Limits of Abstraction
in
Electroacoustic Music

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Submitted works

CD1

1. *Grand Junction*	(1994)	14’ 55”
2. *The Killing Floor*	(1996)	15’ 18”
3. *Boomtown*	(1998) (2 channel mix*)	15’ 22”
4. *Living Steam*	(1999) (2 channel mix*)	20’ 50”

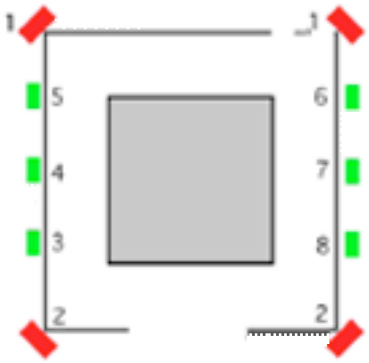
* 2 channel versions for reference only

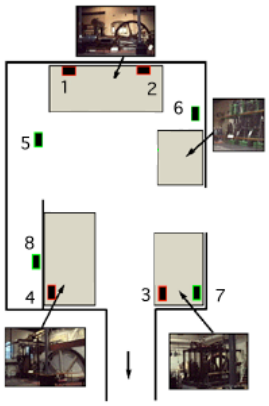
CD2

The Seasons (continuous play version)		58’ 11”
1. *Spring*	(1998)	15’ 00”
2. *Summer*	(1995 rev. 98)	13’ 58”
3. *Autumn*	(1998)	15’ 08
4. *Winter*	(1995 rev. 98)	14’ 03”

ADAT

Boomtown (8 channel master)	15’ 22”
Living Steam (8 channel master)	20’ 50”





***Boomtown*: Track assignment** ***Living Steam*: Track assignment**

(see Figures 5.1 and 5.2 for enlarged versions of loudspeaker placement diagrams)

List of sound examples

CD3

Track 1 sound example 3.1	*Grand Junction*	1’ 58” and 4’ 52”			
Track 2 sound example 3.2	*Grand Junction*	3’ 22”			
Track 3 sound example 3.3	*Grand Junction*	13’ 55”			
Track 4 sound example 4.1	*Summer*	03’ 14”	and	*Winter*	03’ 27”[1]
Track 5 sound example 4.2	*Summer*	09’ 24”	and	*Winter*	09’ 35”
Track 6 sound example 4.3	*Summer*	00’ 00”	and	*Winter*	00’ 11”
Track 7 sound example 4.4	*Summer*	06’ 24”	and	*Winter*	06’ 35”
Track 8 sound example 4.5	*Spring*	10’ 17”			
Track 9 sound example 4.6	*Summer*	03’ 30”			

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[1] 11 second timing discrepancies between *Summer* and *Winter* are due to placement of the CD index point in the *Autumn* / *Winter* transition.

Acknowledgements

I wish to thank Simon Emmerson for his academic supervision, John Dack and Christoph Parry for informal academic advice and my parents for reading the manuscript. Thanks also to Charlres Linehan, Richard Lord, Colourscape Festival, Cathy Lane, Sonic Arts Network, Arts Council of England, Thames Water, Denis Dufour, Bruce Langridge and Oldham Borough for supporting the creation and performance of the individual works submitted, and my family and all my friends for their encouragement and moral support.

Abstract

In this thesis the relationship between abstract and representational aspects of electroacoustic music will be discussed. Such an exploration exposes the limits of abstraction in electroacoustic music, as the interaction between musical form and the world outside the immanent context of the work is revealed.

In **Chapter 1** an examination of the complex system of relationships between sounds within a musical structure and the representational nature of many of the sounds themselves, referring to their origins in the real world, suggests analogies with poetic texts and early twentieth century painting.

In **Chapter 2** there follows a discussion of ideas contained in Simon Emmerson's article *The Relation of Language to Materials* (Emmerson, 1985). Emmerson's ideas are examined and expanded, with particular regard to the relationship of syntax and discourse.

In **Chapter 3** the compositional methodology of sound manipulation is discussed, contrasting analytical and synthetic approaches to sound transformation and Ten Hoopen's model of the specific / surrogate continuum (Ten Hoopen 1994) is discussed and developed. An analogy between structures based on dissonance / resolution and ambiguous / specific source recognition is developed with particular reference to the work *Grand Junction*.

In **Chapter 4** a new model, the *associative field model,* is proposed to examine more closely the nature of ambiguous source recognition with particular reference to the cycle of *Seasons*. The rôle of ambiguity in aesthetic appreciation is discussed.

Finally, in **Chapter 5,** the interaction of the work with its wider context is discussed. The influence of literary accompaniments to the work, such as the title and programme note is considered as is collaboration in the form of music specifically created for contemporary dance, as exemplified in *The Killing Floor*. The interaction of the work and the performance space is considered in the site-specific installations *Boomtown* and *Living Steam*.

Chapter 1

1. Abstraction and Representation

1.1 Introduction

1.1.1 The abstract ideal

Historically, music has frequently been praised as the purest of the arts on account of its inherent abstraction. Requiring no explicit reference to the world outside itself to be understood, music was taken as a model by early abstract artists such as Kandinsky who believed that abstraction was a more advanced stage in artistic development, one to which painting should aspire. He wrote to Schoenberg in 1911:

> "How immensely fortunate (though only relatively!) musicians are in their highly advanced art, truly an *art*[2] which has already had the good fortune to forgo completely all purely practical aims. How long will painting have to wait for this?"
>
> (Hahl - Koch, 1984, p. 27)

Kandinsy's desire was to create a visual art that spoke directly to the soul without the need for representation.

At around the same time[3], however, Russolo was advocating a music made up of the sounds of the real world:

> "Beethoven and Wagner have stirred our nerves and hearts for many years. Now we have had enough of them, *and we delight much more in combining in our thoughts the noises of trams, of automobile engines, of carriages and brawling crowds, than hearing again the "Eroica" or the "Pastorale""*
>
> (Russolo, 1986, p. 25)

While this and many other passages in the *Art of Noises* reads as an explicit call for a representational music, Russolo was clear in his belief that

> "... it is necessary that these noise timbres become *abstract material* for works of art to be formed from them"
>
> (Russolo, 1986, p. 86)

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[2] Italics in quotations are from the original.

[3] The Art of Noises (Russolo, 1986) first appeared in 1913.

Nearly forty years later, when Russolo's dream became a technical reality, Pierre Schaeffer, despite a background in radio[4], envisaged a similarly abstract role for the new sounds of *musique concrète*:

> "Si certain des premières oeuvres concrètes ... jouaient beaucoup sur le « double sens » des sons concrets et le « renvoi au monde extérieur » P. S. a vite pris ses distances par rapport à cet expressionnisme de jeunesse, ... Son projet était bien de « *poursuivre la recherche musicale à partir du concret, certes* », mais seulement pour « *la reconquête de l'indispensable abstrait musical* »[5]."
>
> (Chion, 1983, p. 40)

> If some of the first concrete works ... play greatly on the "double meaning" of concrete sounds and the "reference to the exterior world" P(ierre) S(chaeffer) has quickly stood aloof from this youthful expressionism ... His project was indeed to "pursue musical research based on the concrete, certainly" but only in order "to reconquer the indispensable musical abstract".[6]

1.1.2 The representational reality

Whatever the intention of the composer, however, the experience of listening to electroacoustic music is one in which the "musical abstract" and the "reference to the exterior world" coexist[7]. As John Young points out, the natural tendency to ascribe sources to the sounds we hear is inevitably a part of our experience of electroacoustic music as well:

> "In normal listening experience, we are highly motivated toward correlating a sound with a source object or action, since it forms a part of the way we deduce and interpret the physical nature of our surroundings, assisting orientation and survival in our immediate environment. In electroacoustic music that draws on the sounds of environment and culture, this aspect of listening inevitably becomes part of our response to the compositional context that is created with and around the material."
>
> (Young, 1996, p. 75)

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[4] John Dack (1994) traces the roots of *musique concrète* in Schaeffer's radiophonic work.

[5] Chion is quoting from Schaeffer (1966, p. 24).

[6] I am grateful to John Dack for access to his unpublished translation of the *Guide des objets sonores* (Chion, 1983).

[7] Throughout this thesis the term *abstract* will be used to mean non - referential aspect of sounds and their morphological relationships (except in the chapter on Emmerson, 1986, where his usage is discussed).

Schaeffer's purely abstract approach to his sounds therefore requires listeners to "play along" with the composer, deliberately excluding certain interpretations from their listening experience. In the sleeve notes to the *Études concrètes* he writes:

> " … "the work is no longer an object that will respond to any or all questions; the relationship between subject and object is already inscribed within it. The work expects the listener to accept this relationship. If he or she moves outside, directs his or her attention to sound qualities other than those the composer has dealt with as values, the structure will escape; only chaos will be perceived""
>
> (quoted in Nattiez, 1990, p 98)

A rather different response to the challenge posed by the availability of real world sound to the composer may be found in the work of Robert Murray Schafer (1977) and other members of the World Soundscape Project who advocate a music that focuses on the social and cultural connotations of environmental sounds.

Ideas such as these have led many writers to suggest formal strategies that draw on traditionally representational art forms. Norman (1994) and Appleton (1996) have proposed narrative or story-telling models as possibly more appropriate to the acousmatic situation than traditionally musical ones.

While neither of these authors would deny the importance of the abstract, the strategies they propose focus on the referential, on the real world associations of the sound materials, and, to this extent, also require the listener to adopt a particular stance *vis-a-vis* the work, in this case focusing on extra-musical meanings.

While it may be argued that such a literal reading of real world sounds in a musical context may be the most "natural" way to approach electroacoustic music (many first time listeners respond with a list of images they have perceived or visualised), the structure of much electroacoustic work - the juxtaposition of different types of material, the focus on

transformation, the combination of recognisable and unrecognisable sources, reveals a more complex relationship between abstract and referential aspects.

Indeed, I would suggest that one reason some composers are drawn to the sounds of the real world is that they, as musical specialists, tend to hear the world in a musical, even abstract, way and have a desire to make the duality they perceive in the world explicit to their audiences. This requires the listeners to engage with the work equally on an abstract and a representational level, maintaining a simultaneous consciousness of real-world references and formal construction.

