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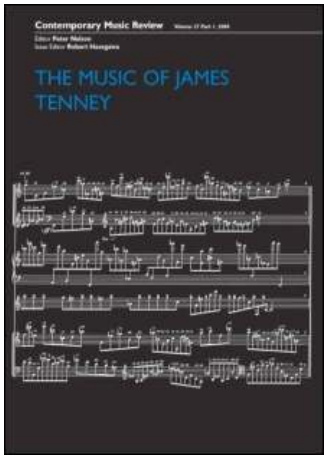

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Defining Timbre – Refining Timbre

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Timbre is defined as the attribution of spectromorphological identity. Electroacoustic music experience, particularly acousmatic music, questions the viability of a notion of timbre. Of primary significance is the traditional linking of timbre to the source and cause of a sound: the concept of source-cause texture is introduced to define this link. The ambiguous relationship between pitch and timbre indicates that timbre cannot be defined as that part of the sound which is not pitch. Problems in establishing the existence of sonic identities within the musical context, and of maintaining the coherence of identities are discussed, opening up questions relating to musical discourse. Two types of discourse – transformational and typological – are defined, leading to the notion of generic timbre. In a spectromorphological music where defining identities becomes problematic it becomes impossible to disentangle timbre from discourse: here the notion of timbre has a limited viability.

KEY WORDS timbre, sources and causes, identity, registration, discourse, typology, transformation.

Introduction

What is timbre? When is it meaningful to use the term? How useful is a concept of timbre in the context of electroacoustic music? Defining timbre is a hazardous operation. "Talking about timbre," says Philippe Manoury "is as delicate as talking about taste" (1991). Moreover, timbre cannot easily be pinned down. Claude Cadoz (1991) goes so far as to state that any discussion of timbre provokes debate on the very nature of music, while Jean-Baptiste Barrière (1991) finds in timbre "the inevitable breaking-point of every musical discussion and every compositional confrontation. It represents opposed notions of music, opposed aesthetic positions." Indeed, the book which includes these writers is called *Timbre, métaphore pour la composition*. You cannot get more all-embracing than that.

One trouble with timbre is that it existed before electroacoustic music, and we therefore have to spend much time and intellectual energy extending or combating notions which were not necessarily designed for the music we make. A second trouble is that we now know too much about timbre. It is one of those subjects where the more you read and the more you have hands-on compositional experience the more you know, but in the process you become less able to grasp its essence.

Whose Timbre?

The third trouble is that timbre means different things to different people. "Whose timbre?" we might ask. For many traditional musicians the oft-quoted definition of the American National Standards Institute, in spite of its curious negativity, has a certain validity:

> "that attribute of auditory sensation in terms of which a listener can judge that two sounds similarly presented and having the same loudness and pitch are dissimilar."

At least it implies the traditional, pervasive notion (however technically incorrect it may be) of the instrumental note as comprising a pitch with timbre, and it evokes the notion of a source even if it is not specifically mentioned.

For the contemporary instrumental composer (I am thinking particularly of spectral approaches to instrumental composition) timbre is an extension of harmony, or vice versa. The composer uses spectral analysis as a basis for conceptualising the relationship between pitch and sound qualities, and attempts to negotiate fluent border crossings between the two.

A third approach to timbre concerns the details of its multidimensionality. Through research publications and through electroacoustic compositional experience we have become very aware of the multiple variables which determine timbral identity. And we have also become concerned to differentiate what is acoustically present in sounds from what is psychoacoustically pertinent. The maps presented by such aids as spectral analysis or sonograms are one thing; finding a safe perceptual way through these territories is another. The multidimensional complex is not without problems. It can reveal to us the "what" of timbre, and explain the "how," but that does not mean we can aurally separate out the dimensions involved nor focus our ears on their details, even though we are so sensitive to their minor behavioural changes. In applying their awareness of multidimensional timbral features, composers, aided and abetted by technology, are often absorbed with concepts, methods and techniques: the listener's apprehension of timbral values cannot simply be equated with the launching of multidimensional attributes by the composer.

