Imaginary Listening

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(for Nick Toller 1954-2007)

On a tangent...

It was upon reading Schaeffer's A la Rechereche d'une Musique Concréte with its descriptions, journal style, of the maestro in the studios of Radio France that my mind went on a tangent (*Janvier 1948...*). Was it the availability of sounds, compiled for broadcast use that piqued his musical curiosity? Was it the atmosphere of a media production house that turned him to those invisible images conjured by the sounds of trains, animals and music recordings? I thought of the sound teams in film studios, surrounded by 'foley' props, sound libraries and their own collected sounds. Having worked with sound effects, myself, for film, tv and radio I could see the fascination. My first film piece was synchronised on the old moviola editing machines. My first studio was installed in an old postproduction facility from the 50s in Caracas. It still had the giant-dial three channel mixers for music, effects and direct sound. I knew the feeling of being surrounded by all these available sounds, and the fascination of aural discovery... to want to use them for something else... forget the screen ! I also understood the discipline and craftsmanship, and curiousity, that bind the postproduction workers to their materials, and how you can become attached to a car-crash or a punch, a 'fat swoosh', man falls downstairs, stilletto heels on concrete. I felt I could understand Schaeffer when he wrote:

18 avril. On ne peut être en deux endroits à la fois. Il me faut choisir entre le studio et la cabine du son. C est là que je me suis finalment réfugié. Une vitre me protège du studio. Je suis parmi les tourne-disques, le melangeur, les potentiomètres. Je me sens vaguement rassuré. (Schaeffer, 1952, p.14)[1]

Schaeffer would go on to develop his work based on the musicality of his found sounds; he would become a Duchamp of the 'son trouvé'. Writing, at an early stage in his research, he says:

Je ne manipule plus moi-même les objets sonores. J ecoute leur effet au micro. (Schaeffer, 1952, p.14)[2]

But then, he would, in the spirit of Picasso and Stravinsky, rearrange those familiar sounds into impossible constructs; listening from all perspectives at once and offering the result to the listener.

Listening, briefly.

As is well known today, in a spirit of almost scientific and certainly musicological investigation he then set upon classifying his material and giving it theoretical respectability. He analysed the ways in which he would choose his material by summarising his, now well known, four modes of listening: *ouïr, ecouter, comprendre, entendre*. His imagination would be piqued by the editing and juxtaposing of sounds according to their characteristics and their evocative nature: a study of the railways, a study of the sounds of animals, text music (Les Paroles Dégelées may be the earliest instance of recorded text music?), as

well as effectively remixing jazz (Jazz et Plaintes), in fact making the first remixes ever. His music seemed to conjure visual images. In some cases such as in the *Etude Violette* and *Etude Noire*, with piano and percussive sounds somehow harking back perhaps to Debussy and Ravel but in the sense in which a DJ would remix Aretha Franklin: irreverently stylish. Music made from segments of music. In fact Schaeffer actually discusses this process as a musical montage in *á la Recherche...* when he explains how he could manipulate various chords recorded by Boulez in different styles –classical, romantic, impressionistic, atonal– and create related but unrecognisable sound constructions (Schaeffer 1952, p.27).

In the sense we have discussed above, Schaeffer was no longer combining the abstracted notions of pitch and rhythm the way a traditional composer would. but he was finding them in everyday sounds. He was also listening beyond the sounds themselves. He was exercising a recombinant aural imagination, he was certainly not the first, but perhaps the first to thoroughly theorise about it.

Schaeffer took the trouble to explain how sound can be listened to analytically, as raw material for composition, but perhaps he left more unsaid in terms of how we listen with our inner ear. According to current research in cognitive science, the brain becomes active in the actual motor centres for movement when we hear music. Also mentioned by (Dean and Bailes 2007, p.93), mirror neurons are supposed to fire sympathetically in response to familiar actions. The reverse is also empirically true, as our physiological responses to imaginary events, as we know from schizophrenia, common anxiety or panic attacks are quite real. Therefore to listen with the imagination is, for all intents and purposes, as 'real' as acoustic listening. For these reasons I am fascinated by how we listen 'inside', and perhaps this type of listening can be described and studied as a way of gaining insight into the creative process of the electronic composer. I call it Imaginary Listening, but I'm sure everybody has a name for it!