1.1.3 Double intentionality

This delicate balance between the abstract and the referential is fundamental to the experience of representational art forms and has, many believe (e.g. Kivy, 1991), always been implicit in the musical experience as well. The representational image requires a simultaneous awareness of the represented object and the medium in which it is represented. Roger Scruton describes the experience thus:

> "The resulting experience is one of 'double intentionality'. It is directed at two objects simultaneously, and forbids their separation . A simple case of this - which Richard Wollheim has called 'representational seeing' but which, ... I prefer to call 'aspect perception' - is the case in which one thing is seen in another .... When I see a face in a picture, then, in the normal aesthetic context, I am not seeing a picture *and* a face; nor am I seeing a resemblance between a picture and a face. The face and the picture are fused in my perception"
>
> (Scruton, 1997, pp. 86-7)

If, as Kivy (1991, pp. 217-226) believes, a similar relationship can be found between representational and abstract aspects of music, then it is in electroacoustic music that this relationship becomes explicit. The listener is aware of both the representation and the act of representation. While individual sounds are associated with perceived real world sources the

listener is always simultaneously aware of the aesthetic nature of the experience[8]. This affects the way the listener deals with the aural information. In the real world the sound of a car approaching at speed, for example, triggers a particular reaction, causing the listener to look round and, if necessary, move swiftly out of the way. In a musical context the same sound does not imply an actual threat as it would in a real-world situation, but may still be perceived as signifying a threat due to the listener's awareness of its real-world implications. The simultaneous awareness of the sound's perceived source, a car, and the sound's actual source, a loudspeaker, causes the listener to treat the sound as an aesthetic object, seeking meanings beyond the simple classification of source-cause[9] and treating the sounds as part of a system of relationships.

1.2 Sound as sign

1.2.1 The Schaefferian listening modes

To examine these relationships it is useful to consider the Schaefferian listening modes as outlined in *Traité des Objets Musicaux* (Schaeffer, 1966) and discussed by Chion in the *Guide des Objets Sonores* (Chion, 1983).

In *The Listening Imagination* (Smalley, 1992) Denis Smalley outlines the four Schaefferian listening modes. The first, he categorises as an *information gathering* mode, concerned with the meaning of the sound, the information it carries about its source. The second, *passive reception* occurs when sounds impinge on the listener involuntarily. The third focuses on the abstract qualities and the spectro-morphology of sounds *(reduced listening)*. The fourth mode Smalley describes as one of *responding to a musical language:*

> "In mode four we find musical works which are purposely created for listening. They can loosely be regarded as specially selected sounds encoded in a structure that has a sense and meaning for those listeners who share the

[8] In Chapter 5 we shall look at exceptional circumstances which may subvert this sense leading to an unease about the boundaries of the work.
[9] The term *source-cause* is proposed by Smalley 1993.

code ... What the listener responds to is the musical sign as opposed to the index of mode one."

(Smalley, 1992 pp. 516)

The sign function is clear in the first listening mode as the sound may be considered to signify its source-cause. The relationship of the sign to the object or, to use Saussurian terminology, the signifier to the signified, is principally paradigmatic. That is to say that the 'meaning' of the sound is determined by its difference from other sounds. The syntagmatic axis, the way a sign operates in relation to its position in a system, also contributes to the sound's interpretation, in the form of contextual cues[10]; however if in mode 1 we are principally concerned with the recognition of individual sounds, the paradigmatic is of primary importance.

Mode 2 may be considered to be pre-semiotic in that the sound impinges on the listener without any interpretation taking place. Once interpretation occurs one of the other listening modes takes over.

Mode 3, reduced listening, focuses exclusively on the signifier, the Schaefferian sound object[11] or *objet-sonore*, at the expense of the signified, which is excluded or bracketed[12]. Mode three therefore can be seen as a deconstruction of the sign function.

Focus on the signifier is valuable because, as Chion argues, the musical sign, unlike the linguistic sign, is not arbitrary.

" ... son sens s'appuie sur des propriétés intrinsèques de l'objet, du matériau"

(Chion, 1983, p. 82)

... its sense depends on the intrinsic properties of the object, the material

[10] The importance of context is discussed in Chapter 3.

[11] In this discussion the term sound object is used in the strict Schaefferian sense of the object identified by reduced listening, divorced from its real world associations.

[12] The origin of *reduced listening* in Husserl's phenomenological reduction is emphasised by Chion (1983, p. 33).

Thus, in the context of a musical composition the sound object (the signifier in mode 1) itself becomes a sign: a musical sign whose meaning emerges syntagmatically according to its position within the musical structure.

This is the focus of mode 4 listening. Chion has argued that 'pure music', that is music that has been written without a particular instrumentation in mind, resides exclusively in mode 4. The reintroduction of 'sonority' through the realisation of the abstraction of the score in sound invokes mode 1 listening (Chion, 1983, pp. 82-3). Modes 1 and 4 therefore are both pertinent to the perception of acousmatic music. The signs of mode 1 point to the world outside the work while mode 4 deals with the discovery of syntagmatic relationships within the work.

1.2.2 The musical sign

The nature of the musical sign is of course widely debated. The principal problem is that the musical sign has no obvious signified. Chion's statement quoted above suggests that the musical sign refers to itself, that its meaning is bound up with its substance. Certainly, the idea that musical signs refer to nothing beyond themselves is widely accepted:

> "Music, for example, is clearly distinguished from natural language by the absence of obligatory semantic bonds, but nowadays we find the description of a musical text as a sort of syntagmatic arrangement completely legitimate"
>
> (Lotman, 1977, p. 9)

This stance again stresses the self-contained nature of the musical work in which all meanings are intrinsic to the work.

Others, like Coker (1972), contend that musical signs refer to other musical signs. This they do either *intermusically,* referring to other signs within the same work, *intramusically,* referring to other works or to stylistic norms, or *extramusically* , referring to the non-musical realm in the form of musical representations. In this view, musical signs are primarily iconic.

They resemble other signs within the same work, in other pieces of music or in the wider world of sound.

However the relationship of, say, a perfect cadence to the other perfect cadences in the musical repertoire seems to have more in common with the Peircian interpretant[13], than the referent or signified. Our understanding of the perfect cadence, for example, is mediated by our knowledge of other perfect cadences. The sign is interpreted by other signs. However, if the perfect cadence signifies anything, then it signifies finality, the end of a piece or phrase of music, not another cadence.

Nattiez has discussed the notion that musical signs are indexical and refer to future events (Nattiez, 1990, pp. 116-7). A dissonance in traditional Western music, for example, points to its possible resolution (or perhaps better to a field of potential resolutions). Nattiez quotes Robert Austerlitz:

> " … "the meaning that is conveyed by a musical text is basically deictic, cataphoric, in the sense that it is *prediction*. The musical text makes reference to the future, in that it challenges the listener to predict the shape of the musical substance to come in the immediately impending future—on the basis of the musical substance perceived in a given moment. ... If anything can be called meaning or *semiosis* in music, then it is the experience required to predict immediately impending musical substance""
>
> (Austerlitz, 1983, p. 4, quoted in Nattiez, 1990, p. 117)

This idea accords with Meyer's implication / realisation model (Meyer, 1956) in which musical meaning arises from the frustration and final fulfilment of expectations. These expectations may be divided into intermusical, intramusical and extramusical: those arising out of the way the work has unfolded so far (e.g. if every phrase is repeated), those arising from our experience of musical repertoire or style and those arising from our knowledge of the real-world behaviour of sounds.

[13] see Monelle (1992, pp. 193 – 194)

A good example of this last category is the sound of breathing which has a characteristic tension / release shape. An isolated intake of breath would raise the expectation of an exhalation which may or may not be forthcoming. This expectation, while rooted firmly in the natural world has an analogous effect to a dissonance demanding resolution in a tonal work. Indeed it is possible to speculate on similar natural archetypes for many musical shapes. The use of recorded sound in acousmatic music can play precisely on these expectations in the formation of musical language.

1.2.3 Representation in music

While the discussion above focuses on the musical sign as a part of a syntagmatic system of relationships it cannot be denied that even in traditional western music many sounds, for example a hunting horn, refer directly to the real world, bringing to mind wider historical and social associations. A question that arises frequently in the history of musical aesthetics is to what extent features such as this can be considered representations. Most of the argument revolves around the definition of representation and is beyond the scope of this introduction. The existence of extrinsic reference in music is not in question. Kivy (1991), who has argued strongly for the notion of musical representations, makes a distinction between musical pictures which literally *sound like* something else and musical representations of other sorts i.e. *representations by conventional association* and *internal representations* (e.g. the *leitmotiv*) which stand for something without resembling it. This distinction bears more than a passing resemblance to Peirce's categories of sign function (Peirce, 1991, pp. 239-240): *icon* (looks like) and *symbol* (stands for by conventional association). Peirce's third category, the *index*, which stands in a contiguous or causal relationship with its signified, can be found in electroacoustic music in the form of recorded sound.

1.2.4 The status of recorded sound

The recording has a special status in the world of signs. Rather than merely resembling its subject or standing for it as a symbol in a formal language the recording is a trace of an actual event that has taken place. It stands in a direct causal relationship to its subject. It may be useful in the first instance to compare the recording to a photographic image. Peirce makes the following observation about photographs:

> "Photographs, especially instantaneous photographs, are very instructive, because we know that in certain respects they are exactly like the objects they represent. But this resemblance is due to the photographs having been produced under such circumstances that they were physically forced to correspond point by point to nature. In that aspect then, they belong to the second class of signs, those by physical connection."
>
> (quoted in Wollen, 1970, pp. 123-4)

While not himself classing the photograph as an indexical sign, Roland Barthes makes similar observations regarding the characteristic nature of the photographic sign. In his essay *Rhetoric of the Image* he writes:

> "... the relation between the signified and signifier is quasi-tautological; no doubt the photograph involves a certain arrangement of the scene (framing, reduction, flattening) but this transition is not a *transformation* (in the way a coding can be); we have here a loss of the equivalence characteristic of true sign systems and a statement of quasi-identity. In other words the sign of this message is not drawn from an institutional stock, is not coded, and we are brought up against the paradox ... of a *message without a code*. This peculiarity can be seen again at the level of the knowledge invested in the reading of the message; In order to 'read' this last (or first) level of the image, all that is needed is the knowledge bound up with our perception."
>
> (Barthes, 1977, p. 36)

I have quoted this passage at length as it brings up a major issue with regard to the recording. The transitions that Barthes refers to - framing, reduction, flattening - are not (or at least need not be) found in the sound recording. The signal that reaches the ear can be to all intents and purposes *identical* to the sound that was recorded. For Barthes this produces a codeless message or natural sign (Wollen 1970, p. 120). For Umberto Eco on the other hand, the

relation of identity would preclude the recording from being a sign at all (Eco 1979, p. 192, quoted by Monelle, 1992, p. 210).