This brings me to a fourth answer to the question, "whose timbre?" The everyday language of qualitative description is accessible to everyone. It is closely allied to the "matter" of sound. Terms like bright/dull, compact/spread, hollow, dense, may be vague, and vague they are destined to remain since they are qualities, but they have the advantage of an immediate, comprehensible identity and are therefore not to be scoffed at. They are verbal signs that essential qualities have been recognised.

Timbre and Source

Having invoked four attitudes to timbral perception I should now hazard a preliminary definition. I have freely adapted a definition by Michel Chion.[1]

> Timbre is a general, sonic physiognomy through which we identify sounds as emanating from a source, whether that source be actual, inferred or imagined.

Prior to the electroacoustic period music always involved identifiable sources. The listener could spontaneously link sound both to a sounding body and a human,

[1] (Chion 1986: 7):."... le timbre, n'étant rien d'autre, en effet, que la physionomie générale qui nous fait identifier un son comme émanant d'un instrument déterminé ou (plus généralement) d'une source déterminé, qui peut être imaginée ou imaginaire."

physical cause. Gesture not only activated the source but could, through breathing and bow control, and techniques of touch, maintain and continue the sounding of the vibratory system. Traditionally, therefore, there is an inherent, culturally imbedded, stable *source bonding* in music. Source bonding is the term I use to encapsulate

> the natural tendency to relate sounds to supposed sources and causes, and to relate sounds to each other because they appear to have shared or associated origins.

All those attributes traditionally packaged under timbre – the nuancing and articulation of note-objects and phrase-shapes, and the control and variation of tone, including the roughness/smoothness of note-grain – could be traced to source-cause interactivity.

In electroacoustic music, however, sources and causes are many, varied, evident or ambiguous, actual or implied, unknown or unknowable: we can perhaps detect traces of cause or source but realise that neither can exist in reality. In instrumental and vocal music source and cause are known in advance of listening, but in electroacoustic music they are unveiled by the composer and are discovered (or not) by the listener in the course of the work, and within that single work there may be a great variety of source-cause shadings and strategies. One of the great interests in electroacoustic music is the adventure of bonding play, which I regard as an inherent perceptual activity. Listeners may share source bondings when they listen to electroacoustic music, but they may equally have different, personalised bondings including those never intended or envisaged by the composer. Widely ranging bondings are inevitable in musics which are not primarily weighted towards fixed pitch-intervals and the instrumental note, and they can occur in what might be considered the most abstract of works.

If source and cause are unstable, illusory or non-existent does this mean that my definition of timbre crumbles? It is certainly too restrictive because apprehending source and cause is not the only identification strategy. Source bonding is extrinsic – it refers to sounding experiences outside the work. But extrinsic links also involve a wide range of real and imagined non-sounding phenomena. Thus source bonding is part of a more comprehensive representational fabric which I shall refer to as the *extrinsic matrix*. The word "bonding" evokes a binding engagement and kinship between listener, musical context, and source-cause searching which is a spontaneous activity for most listeners. However, the wider extrinsic matrix is a less concrete, more inventive and more perishable medium of exchange between work and listener. I can only indicate very generally the content of the extrinsic matrix in this paper. Timbre is concerned with the temporal unfolding and shaping of sound spectra, in other words with *spectromorphology*. One concern of spectromorphology is motion and growth processes, which are not exclusively or even primarily sonic phenomena. Energy, which is inherent in spectral motion, belongs both to sounding and non-sounding experience; it is linked not only to motion in general but to human gesture, whose sounding manifestations are implicated in the causality of source bonding. Motion, growth and energy can be regarded as having a sonic reality but they can also be interpreted metaphorically and symbolically.

Since the notion of source is too restrictive we must invoke a more abstract concept of timbre which can include the source. My definition therefore becomes

> a general, sonic physiognomy whose spectromorphological ensemble permits the attribution of an identity.