Can you imagine?
In a recent article for Organised Sound, John Young writes that although it is outside the scope of his paper, this question merits research in itself: "can music that aims to exploit the true, physically experiential totality of sound – referential and abstract – and that facilitates the production of radically new aural constructs, itself be imagined?" (Young, 2007). In other words, the same question posed by John Locke (Dean and Bailes 2007:92) regarding our ability to form mental impressions without first perceiving through the senses. Or, more prosaically, can we recall something we never knew?

Arguably, a mental image of sound –even if vague– is essentially what every composer has at the beginning of the musical creative process[3]. And imagining sound is probably for everyone, an everyday occurance. According to Dean and Bailes in *Human understanding in imagining and organising sound* (Dean and Bailes 2007, p.92) John Locke refers to the act of remembering as 'secondary perception', they also imply that, according to Locke, the (composer's) mind often goes about recombining sounds in search of a new construction, but that perhaps, as mentioned before, only using sounds that have been previously heard. Empirically we could add that composers and sound designers also recombine characteristics of sound, freely exchanging these amongst the different originally perceived sounds in a kind of cross modulation between aural memories. The result being actually a new 'unheard' sound, unmediated by direct previous perception. In this way, a composer may, for instance, apply the portamento/vibrato of string playing to the sound of

a piano note, as in Takayuki Rai's *Four Inventions For Piano And A Signal Processing Computer (1988).*

Reverse Engineering
How do we appreciate the 'rightness' of these 'radically new aural constructs"? How can we tell if, and excuse the verbosity of this, it is reasonable to believe that the imagining of concrète music owes less to the discovery of musicality in a sound object we collected and more to the composer's inner listening away from the studio ?

I would like to look at two related exercises in sound creativity. Firstly to do with sound design for film and secondly but less extensively in regards to 'pure' electroacoustic composition. When referring to sound design for film, I mean the synthesis and editing of sounds in film, as opposed to the other general meaning of the term in regard to the general managing of audio for a film. The sound designer must 'reverse engineer' a sound 'source' from a visual image. They must work backwards by trying to imagine how a given image should sound. This process of imaginary listening consists of listening in advance of the actual sound being perceived. They see the means of production (the image on screen) and have to imagine, browsing and recombining their memories of sound, what it could sound like.

It is a predictive process to an extent, it probably relies on an implied gestalt analysis of the visuals: big objects that collide will have deep loud sounds, creatures of fantasy will speak with somehow organic voices, strange environments will have noises that we can relate to but not recognise. Imaginary listening for sound design is a close cousin and sometimes identical twin of 'compositional' listening. Historically, it seems that sound creativity on film precedes acousmatic creation and so we will now examine that.

Going to the movies
As a keen film enthusiast I was readily turned on to electronic music through movies. The 70s were a good time for film sound as the work of Walter Murch in THX1138 (1970) helped usher in a refined and holistic approach to film sound. Murch's audio montages in The Conversation (dir. by Francis Ford Coppola, 1974) and THX1138 (dir. by George Lucas, 1970) were possibly the first substantial examples of what Ben Burtt, referring to his own creative audio role in Starwars (George Lucas, 1975) would later call 'sound design'.

In the late 70s film sound also began to aspire to the creation of immersive experiences, of the kind pre-dated in the 50s by the concrète concerts of Schaeffer and Henry's GRM and of course Stockhausen's performances of Kontakte. Immersive sound, allowing the viewer to "ride the film" (Whittington, 2007, p. 108) started appearing in the mass market through technologies like *Sensurround* with its very loud low frequencies (as used in Earthquake, 1974 or Battlestar Galactica, 1978). *Sound 360* (as used in Damnation Alley,1977, by 20th Century Fox) would follow with its LCRS configuration of speakers which in turn would provide the diffusion structure of Dolby Pro-Logic. *Megasound* by Warner Bros. (as used in Altered States, 1980 and Superman II, 1981) would also appear later to literally shake the viewers in sync with the crashes, falls and explosions on screen. Thus, sounds made by images of fiction was more real than the images themselves.