If we follow the latter line of thought we can see a fundamental difference between the recording and the photographic image. We must, I believe, recognise that the transitions of framing, reduction and flattening referred to by Barthes are, contrary to his notion, sufficient to establish a sign function in the photograph and these are lacking in the recording, which stands in a relation of identity to the original sound. If a recording is identical with its original it must possess the qualities of that original. One of these qualities is indexicality. There is no sound without a cause and every sound can be viewed as an indexical sign where the sound itself is the signifier and the cause is its signified. A recorded sound must therefore signify exactly the same thing that its original signifies. A recording of a gunshot must signify a gun in the same way that a real gunshot does.

This line of reasoning would imply a categorical difference between a recorded gun shot and a synthesised gun shot, the former signifying <gun> by a relation of indexicality and the latter signifying <sound of gun> by a relation of iconicity. This may seem overly pedantic as when seen from the point of view of the receiver the synthesised gun shot may indeed be identical to the sound of the gun and therefore effectively fall into the same category as the recording. On the other hand the knowledge of the cultural context, in this case a musical work, may be sufficient to transform the recording of an actual gun into a sign of the latter sort. Our knowledge that we are hearing a recording transforms the sound from index of a cause to icon of another sound, and it is this transformation that allows us to experience the sound aesthetically , giving rise to the sense of double intentionality discussed in 1.1.3 above[14].

[14] These ideas are explored further in Chapter 4.

On the other hand, as we have seen, Barthes' notion of the "anthropological knowledge" which we use to interpret the sign includes our knowledge of how a particular sound behaves in the real world. It is this anthropological knowledge that provides the extramusical interpretants discussed in 1.2.2 above. When we hear a piece of electroacoustic music we bring to it our knowledge of how music works, a code that we understand through our experience of other music, and we also bring our knowledge of the real world. Rather than speak of a sign without a code we might like to view this as a natural code[15] as opposed to a cultural one. As such it is a part of the language we use to interpret the work. As Barthes writes later in the same essay:

> "There is a plurality and co-existence of lexicons in one and the same person, the number and identity of these lexicons forming in some sort a person's *ideolect*. The image, in its connotation, is thus constituted by an architecture of signs drawn from a variable depth of lexicons (of ideolects); ...The variability of readings, therefore, is no threat to the 'language' of the image if it be admitted that that language is composed of ideolects, lexicons and sub-codes;"
>
> (Barthes, 1977, p. 47)

Among these subcodes are both cultural and natural codes which each contribute to our musical understanding and inform the expectations that arise from moment to moment in the listening process.

1.3 Analogy to poetic texts

1.3.1 The interaction of sign systems

The similarity in approaches between the electroacoustic composer and the poet has been observed by Ferrari:

[15] Chion (1983, p. 36) suggests that the natural / cultural duality is fundamental to music.

> "From 1963 on I listened to all the sounds which I had recorded, I found that they were like images. Not only for me who could remember them, but also for innocent listeners. Provide images, I told myself, contradictory images which catapult in the head with even more freedom than if one really saw them. Play with images like one plays with words in poetry."
>
> (Ferrari, 1996, p. 100)

Electroacoustic music shares with poetry a complexity that arises from the simultaneous operation of systems of meaning. In his discussion of the work of the semiotician Yuri Lotman, Terry Eagleton writes of sign systems in a literary (particularly a poetic) text:

> "Each of the systems comes to represent a 'norm' from which the others deviate, setting up a code of expectations which they transgress. Metre, for example, creates a certain pattern which the poem's syntax may cut across and violate. In this way each system in the text 'defamiliarizes' the others, breaking up their regularity and throwing them into more vivid relief. Our perception of a poem's grammatical structure, for example, may heighten our awareness of its meanings."
>
> (Eagleton, 1983 p. 101)

The art of composition with anecdotal sounds can be considered in terms of the interaction of two interpretations of the sonic material within the sign system of abstract musical development on the one hand and within the alternative system of interpretation according to perceived extra-musical meanings in the same material on the other. As in poetry these differing perceptions may interfere with each other or reinforce each other, creating conflict and coherence, tension and resolution.

1.3.2 Autocommunication

According to Lotman, any artistic text produces secondary meanings that are not a part of the primary 'message' of the text but arise as a natural result of language use. Lotman describes two modes in which language can function. The first, which he credits to Jakobson (1964), is characterised as the I s/he system, whereby a message is coded into a language by

the producer and subsequently decoded by a receiver. This is a variant of the classic tripartite model of producer - trace - receiver adopted by Nattiez in his book *Music and Discourse* (Nattiez, 1990, pp. 16-17) as his model for musical communication. While for Nattiez the "message" is not decoded but "reconstructed" in the esthesic process (Nattiez, 1990, p. 17), and despite his avoidance of notions of code (Nattiez, 1990, p. 26), the existence of a "message" that is external to and separate from its expression is implied in such ideas as the long and short circuits of communication (Nattiez, 1990, p. 29n). Indeed the idea that a message is *re-constructed* by a *receiver*[16] encourages this interpretation.

While this model serves well for everyday linguistic communication, the artistic text according to Lotman involves a second system of communication. This *Autocommunication*, as he calls it, operates along the I-I axis rather than the I-s/he axis. Here the producer does not simply encode an external message for the receiver to decode. In the autocommunicative model, the very act of communication produces new meanings. It is not the noise in the medium of communication, nor is it the difference between the receiver's and producer's codes that produces these meanings. It is in the nature of the system itself, in the very act of communication. Natural language for Lotman is, in contrast to artificial language, characterised by its creative function.

> "Every system which fulfils the entire range of semiotic possibilities not only transmits ready-made messages but also serves as a generator of new ones."
>
> (Lotman, 1990, p13)

In the artistic text, syntagmatic aspects of the language become a part of the message. Secondary meanings are produced by the very act of coding or recoding a message in a different system. This explains the difficulty of translating poetry or indeed explaining electroacoustic music.

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[16] See Nattiez (1990, p. 30n) for his own criticism of the word "receive" in this context.

While Lotman's work focuses mostly on the structure of poetic writing, his observations can easily be applied to other forms of artistic expression. Acousmatic music, with its complex relationships between mimetic and abstract structures, closely resembles the relationship of form and content that Lotman finds in poetry:

> " … a message in a natural language is introduced, followed by a supplementary code, of purely formal organization; this supplementary code has a syntagmatic construction and is either totally without semantic value or tending to be without it. Tension arises between the original message and the secondary code, and the effect of this tension is the tendency to interpret the semantic elements of the text as if they were included in the supplementary syntagmatic construction and have thereby acquired new, relationary meanings from this interaction."
>
> (Lotman, 1990, p. 28)

Music, being essentially syntagmatic in nature, in that the meaning of the musical signs arises out of their position in the structure rather than primarily referring to external objects or concepts, sits more easily with this autocommunicative model, than with the I s/he mode in which an independently existing message is coded by the producer and decoded by the listener:

> " … a-semantic texts, with a high degree of syntagmatic organization, tend to become organizers of our associations ... The more the syntagmatic organization is stressed the freer and more associative will be our semantic connections "
>
> (Lotman, 1990, p. 28)

1.4 Analogy to visual art

1.4.1 Great abstraction / great realism

A fruitful analogy when examining the role of the recognisable sound in an essentially abstract musical structure is in the visual art of the first half of the twentieth century. Here the attempt to focus more on construction than representation led to a formal use of representational objects that was essentially non-narrative. The representational object fulfilled a complex role that was no longer about telling a story or simply presenting a likeness, but still relied on a real world connection within a primarily formal language.

In an article published in 1912 entitled "On the problem of form" Kandinsky describes the work of art as lying between two poles:

> "These two poles are:
>
> 1. the great abstraction,
>
> 2. the great realism.
>
> These two poles open *two roads* which lead finally *to one goal*.
>
> Between these two poles lie many combinations of different harmonies of the abstract with the real.
>
> Both these elements were always present in art, where they were to be designated as the "purely artistic" and the "objective". The first expressed itself in the second, whereby the second served the first."
>
> (Kandinsky, 1968, p. 161)

He goes on to describe contemporary art as striving to embody one or other of these poles which he then ultimately equates. In the "great abstraction" the artist attempts to eliminate the object altogether. In the "great realism" the object is rendered "inartistically":

> "The outer shell of the object, which is understood and fixed in the picture in this way, and the simultaneous striking out of the usual obtrusive beauty expose most surely the inner resonance of the thing. Especially through this shell and by reducing the "artistic" to the minimum, the soul of the object stands out most strongly, since the outer palatable beauty can no longer divert. *... The "artistic" brought to the minimum, must be recognised here as the most strongly working abstract."*
>
> (Kandinsky, 1968, pp. 161-2)

Manfed Smuda interprets this idea further:

> "Aus dieser Formulierung wird deutlich, daß die von dem hier gemeinten Gegenständlichen ausgehende Wirkung keineswegs illusionsbildend sein kann. In der von Kandinsky angesprochenen Darstellungsmodalität geht es nicht mehr um das Herstellen von Äquivalenten zu sichtbarer Gegenständlichkeit, die der perspektivischen Darstellungsintention entspricht. Eine Reduktion des Künstlerischen und eine Tilgung seiner kulinarischen Dimension, die bestimmten Rezeptionsgewohnheiten entgegenkommt, verstärkt den Wirkungsgrad des Gegenständlichen in einer ganz spezifischen Weise, die es abstrakt erscheinen läßt, d.h. in diesem Zusammenhang: losgelöst von Illusionsbildenden Implikationen."
>
> (Smuda, 1979, p. 78)

> It becomes clear from this formulation that the effect of the objective, as it is intended here, can in no way be illusional. In the representational modality adopted by Kandinsky it is no longer a case of creating equivalents to visual objectivity in the manner of perspectival representation. A reduction of the artistic and an erasure of its culinary dimension, which elicits certain habitual responses, strengthens the effectiveness of the objective in the quite particular sense that it allows it to appear abstract, freed from illusion-forming implications.

