

A Study on the Relationship Between Noise and Music in the Early- to Mid-Twentieth-Century.

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Introduction

“In the case of sound and noise, the role of technology, through electricity and electronics in particular, is directly vital to all developments in the history of noise and noise music.” — Paul Hegarty¹

With the technology of today, it is easy to take for granted the availability of our surrounding sonic environment: it can be captured, processed, organised, and shared all on one device that fits in our pocket². Furthermore the acceptance of found or sampled sounds in musical contexts is widespread in popular culture, particularly genres in which sampling is a common part of the compositional process like hip-hop and rap. But even just a century ago, music was a much more restricted art-form that largely depended on tones provided by instruments or the voice as its material, excluding the vast world of noise around us. In this dissertation I am going to explore how, in the context of Western experimental music, the division between music and noise was challenged throughout the early- to mid-twentieth century through the use of ‘extra-musical’ sounds. Moreover I will present how technology was often — though not always — crucial in enabling composers to enlarge their sonic palette, and widen the tone-centric concept of Western music in the process.

In constructing my arguments I am going to engage with the works and ideas of five composers, from Luigi Russolo's *The Art of Noises: Futurist Manifesto* in 1913 through to John Cage's seminal 1952 piece, *4'33"*. Drawing comparisons and contrasts between them, my ideas will

¹ Paul Hegarty, *Noise/Music: A History* (New York, London: The Continuum International Publishing Group, 2007), 23.

² I am of course referring to the rise in smartphones and mobile devices, running apps such as Apple's *Garageband*.

be supported by the writing of more contemporary critics, whose relevant arguments I will also include in the discussion. I have chosen to analyse these composers on the basis of providing a mixed variety of viewpoints and approaches towards noise, music, instrumentation, technology, and organisation of sound. It is my aim to illustrate how, though their practical and conceptual approaches may differ (or in some cases build upon each other), they have all contributed towards the common aim of bringing non-musical sounds into a musical context, thus weakening the barrier between 'noise' and 'music'. It is important to bear in mind that the artists I am analysing all worked in a period where the idea of 'sound' was directly tied to that of 'music'; indeed, Seth Kim-Cohen argues, "It was not until the 1990s — some forty-plus years after Schaeffer first spliced tape to fashion an art of concrete sounds — that a sonic aesthetics, distinct from a musical aesthetics, began to establish itself theoretically."³ As such I will not be analysing more contemporary artists that may more immediately come to mind at the mention of noise music, like Merzbow — the "godfather" of noise.⁴ The focus of this dissertation is not noise music in general, but the ways in which the idea of 'music' was challenged through the use of noise during the early- to mid-twentieth-century, and how technology facilitated this.

Before I begin to address these claims I must clarify some of the key terms I am using, most importantly 'noise' and its relation to 'music'. The very concept of 'noise' is a particularly amorphous one, spanning disciplines from physics to philosophy and politics, and as such is an intensely broad and detailed area of study in itself. In the interest of space I will not be delving too deep into the ontology or taxonomy of noise; however I find it necessary to provide at least some kind of working definition, despite the constrictions that it may impose, for the sake of clarity and

³ Seth Kim-Cohen, *In the Blink of an Ear: Toward a Non-Cochlear Sonic Art* (New York, London: The Continuum International Publishing Group, 2009), 91.

⁴ William L. Ashline, 'Lo-Fi Values and Hacked Electronics: On the Aesthetics of Contemporary Korean Free Improvisation,' in *Situations* Vol. 5 (Yonsei University: Winter 2011), 23.

comprehension of the ideas discussed. Unless otherwise specified I, like Henry Cowell, will be defining noise through a physicist's lens: as "sound produced by non-periodic vibration," as opposed to tone, or "sound produced by periodic vibration,"⁵ as is produced by traditional instruments like the flute or piano. Consequently the atonal works of composers like Schoenberg and Boulez will not be featured in my analysis; though they were considered 'noisy' from the perspective of harmony and consonance, they did not expand the range of timbres and seemingly 'non-musical' sounds available to composers in the same respect as my chosen composers.

If this, for the purposes of this dissertation, is noise, then what is 'music'? Again, this is an unstable term which has been subject to constant redefinition by the work of avant-garde and experimental composers. As different definitions and conceptualisations of music are explored by these artists, I find it necessary to provide a broad definition so as not to exclude anyone. Therefore I will join Edgard Varèse in using Hoëne Wronsky's definition of music as "the corporealisation of the intelligence that is in sound,"⁶ for it is the most inclusive I have come across; as Varèse argues, "unlike most dictionary definitions, which make use of subjective terms as beauty, feelings, etc., it covers all music, Eastern or Western, past or present, including the music of our new electronic medium."⁷ This last point is especially important, as the development of new technologies and their impact on the noise/music dichotomy is central to my writing.

Consequently, I must also clarify what I mean by 'technology'. I am not just referring to the common, everyday usage of the term that calls to mind circuit-boards and electronics (though these

⁵ Henry Cowell, 'The Joys of Noise,' in *Audio Culture: Readings in Modern Music*, ed. Christoph Cox and Daniel Warner (New York, London: The Continuum International Publishing Group, 2004), 23.

⁶ Hoëne Wronsky. Quoted in Edgard Varèse, 'The Liberation of Sound,' in *Audio Culture: Readings in Modern Music*, ed. Christoph Cox and Daniel Warner (New York, London: The Continuum International Publishing Group, 2004), 19-20.

⁷ Varèse, *The Liberation of Sound*, 20.

have had an undoubtably important effect on noise and music, the more modern applications of such technology [particularly computers] reaching beyond the scope of this dissertation), but also earlier technologies like musical instruments. Though today we may overlook objects such as the violin or clarinet, they must still be considered as technology, as machines invented with a specific purpose of manipulating materials and air to produce a sonic effect. Therefore I will stand them side-by-side with the radios and turntables that may more readily come to mind.

Now, with these claims and definitions in place, let us travel back to the beginning of the twentieth century to blow open the doors and allow a new cacophonous world of sound to flood in, starting with Luigi Russolo's pivotal manifesto, *The Art of Noises*.

The Art of Noises

“By selecting, coordinating, and controlling all the noises, we will enrich mankind with a new and unsuspected pleasure of the senses.” — Luigi Russolo⁸

Luigi Russolo - *The Art of Noises*

In what Christoph Cox refers to as one of “the most important and influential texts in 20th century musical aesthetics,”⁹ Luigi Russolo confesses his frustrations with the timbral limitations of traditional instruments, and calls for the adoption of “musical noise.”¹⁰ For Russolo, the music of his time failed to accurately convey the “energy, speed, and noise”¹¹ of the urban environment that excited his Futurist sensibilities, the explosion of new timbres in daily industrial life unmatched by the monotony of music.

Russolo begins by contrasting the natural and urban landscapes, stating that music has failed to keep up with the industrialisation and urbanisation of the environment, and consequently is incapable of stirring emotion. His definition of noise is a very mechanical and industrial one — “with the invention of machines, Noise was born,”¹² — referring to the sounds produced by machines throughout the manifesto. Thus, Russolo places an importance on the sounds produced by

⁸ Luigi Russolo, ‘The Art of Noises: Futurist Manifesto,’ in *Audio Culture: Readings in Modern Music*, ed. Christoph Cox and Daniel Warner (New York, London: The Continuum International Publishing Group, 2004), 13.

⁹ Christoph Cox, *Audio Culture: Readings in Modern Music*, ed. Christoph Cox and Daniel Warner (New York, London: The Continuum International Publishing Group, 2004), 10.

¹⁰ Russolo, *The Art of Noises*, 11.

¹¹ Cox, *Audio Culture*, 10.