Of course, much before the 70s, John Cage recognised the importance of sound as used in visual media when he wrote in 1937, in *Credo*: "...The sound of a truck at 50 m.p.h. Static between the stations. Rain. We want to capture and control these sounds, to use them, not as sound effects, but as musical instruments. 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 be-yond the reach of anyone's imagination. Given four film phonographs, we can compose and perform a quartet for explosive motor, wind, heart beat, and landslide." (Cage, 1973)

Even though his famous text was subtitled the 'future of music', I believe Cage was actually writing in hindsight.

Seeding electroacoustics
In the late twenties an age of sound experimentation for film was dawning. Even though there had been attempts, such as Edison's, to synchronise sound and image since the late 1800s, it was not until the late 20s that this idea came of age. It is generally acknowledged that the first fully succesful film to combine sync sound was Warner Brothers' The Jazz Singer (1927). At this time the main purpose of film-sound was to carry the voice and essential incidental noises such as footsteps or doors closing. It would not be long before film sound crews attempted to communicate more than the physical, and compete with the incidental music in illustrating the inner state of the characters on screen.

In Rouben Mamoulian's Jeckyll and Hyde (1932), the sounds that accompany the appear-ance of the psychotic Mr. Hyde could easily be found sixteen years later in musique con-créte. Reverberation, close microphony, backwards sounds and even 'artificial sounds created by photographing light frequencies directly on to the soundtrack' (Hayward, 2004)[4] were used for this film. In fact, 'drawn sound' or directly scratching the optical film was first done in Leningrad in 1929 by Arseny Mikhaylovich Avraamov and Yevgeny Sholpo draw-ing "directly onto film with a pin dipped in Indian ink". Sholpo actually directed a Drawn Sound laboratory in Moscow, the Laboratoriya Risovannogo Zvuka, even developing a photoelectric composition machine which he called the *Variofon* (Davies, 2007). Together with similar experiments carried out in Europe such as those of Edmund Meisel, Rudolf Pfenninger before 1929, and, Oskar Fischinger (later a mentor for Cage) and Paul Arma at Bauhaus between 1931 and 1932. During this period, also, Lászlo Moholy-Nagy would bring together sound and images in Tönendes ABC (now lost) in Berlin, "in which the shapes drawn on the soundtrack were also shown as the visual element of the film" (Davies, 2007).

We can see then, how concréte music was prefigured in Jekyll and Hyde, but also how electronic music as a 'studio art-form' as practised at the WDR-Cologne, was anticipated by experiments in drawn sound, by a good twenty years!

For Instance...
In the scene where Jeckyll becomes Hyde, one can easily do the exercise of imagining these sounds without the visuals as if they were a short early 20th century electroacoustic composition. In Max Steiner's film King Kong (RKO, 1933), re-recording techniques were used to create the giant gorilla's roar. Applying what we have earlier referred to, verbosely, as 'aural memory cross modulation', animal sounds, including lion roars and various go-rilla screeches were layered and played backwards to achieve Kong's fearsome call (Whit-tington, 2007, p. 71). In this way film would allow us to see what, before, we could only imagine, and designed sound would allow us to hear it.

It was a matter of time before these 'proto-electroacoustic' techniques would find their way into the hands of composers. Cage saw the potential, as pointed out earlier, in 1937. But the early experimentation continued at the hands of sound crews in Hollywood, as well as composers working for Holywood Films.