We are going to have to delve into this spectromorphological ensemble, but first we must go more deeply into the contextual environment which establishes the conditions for identification. That means returning to the norms established through instrumental source-cause.

Source-cause Texture

Robert Cogan (1984) sums up the significance and scope of context for instrumental identity:

> ". . .the essential sonic features of any musical instrument are not finally to be discovered either in the practice room or in the anechoic chamber, or even in the most sophisticated statistical analyses of instrumental sound isolated in those places. Rather, the essential sonic features of any musical instrument are to be found in the sum total of its structural sonic contributions to musical contexts. These features will be revealed by analyzing the functions and relations of these contexts and of the instruments in creating them." (p. 185)

The identity of the instrument is exposed through our experience of what I shall call *source-cause levels*. In this instance let us say that the source is a violin, and that the cause is therefore specific types of gestural action of a violinist. The lowest source-cause level is the *imminent level* – the ongoing, intrinsic musical context where we encounter the instrument. Through the unfolding of the musical style we become aware of *registration* – the articulation and play of note-objects and their chaining in phrases over a continuum of registers. The second level is the *cumulative level*, which reaches back to include our previous experiences of violin-sources in the hands of other violinist-causes who articulate both the same music and other genres and styles. I recognise that at both the imminent and cumulative levels the violin may be associated with an accompanying or collaborating source-cause. The third level, the *extended level*, includes ensemble contexts and extends the source-cause base to include the immediate family of stringed instrument-sources. The final level, the *dispersed level*, spreads over the widest possible range of source- cause to include all bowed and plucked instruments, for example viols and rebecs and the instruments of other cultures. The four levels create a potentially enormous reference field whose totality I shall call *source-cause texture*. Its content encompasses our total, long-term experience of imminent registrations, possibly in many musics, across space and time. The idea of source-cause texture is all the more pertinent today when through recordings we have listening access to a vast cross-cultural source-cause repertory. In passing we should note that both mixed and acousmatic electroacoustic works tap existing dispersed levels in order to expand traditional instrumental source-cause.

In electroacoustic music as a whole, however, we do not find such a definable, hierarchical basis for establishing the source-cause aspect of timbral identity. Take

water as an example of an identifiable source. There may be a cause – water activity can appear to be self-activated or can be activated by human or other types of intervention, as in the splash, for example. In a musical work, water, like any sounding source, can exist on both the imminent and cumulative levels. But the extended and dispersed levels cannot be identified because we cannot establish any musical repertory beyond the cumulative level. Our water is not a source-cause in the traditional, instrumental sense – it does not, for example, function in stabilised ensembles. However, it can be extended or dispersed beyond the cumulative level by referring outside musical works to the extrinsic matrix. In instrumental music source-cause texture provides a solid, cultural base. In electroacoustic music, as far as *commonly identifiable* non-instrumental source-causes are concerned, we might say that an equivalent base exists because the sounding area of the extrinsic matrix can provide a substitute for the extended and dispersed levels of source-cause texture, even if we cannot pin down specific levels shared by *all* non-instrumental source-causes. In other words we have many experiences of water sounds beyond the cumulative level, in nature and in culture; we can all clearly relate to expansive shifts into the extrinsic matrix in the case of many environmental sounds, and also to other source-causes such as hitting, scraping or rubbing solid materials. We might say, therefore, that in the case of real source-causes, registration at the imminent level has a signifcant higher-level cultural basis.

Where source-causes are inferred, imagined or non-existent the shift to the extrinsic matrix also occurs beyond the cumulative level, but the emphasis will lean more in favour of the *non-sounding area.* When the non-sounding area is entered we are no longer on secure common ground because source bonding is no longer operable: we cannot identify real sources and causes. Spectromorphological attributes and ideas then evoke and suggest non-sounding substitutes for the extended and dispersed levels, whether these be to do with motion, types of behaviour, spatial experience, energetic phenomena, psychological tensions, and so on. I believe that such ideas, intangible as they might be, are a significant means of articulating that necessary, shared, higher-level cultural basis for a music with non-existent source-causes.