¹² Russolo, *The Art of Noises*, 10.

machines and mechanical processes over the noises already present in natural life, which I find problematic. Russolo explicitly rejects “the exceptional movements of the earth’s crust, hurricanes, storms, avalanches, and waterfalls,” which seem to epitomise the “intense”, “prolonged”, and “varied” noises he declares missing from the pre-industrialised world, instead choosing to proclaim that “nature is silent.” Even if we disregard these most powerful of earth’s noises, describing nature as silent still seems to me a misstep. Rainforests, host to a huge breadth of species each with their own chirps and squawks, and with the thunderous roar of rain pummelling the canopy, present a cacophonous orchestra of noises — though I do bear in mind how I am only able to make this statement because of recordings and documentaries that allow me to virtually visit these spaces, which would not have been available to Russolo in his time; as such, I cannot hold him entirely accountable on this particular occasion. And still, if we forgive Russolo here, his claim “Ancient life was all silence” disregards what Mel Gordon describes as “the normal sounds of rural life - the bleating of domesticated animals, the chirping of birds and insects, the ping of hand-held tools shaping wood and stone.”¹³ Perhaps the reason for Russolo’s rejection of nature’s bellows, cracks, and howls stems from his inability to control them, or implement them within musical contexts. Of course, with the invention of recording media this has since become much easier to achieve, and I will explore the influence of such technology on music presently. Indeed, today one need not even leave the house to find such noises but can instead browse internet sample libraries such as Freesound¹⁴ and SoundDogs¹⁵, finding there a host of sounds recorded and uploaded by others. It would be interesting to see if Russolo retained his opinion if given the technology of today.

¹³ Mel Gordon, “Songs from the Museum of the Future: Russian Sound Creation (1910-1930),” in *Wireless Imagination: Sound, Radio, and the Avant-Garde*, ed. Douglas Kahn and Gregory Whitehead (Cambridge, MA: MIT Press, 1992), 197-8.

¹⁴ www.freesound.org

¹⁵ www.sounddogs.com

In comparing the development of music — from a sacred art-form of pure sound in the primitive world, through to the “consistent and complicated dissonances that characterise contemporary music,”¹⁶ — to the advances in and increased presence of industrial technology, Russolo states: “Today, the machine has created such a variety and contention of noises that pure sound in its slowness and monotony no longer provokes emotion.” To combat this, he proposes that a new range of “*noise-sounds*” be incorporated into the musical palette, expanding the timbral possibilities for composers and enabling them to “enrich mankind with a new and unexpected pleasure of the senses.” The problem as it occurs to Russolo is that the sounds of the traditional orchestra have become “well-known and exhausted,” lacking the ability to move him. This declaration of boredom with these instruments is coupled with a critique of their acoustic properties, asking rather provocatively, “do you know of a more ridiculous sight than that of twenty men striving to redouble the mewling of a violin?” Consequently Russolo argues that with new musical and instrumental technologies, eventually realised in the form of his *intonarumori* (literally ‘noise makers’), the concert halls could be revived. Musicians were to be freed from “traditional and facile rhythms” by embracing the chaotic and irregular vibrations of noise, “never revealed to us entirely and always [holding] innumerable surprises.” Thus technology would aid in the expansion of possibilities for composers and performers alike.

It is vital to regard how Russolo is thinking about noise in a very musical way, applying existing musical codes to the world of *noise-sound*. For example, he states:

We want to give pitches to these diverse noises, regulating them harmonically and rhythmically. [...] Every noise has a pitch, some even a chord, which predominates

¹⁶ Russolo, *The Art of Noises*, 11.

among the whole of its irregular vibrations [...] from this predominant characteristic pitch derives the practical possibility of assigning pitches to the noise as a whole.¹⁷

Here Russolo displays a desire to implement noise within a musical context, giving the impression of a natural progression from the violins and contrabasses he is so unimpressed with. It seems that he envisaged the use of noise in a similar way to traditional instrumental practice, stating that new instruments will “have to offer the possibility of changing pitches and will need a more or less extended range.” Indeed, he even categorises the “infinite variety of noise-sounds” into six families, much like the traditional orchestra:

1. Roars, Thunderings, Explosions, Hissing roars, Bangs, Booms
2. Whistling, Hissing, Puffing
3. Whispers, Murmurs, Mumbling, Muttering, Gurgling
4. Screeching, Creaking, Rustling, Humming, Crackling, Rubbing
5. Noises obtained by beating on metals, woods, skins, stones, pottery etc.
6. Voices of animals and people, Shouts, Screams, Shrieks, Wails, Hoots, Howls, Death rattles, Sobs

In this list we have included the most characteristic of the fundamental noises. The others are only associations and combinations of these.¹⁸

I find it intriguing that Russolo divides the apparently “infinite” range of timbres into these categories, when previously in the manifesto he claims that one of the limitations of musical sound

¹⁷ Ibid., 12.

¹⁸ Ibid., 13

is how “the most complicated orchestras can be reduced to four or five classes of instruments.” As such, his decision to categorise *noise-sound* into six distinct families seems somewhat contradictory. I can only imagine that this decision was made so as to enable composers to more clearly notate their scores and allow the futurist orchestras he envisioned to realise their music, sympathetic to the fact that such a practice is also required for traditional orchestras. When presented with Russolo’s adherence to musical codes, for me it reaffirms that he was not disenchanted with music as an art-form, but instead frustrated with how it had become stale and monotonous in part due to the eruption of new sounds brought about by the industrial’s increased presence in daily life — in much the same way as someone, having been exposed to colour for the first time, would be frustrated to find they must watch films in black and white.

Whilst (or perhaps, because) Russolo’s ideas about the broadening of music’s vocabulary with *noise-sound* and new timbres were so revolutionary for his time, they were not readily accepted; indeed during the first concert with his *intonarumori* in 1914, a riot broke out amongst the audience in reaction¹⁹. Hegarty argues that it was the implementation of his ideas that was at fault: “Like many of the Futurists, Russolo’s ideas were way ahead of the actual art he produced.”²⁰ Instead of fully embracing the machinery that inspired him so deeply by either bringing it into the concert hall or placing factories directly within a musical context (as Cage and the Fluxus artists later would with ‘found sounds’), Russolo built instruments, his *intonarumori*, that would imitate them. To illustrate his point Hegarty refers to composer Claude Debussy, who stated, “[Futurist music] claims to reassemble all the noises of a modern capital city and bring them together in a symphony [...]. It’s a very practical way of recruiting an orchestra, but can it ever really compete

¹⁹ Benjamin Thorn, “Luigi Russolo (1885-1947),” in *Music of the Twentieth-Century Avant-Garde: A Biocritical Sourcebook*, ed. Larry Sitsky (London: Greenwood Publishing Group, 2002), 415.

²⁰ Hegarty, *Noise/Music: A History*, 13.

with that wonderful sound of a steel mill in full swing?”²¹ However, I do question whether audiences in the early twentieth-century would have been more accepting of a steel mill presented as music.

Edgard Varèse - Music as Art-Science

An interesting comparison to Russolo is French composer Edgar Varèse, who shared many of the same desires regarding the diversification of musically-acceptable timbres and the need for new technologies to expand the possibilities available to composers, but held a different view concerning their implementation. Like Russolo, Varèse sought to intensify the importance of timbre in musical composition, extending its previously “incidental, anecdotal, sensual or picturesque” role. In his lectures from 1936 to 1962²² Varèse used phrases reminiscent of Russolo’s impassioned language, calling for the “liberation of sound” and the “right to make music with any sound and all sounds,” believing that the use of “certain interferences created by the partials,” — i.e. noise — “will represent an appreciable contribution...An entirely new magic of sound!” Thus the ideas presented here can be seen as echoing Russolo’s desire to “enlarge and enrich the field of sound”²³ through the use of *noise-sound*. But Varèse, like Debussy, felt that Russolo fell short in executing these ideas, that the Futurists “never succeeded in progressing any further than mere noise. They produced no work of art. There was no attempt to go beyond the single imitation or unmodified utilisation of familiar noises.”²⁴ Consequently Varèse approached the use of noise and its relation to music in a different manner.