One such case is well known, the 'electronic tonalities' –as they had to be called not to up-set the film unions– of Forbidden Planet (1956). Louis and Bebe Barron took the electronic imagination a step further by combining the illustration of psychological states such as had been seen in Jekyll and Hyde, whilst at the same time creating musical pieces

Four years later, in 1960, in Silent Star, (Kurt Maetzig's Venus space trip, co-produced by-Poland and East Germany) Andreijj Markowski created a musical soundtrack which illus-trates the narrative thrust and psychological states of the characters whilst embodying space age technology, in much the same way as Forbidden Planet although less well known.

A more contemporary example of sound experimentation being inherently musical is found in the sound design by Walter Murch for George Lucas' THX1138 (1970). Murch was also co-writer of the screen play which gave him a special insight into the story and how it should be told audiovisually. His work on this film ranged from sonoristic segments which would not have been too dissimilar to earlier concert works such as Penderecki's Thren-ody (1960) or to Ligeti's atmosphères (1961), yet by his own account he also incorporated contemporary musical devices such as phase techniques inspired by the work of Steve Reich (for the trial scene). His 'temp track' for the film was so musical, made of reversing, editing and making montages of orchestral recordings (such as the Pergolesi Stabat Mater for the opening), that composer Lalo Schifrin recreated a large part of it by scoring the re-sulting sounds for the film orchestra[5].

His creation of motorised sounds such as the ones for the jet-cars and motorcycles to-wards the end of the film are illustrative of how electroacoustic techniques have been de-veloped in film, in parallel and arguably independently of acousmatic music, from their own tradition of craftsmanship –to become an art form in itself. The jet cars, again by Murch's account were created by manipulations of a "foot and a half of tape" of a recording of a jet landing. The motorcycle sounds were made using distorted recordings of females scream-ing.

...and the radio
It was the experiments of the late 20s and early 30s, and arguably, the feedback between film and radio sound techniques that would set the scene for Schaeffer's early work. In fact, why did Cage not mention the radio in his Credo? This merits a moment of reflection. Was it because radio was, at the time, mainly a live performance medium? His eventual interest in radio was more as a sound source, as exemplified in Imaginary Landscape no. 4 (1939), than a means for diffusing works, perhaps with the later exception of the 1982 radio play "Marcel Duchamp, James Joyce, Erik Satie: An Alphabet". I would argue that Cage was attracted to film because it was a recording medium. It promised to summon an infinite variety of sounds that could be registered on its magnetic tape format, and it was more developed than reel to reel machines of the time (the earliest being available since the beginning of the 30s). Although constrained to work for visuals, film sound promised to liberate the imagination.

Is it right?
The actual RTF and WDR studios that saw the birth of electroacoustic/electronic music experimentation were primarily intended for radio. Schaeffer himself was a radio engineer. Imaginary listening in media starts with radio, of course, as much as with cinema. The dif-ference being, perhaps, that in cinema the visual element helps better judge the appropri-ateness of the imagined sound. Because on film, imagining the sound an invisible or

chamaleon-like rastafarian alien could make is a strangely objective exercise (Predator, 1982): on screen an almost transparent visual interference is detected in the lush rainforest vegetation, Now and again we believe we can see something. Every time we see this ripple, we hear a sound which seems acoustic (a long grained repetitive 'natural' scraping sound, maybe a big cat breathing sound, with a gradual amplitude onset and release), it sounds organic as opposed to electric in nature. A process of metaphor is instinctively applied (Cook, 2000). We identify synaesthetically, elements of the visuals which could be said to also be contained in the audio. We are then able to evaluate whether they have been succesful, as we decide whether there is a '*readily perceptible intersection* (Cook, 2000, p.70) between the aural and the visual gestures. In a sense, it is the earlier cross modulation idea but this time straddling sensory fields or modes.