Lest anyone should think that the extrinsic matrix is irrelevant to instrumental source-cause – that instrumental music refers only to itself – it needs to be underlined that behind the causality of instrumental gesture lies both a broader experience of the physicality of gesture and its proprioceptive tensions, and a deeper, psychological experience of gesture. In instrumental music human-bonded source-cause texture *represents* these primal levels of gesture found in the extrinsic matrix. In electroacoustic music where source-cause links are severed, access to any deeper, primal, tensile level is not mediated by source-cause texture. That is what makes such types of acousmatic music difficult for many to grasp. In a certain physical sense there is nothing to grasp – source-cause texture has evaporated.

However, neither the imminent not the cumulative levels in electroacoustic music can be considered equivalents of instrumental music. At the cumulative level of electroacoustic works, the diversity of source-cause and the varieties of spectromorphological physiognomy are vast. Instrumental music cannot be considered comparable. Even the imminent level of individual electroacoustic works is concerned with the registration of multiple spectromorphologies many of which may be unique to a single work. It is to the imminent level, to the intrinsic

spectromorphology of the musical work that we must now turn in the search for the identity of timbre, but before confronting this problem I must discuss pitch in electroacoustic music.

The Timbre of Pitch – the Pitch of Timbre

The basis for the traditional notion of timbre relies on the conceptual possibility of separating pitch from timbre. The heritage of music writing has tended to encourage abstract approaches to pitch which, at worst, becomes alienated from the spectromorphologies responsible for creating and shaping it. Once tonality and intervallic pitch are no longer regarded as the predominant carriers of musical messages, pitch and timbre can cohabit in a spectromorphological music where the ear has opportunities for shifting in and out of pitch values. In electroacoustic music we are concerned not only with the received notion of the timbre of pitch but also the pitch within timbre, and moreover, timbre without pitch. Pitch is present even when not perceived. Perhaps it is resting, hidden deep in a spectromorphology, awaiting possible attention, a moment when, for example, the context might change so that perceptual focus becomes directed towards what was a sleeping attribute. The salience of pitch therefore becomes contextual in electroacoustic music. Timbre rather than being that part of the sound which is not pitch, encompasses the inherent qualities of the whole sound. Perceived pitch is one of these inherent qualities, but the term "timbre" cannot alone be expected to shoulder the burden for all the others. Once split open, the timbre complex is not a package of distinctly separable parameters, but a field of interactive behaviour, played out in the relations between spectral space and temporal change. Under such conditions does not the concept of timbre become so general as to be meaningless?

Registration

If timbral identity in electroacoustic music is so heavily reliant on the single imminent level then registration within the work is the key. It is registration which enables us to connect to source-cause texture and to the extrinsic matrix. Registration in instrumental music I defined as "the articulation and play of note objects and their chaining in phrases over a continuum of registers." Registration in electroacoustic music cannot be so systematic because there is no consistent low-level note-object, no consistent phraseological practice, nor is there the same registral continuum. If there is no underlying, pitch-base system shared by spectromorphologies then registration can no longer be controlled by the exposition of pitch registers, but instead becomes concerned with variable spectromorphological attributes. With such an all-embracing openness we are in danger of losing our way, as registration starts to permeate the very nature of the musical discourse perhaps to the point of becoming synonymous with it. Robert Cogan (1984) outlines the general requirements of registration:

> "To be musically and sonically significant, a sonic element must reveal itself in a musical context. Indeed it requires not only a presence but, usually, reiteration and amplification (used here in the structural sense). Some phonic

> properties are so weakly (or accidentally) present in an instrumental sound and so unamplified in a given context that they disappear in the context or do not, at any rate characterize it. They do not *function* in the particular context." (p. 146)

We have therefore to discriminate the incidental from the functional, to decide which spectromorphologcial attributes matter, and we have to discover this anew in the imminent level of each electroacoustic work. A pair of related variables underpins our attempts at determining identities:

1. the coherence and strength of spectromorphological identity;
2. the duration needed to establish existence and expose registration.