²¹ Claude Debussy, *Writings on Music* (London: Secker & Warburg, 1977), 288. Quoted in Hegarty, *Noise/Music*, 14.

²² Cox, *Audio Culture*, 17.

²³ Russolo, *The Art of Noises*, 13.

²⁴ Fernand Ouellette, *Edgard Varèse* (London: Calder and Boyars, 1973), 38. Quoted in Hegarty, *Noise/Music*, 14.

Rather than applying the existing musical codes of pitch and harmony to his reconceptualisation of music as Russolo did, Varèse stated, “There will no longer be the old conception of melody or interplay of melodies,” instead declaring himself “a worker in rhythms, frequencies, and intensities.”²⁵ Though Russolo and Varèse shared an interest in the more complex rhythmic qualities of sound and placed an increased focus on the role of timbre, this is where their paths appear to diverge. Varèse visualised music in a more spacial way, describing “the movement of sound-masses, of shifting planes [...] taking the place of the linear counterpoint,” whereas in *The Art of Noises*, Russolo wrote of pitches, chords, and chromaticism²⁶. And though Russolo certainly displayed a frustration with the limited acoustical properties of traditional orchestral instruments, it was Varèse who truly began to explore the projection of sound in space:

We have actually three dimensions in music: horizontal, vertical, and dynamic swelling or decreasing. I shall add a fourth, sound projection — that feeling that sound is leaving us with no hope of being reflected back, a feeling akin to that aroused by beams of light sent forth by a powerful searchlight — for the ear as for the eye, that sense of projection, of a journey into space.²⁷

In this quote, taken from a lecture given by Varèse in 1936, we can start to see the genesis of early diffusion techniques, clearly linked to his desire to imbue the planes and sound-masses he described with a more physical presence within space. Of course achieving this would be reliant on the

²⁵ Varèse, *The Liberation of Sound*, 20.

²⁶ Russolo, *The Art of Noises*, 12-13.

²⁷ Varèse, *The Liberation of Sound*, 18.

development of new technologies, which Varèse saw as a crucial part of music's growth - so much so that he began to redefine music as an "art-science"²⁸.

Indeed, the greatest area of distinction between Russolo and Varèse's propositions has to be their position on the use of newer technologies, particularly in relation to older technologies in the form of traditional orchestral instruments. Whereas Russolo was zealously vocal about his displeasure with and desire to abandon such instruments²⁹, Varèse sought a much more cooperative relationship. Explicitly stating that he did not "desire to disparage [or] discard the great music of the past," Varèse believed that new sounds — especially those provided by electronic means — could and should be viewed as an addition to the musical instruments used up to that point, expanding the timbral possibilities available to the composer: "Our new liberating medium — the electronic — is not meant to replace the old musical instruments, which composers, including myself, will continue to use. Electronics is an additive, not a destructive, factor in the art and science of music."³⁰ In this light Varèse, "unwilling to accept the ultimate usefulness of music created only from noises,"³¹ could be seen to be more conservative here when compared to Russolo, whose revolutionary ideas left little room for traditional instrumentation.

Varèse also had more of a chance to explore the application of new technologies towards music and composition in his lifetime. Intensely interested in the expansion of his musical potential through the use of technology, Varèse envisioned some quite sophisticated ideas for his time relating

²⁸ Ibid., 19.

²⁹ "We cannot for long restrain ourselves from the desire to create finally a new musical reality by generously handing out some resounding slaps and stamping with both feet on violins, pianos, contrabasses, and organs." Russolo, *The Art of Noises*, 12.

³⁰ Varèse, *The Liberation of Sound*, 19.

³¹ Hegarty, *Noise/Music*, 14.

to synthesis and sound diffusion techniques. Here, in a lecture from 1939, Varèse lists many of the advantages he anticipated from the progressing relationship between music and technology:

[...] unsuspected range in low and high registers; new harmonic splendours obtainable from the use of sub-harmonic combinations now impossible; the possibility of obtaining any differentiation of timbre, of sound-combinations; new dynamics far beyond the present human-powered orchestra; a sense of sound-projection in space by means of the emission of sound in any part or in many parts of the hall, as may be required by the score; cross-rhythms unrelated to each other, treated simultaneously, or, to use the old word, “contrapuntally,” since the machine would be able to beat any number of desired notes. any subdivision of them, omission or fraction of them - all these in a given unit of measure or time that is humanly impossible to attain [...] ³²

Here, speaking in the more technical vernacular of harmonics as opposed to musical notes, Varèse concurrently imagines the expansion of sonic capabilities compared to traditional instrumentation in terms of range, timbre, dynamics, projection, and rhythm. He views the use of electronics as a way to surpass the limitations of human performers, achieving that which is “humanly impossible to attain,” aiming further in this respect than Russolo did with his Futurist orchestra, which was still very much “human-powered.” In this sense, Varèse believed that composers would be enabled to “satisfy the dictates of that inner ear of the imagination” like never before, marking technology as a crucial factor in the evolution of music as an art-form.

Consequently Varèse began to view music as a collaboration between the composer and the engineer, and later the composer and computer itself. Predicting the increased presence of

³² Varèse, *The Liberation of Sound*, 19.

technicians and physicists in creation of music, he conceived a range of ideas spanning the development of new notation and graphic scores, to the reproduction of precomposed media³³. But despite the technological advancements that would enable composers to transcend the limitations of human performance, Varèse remained realistic regarding the computer's role in composition: "The computing machine is a marvellous invention and seems almost superhuman. But in reality it is as limited as the mind of the individual who feeds it material...the machines we use for making music can only give back what we put into them."

Henry Cowell - Instrumental Noise

American composer Henry Cowell provides an interesting counterpoint to Russolo and Varèse in his text *The Joys of Noise*³⁴: rather than look outward towards new technologies, Cowell shifts his gaze inward at the noise already present in traditional instruments, paving the way for such works as Cage's "prepared piano".³⁵ In calling for a "closer scrutiny of musical axioms,"³⁶ more specifically in this case that music and noise are opposites, Cowell argues that noise is indeed inherent in many methods of generating sound, and hence music.³⁷ The first example Cowell provides is that of a singer, stating that the only instances in which a 'pure' tone can be achieved - if at all - are when vowels are being sung. Otherwise, "the pronunciation of most consonants produces irregular vibrations, hence noise." This analysis is then applied to musical instruments with the assertion that "there is a noise element in the very tone itself of all our musical instruments." By

³³ Varèse, *The Liberation of Sound*, 19.

³⁴ Cowell, *The Joys of Noise*, 22.

³⁵ Cox, *Audio Culture*, 22.

³⁶ Cowell, *The Joys of Noise*, 22.

³⁷ It may be worth reminding that Cowell's definition of noise is, "sound produced by non-periodic vibration," in direct opposition to tone — "sound produced by periodic vibration" — and is the working definition I have been using, as stated in the introduction to this dissertation.

using a harmonic analyser, Cowell was able to prove that there are both periodic and non-periodic elements to the sound of a violin which combine to form its distinctive sound.³⁸ Cowell famously explored such sounds, as succinctly described by Christoph Cox, by treating “conventional instruments in unconventional ways.”³⁹ Through pioneering extended techniques such as reaching inside the piano to bypass its hammers and manipulate the strings directly, Cowell was able to expand the palette of timbres available to him without the need to develop new technologies like those desired by Russolo and Varèse. In the case of non-acoustic instruments, specifically pure tones produced by electronic means, Cowell notes that resonances such as those caused when playing sound in a room still affect what we hear and as such cannot truly be considered ‘pure’. As such the distinction between ‘music’ and ‘noise’ is made to appear a false one.

