus toward the studio space, suggesting that the trajectory of increasingly fleeting engagement with such spaces pushes them into the realm of *non-place* as "a more or less generic, functional place, a place at which musical 'travellers' can stop over" to realize their intentions "whenever and wherever it suits them, and always within the comfort of a certain temporary isolation" (Théberge 2004: 771–772). Listener-vagabonds, with erratic, splintered geographies.

As this studio has been reduced to an arbitrary node in the practice of the listener-operator, it seems necessary to revive some of its dignity: it is kindly offering the *humanoid alien* isolation both socially and acoustically; it is affording them periphonic reproduction of their precious abstract masterpiece; it is providing a referential-quality space within which they can compare and critique the desired sonic qualities of their endeavors. This studio represents, then, an acoustic exoskeleton, an augmentation attached by hot-swappable USB-umbilical cord that affords an interface with and return to the studio-womb. Perhaps this controlled, *non-space* acoustic quality is the primary concern of this particular node and validates its existence? It proffers a firmer *grip* on the materials. This need for a focused environment for the reproduction of sound in 360 degrees helps to define this space away from anonymity that the complexities of creative endeavor can lead to.

The context of this studio being within a higher education institution with undergraduate and postgraduate listener-operators, with eclectic aesthetic pursuits, has ultimately shaped its formulation. The need for meaningful pedagogical engagement stems essentially from the necessity in electronically informed compositional practice to understand the means of production in some capacity, in order to effectively exploit the paradigms adopted. The composer-practitioner is therefore equipped with a technical understanding of such a studio, indeed the technical principles underpinning the techniques are necessarily

explained before the opportunity to explore and experiment is gifted, and thus expectations are already solidifying. When conceiving of the studio space, a lengthy engagement was made concerning the possibility of veiling the loudspeakers in the studio array with fabric, disguising their presence visually—a sort of second-order veil to the first-order acousmatic *veil of the loudspeaker*. Eventually, the approach to the loudspeaker array adopted in this case is one that embraces an exposed, digestible orientation of array with an openness in form, and subsequently, function and limitation. As a squidgy *humanoid alien*, this satisfies my curiosity. I'm comforted by knowing. But how might this shape an engagement with the space? Might it better demonstrate the principle if we *aren't* distracted by the visual giveaways? The man behind the curtain isn't given opportunity to conjure the illusion in fair conditions if we're presented with the infrastructure, the strings of the puppet. This concern has implications and has consequently shaped the nature of the studio. It must accommodate listeners of varying expertise, interest, and trajectory, but has it limited the potential of the desired effect to unfurl? Perhaps this utilitarian aesthetic is a detrimental skew to our experience of these listening machines and should be challenged more vigorously?

Finally, acknowledging that our sponge-baffles displace the medium we find ourselves enveloped, carving out our spatial niche, altering the transmission of the encoded language of sound, imparting some of ourselves on the final acoustic message, a studio can be sympathetic to our *humanoid alien* peculiarities, at least to some extent. In a broader aspiration to ensure accessibility to a listener-operator of as many means of mobility as possible, the studio space has been designed with a variable-height lift. This dynamic structure affords the listener-operator a variable position in the space: the modest square platform is positioned, finely, to the exact location in the vertical plane that ensures the head-as-bullseye to sit in the loudspeaker-crosshair-stare. The architecture is bending to the listener-operator's whim in an accommodating, subservient manner. Further to this, the desk surface or *command center* is able to be positioned variably in the vertical plane, offering the possibility of sitting or standing in the audition of the sonic environment. This affordance is a concession in the face of rigid permanence that the studio space otherwise suggests, an acknowledgement of "sonic co-presence" (Schulze 2018a: 142). One size fits all. All *humanoid aliens* welcome.

Toward a Decentralization of Musical Endeavor

The precedent of such a studio space is fragmented, but there are broad themes that can assist in the reflection of their development. The continuing overarching tendency is to divorce a critical engagement with the resulting relationship between listener-operator and the technical means of production that the studio space affords. Echoing the characterization of the studio as a laboratory and its *container technology* attributes,

the common method of engagement with established studios, academic "studio reports" amount to little more than technical inventories and concise accounts of activity with little, in any, broader engagement with the aesthetic and philosophical entanglements they can engender (typically with an encapsulation of the wider conglomerated cognate music facilities, too). This is perhaps in tradition with an historical *centralization of potential* for studio-based endeavor, but it deviates in part, as it is seemingly predicated on some notion that the space is mere facilitator of the process of the artist.