Existence

There is no standard duration for establishing existence. In electroacoustic music quite long evolution times may be needed to establish existence and impose identity. Take an active water texture as an example. Although we may recognise immediately that it is water it takes longer to determine what we might refer to as its inner "timbral" detail because it is not the odd globule but textural behaviour which establishes its imminent identity, for example its resonances, noise content, and pitch-streams or contours. Identifying a crude source-cause is one thing; penetrating its behavioural detail is another. If such a texture were not a recognisable source-cause then extended duration could be even more important. With this water texture the establishing of existence and the evolution of its registration are inseparable, and the attributes which we discover may prove to be significant or not as the imminent level proceeds.

Textural behaviour can therefore be an example of what I shall call a *registration generator* – an ongoing context whose continuity is necessary to establish existence and registration. Continuous evolution and continuous transformation can also be considered registration generators. They can be ongoing contexts where there is no border between existing and transforming, existing and evolving. In other words, change becomes fundamental to existence and registration: we apprehend identity as the consequence of change.

There are types of spectromorphology whose existence can only be established after a certain evolution time because the completion or partial completion of a pattern is integral to identity. Motions based on rotation are examples of spectromorphologies whose timbre (if that is the right word) is embodied in the spectral changes over at least one rotation-cycle. This is an instance of a registration pattern where it becomes impossible, or at least perceptually implausible, to distinguish between what might be considered its timbral matter on the one hand and its short-term evolution on the other.

Coherence

The notions of existence and registration imply a certain coherence, otherwise identity would not be feasible. Coherence in the case of instruments is usually

associated with spectral fusion, which in turn is associated with harmonicity. Jean-Claude Risset (1991) considers fusion a necessary timbral property:[2]

> "The notion of timbre implies fusion; it corresponds to the sound quality of an ensemble of components integrated in an auditive entity which is assignable to a single source, whether real or virtual." (p. 257)

Since fusion is so often closely aligned with harmonicity, and since I find it too rigid a word, I prefer the term "integration." That also allows us to talk of an integration-disintegration continuum.

From a theoretical point-of-view integration/disintegration possesses a spectral and a morphological dimension – spectral space and its internal distribution on the one hand, and shaping over time on the other. Integration means that within a sonic physiognomy the distribution of spectral components in spectral space, and their behaviour over time should not be such that a component or sub-group of components can be perceived as an independent entity. Certainly a fairly high degree of integration is necessary if something called timbral identity is to be established, but where are the borders between tight fusion, a looser interdependence, and a dissolution towards independence? When is a timbre a timbre and when is it a collection of timbres? When does the physiognomy crack?

The course of even a relatively short spectromorphology can travel between integration and disintegration. For example, using the unifying weapon of the attack phase I can impose a causal coherence on the onset of a spectromorphology; as it continues I can intervene in the temporal evolution of the spectral components, perhaps refocusing the spectral space by weighting attention towards certain components, perhaps separating some out, perhaps clearing gaps in spectral space, perhaps drawing attention to intervallic pitch, perhaps secreting in new components. In other words new objects, strands or gestures can emerge in the multi-level play of hierarchies as they expand and contract in the course of electroacoustic musical discourse. We must also not forget that aural acuity, attention, and the volition of focus are crucial protagonists in this unveiling of identites, particularly in contexts of fleeting ephemera.

It seems that as long as a spectromorphology is perceived as a coherent entity, then "timbre" is a word we might use to encapsulate its global physiognomy. This is the equivalent of saying it has an identity, or that it has a source-cause since source-cause implies coherence. But the problem is to identify coherence! Playing with integration and disintegration is at the very heart of electroacoustic musical discourse, a discourse which becomes spectromorphology itself once the timbre complex is split open, a discourse where the notion of timbre can at one moment perhaps be grasped, but at the next it evaporates.