In fact, Cowell also deconstructed the axiom “that the primary elements of music are melody, harmony, and rhythm.”⁴⁰ He argued instead that music would be more sensibly divided into sound and rhythm: “sound comprising all that can be heard, and rhythm the formulating impulse behind the sound.” This way noise could be incorporated into the term ‘sound’, and rhythm would more accurately reflect its existence as a conception rather than a sonic entity since — as Cowell notes — though rhythm is often marked by sound, it is more accurately described as the spaces between the sound and the action behind them. With this in mind I would like to draw comparison to Varèse who, as previously stated, thought of himself as “a worker in rhythms, frequencies, and intensities,”⁴¹ displaying a similar interest in the division of music — or in his case, “organised sound” — into rhythm and colour.⁴²

³⁸ Cowell, *The Joys of Noise*, 23.

³⁹ Cox, *Audio Culture*, 22.

⁴⁰ Cowell, *The Joys of Noise*, 23.

⁴¹ Varèse, *The Liberation of Sound*, 20.

⁴² *Ibid.*, 18.

Influenced by his studies of African and Asian musics⁴³, Cowell, like Varèse, held a particular interest in percussion and noise-making instruments, being less ambiguously ‘noisy’ than their more tonal counterparts. Not only did he believe in their ability to help erode the boundary between ‘noise’ and ‘music’⁴⁴, Cowell also correlated the use of percussion and noise to the emotional power a piece of music delivers: “Noise-making instruments are used with telling effect in our greatest symphonies, and were it not for the punctuation of cymbal and bass drum, the climaxes in our operas would be like jelly-fish.”⁴⁵ In addressing the relationship between noise and volume (dynamics being a key factor in the emotional impact a piece can possess⁴⁶), Cowell referred back to his observations on noise within tone, stating, “as musical sound grows louder, the noise in it is accentuated and the tone element reduced...yet music does not touch our emotional depths if it does not rise to a dynamic climax,” thus implying a direct relationship between noise and emotion.

As a student of Cowell, it seems fitting at this point to turn my attention to John Cage, whose importance in experimental music must not be ignored; indeed, according to Christoph Cox: “No figure has had a more profound influence on contemporary musical thought and practice.” Among many other things (“from experiments with turntables and radios, to percussive music, to chance generation of work, through the incorporation of any and all sound to the recent ring of music as simply ‘organised sound’ for and only existing through the listener,”⁴⁷), Cage built upon

⁴³ Cox, *Audio Culture*, 22.

⁴⁴ In closing *The Joys of Noise*, Cowell refers directly to the importance of Varèse’s percussive works *Hyperprism* and *Arcana* (though not without acknowledging certain weaknesses) in “opening a wide field for investigation”^{*} of the use of noise in music.

^{*}Cowell, *The Joys of Noise*, 24.

⁴⁵ Ibid., 23.

⁴⁶ Ibid.

⁴⁷ Hegarty, *Noise/Music*, 16

Cowell's ideas concerning extended instrumental techniques and percussion as a gateway to 'noisier' music. Much of his work would question the barrier between noise and music, as well as a multitude of other musical axioms: as Seth Kim-Cohen states, "The Western compositional tradition was [...] his target. He sought to overturn the presumptions, habits, and hierarchies that had set music's agenda for three hundred years."⁴⁸ And as I will come to explain, though new technologies such as the radio played a significant part in these efforts, Cage also managed to achieve a long-lasting impact with found objects and, in the case of *4'33"*, no technology at all.

⁴⁸ Kim-Cohen, *In the Blink of an Ear*, 19.

John Cage, Pierre Schaeffer, and Electric Technologies

“If Russolo constitutes the earliest and seemingly obligatory case study for any scholarly work dealing with the conjunction of noise and art, the other unavoidable figure who must be attended to in all work of this kind is, of course, John Cage.” — Greg Hainge⁴⁹

“The world was now a source of endless sounds.” — Pierre Schaeffer⁵⁰

John Cage - *The Future of Music*

In the 1937 essay *The Future of Music: Credo*, Cage echoes Russolo, Varèse, and Cowell, pronouncing his views about the increasingly important role of noise in music by simultaneously providing an overarching statement and expanding on the ideas presented within through concise explanatory paragraphs. The parts of Cage’s statement relevant to my arguments read thusly:

I believe that the use of noise to make music will continue and increase until we reach a music produced through the aid of electrical instruments which will make available for musical purposes any and all sounds that can be heard. Photoelectric, film, and mechanical mediums for the synthetic production of music will be explored. Whereas, in the past, the point of disagreement has been between dissonance and consonance, it will be, in the immediate future, between noise and so-called musical sounds.

⁴⁹ Hainge, *Noise Matters*, 52.

⁵⁰ Pierre Schaeffer, *À la recherche d’une musique concrète* (Paris: Le Seuil, 1952), 23. Quoted in Paul Hegarty, *Noise/Music: A History* (New York, London: The Continuum International Publishing Group, 2007), 33.

The preset methods of writing music, principally those which employ harmony and its reference to particular steps in the field of sound, will be inadequate for the composer, who will be faced with the entire field of sound. New methods will be discovered, bearing a definite relation to [...] present methods of writing percussion music and any other methods which are free from the concept of a fundamental tone.⁵¹

There are a lot of ideas here to unpack, so I will tackle them systematically, dividing them into three sections: i. The continuation of Cowell and Varèse's ideas regarding the use of percussion; ii. Cage's conceptualisation of music, noise, and silence, leading to the abandonment of instruments and technologies in *4'33"*; and iii. The use of "mechanical mediums" and audio (re)production technologies.

i. Percussion Music

The first points I would like to analyse come near the end of *Credo*, concerned with the use of percussion as a movement towards noisier musics. Much like Cowell and Varèse, Cage emphasised the importance of percussion music for two reasons: the noisiness and timbral qualities provided by percussion instruments; and the new ways of thinking about notation and rhythmical structure they evoked.

Like his predecessors, Cage acknowledged the similarity between percussion and other noise-making objects that aren't usually used musically, in an effort to bring about their acceptance

⁵¹ John Cage, 'The Future of Music: Credo,' in *Audio Culture: Readings in Modern Music*, ed. Christoph Cox and Daniel Warner (New York, London: The Continuum International Publishing Group, 2004), 25-8.

in musical (particularly academic) contexts. He wrote, “any sound is acceptable to the composer of percussion music; he explores the academically forbidden ‘non-musical’ field of sound insofar as is manually possible.”⁵² Cage would later illustrate this point in his *Imaginary Landscape* pieces (1939-1952), which will be addressed later for their significant use of technology, using such objects as tin cans and conch shells among the more traditional bass drums and gongs — thus uniting percussion and found objects under Cowell’s term, “noise-making instruments”.⁵³ Once again comparisons can be drawn between the *Imaginary Landscapes* and Varèse’s work, particularly the use of sirens in his 1933 piece for percussion, *Ionisation*. These objects would extend the timbral palette available to Cage in a very ‘low-tech’ manner, contrasting with the revolutionary use of new technologies — such as turntables — which would provide Cage with an entire other world of sound. Similar techniques were famously explored by Cage with his prepared piano, continuing Cowell’s investigation of the noise inherent in musical instruments. Cage developed these ideas by inserting “screws, bolts, cardboard, weather stripping, and other objects into the piano’s strings to highlight the instrument’s percussive character and to extend its sonorous possibilities,”⁵⁴ simultaneously drawing attention to the musical nature of noises drawn from instruments and found objects.

