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Electroacoustic Music before Language

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Abstract – and Introduction

The Language of Electroacoustic Music (Emmerson, 1986) was published by the Macmillan Press in late 1986 and has remained available continuously since. *Expanding the Horizon of Electroacoustic Music Analysis* (Emmerson and Landy, 2016) was published by Cambridge University Press almost exactly 30 years later, so I thought it pertinent to take stock – what has changed over this period?

Electroacoustic music has (with some significant exceptions) developed a *practitioner-led* musicology – at least in the English-speaking world. In 1986 all ten contributors to *The Language of Electroacoustic Music* were composers. I believed at the time that this would change and that mainstream musicology would take on the challenges of this new music and develop its analytical discourse. Yet by the time of writing *Expanding the Horizon of Electroacoustic Music Analysis* there had hardly been any change. Possibly 2 of the 18 contributors would *not* claim to be composers first and musicologists/writers second.

So taking stock has becomes a reflection on the overarching questions: why has nothing really changed? Why has electroacoustic music practice remained (in much part) so separate from other forms of instrumental contemporary music? Why has it remained so woefully neglected by the musicology community? Conversely why has its own musicology – or any aspect of its study - failed to make much impact in more mainstream musical discourse?

"Search for a language" (Pierre Schaeffer)

Almost from the inception of *musique concrète* Pierre Schaeffer declared the need to –

> "Search for a language." (Schaeffer 1967, p. 29 – also developed in Schaeffer 1952, 1966)

He rejected any *a priori* language – one structured independently of the sound material itself. His was an empirical and experimental enterprise, encouraging the smaller steps of the *étude* before the leap to an extended 'work'.

It seems that the project that led to the *Traité des objets musicaux* (Schaeffer 1966, 2017) has as a barely concealed ghost the search to discover musical equivalents to *phonemes* – functional small units that could be chained in sequence to form phrase structures – musical utterances which in turn parallel the phrases of speech and song. But can such functional units

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be subdivided into equivalents to 'vowels' and 'consonants'? – those apparently neutralised building blocks from which words and hence meanings can be built. We need to establish some preliminary procedures.

Scales

Scales help us to order things - from nominal difference to ordinal and cardinal scales:
A ≠ B (simple difference (holistic distinction) – nominal)
A > B (difference comparison (of some quality) - ordinal)
A=7, B=4 (difference measure (of some quality) – cardinal)

We may contrast the stark difference of *pitch* and *timbre* when we apply scalar thinking: pitch is a single dimension, timbre is multidimensional. Hence ideas for timbral *ordering* are complex. Attempts to rationalise this complexity have broadly taken two contrasting routes – reflecting the history of their cultures of origination.

The emergence of an empirically measured psychoacoustic approach was facilitated by the new digital means of the 1970s (Grey 1977, Wessel 1979, McAdams and Saariaho 1985). Here there is an attempt to unravel 'multidimensionality' quite precisely, to find those dimensions (which lie behind scales) that are pertinent to our perception of differences between timbres. Sometimes the material focused on a classical instrumental model of 'steady state' timbre (although including basic envelope control).

Pierre Schaeffer's contrasting approach also addressed perceptual qualities, but in a much less quantitative way which included *ab initio* a greater attention to noise, inharmonicity and time-domain aspects of sound. He aimed to create practical scales (*a posteriori*) through the detailed listening-based analytical methods of *typology*, *morphology*, *characterology* of sounds (1966, Chion 1983). Yet for the *objet sonore* we do not (cannot) have an equivalent – even a parallel - to pitch ordering and interval.

We can indeed subdivide the sound object into component parts. We might focus on the attack part, the continuant and its evolution, and aspects of its termination. But parallels with language are fraught with misunderstanding. A spoken word may be divided into its constituents: 'd-o-g' as two consonants and a vowel - a reduction designed ideally to neutralise, generalise and objectify the components.

The whole point is that Schaeffer's method takes a holistic view of the object – the separate components are there[1], to be sure, but are determining of the total object as perceived. At best the sound object may have an approximate equivalence to the phoneme[2] – but one I shall argue further which has considerable expression and meaning already inherent. In practice we have no equivalent to the neutralised and generalised consonant and vowel, chained together to form phonemes and words.