Early studio examples were limited in number and accordingly exclusive. The early technical approaches were high maintenance, requiring technical personnel as part of the process as exemplified by sound engineer Jacques Poullin's involvement as *technician* in the first electroacoustic studio established at Radiodiffusion Télévision Française (RTF) in Paris in 1951 (Palombini 1993: 542). They represented organic-mechanical hybrid machines that seemed to live and breathe, with technological devices and mediums that reacted to temperature, time, and even gravity. They were historically populated with often bespoke, idiosyncratic, delicate hardware with narrow tolerances and they utilized expensive, volatile mediums with a distinct lack of potential for mobility and a resulting anchoring of technique to location: far from a *non-place* that is at least a seductive description for the contemporary iterations. As Manning identifies, the second-half of the twentieth century saw a tendency of new aesthetic causes to "polarise around select groups of activists with a strongly defended identity" with some emerging institutional studios reflecting the trend. Early expression of the studio had afforded unusual freedoms of time and use of spaces to explore vanguard edifices of sound reproduction and musical expression, with a coagulation of notable resonant conceptual and aesthetic frameworks, or *schools*, such as that of *musique concrète* and the subsequent Groupe de Recherches Musicales at RTF and the *elektronishe Musik* movement that broadly orbited the Norwestdeutscher Rundfunk (NWDR) studio of Cologne and their respectively divergent aesthetic, and eventually evolving, trajectories (Manning 2013: 19). This centralization clearly produced a gravity, as composers were keen to work within the walls of these technological concoctions, full of new potential and power but fledgling aesthetic direction. The studio represented the conduit of creativity, a significant partner in the process. This gravity does still echo today, with studio residencies to established institutions a recognized and valued proposition for the composer in the field of electroacoustics: a pilgrimage to Mecca, perhaps (Bates 2012a: 14).

With an appropriate prescience, Cary, a composer and creator of a personal studio space composed of "ramshackle apparatus which only I would dare to use" (Cary 1966: 313), makes a call to arms in a direct reply of the "rapid development of tape and computer music" (ibid.: 312) that was unfolding internationally at the time. The substance of interest here is a proposed institutional model. Of two propositions offered, the prescience is found in the suggestion of a "first-class studio attached to a university, so that access could be had to really expensive devices like computer when necessary," exploiting not only the financial power of such an institution but also the technical expertise that could be sought in house. The proposition is completed by a studio "working into the normal composition courses of the College of Music, it would also provide teaching to equip the composer to

use the new techniques. Apart from anything else, this close co-operation of artists and scientists could produce remarkably fruitful results in terms of broadening horizons." This approach has provided the broad template for much development of the sort of studios spaces we contemplate here and indeed is broadly the template of the studio around which this chapter is based. Indeed, when discussing what characterizes a vanguard technological approach today—high-density loudspeaker arrays (HDLAs)—Lyon explains that "during the 1960s and 1970s, computer music research could only be pursued at a small number of institutions on expensive, special-purpose hardware," and a new trend for technically remarkable HDLAs systems follows this model. As a validation of Cary's call to action it's understood that for this period in the development of computer music aesthetics and techniques, institutions were a "crucial incubator for the development of the widespread computer music culture that we currently enjoy" (Lyon 2016: 4). We retain some notion that these spaces should necessarily be vanguard, perhaps never standing still. The technological forces that inform experimental studio spaces are agile. The turnover of technical paradigms and forces makes obsolescence of approach an inevitability.

Meanwhile, in a liberal reach, Wataru Uenami, the first director of Japan's Nippon Hoso Kyokai (NHK) experimental studio, was an advocate for a "free set studio" that Loubet describes as a studio "without predetermined technical, theoretical, or aesthetic agendas." According to this approach, the ideal studio is "an empty one, in which specific devices would be placed when requested by a composer for a particular artistic production" (Loubet 1998: 52). This proposition is an ambitious one that seemingly attempts to strip back the layers of *coercion* that a studio's technical infrastructure imbues. The studio is back to its *container* essence, a technological blank-slate, a *non-space* beyond just the acoustic character, in Théberge's conception. Despite the aspiration, it transpired that it wasn't possible to realize this "free set" philosophy with the studio's technological infrastructure, even though the "theoretical and aesthetic liberty were respected" (Loubet 1997: 18). But this ideal has perhaps been realized in some sense of its formulation, through the migration of the physical technological devices to the virtual. Preceding the march to virtualization, the significance of these pioneering studios spaces is diluted by other technological and economical forces, becoming "submerged within a much broader culture of general accessibility and increasing affordability" of the means of production. Consequently, the early period of these studios from the 1940s through to the 1970s "marks an important watershed in electronic music, where the distinctiveness of individual endeavour, channelled for the most part through established studios and performing groups" (Manning 2013: 132) is no longer a defining trait of the concept. The studio is no longer such a powerfully exclusive space, no longer representing the same centralized potential.