Cage also perceived percussion music as a bridge towards future musics that would focus on rhythms and sound textures as opposed to the use of tones, confidently stating, “Percussion music is a contemporary transition from keyboard-influenced music to the all-sound music of the future.”⁵⁵ Here it is evident that Cage was calling for a rethinking of composition and the way it is approached, liberating himself from the way of thinking and working that a keyboard imposes upon

⁵² Ibid., 27

⁵³ Cowell, *The Joys of Noise*, 23.

⁵⁴ Cox, *Audio Culture*, 25.

⁵⁵ Cage, *The Future of Music: Credo*, 27.

a composer. This bears a significant relation to Varèse's reconceptualisation of music,⁵⁶ moving away from the tonal towards "the movement of sound-masses"⁵⁷. Such a way of thinking about music places more importance on the timbral and inter-rhythmic qualities of the sounds themselves, as opposed to consonance and dissonance. Consequently, new methods of notation would be required to effectively express these ideas; speaking to his students, Varèse stated, "as frequencies and new rhythms will have to be indicated on the score, our actual notation will be inadequate."⁵⁸ This is echoed by Cage, who highlights that rather than notating percussion music around the use of tone, "methods of writing percussion music have as their goal the rhythmic structure of a composition."⁵⁹ Cage would go on to experiment with new notational and structural techniques throughout his lifetime, in an effort to expand the boundaries of musical composition through structure as well as timbre.

Let us now move on to further explore Cage's use of 'non-musical' sound, widening our perspective from percussive objects towards the "entire field of sound"⁶⁰ utilised in 4'33".

ii. Music, Noise, and Silence

Early on in *The Future of Music: Credo*, Cage brings to our attention the world of noise around us in daily life, and its potential to be used in music:

⁵⁶ Specifically: redefining music as "organised sound" and himself as "a worker in rhythms, frequencies, and intensities," as previously stated.

⁵⁷ Varèse, *The Liberation of Sound*, 17.

⁵⁸ Ibid., 18.

⁵⁹ Cage, *The Future of Music: Credo*, 27.

⁶⁰ Ibid.

Wherever we are, what we hear is mostly noise. When we ignore it, it disturbs us. When we listen to it, we find it fascinating. The sound of a truck at fifty miles per hour. Static between the stations. Rain. We want to capture and control these sounds, to use them not as sound effects but as musical instruments.⁶¹

In a somewhat similar vein to those who preceded him, Cage is displaying here a will to enlarge the musical palette through ‘non-musical’ sound, advocating closer listening to even the most subtle and seemingly mundane events. Whilst noting that indeed, these noises are often disturbing to us and seen as something to eradicate (traffic noises) or an indication of failure (static), Cage argues that there is a beauty in these sounds when we pay attention to them with a musical ear, similar to Pierre Schaeffer’s concept of “reduced listening”⁶². And whereas Russolo was focused (perhaps too narrowly) on the mechanical noises of the industrial and urbanised world, Cage also welcomed the sounds of nature into his inventory, indicating that the source of the sound was not necessarily important — further strengthening the connection between Cage and Schaeffer, much of the latter’s work being dedicated to the separation of “signal from source”⁶³. By embracing all of these noises, the composer (or to use Cage’s term, “organiser of sound,”⁶⁴) would have access to the “entire field of sound,” — language which, as we have seen, would later be adopted by Varèse.

Whilst developments in recording and playback technologies like tape and the gramophone were certainly influential to Cage and enabled him to explore these ideas, as I will present in part iii., the most eloquent expression of noise-as-music was to be achieved without any of this

⁶¹ Ibid., 25-6.

⁶² Pierre Schaeffer, ‘Acousmatics,’ in *Audio Culture: Readings in Modern Music*, ed. Christoph Cox and Daniel Warner (New York, London: The Continuum International Publishing Group, 2004), 76.

⁶³ Cox, *Audio Culture*, 76.

⁶⁴ Cage, *The Future of Music: Credo*, 27.

technology. In 1952, fifteen years after presenting these concepts in *The Future of Music: Credo*, Cage revealed what was to become his most famous work, *4'33"*, performed on piano by David Tudor. Though I assume that most people reading this will be familiar with the piece, I will nevertheless borrow Greg Hainge's summary as a brief explanation:

Cage, in an anechoic chamber, expects to hear silence but is instead assaulted by the sounds of his own body. Realising that there is then no such thing as silence, he writes *4'33"*, a piece which instructs the performer merely to mark off time in three movements during a period of four minutes and 33 seconds, and otherwise to sit motionless at his/her instrument, thereby allowing the ambient sounds of the performance space and its surroundings to invade the aural consciousness of the audience and become the musical text.⁶⁵

Instead of using building new technologies to mimic a certain group of desirable noises (Russolo), incorporating noises amongst traditional musical instruments (Varèse), or even using recording technology to capture and play back organised fragments of the "field of sound"⁶⁶ (Schaeffer), Cage challenged the divide between music and noise by using extraneous, "non-intentional" sounds as the very material of the piece itself. Sounds of the audience shuffling, the hum of lights and fans, even the traffic outside the concert hall became a part of the music; or, to paraphrase Hainge, all sound was rendered musical, "converting noise into the primary, desired content of his piece and therefore leaving noise behind in the process."⁶⁷ Of course this had a profound effect on the idea of what constitutes 'music' and 'noise', and how the two relate. As Hainge begins to suggest, some critics

⁶⁵ Hainge, *Noise Matters*, 52.

⁶⁶ Cage, *The Future of Music: Credo*, 27.

⁶⁷ Ibid.

argue that with *4'33"* Cage eradicates noise, revealing the world to be “infinitely musical,”⁶⁸ — though others, namely Hainge⁶⁹ and Kahn⁷⁰ take issue with this from an ontological perspective⁷¹. What is clear is that Cage reaffirms the subjectivity of noise, declaring it musical as long as we perceive it as such, and demanding our reassessment of the boundary between noise and music.

The way that Cage brings to light the power of our subjectivity with *4'33"* is to me as interesting as the message it conveys. Whilst Russolo codified noise through the use of conventional music language and ideas like pitch and chromaticism, Cage takes a more meta, conceptual approach by employing a different set of conventions in the standardised behaviours of the concert hall, as is well explained by Kyle Gann in his book, *No Such Thing as Silence: John Cage's 4'33"*:

Through the conventional and well understood acts of placing the title of a composition on a program and arranging the audience in chairs facing a pianist, Cage was framing the sounds that the audience heard in an experimental attempt to make people perceive as art sounds that were not usually so perceived....its effect was to drive home the point that the difference between ‘art’ and ‘non-art’ is merely one of perception, and that we can control how we organise our perceptions.⁷²

⁶⁸ Paul Hegarty, *Noise/Music: A History*, 6.

⁶⁹ Hainge, *Noise Matters*, 52.

⁷⁰ Douglas Kahn, ‘Introduction’, in *Wireless Imagination: Sound, Radio, and the Avant-Garde*, ed. Douglas Kahn and Gregory Whitehead (Cambridge, MA: MIT Press, 1992), 3.

⁷¹ Though as stated in the introduction, I will not be diving into the ontological rabbit-hole on this occasion.

⁷² Kyle Gann, *No Such Thing as Silence: John Cage's 4'33"* (New Haven, CY: Yale University Press, 2010), 20.