Discourse Stability and Variability

This supposedly coherent identity which might be called timbre is not necessarily an entity which can be prised apart from the sounding context. A timbre may be

[2] "La notion de timbre implique la fusion; elle correspond à la qualité sonore d'un ensemble de composantes intégrées en une entité auditive et assignées à une même source sonore réelle ou virtuelle."

a discrete object which can be separated out from its context, but it can also be a continuity which is intertwined or blurred with other continuities or whose start and end cannot be discerned. We can therefore talk about the concept of *timbral level*, which concerns the relationship between two continua.

1. *duration*: short-term entity . . . . . longer term evolution
2. *separability*: discrete object . . . . . continuing context

The continuing context could even encompass the whole work if the work is itself a continuity, or if we could ascribe a general timbral ethos to the work as a whole – a timbre of timbres if you like.

Timbral level in traditional note-based music is quite simple. The note is the lowest level and it is articulated by an instrumental source. Form develops from note articulations. In electroacoustic music continuing contexts resist and deny low-level segmentation. Thus once timbral level ceases to be clearcut we cannot separate timbre and discourse: timbral attributes become woven into the spectromorphological fabric.

But let us assume that in the opening stages of the imminent level coherent existences have been established, whether through the persistence of existence, through separability, through source-cause coherence, or through limited registration. Let us also assume that discourse is about maintaining and developing some of these identities, and that we wish our transformed identities to show their roots. What next?

Transformational discourse

I recognise two approaches to musical discourse which concern the application of those attributes associated with timbre. The first is *transformational discourse*, where an identity is transformed while retaining significant vestiges of its roots (i.e. an identity-base in the imminent level, or a strong extrinsic identity). To achieve this, certain attributes must remain stable while others vary. Digital synthesis and treatment techniques permit detailed and subtle spectromorphological intervention allowing us to create and transform what were timbre's multidimensional attributes. Spectromorphologies therefore become *malleable*, and the composer has to decide how to retain stability. The stability/variability relationship is a difficult area of decision-making related to the coherence of discourse. There is so much choice, and in transformational discourse there are many ways of achieving and losing this equilibrium. Here are a few examples of prevalent techniques:

1. stretching or contracting in time which does not threaten too much the aural, evolutionary integration of spectral components. Compress too much and you destroy identity; stretch too much and you destroy, for example, attack identity.
2. changes in spectral density by thickening, or by spreading in spectral space, which are perceived as addition – a growth process.
3. changes in spectral weighting (e.g. brighter, or emphasizing internal intervallic pitch) without altering the essential content (i.e. frequency spacing) of the spectral envelope.

4. variation in or reshaping of a morphology (for example, the attack impact) in such a way that it does not affect the identity of the continuing body of a spectromorphology. This implies either that
   (a) the sound is a strong spectromorphological type well known through extrinsic experience (e.g. a bell, the voice); or
   (b) that the base-spectromorphology has been previously announced and that if this was some time previously then it was striking enough in context for relevant features to be memorable; if the base-spectromorphology is less memorable it would need to be relatively contiguous to the present event.

Of course if a morphological feature (e.g. the attack) is the dominant, identifying determinant then interference can mean a change of identity: source-cause itself is perceived to be transformed, and bonding play is involved.

Although in these four examples I am assuming the retention of identity, and although the spectromorphological features mentioned are commonly attributed to timbral multidimensionality that does not mean that we would necessarily choose the word "timbre" to describe these types of relations in transformational discourse.

I note in passing that memorability and contiguity are two important tools of discourse. It is undoubtedly true that pitch relations and source-causes are the most easily memorable sonic phenomena, and that the problem with multiple spectromorphological attributes is that we do not know which ones are to be relevant in the discourse. This is why electroacoustic music which avoids pitch phenomena and strong source-cause references will be most frequently concerned with contiguous relationships. Continuing textural contexts and continuous transformation are prime examples of contiguous development. Non-contiguous discourse can only be highly developed within the precise and detailed memorability of culturally imbedded pitch and rhythmic systems. In my opinion, expecting to apply the criteria of pitch/rhythm-based discourse to discourses which instead exploit the disparate attributes of spectromorphological multidimensionality, is misguided.