This then, for Smuda, is the point of contact between the "great abstraction" and the "great realism":

> "Verschieden sind die "große Realistik" und die "große Abstraktion" in der Darstellungsmodalität, gleich sind sie in ihrer Absicht, die illusionsbildende Wirkung abzubauen."
>
> (Smuda, 1979, p. 79)
>
> The great realism and the great abstraction, while differing in their representational modality, share a common desire to dismantle the illusion-forming effect.

What these two approaches have in common then is that the illusory object is abandoned. The object is no longer in the work, the work becomes the object (abstraction), the object becomes the work (realism). Smuda quotes Ferdinand Leger:

> "Es gibt keine Landschaften mehr, keine Stilleben, kein Gesicht. Es gibt das Bild, den Gegenstand, das Gegenstand-Bild, den Bild-Gegenstand"
>
> (Smuda, 1979, p. 89)
>
> There are no more landscapes, no still-lifes, no portraiture. There is only the image, the object, the object-image, the image-object.

As we have seen, the recording is indexically related to its object. It does not need to be a part of a formal language to be understood. Its primary denotation can be grasped paradigmatically. At this level the recording is to all intents and purposes identical with the sound that was recorded. This being the case it is possible to identify recorded sounds with Kandinsky's class of great realism. Smuda cites Duchamp's ready-mades as examples of the

great realism (Smuda, 1979, p. 126) and the recorded real-world sound has similar qualities of being physically identical to the object it represents[17].

On the other hand, within the essentially abstract paradigm of a work of music it is not surprising to find the real world sound functioning in much the same way as the representational object functions in art of the great abstraction, art which stands at the turning point away from representation.

1.4.2 Cubism

Cubism, both in the early analytical phase and particularly in the later period of synthetic cubism[18] exemplifies the redefinition of the object in a way which has parallels with the use of representational sound in many electroacoustic works.

In analytical cubism the object is presented as it appears to the mind or imagination[19]. As such, the analysis of the object on which the painting is constructed focuses on the *con*ception of the object in contrast to the phenomenologically inspired *per*ceptual bias of Schaefferian *reduced listening* strategy. Nevertheless a methodological similarity may be observed in the way that analytical engagement with the object provides the basis for transformations which reduce the illusionistic potential of the representation.

In synthetic cubism the object proper reappears in the form of collage. Objects from the real world (e.g. newspaper cuttings, coloured paper etc.) are physically brought into the painting untransformed:

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[17] In Chapter 5 we shall see how this can be used to create an 'anxious boundary' between the work and the world around it.
[18] The distinction between *analytical* and *synthetic cubism* can be traced to the writings of Juan Gris (see Golding, 1994, p.59).
[19] see Smuda (1979, p. 86).

> "In Braque's own words he introduced foreign substances into his paintings because of their 'materiality' and by this he was referring not only to their physical, tactile values, but also to the sense of material certainty they evoked."
>
> (Vallier, 1954, p. 17, quoted in Golding, 1994, p. 62)

The real world object is used in a non-narrative way, not so much representing an individual thing as thing-ness in general, the materiality of the real world. Similarly the real-world sound in some acousmatic works is used less for what it is than for the fact that it is something identifiable, the aim being to cause the listener to associate the work with the materiality of the world rather than to say something specific about the particular facet of the world embodied in a particular sound.

Perhaps an even less referential use of the object is suggested by Smuda:

> "Im analytischen Kubismus wurde deutlich, daβ der Betrachter die auf der Gemäldefläche analysierten Gegenstandsansichten seinerseits durch Reflexion auf die Strategie der Darstellungsmittel zu einem Gegenstandsbegriff synthesiert. Gris schreibt deshalb der Malerei des analytischen Kubismus eine erhebliche Suggestionskraft zu. Um diese Suggestion für den Betrachter zu 'ratifizieren' setzt Gris >Gegenstandszeichen< in seine Gemälde, die jedoch im Gegensatz zu analysierten Volumina aus den synthetischen Beziehungen abstracter Flächenformen abgeleitet und dem Zusammenhang der Flächenarchitektur integriert werden. So ergibt sich zwar im Synthetischen Kubismus eine leichtere >Lesbarkeit< des Gegenstands, aber selbst eine Synthetisierbarkeit zu so etwas wie ein Gegenstandsbegriff ist unterbunden, weil der Gegenstand auf der Gemäldefläche nur den Stellenwert eines Zeichens unter anderen gleichwärtigen Zeichen hat."
>
> (Smuda, 1979, p. 90)
>
> In analytical cubism it became clear that the observer synthesizes the conceptual object himself out of the aspects of the object analysed on the picture surface, through reflection on the means of representation. Thus Gris ascribes a great power of suggestion to the painting of analytical cubism. In order to ratify this suggestive power to the observer, Gris places 'object-signs' into his paintings which, in contrast to the analysed volumes, derive from the synthetic relationships of abstract surfaces and integrate with the context of the surface architecture. While this leads to a more straightforward 'legibility' of the object, the object on the surface of the painting has the character of a sign among other signs of equal value, restricting the ability to construct an objective reality.

The object becomes a sign among signs, a sign-post almost, guiding the viewer through the composition. In music the recognisable sound may also have a structural purpose, almost in the manner of a melodic motif, giving listeners an easily graspable marker that may, like the loom-shuttle sound in Stockhausen's *Trans* for example, guide them through the musical structure. In such a case the sound loses its specific narrative dimension, while still embodying a materiality that is imparted to the work as a whole.

The analogy between the two principal phases of Cubism and the methodology of acousmatic music will be expanded in Chapter 3. For the present it is enough to observe that representational sound, however 'realistic', may be used in a radically non-illusionistic way within the acousmatic work. Representational sound need not imply narrative but may, on the contrary, emphasise structural, even abstract, relationships within the work.

Chapter 2

2. Aural discourse / mimetic discourse (Emmerson, 1986)

2.1 Introduction

The ideas presented in Chapter 1 relate closely to those discussed by Simon Emmerson in his influential chapter *The Relation of Language to Materials* (Emmerson, 1986). Here Emmerson divides *musical discourse* into the two classes of *aural discourse* pertaining to the

> " … more abstract musical discourse ... of interacting sounds and their patterns"
>
> (Emmerson, 1986 p. 18)

and *mimetic discourse*, based on the referential qualities of the sounds of the piece. Emmerson considers this duality fundamental:

> "For the composer of electroacoustic music this duality in content may be used to advantage. Even for those not interested in manipulating these associated images in composition, it must at least be taken into account."
>
> (Emmerson, 1986, p. 19)

He goes on to differentiate between syntax abstracted from the sound material and abstract syntax in which sounds are placed into formal structures derived in isolation from the sounding material.

In the present chapter I will discuss Emmerson's ideas in some detail as they deal directly with the interaction of abstract and referential approaches to sound, which is the subject of this thesis. It is important also to introduce Emmerson's terminology as it is widely known and differs somewhat from the terminology used elsewhere in this thesis. In particular Emmerson's use of the term *abstract* with regard to syntax has a somewhat different meaning from my preferred usage, which accords more closely with Emmerson's *aural discourse*.

Emmerson contrasts *abstract syntax* with *abstracted syntax*. In the former the syntax is imposed on the material from the outside, in the latter the material itself suggests a syntax to

the composer. Abstract, in this sense, refers to the relationship between the syntax or construction of the work and the material, not to the relationship of the syntax to the outside world. One could for example imagine a work in which a different sound was arbitrarily substituted for each word of an English sentence such as "the cow jumped over the moon". This would be an example of abstract syntax despite the syntax having roots in a recognisable real world structure, that of the English language. Indeed most of the examples of abstract syntax given by Emmerson draw their inspiration in some way from extra-musical sources. The crucial point is the arbitrary relationship between the sounds themselves and their placement within the structure of the work. Examples given by Emmerson of abstract syntax include serialism (Stockhausen's *Elektronische Studie II*) and structures based on the fibbonaci series (in Michael McNabb's *Dreamsong*) or even a quasi-narrative symbolism (in Wishart's *Red Bird)*. It is, then, the relationship between the language and the materials, the sounds themselves, that is deemed to be abstract. In an 'abstract syntax' the vocabulary (sound material) has an arbitrary relationship with the syntax, whereas in an abstracted syntax the vocabulary in some way influences or suggests a suitable syntax.

2.2 Syntax and discourse

A difficulty arises in Emmerson's chapter, because he contrasts syntax not with vocabulary, but with discourse which, as we shall see, has a rather convoluted relationship with the syntax itself. This relationship emerges clearly when we try to separate production and reception. Emmerson's notion of discourse is essentially based on the perceived qualities of a work, while his discussion of syntax focuses on the producer and compositional method. Syntax, I will argue, may, if abstracted from the material, serve to suggest either mimetic or aural discourse. On the other hand, abstract syntax may, if perceived, become the primary discursive element in a work, drawing on both aural and mimetic listening strategies for its understanding.

Emmerson's viewpoint is, he states, that of the composer:

> "We will remain concerned here with the choices open to the composer of electroacoustic music, rather than the possible interpretation of those choices by the listener."
>
> (Emmerson, 1986, p. 18)

This said, his discussion of discourse concentrates by necessity on the perceptible qualities of the sounds used. If we are to discuss the discourse of a work from the composer's perspective we can only speak of the *intended discourse*. How does the composer wish the work to be perceived, as aural discourse or as mimetic discourse?