There is no mention of pitch, nor even rhythm, in attempting to justify bringing noise into the realm of music: rather, it is our attention and behaviour that is called upon. For me, this is the vital conceptual leap that Russolo was unable to make, and one of, if not the most important step towards the integration of noise within music. And yet, the only audio technology involved in *4'33"* is the instrument sat lifeless in the limp hands of the performer (or any incidental technologies, such as the stereo of a car driving past). Therefore I now find it important to address the claim I presented in the introduction to this dissertation, that technology is most often a crucial factor in enabling noise to be incorporated into the world of 'music'. Cage's *4'33"*, in combination with Fluxus artists' use of 'found sounds' inspired by his work, is the reason I must use the qualifier "most often." For though the other artists and composers I am analysing utilised or catalysed new technological developments in order to challenge the way we think about music and noise, Cage masterfully achieved this goal with, almost literally, nothing. Since the impact of *4'33"* could be the subject of a dissertation in itself, and in the interest of allowing room for other works, I must end my analysis here. I will now move back to the technological, analysing key instances where new "mechanical mediums"⁷³ such as the radio and gramophone perform a crucial role in Cage's work.

iii. Mechanical Mediums

In *The Future of Music: Credo*, Cage displays his dissatisfaction with the use of electronics in music up until the time of writing, taking issue with their generally imitative — as opposed to innovative — use. He writes: "Most inventors of electrical musical instruments have attempted to imitate eighteenth- and nineteenth- century instruments, [...] The Novachord and the Solovox are examples of this desire to imitate the past rather than construct the future."⁷⁴ It becomes clear that

⁷³ Cage, *The Future of Music: Credo*, 26.

⁷⁴ Ibid.

with technology, Cage desires to open up new sonic possibilities rather than recycle the old. And whilst Russolo wanted to expand his timbral palette in a similar manner, he sought to achieve this through mimicking the machines that inspired him — therefore constructing sonic future based on imitation. Instead, Cage examined newly existing technologies (which, in Russolo's defence, were not available to him at the time) from a musical perspective, viewing the knobs and dials as parameters to be manipulated just as the strings of the violin or keys of the piano. This reveals Cage's ability to distance himself from the prescribed usage of objects like the radio or gramophone — what purposes they should be used for, their typical modes of operation — instead exhibiting an innovative approach, bending the technology to create new creative possibilities. This unique approach can be viewed again as Cage proceeds in highlighting how peoples' desires to imitate past music restrict the musical potential that new technologies afford us, using the theremin to illustrate his point:

When Theremin provided an instrument with genuinely new possibilities, Thereminists did their utmost to make their instrument sound like some old instrument, giving it sickeningly sweet vibrato, and performing upon it, with difficulty, masterpieces from the past. Although the instrument is capable of a wide variety of sound qualities, obtained by the turning of a dial, Thereminists act as censors, giving the public those sounds they think the public will like. We are shielded from new sound experiences.⁷⁵

Instead of clinging to the past Cage embraced the future, drawing musical properties from new technologies and presenting them instruments in their own right. In *Credo*, Cage writes about the possibilities of film phonographs in musical composition:

⁷⁵ Ibid., 26.

Every film studio has a library of ‘sound effects’ recorded on film. With a film phonograph it is now possible to control the amplitude and frequency of any one of these sounds and to give to it rhythms within or beyond the reach of the imagination. Given four film phonographs, we can compose and perform a quartet for explosive motor, wind, heartbeat, and landslide.

Again, Cage is taking new technologies and adapting them for use in a musical context, therefore giving him access to a breadth of new sounds. By eschewing the intended use of sound effects and viewing them almost as ‘sonic objects,’ as Schaeffer pioneered,⁷⁶ Cage challenged our preconceptions on what could be considered ‘musical’, implementing what was previously thought of as ‘effects’ or ‘noises’ into his compositions. The development of technology such as the film phonograph that allowed for the capture and reproduction of sound was evidently a critical component of these ideas, for they could not be realised without it.

Cage’s first work to incorporate new audio technology in this way was *Imaginary Landscape No.1* (1939), among the first pieces to use turntables⁷⁷ and “one of the earliest electro-acoustic works ever composed”⁷⁸. In a similar way to Varèse’s *Ionisation*, Cage combined percussion (a large Chinese cymbal and muted piano⁷⁹) with what would have been considered extra-musical sounds, here using two turntables playing test tones found in a radio station he frequented in Seattle.⁸⁰ Cage would use the unique capability of the turntable to alter the playback

⁷⁶ Schaeffer, *Acousmatics*, 79.

⁷⁷ Cox, *Audio Culture*, 25.

⁷⁸ John Cage Trust, ‘Imaginary Landscape No.1,’ in *Work Details*. http://johncage.org/pp/John-Cage-Work-Detail.cfm?work_ID=100 (Accessed 23 April 2014).

⁷⁹ Ibid.

⁸⁰ Richard Kostelanetz, ‘John Cage on Radio and Audio Tape,’ in *Sound by Artists*, ed. Dan Lander and Micah Lexier (Art Metropole and Walter Phillips Gallery, 1990), 289.

speed as a creative device, switchable via a clutch, therefore giving him control over the pitch of the resulting sound. Even the mechanical noises of the turntables themselves — “the workings of the machinery, through the changing of speeds, the inclusion of other incidental noises from the needle, or from the records,”⁸¹ — would become part of the musical material, a concept Cage would expand upon with his *Cartridge Music* (1960). By presenting turntables in an instrumental context we are reminded that traditional orchestral instruments are themselves machines⁸², each with their own incidental noises. Thus we are able to draw comparison between the noises of the turntable’s needle with those of the vocalist’s consonants, and other noises inherent in the tone of musical instruments as demonstrated by Cowell.⁸³ Therefore one can posit that the inclusion of the turntable’s mechanical noises are just as musical as the click of the clarinet’s keys or the scratch of the violin’s bow, bringing these new forms of noise into the fold of music.

The collaboration between Cage and the engineers at various radio stations would prove to be influential on his music, validating Varèse’s emphasis on the relationship between composers and technicians. Cage developed new ideas, both technical (“the thunderous sound of the coil of wire in a contact microphone,”) as well as conceptual (“I wanted to elevate the [radio] sound effect to the level of musical instruments,”⁸⁴ in a similar vein to Schaeffer’s radiophonic art⁸⁵). Furthermore radio held a significant presence in a number of Cage’s works such as *Imaginary Landscape No.4* (1951), becoming the very instrument of the work. In this piece, for twelve radios and twenty-four performers, the knobs and dials would once again become the parameters for musical expression,

⁸¹ Hegarty, *Noise/Music*, 26.

⁸² As reaffirmed by Hegarty, *Ibid.*, 27.

⁸³ Cowell, *The Joys of Noise*, 23.

⁸⁴ Kostelanetz, *John Cage on Radio and Audio Tape*, 290.

⁸⁵ John Dack, ‘Pierre Schaeffer and the Significance of Radiophonic Art,’ in *Contemporary Music Review* (Harwood Academic Publishers, 1994).

the shifting clouds of static and bursts of pop music and radio programming forming the core of the material — not forgetting, of course, the incidental sounds of operation. Like *4'33"*, in *Imaginary Landscape No.4* Cage frames these unpredictable noises by placing them in a musical context (the performers reading a score, guided by a conductor) in an effort to perceive them as musical. But because of the complete lack of tonal structure and particular actions required for the piece (i.e. the turning of dials), traditional notation would not suffice: new notation would be needed to fully exploit this new, noisier music. As Varèse envisioned new graphical notation for his organisation of sounds,⁸⁶ so too would Cage experiment with unconventional scoring techniques. In an 1984 interview with Richard Kostelanetz, Cage explains some of the methods he used, still using notes for their rhythmic value, but allowing for different perceptions of time and metre; however his biggest breakthrough emerged later: "I dropped all notion of metre and went directly into plain space equals time, which has enormously facilitated the writing of new music."⁸⁷ In my opinion this brings Cage to stand above his contemporaries: not only did he facilitate the use of noise in his music through audio technologies, but also by developing new notational (and, it can be argued with *4'33"*, conceptual) technologies.