But sound events *are* chained together and *do* sometimes seem to create some kind of *utterance* – which might seem to contradict what I have just argued! So what is going on? What do we mean by 'utterance' if it's not exactly language? However simple the sequence of sound events, their gestural and referential qualities have an indicative function at some level. Yet if we have no stable equivalent of the *vowel*, *consonant*, *phoneme* or *word*, the

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[1] Noises and various kinds of continuous spectra may appear to be equivalents to consonants and vowels but cannot easily be generalized in these terms.
[2] Longer sound objects of greater complexity would break this weak relation.

relationship to language becomes more tenuous and problematic. So, what instead? I suggest that electroacoustic music is concerned with another kind of semantic unit. One that existed *before* language – yet is still found indelibly *within* it.

Losing words - music *before* language

I wish to engage with a word that understandably went out of fashion some time ago – *primitive*[3]. Perhaps electroacoustic music addresses more primitive aspects of our evolution. Humans produce sounds that have very high perceptual and communicative power as well as, often, great emotional valence. These may be vocal, or the result of causal actions (clapping, slapping, hitting, blowing, scraping for example). Furthermore humans imitate animal sounds, sounds of non-human agency (wind and water) communicating (or signifying) needs and their fulfilment.

If we consider vocal sounds, we refer here to the *non-verbal, pre-linguistic* – possibly *proto-linguistic* – exclamations: grunts, groans, moans, laughs, sighs, screams, and so on. These may express sadness, anger, awe, fear, satisfaction, humour … and many other signals for sharing and communicating *something about me or about the world*. I am suggesting that our building blocks have more in common with such sound events reflecting the whole gamut of emotion, expression and communication.

These are 'readymades' so to speak, full of enormous potential - unlike in pitch-based musics where the individual pitch has been stripped down completely and needs to be combined with other pitches (in varying durations and articulations) to build something that has musical function or meaning. Both pitched music and language require this *combination of elements* before a semantic level can emerge. But the sound object/event already has potential syntactic and semantic functions - something not possible in languages as recently analysed[4].

'Marked by the world'

Such proto-language is strongly influenced by the affordances of the world around us. I suggest this relates to Schaeffer's discussion of timbre as something 'marked' by the physical world (even after reduced listening has removed *specific* sources and causes). Our sound object need not be a recording of a specific (or recognisable) event – but we search for evidence of its worldly *facture*[5].

> "[Schaeffer] also emphasizes how, in the act of hearing itself, the ear, in order to appreciate the sound, is spontaneously sensitive to the manner in which *it hears it to be made* – not so much in the sense of identifying its source as in identifying the energetic process which gives rise to the sound object. This is why he creates the notion of *facture* [...]"[6] (Chion 1983, English translation 2009, p. 36)

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[3] I was 'brought up' in the mathematical sciences where the term 'primitive' is often used to mean a fundamental building block without negative connotation.

[4] Onomatopoeia combines phonetic (sound) and semantic (meaning) aspects.

[5] Schaeffer was dealing with recorded sound and did not have the synthesis power to create electronic imitations of real world sounds – later writers have included these with descriptions such as '*seem to* refer to real world events'.

[6] Schaeffer's discussion of *facture* as a 'mark of the world' interestingly foreshadows Kendall's (2008) reframing of the 'sound object' as 'sound event' – shifting focus to the possibility of agency.

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And so it follows logically that Schaeffer found early electronic sound impoverished in exactly these terms – it showed no signs of worldly 'making' and we would therefore have no evolutionary relationship to it. That's one reason he hated it. Indeed more widely we find early electronic sound described as 'unworldly' or 'other worldly' and the first choice as sci-fi soundtrack for quite some time. Yet even within Schaeffer's group others worked steadily to demonstrate that electronic sound could gain a degree of interest through more complex *behaviour* – thus regaining a relationship to real world models.

> "Even if musique concrète had mainly been based on the recording and manipulation of sounds, synthesis was not excluded as a sound source. Since 1955, Pierre Henry had already started using oscillators to produce sounds for musique concrète." (Teruggi 2007, p. 219)

> "The typo-morphological concepts applied to the [Coupigny] synthesiser[7] implied that sounds would not be constructed on oscillator additions or calculated modulation, but that complex sound materials would be easily generated and controlled globally, from a morphological perception point of view and not as a parametric architecture." (Teruggi 2007, p. 220)

I argue that our material (whatever its real origins) is first and foremost 'environmental' in character. But not only for sounds *timbrally* but also in terms of *space*, *place* and *behaviour*. These, too, engage with our embodied sense of environment – I would relate these to Denis Smalley's notion of 'indicative fields':

> "Three are archetypal: gesture, utterance and behaviour. These fields are original universals. […] The six remaining fields are energy, motion, object/substance, environment, vision and space." (Smalley 1996, p. 83)

The modelling of such natural behaviours to sound (swarms, chaos and fractals, for example) has been expanded vastly by computer-algorithmic techniques.