So, while the syntax of a composition is clearly a question of its production, a choice made by the composer, the discourse is a perceived quality of the work over which the composer only has limited control. Emmerson admits that the listener may well respond differently than the composer intended:

> "It is at this point that the composer must take into account audience response; he may intend the listener to forget or ignore the origins of the sounds used and yet fail in this aim."
>
> (Emmerson, 1986, p. 18)

A composer may intend a particular discourse to dominate, but this is no guarantee that the work will be perceived in this way. Discourse, unlike syntax, is defined by perception:

> "From one angle we may hear the music as having either an aural or a mimetic discourse; from another, either of these may be organised on ideas of syntax either abstracted from them or constructed independently from them in an abstract way."
>
> (Emmerson, 1986, p. 24)

This is not to say that the composer has no influence over the perceived discourse of the work. As we shall see, the composer may compose the work in such a way as to suggest a suitable listening strategy, which may lead to the perception of the intended discourse. The means that the composer has to do this are twofold: vocabulary and syntax. Discourse arises out of these two elements: the choice of sounds and the way they are put together.

2.3 Syntax, vocabulary and perceived discourse

2.3.1 Choice of vocabulary

The choice of vocabulary, the sounds themselves, will influence the listener's choice of listening strategy[20]. Sounds will suggest a mimetic listening strategy if they are highly recognisable. Less obviously recognisable sounds or sounds with a clear pitch content or rhythmic content, such as drones or rhythmic loops, tend to suggest an aural listening strategy. Of course perception of a single sound is not the same as perception of a discourse. Discourse emerges when the sustained use of a particular listening strategy yields satisfactory aesthetic results in the form of interesting relationships between individual elements.

This is where the composer's choice of syntax becomes influential.

2.3.2 Abstracted syntax

A closer look at two of Emmerson's examples of abstracted syntax reveals two distinct modes in which this abstraction may take place. These two modes accord with the two modes of intended discourse.

1. Syntax abstracted by means of aural criteria

Emmerson's examples of works that combine aural discourse and abstracted syntax are taken from works produced in the studios of the GRM in the 1950s, 60s and early 70s. Of Parmegiani's *De Natura Sonorum* he writes:

[20] The correlate of the producer's choice of vocabulary for the receiver is the choice of listening strategy.

> "... in this case the composer skilfully combines the material in ways which concentrate on the perception of specific acoustic properties, moving our attention away from any possible mimetic references, not merely towards the microstructure of the sounds but towards the way the sounds combine to reinforce this perception."
>
> (Emmerson, 1986, p. 29)

In other words, the composer uses a syntax based on aural relationships within his vocabulary of sounds, to encourage the listener towards an aural listening strategy. Sustained application of 'aural' listening strategies is rewarded and the listener is led to discover an aural discourse in the work.

2. Syntax abstracted by means of mimetic criteria

The other form of abstraction from materials may be seen in Emmerson's example of a work in which mimetic discourse dominates and abstract and abstracted syntax are combined: Trevor Wishart's *Red Bird (1978):*

> "The final order and combination of sound-events is strongly influenced by what is effectively a 'story line', while the composer retains an aural judgement as to the exact nature of many of the studio montage procedures. The work thus combines elements from 'abstract' and 'abstracted' syntax poles"
>
> (Emmerson, 1986, p. 37)

While the global narrative may indeed be described as being:

> "constructed independently from [the materials] in an abstract way",
>
> (Emmerson, 1986, p. 24)[21]

many moment to moment syntactical decisions do depend on the particular vocabulary chosen to represent these narrative ideas. The juxtaposition of the sound of gunfire with screaming voices early in the piece is a good example. The syntax here is abstracted from the materials on the basis of their mimetic implications rather than on the basis of their morphology. The syntax is nonetheless dependent on the materials and not:

[21] Abstract syntax which does fulfil this criterion is also present in *Red Bird* in the form of quasi-serial combinations which are discussed later in the chapter (Emmerson, 1986, p.38).

> " … the creation and manipulation of essentially *a priori* shapes and structures by the composer"
>
> (Emmerson, 1986, p. 22)

Emmerson does not himself make the distinction between syntax abstracted from the aural qualities, or morphology of the sound vocabulary, and syntax derived from the mimetic implications of the sound vocabulary. His notion of abstraction from materials is essentially aural, and this leads him to classify *Red Bird's* 'story line' as entirely abstract:

> "It represents a work in which mimetic discourse is dominant and whose syntax combines montage based on both the specific acoustic properties of the sounds and a more abstract schema based on a carefully determined symbolic narrative."
>
> (Emmerson, 1986, pp. 36-37)

It may be argued that while a narrative determines its vocabulary, an abstracted syntax based on aural criteria proceeds from the material to the syntax. This idea, with its roots in Schaefferian thinking and the modernist "truth to materials" ideal, belies the real composing situation which comprises a complex set of feedback loops in which syntax and vocabulary inform each other. Syntactical decisions may be made either or both aurally and mimetically, based on the perceived abstract and representational qualities of the material. Vocabulary is, then, as likely to be determined by syntax as to determine it. This is as true of a mimetically derived syntax as it is of an aurally derived one.

Despite Emmerson's emphasis on the aural dimension as the focus of abstracted syntax, his final examples of works where mimetic discourse is dominant do draw on the mimetic character of the sounds as a determinant of the work's syntax, allowing narrative content to dictate the ordering of anecdotal sounds.

The examples he uses are taken from the works of Luc Ferrari, in particular his *Presque Rien No. 1 (1970)* and his *Music Promenade (1968)*. While Emmerson has since retracted the first example on the grounds that the lack of intervention in the recording that forms the basis

of this composition does not constitute the creation of a syntax[22] one could easily imagine a work such as *Presque Rien No. 1* being created out of a montage of fragments from different recordings rather than a single recording. The syntax of such a piece would be abstracted from the materials on the basis of their mimetic content rather than their 'aural' morphologies. The composer would decide on syntactical juxtapositions and sequences of material on the grounds of their mimetic compatibility, their ability to suggest a coherent soundworld despite their disparate origins.

Music Promenade might, at first sight, be considered to be such a work. Emmerson points to the way

> "*Music Promenade (1968)* is a polyphonic mix of several such layers with the heightened reality that this simultaneity of different environments brings about"
>
> (Emmerson, 1986, pp. 36-37)

This is, however, essentially an observation about the *perceived discourse* of the work. Luc Ferrari himself has written of the work's construction:

> "Each of the four tapes was about twenty minutes long (each tape has a different duration so that the cycles can never encounter in the same manner). The structure of each tape consists of a succession of short characteristic sequences alternating with blurred and slight, sometimes nearly silent sounds. When one characteristic sequence encounters by chance a slight sound, this one colours that one. On the other hand, when an event sequence encounters another one, they perturb each other, for their good or for their evil. Such is life. "
>
> (Ferrari, 2000, p. 60)

Not only does this quotation imply that the composer's intended discourse is as much aural as mimetic, the emphasis on arbitrary interactions of four tape loops suggests that the syntax of *Music Promenade* is at least partially abstract.

[22] Personal communication.

2.3.3 Abstract syntax

The example of Luc Ferrari's *Music Promenade* raises two fundamental issues concerning the nature of abstract syntax.

As is evident in the two statements about *Music Promenade* quoted above, it is possible to perceive either an aural discourse or a mimetic discourse in the music. The choice of vocabulary, untransformed environmental recordings, strongly suggest a mimetic discourse, yet the composer is clearly also interested in the aural interaction of large and small sound events.

It was suggested above that the composer may try to influence the perception of the listener by choosing one syntactical approach over another. At the beginning of *Red Bird* for example the composer clearly associates the sound of gunfire with screaming voices. In this way he confirms that a mimetic listening strategy is appropriate at this point. A mimetically abstracted syntax creates a mimetically meaningful structure. In the second section of Parmegiani's *Dedans Dehors* (1977) on the other hand, recorded waterdrops are juxtaposed with electronically created sounds which resemble them with regard to pitch and amplitude envelope. This syntactical juxtaposition clearly suggests that an aural discourse is intended by the composer. The listener may apply a mimetic listening strategy which would yield some amusing results such as "someone is playing synthesizer in the bath". However most listeners will probably realise that this was not the composer's primary intention and adopt an aural listening strategy appropriate to the intended discourse. An abstracted syntax, then, can suggest an appropriate listening strategy, either mimetic or aural.

What influence does an abstract syntax have? Consider two fictitious composers. Composer A uses a mathematical system to determine the temporal distribution of recorded sounds, which she has selected for their intrinsic aural qualities. Composer B uses the same

system of construction, selecting precisely the same sounds for their social and narrative implications. The two works produced are identical in every respect except at the level of composer's intention. Composer A wishes the listener to perceive the *aural discourse* of patterns of pitches and rhythms that emerge as a result of the new structure. Composer B is interested in the associations that arise from his unique combination of sounds, that is to say he intends a mimetic discourse. The listener will probably perceive a combination of aural and mimetic discourse, or may choose to focus on one or the other. The syntax, the arrangement of sounds, gives no clue to the intended discourse. Either listening strategy may or may not produce interesting aesthetic results.

2.3.4 Abstract syntax and aural feedback

This fictitious example is of course rather extreme. The complexity of the actual composing situation is revealed in Emmerson's comments with regard to Michael McNabb's work *Dreamsong:*

> "There is no doubt that the composer would have tried another approach had the Fibonacci series resulted in unsatisfactory aural results"
>
> (Emmerson, 1986, p. 32)

With the exception of a very few radicals, composers are in a constant dialogue with themselves as listeners. If the results of an abstract process are aurally unsatisfactory, the process is modified. On the other hand, even the most aurally biased composer will occasionally try out an arbitrary combination of sounds to see what happens. There is a constant play of conception and perception, playing off an abstract idea against a perceived result.

2.3.5 Mapping in abstract syntax

In addition to this, my extreme example of two composers using abstract syntax to different ends leaves out one crucial piece of information. While an abstract syntax imposes a

pattern on the materials that is in no way derived or abstracted from them, the vocabulary must in some way be mapped on to the system being used. Here the composer must again make a choice, which may have the result of suggesting an appropriate listening strategy or at least giving a hint at the composer's own bias.