Though Cage first encountered audiotape in 1949 when he met Schaeffer in Paris, it wasn't until 1952 that he started working with the medium.⁸⁸ After a year of work funded by Paul Williams, Cage released the *Williams Mix* (1953), an exploration of the new possibilities afforded by magnetic tape. Aware of the limitations of his own, singular involvement in the project, Cage recruited the help of David Tudor, Earle Brown, Christian Wolff, and Morton Feldman, stating, "I was anxious not to exploit them alone but with other people, because each mind would bring into

⁸⁶ Varèse, *The Liberation of Sound*, 19.

⁸⁷ Kostelanetz, *John Cage on Radio and Audio Tape*, 294.

⁸⁸ *Ibid.*, 296

the new possibilities, a different slant.”⁸⁹ The work, totalling “a little over four minutes,” took a year to produce because of the meticulous way it was crafted — physically cutting and splicing the tape into tiny fragments. This manual manipulation of recorded sound that tape enabled interested Cage, resulting in variations that couldn’t occur through knobs and dials. It provided him with a new way of visualising sound and the ways it could be organised: “What was so fascinating about tape possibility was that a second, which we had always thought was a relatively short space of time, became fifteen inches. It became something quite long that could be cut up.” Indeed, Cage managed to fit 1097 sounds on a quarter of an inch of tape — never could he have notated 1097 notes within the same amount of time to an orchestral musician. But Cage did in fact score *Williams Mix*, nearly 500 pages in total. One of the most widely recognised pages, Cage notes, “is like a dressmaker’s pattern, it literally shows where the tape shall be cut, and you lay the tape on the score itself.” Other instances of unconventional notation in the piece include a labelling system, using letters to describe the cuts and transformations in frequency and loudness made to the sound: “someone else could then follow that recipe, so to speak, with sources other than I had, to make another mix.” Once again Cage is displaying his entire commitment to this new, noisier world of composition by creating new notational structures that would allow it to be embraced by others.

Reflecting on *Williams Mix*, Cage noted its “unprecedented range of sounds and the rapidity of their articulation,” both qualities dependent on the affordances of new technology and Cage’s creative application of it towards music. But despite these praises, he still seemed sceptical: “All this effort is a highly questionable process, in view of the electronic utilities we now have that produce with ease musics of much greater lengths and, if I may say so, greater variety.” Such a statement is even truer today, with modern digital audio workstations allowing users to cut and edit sound files with an unprecedented degree of precision, and the ability to undo any mistakes.

⁸⁹ Ibid.

To finish our exploration of radio, tape, and new ways of organising sound, let us at last turn our attention to Pierre Schaeffer whose *musique concrète* and *objet sonore*, though he might not have recognised it in his lifetime,⁹⁰ would have a widespread affect on music even to this day.

Pierre Schaeffer - *Musique Concrète*

Similar to Cage and 4'33", Pierre Schaeffer employed found sounds as the material of his *musique concrète*,⁹¹ drawing attention to the musicality of our environment in the process. But Schaeffer, trained as a radio engineer, came from a more technological perspective, influenced by radiophonic art. As Hegarty summarises: "Schaeffer imagined a new form of music where research and art would combine, with the quasi-scientific research leading to an artistic outcome,"⁹² bearing an undeniable relation to Varèse's vision of music as art-science.

Though Schaeffer was not without musical experience — "his parents were both musicians, he was born in the shadow of Nancy conservatoire, and [earned] a cello diploma"⁹³ — he chose to work in radio, what he called a "miracle-machine, this chamber of wonders."⁹⁴ Schaeffer became involved with the drama productions and radiophonic art, involving "the creation of simple sound effects [and] more complex accompaniments used to accentuate or comment on aspects of the

⁹⁰ "In a 1986 interview with Tim Hodgkinson, Schaeffer says, "It took me 40 years to conclude that nothing is possible outside of DoReMi. [...] In other words, I wasted my life."*

Kim-Cohen, *In the Blink of an Ear*, 11.

*Tim Hodgkinson, "Interview with Pierre Schaeffer," in *Recommended Records Quarterly Magazine* 2, No.1 (1987), http://www.ele-mental.org/ele_ment/said&did/schaeffer_interview.html (accessed 23 April 2014).

⁹¹ Pierre Schaeffer, *À la recherche d'une musique concrète*, 119.

⁹² Hegarty, *Noise/Music*, 32-3.

⁹³ John Dack, *Pierre Schaeffer and the Significance of Radiophonic Art*, 1.

⁹⁴ Pierre Schaeffer, *Machines à Communiquer* (Paris: Editions du Seuil, 1970), 89. Quoted in Dack, *Pierre Schaeffer and the Significance of Radiophonic Art*, 1. Trans. John Dack.

dramatic action.”⁹⁵ One of the most important productions that would push Schaeffer towards the conception of *musique concrète* was *La Coquille à Planètes* (1944), which he described as an attempt to “promote the acknowledgement of specifically radiophonic expression into every possible and imaginable domain,” combining music and noise to “reveal preoccupations which led to ‘*musique concrète*’.”⁹⁶ Critic John Dack expands on this statement, arguing that from the experience of working on *La Coquille à Planètes*, Schaeffer recognised “the potentially profoundly poetic nature of sounds heard whilst listening to the radio, thus without any visual confirmation of source,”⁹⁷ leading towards the development of reduced listening — and by extension, I will argue, the use of noise in music.

This new non-visual relationship with sound was enabled entirely by the invention and production of audio technologies which were available to Schaeffer through his work in radio, and *musique concrète* was an artistic exploration of this relationship. Whereas Cage’s intention was “to let sounds be themselves rather than vehicles for man-made theories or expressions of human sentiments,”⁹⁸ Schaeffer’s work was driven by his research, in particular the concepts of “acousmatic listening” and “*objets sonores*”⁹⁹. In the interest of space I will not be delving too deep into the phenomenological implications of these concepts, but it would be foolish not to provide at least a brief summary of what is relevant. Critic Greg Hainge provides a useful in glossing Daniel Teruggi’s work on technology in *musique concrète*:

⁹⁵ Dack, *Pierre Schaeffer and the Significance of Radiophonic Art*, 1.

⁹⁶ Pierre Schaeffer, *10 Ans d’Essais Radiophoniques* (Arles, Phonurgia Nova/INA, 1989), 30. Quoted in Dack, *Pierre Schaeffer and the Significance of Radiophonic Art*, 2. Trans. John Dack.

⁹⁷ Dack, *Pierre Schaeffer and the Significance of Radiophonic Art*, 2.

⁹⁸ Michael Nyman, *Experimental Music: Cage and Beyond* (second edition) (Cambridge: Cambridge University Press, 1999), 10. Quoted in Hegarty, *Noise/Music*, 26.

⁹⁹ Schaeffer, *Acousmatics*, 76.

Indeed, as Teruggi notes, the primary objective of the early practitioners of *musique concrète* was to use the tools at their disposal or to create new tools to “strongly affect the essential parameters of sound in order to create a ‘distorted’ perception of them” and, as a result, “to ‘erase’ from recorded sounds any referential allusion.”¹⁰⁰ In so doing, they wished to present the sounds in their limitless palette as *objets sonores*, sounds to be heard, analysed, or studied for their own intrinsic qualities and properties and not, therefore, relegated to the inferior status of signifier always deferring to the more important and essential signified.¹⁰¹

From the arguments presented here it is evident that technology was crucial in enabling this suspended listening to take place,¹⁰² by first removing sounds from their context via recording, and then manipulating them — for example by altering the playback speed to change their pitch, like we have seen with Cage — before finally recombining them like a sonic collage: “With every stage, the sound is becoming more ‘musical’, more ordered, and Schaeffer is clear: “I love order” [je suis [...] fanatique de l’ordre].¹⁰³ Ordering is the human intervention that creates music.”¹⁰⁴

¹⁰⁰ Daniel Teruggi, ‘Technology and Musique Concrète: The Technical Developments of the Groupe de Recherches Musicales and their Implication in Musical Composition’, *Organised Sound*, 12, No.3 (2007), 214.