Neuroscience

Recent neural brain activity research using musical stimuli shows that there is some overlap of brain region activity between music and language. This is usually associated with the semantic areas of the brain. But these tests are overwhelmingly based upon tonal - and hence pitched - music examples (whether classical or popular). Whatever our personal (perhaps aesthetic and compositional) views pitch has a special place in perception – it is a cardinal scale that is reducible to a single measurable dimension. But it has dominated neuroscientific research as applied to music. So I want to reframe the fundamental shift (and difference) described in this paper as a serious proposal for further research by - and with - our neuroscience colleagues.

MANIFESTO for research **in the form of an open letter**

Dear colleagues in neuroscience -

For a time at least, please dump the Mozart and the tonal popular music!

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[7] The Coupigny synthesiser was constructed in the GRM studios in the late 1960s; Teruggi (2007) cites major works made with it by Bayle, Parmegiani, Chion, Reibel.

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We have some different suggestions:

– use music that is predominantly timbral and textural and has little pitch material[8].

I suggest we start with quite abstract soundworlds that do not immediately reference everyday real-world sounds.

– scan me thinking such music.

Being scanned listening to Denis Smalley's *Pentes* for the 501st time would be a pleasure – come to think I know it so well you can do a test scanning me *thinking it through* without physical sound input[9]. To have a copy of the 'diffusion score' - a kind of evocative notation - with me would make that more accurate.

More nuanced tests follow:

– as previously but also using recognisable real world sounds.

We need to discuss this further – it will be an important variable in this test. It's a complex issue – one person hears 'the sea' another a complex noise sound! How does *reduced listening* work here? Can I *will* myself *not* to recognise 'the sea'?

– start from the predominantly timbral but 'allow back in' the clearly pitched[10].

How does pitched material interact with the timbral/textural? This may engage different parts of the cortex – in conflict, tension, creative 'play'[11]? Just as with the complex relationship of apparently abstract complex sounds with 'recognisable' world sounds, so with pitched musics too, what happens when we include allusions to known styles of music, even quotations? What is the role of memory here?

Environmental dimensions are more important:

– how do perceptions of place, space and distance effect results?

Then we have the time domain:

– how does pacing change our perception of timbral music?

– how is pulse perceived? does it change our perception of sound quality?

Also live performance and interactive electronics:

– what distinguishes 'liveness' in this kind of music? How does this affect perception of the results in a timbral music?

Listening to a live performance is not the same as listening to a recording of a live performance. (Our first tests may have to compromise here!)

– we cannot exclude the visual element – and its mediated complexity where cause and effect may be dislocated! How does this change things?

Here pitched and complex timbral sounds may be closely entwined – combining traditional and non-traditional instrumental techniques. You might try testing performers and non-

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[8] Or at least where the pitch 'argument' is secondary to the timbral.

[9] Imaginary sound is now well established in research (Grimshaw and Garner, 2015).

[10] An absurdly simplified proposal – this can take many forms. Pitch is never really totally absent from any timbral music!

[11] I find these questions arise listening to Katharine Norman's *Trying to translate* (1991) which combines piano, live electronics and recorded sound in a sometimes 'strange' play of pitch, timbre and 'real' language.

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performers specifically to see what differences there might be! The theory of mirror neurons suggests we perform in our minds when we see others performing. For a non-pitched and non-rhythmic music that may be a complex internal behaviour as yet unobserved.

Once we begin to work out all the possible combinations of these topics and questions we glimpse the daunting richness of this proposed research programme. That is why we need to begin it now!

Summary – and conclusion

To refer to the *language* of electroacoustic music gets across the idea of putting sounds together to make meaning - but we search in vain for consistent parallels to vowels, consonants and phonemes. Though interestingly we might usefully retain ideas of 'phrase' and 'sentence' and hence the notion of *utterance*. These utterances remain at the level of *proto-language*: emotionally charged grunts, groans, laughs and shivers; human signals and pointers or maybe sounds mimetic of environmental events (wind, water, geosphere … and beyond) – set in a space, place, at a distance. We should also include kinds of primitive sonic art (vocal or instrumental) – humans would surely have bowed, scraped, blown and hit objects to hand. So maybe these pre-linguistic primitives of the sound world are our building blocks. Perhaps this is one contributory reason why musicology in general has ignored and, to a large degree, continues to ignore this field. So perhaps in suggesting back in 1986 that we examine the *language* of electroacoustic music I might today rephrase that as the *proto-language* of electroacoustic music!

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