Typological discourse

The second type of discourse is typological discourse. Identities are recognised as sharing timbral qualities but are not regarded as being descendants of the same imminent identity – they do not possess a common identity-base. Typological discourse is associative. While each imminent level will present different manifestations of a timbral type, there is also a cumulative level which reaches across works. The larger groupings of the timbres of typological discourse can be called *generic timbres.* Electroacoustic music has made possible the expansion and development of certain generic timbres which have become its idiomatic property.

The timbres of noise are a particularly striking example. While noise is present in instrumental and vocal timbre it only really takes off as a timbral type once it meets up with the electroacoustic medium. One prevalent type is *granular noise.* Granular noise is textured impulses of varying consistencies and resolutions ranging from roughness through granularity to grit, with an internal behaviour

which, while showing varying degrees of regularity or irregularity, remains a coherent identity. Beyond roughness granular noise smooths out, and somewhere beyond grit the texture starts to fragment. Granular noise has strong source-cause bondings which are extremely wide- ranging – sea, water in general, wind, foliage (living or dried), fracturing materials (wood, stone), motions of friction, unvoiced vocal behaviours, certain types of breathing and fluid congestion, types of mechanical noise, static interference. What category of sonic phenomenon is not implicated? It is undoubtedly true that these source-cause bondings, whether blatant or subliminal, account for the popularity of granular noise in that they can initiate prolific bonding play in musical discourse particularly in their inherent ability to draw together humanity, nature and the elements. Note that there is a powerful spatial dimension involved, at once personal and environmental. Note also granular noise's tensile properties: it can be extremely relaxing or penetratingly tense. While it is commonly regarded as non-pitched we can say that the pitch of timbre can be activated in typological discourse. We should also not forget that resonance can be part of granular noise. Resonance embodies the latent pitch inside or behind granular noise, which can become a partner in the surrounding discourse. The most significant aspect of noise typologies is that they satisfy the most important criterion of all – they already lie within our cultural experience.

The discourse function of granular noise can be a decorative or subordinate strand or trace injected into a spectromorphology, or it can be at centre stage. As far as timbral level is concerned granular noise is not a discrete phenomenon but a texture where higher level patternings are the structuring aspects of its physiognomy. No doubt granular noise, if studied in more detail would break down into sub-categories – it is too unwieldy as it is.

Inharmonicity is another generic timbre, and a vexing one because of its disintegrative tendencies. This makes it difficult to pin down. At the very least inharmonicity has initiated a different attitude towards intervallic pitch, provoking spectral spaces where we hear fixed pitches but where the intervals created are not necessarily bearers of intervallic pitch functions. Inharmonicity has different imminent physiognomies related more to higher-level groupings in musical contexts than to individual objects. Who, for example, would confuse the style of inharmonicity of Chowning with that of Risset? But I do not yet know of any secure method of categorising inharmonicities in such a way as to overcome the unhelpful negativity of the term.

I hope I can safely say that with generic timbres the term "timbre" is appropriate. We can intuitively apprehend the contextual conditions determining existence, registration, coherence, and source-cause texture at the imminent and cumulative levels, spreading to the extrinsic matrix at the extended and dispersed levels.

Transformational and typological discourse are not mutually exclusive, and moreover, tipping the scales either way can be a question of listening choice and listening experience – listening experience is variable and subjective. The difference between them is really a question of whether identities are more or less specific – the less specific the identities, the more typological the discourse becomes. And they can exist together. For example, a specific event subject to transformations can also be a bearer of generic timbre. In fact I recognise six *interactive types of electroacoustic discourse*. The first three are primarily concerned with identities and how we interpret them. They are

source-cause discourse, which is concerned with the bonding play of specific or inferred sounding identities.
transformational discourse
typological discourse

The second three discourses are concerned with relations among identities. They are:

behavioural discourse – the changing states of identities' cohabition/conflict and dominance/subordination;
motion discourse – the relations of types of motion and growth and their directional tendencies;
tensile discourse – how the previous five discourses together create formal tensions.