¹⁰¹ Hainge, *Noise Matters*, 162.

¹⁰² However this is not to say that the *objet sonore* was a technical concept; as Seth Kim-Cohen is eager to remind us, technology is only the enabler of the sonic object, which “cannot be a product of the recording medium itself. [...] [Schaeffer] points out that a few centimetres of magnetic tape can contain a number of sonic objects. [...] The sonic object, he writes, is “a perception worthy of being observed for itself.”*”
Seth Kim-Cohen, *In the Blink of an Ear*, 11.

*Schaeffer, *Acousmatics*, 78.

¹⁰³ Schaeffer, *À la recherche d’une musique concrète*, 99.

¹⁰⁴ Hegarty, *Noise/Music*, 34.

Therefore Schaeffer, like Cage, challenged what was considered ‘musical’ by taking noises from the surrounding environment¹⁰⁵ and through an artistic process — Schaeffer’s being methods of manipulation and montage, Cage’s being more conceptual — presented them as music, a music of enormously expanded timbre and texture: “Non-musical sounds¹⁰⁶ would be richer, fuller, and the amount of combinations available almost infinite.”¹⁰⁷ Indeed, in his paper *À la recherche d’une musique concrète*, Schaeffer cites André Moles who estimated a total of 13,000,000 available tones.¹⁰⁸ As Hegarty writes, “Western music, whether tonal or ‘atonal’, was severely and inherently limited”¹⁰⁹ in comparison. Here obvious connections can be drawn to Russolo who, as I have explored, felt frustrated by the limits of tone-based music and attempted to incorporate the richer world of *noise-sounds* into his music. But whereas Russolo’s *intonarumori* were imitative of the machines that stirred him, Schaeffer was enabled by recording technology to not only capture and reproduce these exact sounds, but also to layer other artistic processes in the form of manipulation and montage, elevating his work beyond simple imitation.

Whilst Schaeffer’s work can be compared to Cage and Russolo’s, it is Varèse’s concept of music as art-science that is perhaps most pertinent. *Musique concrète* and the work of establishments like the *Groupe de Recherches Musicales* embody Varèse’s impassioned lectures on the linking of music and science, composers and physicists,¹¹⁰ and in the state-funded studios of France composers embraced the emerging experimental quality of music, inventing instruments and

¹⁰⁵ For example Schaeffer’s first piece, *Étude aux chemins de fer*, was made from the sounds of trains. Hegarty, *Noise/Music*, 33.

¹⁰⁶ The term “non-musical sounds” would perhaps be better replaced with ‘noises’, since Schaeffer makes these sounds musical through their artistic selection, manipulation, and organisation, before presenting them as “*musique*”.

¹⁰⁷ Hegarty, *Noise/Music*, 33.

¹⁰⁸ Cited by Schaeffer, *À la recherche d’une musique concrète*, 199.

¹⁰⁹ Hegarty, *Noise/Music*, 33.

¹¹⁰ Varèse, *The Liberation of Sound*.

sounds with the new electronic means available to them.¹¹¹ Such studios beat a resemblance to the “centres of experimental music” that Cage calls for at the end of *Credo*, in which “the new materials, oscillators, turntables, generators, means for amplifying small sounds, film phonographs, etc.”¹¹² would be available to artists and technicians alike.

Thus concludes this section on how John Cage, Pierre Schaeffer, and electrical technologies of the mid-twentieth-century impacted the relationship between noise and music. Whilst technology has advanced significantly since then, Hegarty argues that musicians’ methods of working — “sampling, montage, the use of the studio (even if this could be a laptop)”¹¹³ — have largely remained the same. Both Hegarty and Kim-Cohen look reference Drew Daniel of Matmos (the work of whom includes *A Chance to Cut is a Chance to Cure*, constructed from the sounds of plastic surgery operations¹¹⁴) amongst others in illustrating the lasting impact that Schaeffer’s work in particular has had on the way music is created. Daniel argues that the methods of contemporary popular music production render it *musique concrète*; Kim-Cohen summarises his argument thusly:

*All contemporary popular music is musique concrète due to the way it is constructed: using isolated bits of sound — sometimes sounds produced by the artists themselves, sometimes by others, sometimes musical sounds — and digitally rearranging them based on their usefulness within a compositional framework.*¹¹⁵

¹¹¹ Hegarty, *Noise/Music*, 26.

¹¹² Cage, *The Future of Music: Credo*, 27-8.

¹¹³ Hegarty, *Noise/Music*, 33.

¹¹⁴ Ibid.

¹¹⁵ Kim-Cohen, *In the Blink of an Ear*, 11.

And so the case is made that, though Schaeffer may have felt he had “wasted his life,”¹¹⁶ the impact of his work is undeniable and still felt to this day.

¹¹⁶ Tim Hodgkinson, “Interview with Pierre Schaeffer.”

Conclusion

“The mysterious frontiers which separate the realm of noise from that of music are tending increasingly to disappear.” — Erik Satie¹¹⁷

Coming to the end of this dissertation, it is now a suitable time to reinstate and directly address the claims I presented in the introduction and summarise my arguments.

I have chosen to evaluate the relevant work and ideas of five composers (or perhaps more suitably in Schaeffer’s case, technicians) who I believe have challenged the divide between noise and music. Furthermore I have drawn attention to the technology, whether mechanical (orchestral instruments), electrical (frequency analysers, turntables) or organisational (unconventional notation), that has been an underlying factor in their work, enabling them to realise their research and new forms of artistic expression. Whether they forged their own technologies, presented a new perspective on existing ones, or bypassed them completely, these artists all contributed in some way to the progression of the term ‘music’ towards a noisier future that would provide wider possibilities for future musicians. In concluding these ideas I would like to draw upon Douglas Kahn, who also highlights Russolo, Varèse, and Cage in providing a summary of this movement from ‘noise’ to ‘music’ in the context of the avant-garde:

Even this century’s most noted radical attacks upon music - conducted, as they were, under the sign of noise and sound - ultimately returned to music. Luigi Russolo’s ‘art of noises’ was recuperated immediately into the goal of ‘a great renovation of music’;

¹¹⁷ Erik Satie, *Écrits* (Paris: Éditions Champ Libre, 1977), 140. Quoted in Paul Hegarty, *Noise/Music: A History* (New York, London: The Continuum International Publishing Group, 2007), 16.

Edgar Varèse's 'liberation of sound' was a motto of retreat when compared to Russolo's position; and at the core of John Cage's emancipatory project was a will to impose musical precepts upon all sounds. The main avant-garde strategy in music from Russolo through Cage quite evidently relied upon notions of noise and worldly sound as 'extra-musical'; what was outside musical materiality was then progressively brought back into the fold in order to rejuvenate musical practice."¹¹⁸

Finally, the technical and aesthetic concepts these five individuals explored have not been viewed in isolation but were shown to be interconnected, each reinforcing or challenging another. Though the motives behind its use may have varied somewhat — from the search for more stimulating timbres to the very questioning of music itself — noise was an irremovable presence in their work. By utilising what were considered to be 'non-musical' sounds in a musical context, these figures were conducive in the acceptance of such sounds within the term 'music'; for after all, to quote Varèse, "what is music but organised noises?"¹¹⁹

¹¹⁸ Kahn, *Introduction*, 3.

¹¹⁹ Varèse, *The Liberation of Sound*, 20.

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