Given images for electroacustic music
One could say, that in electroacoustic composition, to appreciate the result of imaginary listening implies mostly an exercise in believing the explanations of composers; how the actual piece is an approximation to what they 'heard inside their head'. Similarly to film sound design, one could also say that the composer aspires to an imaginary sound product ahead of producing the sound. Yet any evidence of this is only given to us by the composers themselves. In Francis Dhomont's *Chroniques de la Lumière* (1989, 2005), the maestro explains in his programme notes for this piece: "*These "Chronicles" are an impressionistic sonic version of visual elements –an undoubtedly metaphorical act–, a personal daydream of light [...]. An evocation of luminous phenomena, natural rays or multiple artifacts [...]* (Dhomont, 2006).

Dhomont's comments, even brief as they are, serve as a plinth for our understanding of his inner listening; they also enable us to judge better the acuity of his inner ear, or at least they give us a chance to compare our own mental images thus evoked with the composer's final results. We can catch glimpses of the 'mental hearing' process of the composer in electroacoustic music, then, by contrasting the music with a title, or a programme note, or even the choice of CD or album cover (Cook, 2000).

Explaining his use of the sound of locomotives, in *Etude aux Chemins du Fe*r, Schaeffer writes that sequencing these creates a dramatic tension which forces the imagination (Schaeffer, 1952, p. 21). He expands on this, writing that on the one hand it anthropomorphises the sound as it stops, starts labouriously and 'breathes', and, on the other by means of constant repetition it isolates the sound itself from its cause. It renders it meaningless in a process of reduced listening. But the point here is that this sound manipulation 'forces' the imagination and, so, the outcome is far from objective. It creates a new image, maybe related to the original train sound, but different. Schaeffer himself interprets his train montage as having human qualities. He imagines the trains alive. He delivers a dramatically paced narrative of the 'life' of the train. After reading Schaeffer's own comments, can we listen to *Etudes aux Chemins du Fer* without trying to 'see' the humanity of the machine? Can we safely say that we are able to listen to it in a reduced way?

Finally.
We listen with our imagination, as we trawl through our memory stimulated by the ear. Some of the things we perceive may be seeded by the composer's comments, by a picture or an anecdote, or by the place in which we first listen. On the subject of how sounds are perceived by different people, Katharine Norman writes in Sounding Art that "sounds release information that –trailing through our back catalogue of experiences– we use to make educated guesses". Listening creates, thus, new connections between recounted

and experienced events and pauses time as it launches us through what Norman calls our 'back catalogues'. It causes us to reflect and review.

When electroacoustic sound is designed or recombined for film, a further dimension is added to this process of self review. It presents us with an image of something that is not actually happening in synchrony with a sound that was not actually produced by it. Partly it is the 'added value' that Michel Chion explains in his book Audiovision: film sound seems unnecessary, it seems to duplicate what we see, when in fact it is colouring what we see (Chion 1990). But partly it is also the pure sonic makeup of the sound, the elements we vaguely recognise, that touch us in our causal and semantic listening (Chion 1990). In acousmatic music, on the other hand we also have images, possibly the ones ellicited by the sounds we have learnt to identify on film and visual media in general, as well as the ones presented by the composer. It seems that electroacoustic music, having been originated in film, as it were, has a need to return to the image in order to understand and explain itself.

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Endnotes

[1] 18th April. One can not be in two places at the same time. I must chose between the studio recording area and the control room. It is there that I finally take refuge. A glass window protects me from the studio. I am amongst the turntables, the mixer, the faders. I feel vaguely reassured (Schaeffer, 1952, p.14. Translation: J. d'Escriván)

[2] I do not manipulate the sound objects anymore. I listen to their effect through the microphone (Schaeffer, 1952. p.14. Translation: J. D'Escriván))

[3] I agree that sometimes the inspiration is extramusical but one can argue that the intention is musical otherwise the creative process would lead the artist to a different art form, *ergo*, if the final output is to be musical, some desire for sound or mental image of sound must be had by the composer.

[4] Although Davies (2006) states that the 'synthetic high and low frequencies' were actually drawn onto the soundtrack

[5] In the interview that comes as a bonus feature on the THX1138 DVD, Murch recounts how he was amazed to hear the orchestra 'playing' the temp track.