Two Indigenous Timbres of Timbres

Before concluding I need to mention two types of timbre indigenous to electroacoustic music. The first is *processing timbre*. Synthesis methods and treatment processes often impose their own timbral flavour on musical contexts, and indeed whole works. The sounds of what might normally be regarded as different source-causes and spectromorphologies appear to be coated in the same timbral veneer. At a lower level the detailed diagnosis of particular processing timbres is likely to be the pastime of specialists – composers, researchers, technologists – rather than other listeners. Individual processing timbres hover between innovation, when they are exciting to behold, fashion, when usage spreads, and cliché, when they have been flagellated to the point of collapse. Who can predict and delineate the border between excitement and torpor? The detection of technological source-cause can be an undesirable interference in the musical exchange between composer and listener. The composer's inventive skill is the only panacea. Higher level veneers are often unnoticed by the composer, who has been so immersed in spectromorphological detail, but they are easily picked up by other listeners, whose aural approach is always more global.

Processing timbres are important in that they impart a characteristic sound to electroacoustic music. Electroacoustic music has its timbres, which can have a neutralising effect on sonic communication.

The second indigenous timbre of timbres is the *loudspeaker*. Our dependency is total. Loudspeakers possess an inherent spectral weighting which affects the hearing and the composition of musical timbre, and is itself a timbre. While on the one hand we rely on timbral invariance for studio monitoring or home listening, we have to remember that the loudspeaker is a variant. We harness comparative timbral variance to excellent effect in the multi-speaker diffusion systems. Boulez (1987) called the loudspeaker "a great anonymous pulveriser of sound that does not measure up to the means which have been developed to create a new sonic world." (p. 170) Even if this was true in 1985 (when he spoke these words) it is no longer the case. . . . if you have enough money. We still need constantly to be aware of how crucial the loudspeaker is for the electroacoustic arts and how its timbral collusion with global processing timbres can indeed rob the real timbres of their individual physiognomy.

Concluding remarks

I have been concerned not with the acoustic nature of timbre, nor even, truthfully speaking, with its psychoacoustic properties, but with its apprehension, identity and functions in musical contexts from the listener's point of view. Above all, the use of the label "timbre" is a signifier that we have identified spectromorphological, physiognomic attributes to which we can ascribe meaning. We not only recognise and identify qualities but we identify with them. The concept of timbre, then, evokes both real and symbolic links between our identity and sonic identity, and in electroacoustic music between our identity and that of the wide-open sounding and non-sounding world outside the music.

When source-cause slips into hiding, identity becomes problematic, even impossible. Timbral qualities become phantoms and phantasms. Personalised visions during the imminent level suggest circuitous, labyrinthine trails to wider generic identities and to the extrinsic matrix. The spectromorphological traces which inspire such trail-finding can no longer be parcelled up in generalised physiognomic packages. Timbre becomes the timbre complex, and the timbre complex splits open to reveal disparate lives: the timbral nucleus dissolves, seeping through musical discourse. In struggling to maintain a timbral essence we are indeed obliged to penetrate the very nature of musical discourse.

Composing with timbre, composing within timbre, means confronting and enjoying its dissolution. This can only really be fully pursued in an *acousmatic* electroacoustic music. In contrast, adventurous contemporary instrumental music, and works which mix instruments with an acousmatic element, are rooted in the umbilical security of instrumental source-cause coherence and directly apprehended sound-making gesture. This equates not with a burning desire to explore timbre, but with a hesitant reserve about cutting loose in order to pursue a freer exploration. There is no reason why the traditional notion of timbre should fade away. A notion of musical timbre will always exist alongside its dissolved attributes. In keeping with this ambivalence I can summarise this discourse in six words:

Timbre is dead. Long live timbre.

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