A virtualization of some part of the means of production can only alter the relationship of the listener-operator to the studio, as less haptic and more removed or *distant*. Activity is sorted and distilled into standardized form and standardized language through software facilitation and ubiquity. The significant *bedroom producer* phenomenon is merely an exposed layer of musicking that is symbolic of a broader shift in the context and means of production in music. The emergence of the software ecosystem is a democratization, to some extent, of the means of production. As part of this realignment, the experimental

and otherwise contemporary musicking has matched a trend toward a decentralization of musical endeavor away from the particular exclusive, idiosyncratic institutional studio spaces. Studio *work* can be achieved in the liminal, unanchored space. This is of course overlooking the observation that studios typically offer distinct sound reproduction opportunities that are less ubiquitous. In contrast with abstract formats such as ambisonics, loudspeaker arrays can represent a prescriptive relationship of audio signal or *channel* to loudspeaker: a literal, logical, and tangible structure of agency and effect. Experimental studio spaces have tended to gravitate toward adventurous spatial arrangements that looked beyond the entrenched, hegemonic stereo landscape, examples of which include the quadraphonic array and its related, extended forms. This sort of array represents a traditional, more rigid relationship that a composer-practitioner can have with the compositional presentation medium that is, by its nature, restricted in potential context. Later technical approaches that have divorced the internal compositional space from the loudspeaker array has precipitated the decentralization further, reducing the potential allure of the studio environment in its physical, located sense. A curious variability in environment and listening context is possible. One moves from the specific studio edifice to the laptop/headphone, geographically unanchored scenario. In some senses, then, we have raised anchor on history, in others, we're snagged.

A Mode of Audition and Agency

Perhaps we, in some ignorance, chase our acousmatic desires to a logical conclusion of experience. Somehow, the acousmatic cause is served through deprivation of the expendable senses. The *press* of this studio environment is starved of distraction, the noise-floor of the senses so distant as to invite a pronounced focus on the sonic effect. No light clouding the vision, no glowing dots expressing the correct and active function of a loudspeaker, no horizons. There is only sound … pure, wonderous sound in all directions around me. A plausible, tangible sonic environment with a veracity in form, a vivid sense of localized signals across a diffuse atmosphere and a sensation of low-frequency anatomical resonance, exciting the sponge-baffle body. All of the cues. This is the ultimate expression of sonic time and space, a *non-space* in full relief with all of the necessary non-characteristics, the perfect container for *generated space*. A cinema exclusively for the ears with none of the cross-sensory noise, no one leaving for the restroom, just my idiosyncratic listening history as guide. The *grip* I'm afforded is maximal. The composer has the levers, I create the spectacle. But, instead of the fantasy of a siloed sense of sound being realized, the *press* of the studio is advanced in concept and variability.

In one reality, the reduction of the studio into a virtual, liminal, or delocalized space precipitates the reimagining of a studio into simply a mode of audition and agency. We've abandoned the reified listening machine edifice and instead transpose our sonic environment with another, in impressive fidelity. The sponge-baffle corpus of the listener-operator is excited not by "loudspeakers" with their archaic formfactors, non-linearities

and directionality, but by the ultimate of *non-spaces*, a membrane encapsulating the *humanoid alien*, in perfect sympathy with their anatomical topography. The membrane is the latest wearable-technology, tracing its development back to devices such as the humble subwoofer bracelet, but is instead a more complex haptic device that, in tandem with a direct-to-cochlea injection of sonic information, receives and transmits sonic activity to be transduced across the sponge-baffle surface as sonic experience. The studio is everywhere and nowhere, a *container technology* only in abstract. There's no tension of distance. The "free set studio" of Uenami's vision is finally fully realized. A studio space is no longer a *coercion* of agency but a passive approach, a secondary layer upon another reality, fully liminal. Potential is utterly decentralized, scattered everywhere.

In an alternative reality, the concept of studio as curated environment is advanced. We've perfected the reproduction of soundfields as reliably convincing illusion. The coercive quality of the studio is instead honed, made more dynamic in all directions. The sense of physical space, absorptive quality, luminosity, scent, inertia is dynamic, attuned to the desires of the listener-operator, free to discover the conducive combinations. The potential is centralized, focused but fluid, and the *quiet complicity* of the studio is amplified, embraced and more fully understood.