Taking two examples of abstract syntax from Emmerson, Stockhausen's *Elektronische Studie II* and Cage's *Williams Mix,* in the former the sounds are arranged serially according to criteria that may be described as aural - frequency content and duration - while in the latter, sounds are classified according to both mimetic and aural content. A first phase of classification of sounds was based largely on mimetic criteria:

> "... [Cage] used six categories of sounds: city sounds, country sounds, electronic sounds, manually produced sounds (including instrumental music), wind-produced sounds (including singing), and "small" sounds ... This plan is unique in that it is not based on the acoustic properties of the sounds, but rather on the identity of their sources. To properly classify a sound, Cage's system demands that one knows what produces it or where it comes from."
>
> (Pritchett, 1996, p. 106)

A second phase of classification focuses on aural criteria:

> "Each sound was then classed according to whether its frequency, overtone structure or amplitude remained constant (c) or varied (v)"
>
> (Revill, 1992, p. 145)

So Cage adopted a combination of aural and mimetic mapping strategies within the context of abstract syntax. The syntax may be derived from the I-Ching operations that determined the durations and locations of the various types of material, but the way the sounds are mapped on to the results of the I-Ching operations depends on both mimetic and aural analysis of the sonic vocabluary of the piece.

2.4 Syntactical discourse

Finally we might return to our fictitious composers and consider a third composer C, whose stated aim is to realise abstract patterns in sound. This composer is primarily interested

in syntax and uses recorded sounds to articulate an interesting structure with scant regard to the acoustic result. The sound vocabulary is chosen on the basis of intelligibility. Widely differing types of sounds both recorded and synthesized are used for ease of differentiation. It is the syntax itself that the composer wishes the listener to perceive, and this is kept simple enough to be identifiable as an additive process. We could say that the intended discourse is neither strictly mimetic nor aural, as either mimetic or aural listening strategies, and most likely a combination of the two, will yield an insight into this structure. The boundary between syntax and discourse becomes somewhat blurred. The intended discourse of the work may be considered to be essentially a *syntactical discourse*.

For the listener the blurring of discourse and syntax is equally problematic as syntax can only be perceived through analytic listening, parsing the material and finding relationships. Listeners will parse the material in the light of whichever listening strategy they choose to adopt and may perceive an abstract syntax through adoption of either or both aural and mimetic listening strategies or a combination of the two, observing, for example, that the high pitched glissando (aural) always precedes the birdsong (mimetic).

An interesting set of works to look at with regard to these ideas are process pieces such as Steve Reich's *Come Out* (1966) and Alvin Lucier's *I am Sitting in a Room*. (1971). In both pieces the perceived discourse is of the sort I have described as syntactical: a gradual transformation that is so slow as to be easily recognisable. The material demands that both mimetic and aural listening strategies are adopted. Indeed, it is the transformation of the material from sounds that strongly suggest a mimetic interpretation into sounds which encourage an aural approach that constitutes the musical argument of both these works. It is this essentially syntactical discourse that is perceived by the listener.

2.5 Toward a compositional aesthetic

The perception of aural, mimetic and even syntactical discourse in electroacoustic music is fluid and personal and often as dependent on personal preferences and listening habits as on the materials and structures produced by the composer. The experienced listener may be more inclined to an aural bias than the novice. In my personal experience I often find it harder to recognise sources of sound effects than many non-composers, because I habitually accept sounds as being artificial, virtual, even source-less.

In the works discussed in the following chapters I have attempted to discover a relationship between aural and mimetic approaches in which the two stand in a balanced relationship. Structural relationships based on aural criteria combine with an awareness of the mimetic implications of the vocabulary and its syntactical combinations. Particular attention is paid not only to possible referential meanings in the sounds, but to the extent to which those meanings impinge on the listener at different points in the works. Aural feedback during the composition process was the ultimate arbiter of the success of this approach in which as we shall see in the next chapter, the possibility of source recognition becomes a compositional parameter.

Chapter 3

3. Transformation and structural manipulation of source recognition

3.1 Introduction

The division of *vocabulary* and *syntax* in electroacoustic music is methodologically complex. While many composers seem to divide the composition process into two distinct phases, the creation of a vocabulary of sounds, and the subsequent assembly of larger scale structures, it must be borne in mind that syntactical decisions are a major part of the development of materials. Sounds are chosen with *syntactic potential* - morphological or mimetic similarities that may form the basis for syntactical relationships.

While the electroacoustic repertoire does contain works in which the recorded sound appears unaltered (except through the fact and artefacts of recording[23]), the vast majority of composers see the need to transform their recordings further once they have been captured by the recording medium. For many composers transformation[24] seems to be fundamental to the development of a suitable vocabulary for acousmatic music. In the following discussions I will examine the studio-based practice of sound processing, and its role in compositional methodology and then move on to look at how *thematic transformations* may be incorporated into the syntax of a work.

Before commencing I should like to define the following basic terminology. The sound to be transformed I will call the *origin* of the transformation. The result of a transformation will be known as a *derivative*. It is important also to note that the origin of a transformation may already be a transformed sound, the derivative in an earlier process.

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[23] It is clear that every recording represents a selection of material normally deliberately chosen by the recordist. Location, perspective, choice of microphone etc. constitute a creative transformation of a sort.

[24] In this chapter the word transformation applies to the compositional act of changing a sound in the studio rather than the transformation of one perceived source into another within the context of a work, which is a manipulation of a perception during the course of a sound or texture. This will be called *progressive transformation*.

3.2 Analytical and synthetic transformations

Taking our terminology from the analogy to the phases of cubism discussed in 1.4.2. we can identify two compositional approaches to sound transformation: *analytical transformation* and *synthetic transformation*. Just as the first wave of cubist paintings was concerned with a close examination of a subject out of which the painterly forms were abstracted leaving a residue of meaning which could still be recognised, the tradition of *musique concrète* is concerned with abstracting formal properties from sounds through the application of *reduced listening*. This analytical approach in electroacoustic music frequently leads to sounds in which, just as in analytical cubism, the perceived source of the origin of the transformation is still perceptible in the transformed sound.

Synthetic transformation occurs when the actual source of the transformed sound is deemed irrelevant to the sound produced. This is not to say that the sound has no perceived source, or that the perceived source is of no importance. On the contrary, as we shall see in Chapter 4 in the discussion of *The Seasons*, the categorisation of sounds may still be a primary concern of the composer. However the perceived *source-bond*[25] in this case is produced synthetically and is not conceptually linked to the perceived source of the origin of the transformation. Sound processing has passed into the realm of sound synthesis[26]. This situation is more akin to the synthetic phase of cubism in which the subject of the painting is allowed to arise out of the abstract forms on the canvas.

[25] The concept of *source-bond* is taken from Smalley (1986).

[26] In these cases the process often has more relevance to the final sound than the actual source which may function purely as an input to the process.

3.2.1 Synthetic transformation

We can identify a very practical reason why composers would choose to use transformation of existing sounds as a basis for synthesis. It is easier for the composer to start from an existing sound than to work from a completely blank palette. The instrumental composer has always been able to work from the basis of a known sonic quantity, the sound of the instrument they are writing for. Furthermore, the whole fabric of an instrumental composition is suffused with known elements. Kivy has argued that the basic material for composition is not sound but music:

> "Composers do not start from scratch with some kind of palette of natural sound. They work with melodies, melodic fragments, preformed patches of harmonic fabric, well-worn, secondhand bits and pieces of contrapuntal building blocks: in short, the materials of music are not natural sounds, but music already."
>
> (Kivy 1991, p. 12)

In electroacoustic music the building blocks may well be natural sounds that have no previous musical incarnation. Starting from a known sound gives the composer a handle on its behaviour and implications in a way that is analogous to the melodic fragments and harmonic building blocks of instrumental music.

Indeed, the sheer quantity of parameters involved in sound synthesis makes it very difficult to specify a new sound from scratch that has anywhere near the level of complexity of a natural sound. Stockhausen and Eimert's ideal of being able to compose each sound as one might compose a whole work is not a workable option if any level of complexity is desired in the acoustic result. Granular synthesis is often considered to be the closest approach to this ideal (e.g. Truax, 1990). Here the micro- and macro structures are controlled in a simultaneous compositional act. However this act is normally one of specifying at one scale and letting the other emerge as a consequence of the algorithm. Many completed compositions of this type are either created by "living with" the less than satisfactory musical

results of processes that are ‘mathematically rigorous’, or, more frequently, by aurally selecting and combining the most pleasing results from numerous experiments. This latter approach is not unlike the experience of working with real-world sounds. An experimental cycle of prediction and evaluation is entered into, be it one of tweaking the parameters of a granular algorithm or tweaking the parameters of a DSP program.

In both cases the composer enters into what Nicholas Cook calls a “creative dialogue” with the material (Cook, 1990, p. 211). Cook suggests that the composer needs such a dialogue, be it with a series, or a tonal system or indeed a notational system. The electroacoustic composer enters into this dialogue with his source material. Much as the sculptor walks a path between finding form in the stone and imposing form on the stone, the composer using a real-world source finds the musical possibilities latent in the material and brings these to the fore.

It should be made clear that synthetic transformation of sound does not depend any less on aural analysis than analytical transformation does. Some synthetic transformations may be goal–directed. A composer may wish to create a particular type of sound and choose a similar sounding source as the origin of transformation, for example creating the sound of ‘water’ from a crinkled plastic bag. The composer may focus on transformations that will make the actual sound more like the desired sound. This kind of transformation, which alters the perceived source of the sound, requires analysis both of the sound being transformed and of the imagined sound, to find and emphasise common features and alter differing features. Alternatively the composer may simply allow the sound to become what it will without having any particular result in mind. This still requires analysis and evaluation of the material.

The distinction between analytical and synthetic categories of transformation is to be found in the attitude to the relationship between origin and derivative. Analytical transformation assumes a perceptible connection between the original and its transformed derivatives, while synthetic transformation does not.

It is of course true that the actual source of a sound is not normally the concern of the listener for whom the perceived source is the only reality. This undeniable fact merely points out the complexity of the real situation in which both analytical and synthetic approaches coexist. A composer may, having produced some very convincing water sounds from, say, a processed plastic bag, go on to produce numerous variants of the water theme by analytical transformation of the synthesised water sound.

The result of a synthetic transformation may, then, itself become a source for many analytical transformations, which form thematic material for the piece.

3.2.2 Analytical and thematic transformations

In most cases, then, analytical transformation is used thematically, the connection between source and derivative being used as a source of musical relationships and development within the work. This type of transformation may therefore be considered to be a *thematic transformation*.

The thematic link between origin and derivative may be either *mimetic*, depending on recognition of its wateriness, or *morphological*: In the latter case the new sound may no longer sound like water as such, but may still be clearly related to the watery sound heard earlier because of, say, its dynamic profile or pitch contour.

We can differentiate, then, between a *mimetic thematicism* and a *morphological thematicism*. These two forms tend to overlap as morphological similarities may produce related source perception, particularly when they are the result of a process of transformation. However two sounds may have strong morphological similarities without sharing a perceived source. It is also possible to imagine a thematic link between two sounds that depends entirely on source relatedness without any morphological similarity (though this would be unlikely to be created through transformation). The sound of a car door slamming and the ignition of a motor might be an example.

It is clear from the above example that sound transformation is not essential to either mimetic or morphological thematicism. However in many cases transformation is used as the principal method of producing thematic links on either or both the morphological and the mimetic level.

Clearly not every transformation will be perceived thematically. It would be wrong to assume that merely using the same source sound to generate all the sounds of a particular work would ensure some sense of organic unity in the resulting sounds. Thematic links must be established compositionally both when generating material and when establishing larger structures. They cannot be assumed to result automatically from the use of transformative processing.

Thematic links are created by the composer, but perhaps more importantly they are created by the listener. They are created by an act of analysis on the part of every member of the audience, who compares and categorises his or her aural experience of the work. The listener is likely to find some relationships, whether they are intended by the composer or not. However, as we saw in Chapter 2, the composer's syntactical decisions may help to suggest appropriate listening strategies. If the composer is interested in the relationships that arise out

of a thematic approach to sound processing, then these must be established by the compositional act.

This approach to sound transformation was taken in the first work under consideration: *Grand Junction*.

3.3 *Grand Junction*

3.3.1 Project description

Grand Junction is a work for tape, in which real world sounds and transformed sounds are integrated into a musical structure, using their recognisability as a compositional parameter.

The starting point for the piece was a visit to the Kew Bridge Steam Museum in London. The museum is housed in the former Kew Bridge Pumping Station of the Grand Junction Waterworks Company which supplied water to Paddington, Kensington and Ealing from 1838 until 1985 (when the site had already been a museum for some years). The museum houses the largest functioning Cornish beam engines in the world as well as numerous smaller engines and it was the sound of these engines in action that inspired the writing of the piece. I wished to explore the inherent "musicality" of the machine sounds, the rhythmic drive of the smaller engines and what I perceived as the cadential phrases of the huge 90 - inch bore water pumps. I was also concerned to capture something of the atmosphere of the pumping station itself, both in its current guise as a museum, a kind of shrine to the machine age, and as it must have been in its heyday, a hive of activity, a powerhouse at the very heart of industrial London. This duality between abstract musical qualities on the one hand and their contextual meaning became the central dialectic of the piece and informed its composition at every level, from the particular sonic vocabulary to the large scale structuring of the work.

3.3.2 The 'possible reality' frame

During the creation of *Grand Junction* the image of the piece as a kind of dream became important to me. As in a dream, images (in this case sounds) from the real world are transformed and recontextualised, emphasising both their abstract aesthetic qualities and their symbolic significance to the dreamer. The piece begins with a descent from the 'real' world (an environmental recording of the museum as it might sound to any visitor) into a dreamlike musical world and ends with a corresponding 'waking' in which the isolated sound of an artificially magnified steam engine is returned to its 'natural' scale and environmental context. This is analogous to the way the real world impinges on the dreamer as he or she becomes gradually aware of the reality of, say, the sound of an alarm.

It is important to emphasise that the 'reality' of the opening and ending is as artificially constructed as the rest of the piece. However the context in which sounds are presented point toward them being part of a possible sonic environment, acceptable as a representation of the real world. Obviously a listener who has never been to the Kew museum will not recognise the specific soundscape. Nevertheless, the presence of human voices, the ambience of the hall in which the recording was made and the lack of conflicting evidence should lead most listeners to an interpretation of the soundworld as belonging to a possible reality.

We shall see that this opening provides a *remembered context* which becomes part of the listening experience of the rest of the work. The listener may use this as a frame of reference for the transformed sounds later in the work, comparing them with the remembered sounds of the opening and making associations with the perceived sources evoked by them. So while the specific sources evoked by the opening will vary according to each listener's experience, the opening itself acts as a shared experience to which later sounds may be compared. In other words, the context of the sounds of the opening encourages a real-world

interpretation of the material, which is in turns confirmed or frustrated. In the following discussion we shall develop this idea to construct an analogy to tonal music. The remembered context provided by the recognisable opening, and its subsequent reassertion at the end of the piece may be considered analogous to a tonal centre[27], which is departed from, referred to and finally re-established at the end of the piece.

3.4 A tonal analogy for recognition-based structures

A useful starting point in the discussion of the thematic sound transformations and recognition based structuring in *Grand Junction* is the model suggested by Christiane Ten Hoopen (Ten Hoopen, 1994). This model develops Denis Smalley's concept of surrogacy (Smalley, 1986, p. 82).

Ten Hoopen's model (Figure 3.1) proposes a continuum between first order and distant surrogates, between sounds with a clear *source-bond* and more ambiguous sounds:

> "The extent to which source recognition is possible, or even relevant, provides a measure on which we may organise this potential of sonic material, by presenting it along an *axis of source recognition:* a continuous series from the specific case to a surrogate case. The origin of this continuum - the specific case - consists of a sounding flow identifiable as coming from an 'actual' source existing in the real world. But further removed from the origin, in each subsequent part of this continuum the less recognisable the source of sounds will become *[sic]* ."
>
> (Ten Hoopen, 1994 pp. 63)

[27] The tonal analogy has also been suggested by Wishart (Martin, 2000, p.31).

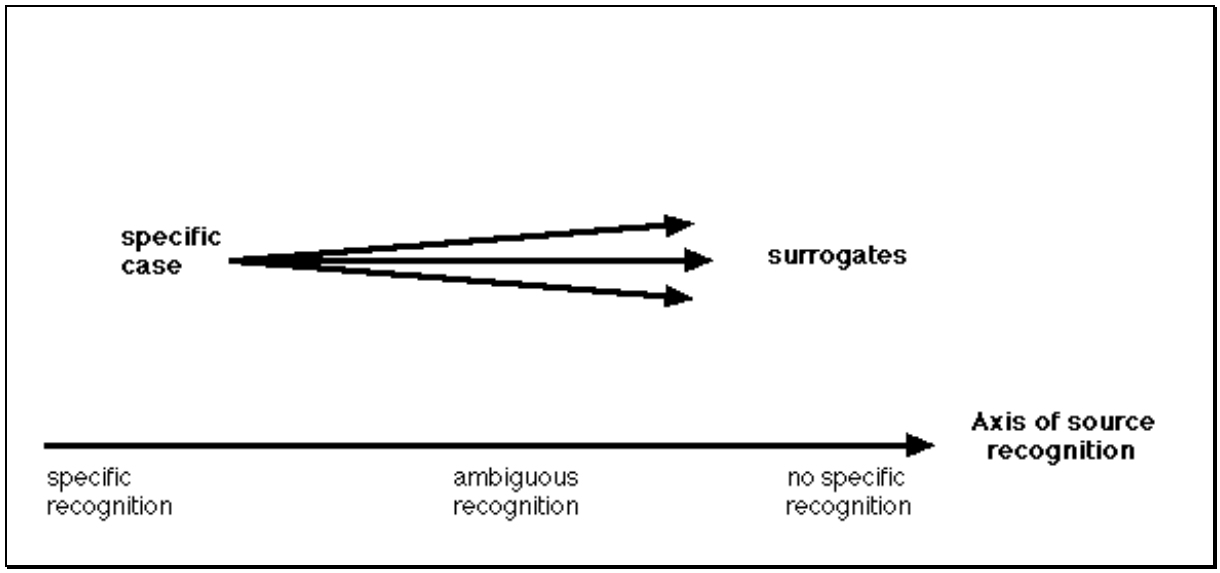

Figure 3.1 The specific / surrogate continuum (Ten Hoopen, 1994)

It would of course be a mistake to assume that the mere act of transforming a sound moves it further along the axis of source recognition. The arrows in Ten Hoopen's diagram are perhaps misleading in this respect. Indeed, as we shall see, the distance of a sound from the "specific recognition" end of the axis of source recognition may be unaffected by certain transformations, while the nature of the recognised source is altered radically.

Ten Hoopen's model therefore does not address the act of transformation as such or the complexity of the region defined as "ambiguous recognition". What the model does indicate, however, is that it is possible to establish hierarchies based on the extent to which a specific source is recognisable[28]. These hierarchies may well be ubiquitous in the listening experience. Even in everyday listening there are times when the cause of a sound is unknown or ambiguous. Certainly, these hierarchies have been used explicitly by composers as diverse as Parmegiani, many of whose pieces have the character of a theme and variations with a recognisable sound presented at the beginning of a section followed by related sounds of various levels of ambiguity, and Stockhausen, who, in *Gesang der Jünglinge,* organised his

[28] Structural use of the specific / surrogate continuum has also been suggested by Young (1994).

material on a continuum of comprehensibility (Stockhausen, 1960, pp. 40-64) from recognisable words to abstract sounds.

3.4.1 Mimetic dissonance

It is this hierarchical structure that allows us to make the analogy to tonality. *Grand Junction* may be described as a structure in which various degrees of abstraction and recognition interact. The final return to 'reality', like various transformations in the course of the composition, has the character of a resolution.

Taking this analogy further one can consider various positions along Ten Hoopen's *axis of source recognition* to indicate different levels of what I propose to term *mimetic dissonance* which may be 'resolved' by revealing a hitherto obscure source. Such resolutions can occur both on the small scale or on the large scale and will be examined in more detail in 3.5. But before we can look at the nature of the resolution of mimetic dissonances within the musical work, we must look a little more closely at the sound material itself and how it responds to transformation.

3.4.2 Transformation and mimetic value

While it is important not to assume that transformation of a sound constitutes a linear movement along the axis of source recognition, it is true to say that the location of a sound along this axis may be manipulated by transformation. For the purposes of this discussion I propose the term *mimetic value* to describe the position of a sound on the axis of source recognition: an unambiguous case having high mimetic value compared to a remote surrogate which has a low mimetic value. The mimetic value of a sound can be considered a measure of its mimetic dissonance. Mimetic value is, however, a more broadly applicable term, as the concept of mimetic dissonance is relevant only to musical structures in which a dissonance / resolution model is applicable. Mimetic value on the other hand has no structural implications

of this sort. It would be a mistake to consider mimetic value to be an absolute quality of a particular sound. As Ten Hoopen has pointed out:

> "... *contextual circumstances* are essential in the source recognition process."
>
> (Ten Hoopen, 1994, p. 64)

As such mimetic value is always context dependent, both in terms of the immediate context of concurrent and surrounding sound materials and in the wider context of the work as a whole. We shall see that this very fact allows the resolution of mimetic dissonance to occur. However for the time being it is important to establish the way sound transformations can affect mimetic value at the point of creation.

In *Grand Junction* two approaches to sound transformation occur. I will call them *abstraction* and *mimetic mutation*.

3.4.3 Abstraction

Abstraction focuses on the abstract potential of the source material[29]. It tends to take a particular parameter of the sound's morphology, identified as interesting by close listening, such as its pitch content or rhythmic contour, and emphasise this at the expense of the recognisability of the sound's origin. I shall refer to this parameter as the *focus of transformation***.** The abstracted sound is likely to posses a lower mimetic value and may even suggest a source that is unrelated to the actual source or the originally perceived source of the origin of the transformation.

[29] The term *abstract potential* is taken from (Smalley ,1986).

3.4.4 Mimetic mutation

However it is also possible, through an identical process, to produce sounds that retain a high mimetic value. Indeed it is possible to select a focus of transformation in such a way as to emphasise the *source-bond*. Proponents of the application of Gibson's 'ecological' approach to perception (Gibson, 1966; 1979) have observed that certain structural invariances in a sound play a defining role in its recognition at the expense of other parameters. Luke Windsor writes:

> "Warren and Verbrugge (1984) discovered that the distinction between "breaking" and "bouncing" glass is made by subjects on the basis of specific temporal invariants, rather than any frequency information. Although the noise burst that occurs at the start of the sound of a breaking bottle is absent in the case of bouncing, removing this spectral information has little effect on the discrimination of these two types of event. It seemed that the only information necessary for the discrimination of breaking and bouncing lies in their higher order temporal structures."
>
> (Windsor, 1995, p. 65)

Selecting the rhythmic structure of a breaking glass sound as a focus of transformation and altering the frequency content for example would therefore lead to sounds that are still identifiably glass-breaking sounds or at least put the listener in mind of breaking glass while also being obviously interfered with[30]. Alternatively it is possible even to exaggerate certain characteristics of a sound that are crucial to its recognition. In *Grand Junction* many new sounds were produced which are recognisably mechanical and metallic and will most likely be recognised as steam engines, actually being rather slower, deeper or louder than the origins of the transformation. I call these transformations *mimetic mutations,* as they need not essentially alter the mimetic value[31] of the origin. This is not to say that the perceived source is identical to the perceived source of the origin, but that the sense of a real world source for

[30] This may be considered to enhance the experience of *double intentionality* (see 1.1.3).
[31] *Mimetic value* is defined above in 3.4.2.

the sound is as strong. The sound occupies the same location along the axis of source recognition.

3.5 Abstraction and mimetic mutation in *Grand Junction*

It is possible to identify both abstractions and mimetic mutations in *Grand Junction*. Most of the mimetic mutations take the form of exaggeration or heightened realism, while the abstractions might be considered surreal in the sense that being further removed along the axis of source recognition they contribute to the sense of unreality by being of ambiguous origin.

3.5.1 The exaggeration / abstraction graph

A graph may be constructed (Figure 3.2) on which a central line represents a *possible reality*. Sounds situated above this line are mimetic mutations that have the character of a heightened or exaggerated reality, sounds below the line are abstractions which have a more ambiguous relationship with any perceived source resulting in a sense of subversion of 'reality'. It may be observed that the area below the line (abstraction) is directly analogous with Ten Hoopen's *specific / surrogate continuum,* the area above the line representing the multitude of sounds in *Grand Junction* that retain a strong sense of a source albeit one of an exaggerated proportions. The listener may disbelieve that these sounds have an actual origin in the world on account of their scale and context, but may still associate them with an imagined virtual source, for example some kind of mega-machine. While the sense of causality in these mimetic mutations is strong, the clearly unreal or exaggerated nature of the perceived sources does produce a sense of mimetic dissonance as the listener is conscious of the implausibility of the sound compared to the established point of reference.

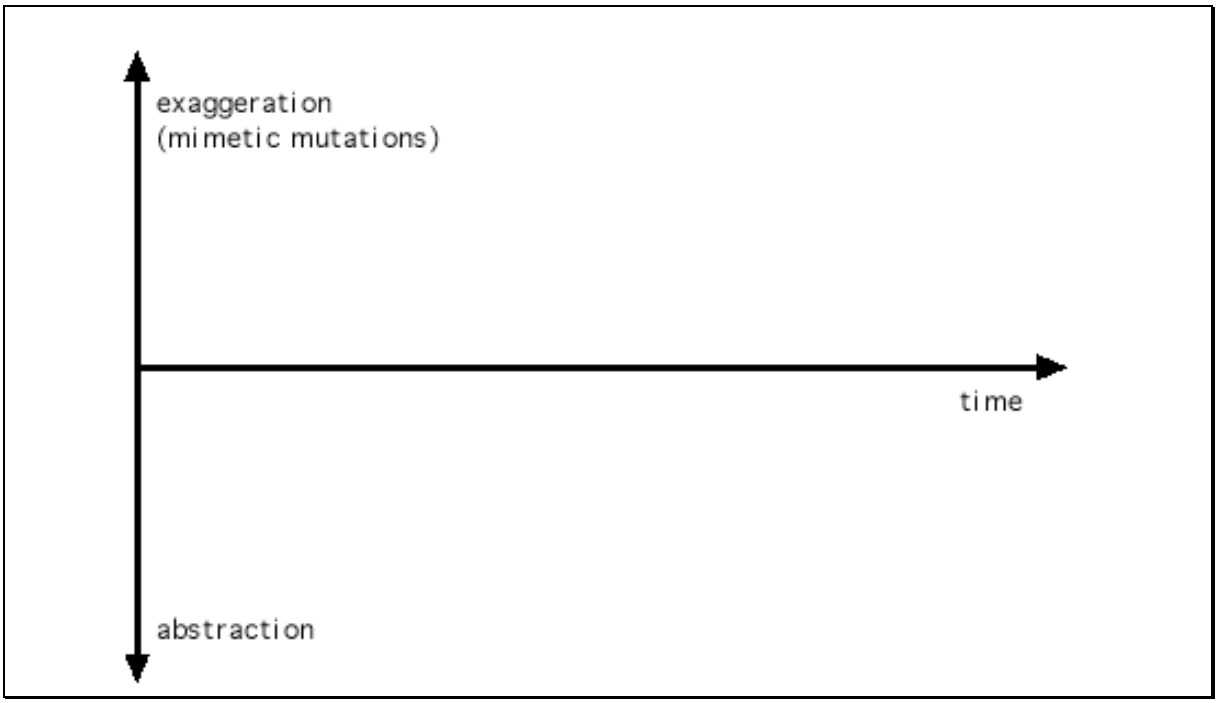

Figure 3.2 Exaggeration / abstraction axis

Sounds situated on the line, principally those at the beginning and end of the piece, are sounds that belong to a possible reality. This does not necessarily indicate that only the source recordings themselves belong in this region, merely that the way these sounds are presented reinforces their real world origin. The sound environment as it is presented represents a believable world in which no contradictory sonic information draws attention to the artifice. Mimetic mutations may well - and indeed do - form a part of this 'real' environment. However their seeming 'rightness' gives them a particularly unambiguous sense of source situating them clearly at the 'specific' end of the *specific / surrogate continuum.*

As previously mentioned, in *Grand Junction* these coherent worlds appear at the beginning and end of the piece and while they by no means contain all the sound sources used, they do provide a frame of reference against which the other sonic experiences of the work may be compared. It is not so necessary then for the listener to have a direct knowledge of the sound of the particular steam engines from which the sounds of *Grand Junction* are derived as the context for hearing thematic transformations is provided by this *possible*

reality environment with which it starts and to which it finally returns. As a general rule it may be fair to assert that in a composition which uses transformation thematically, the less familiar a source sound is the more important it becomes to familiarise the listener with it explicitly. A piece based on transformations of the voice for example will need less explicit instances of the source for the thematic relationships to be perceived than, say, one using the sound of a particular machine or household object.

In *Grand Junction* the constant presence of heightened mimetic mutations of the engine sounds serves as a constant reminder of the mechanical sound world from which the material is derived. The statement of this 'reality' therefore does not refer explicitly to every sound source but indicates a region of possible sources which contextualise the transformations of the rest of the piece.

Context, then, is all important both in terms of the large scale structure of the work as a whole and in terms of the instantaneous assignment of mimetic value to individual sounds. It is through the manipulation of context that the mimetic value of individual sounds may become a compositional parameter and the resolution of mimetic dissonance may be achieved.

3.6 Structural relationships that affect mimetic value

While each individual transformation can be thought of in terms of abstraction and mimetic mutation, the resulting sounds as they appear in an acousmatic work are not presented in isolation. It is the syntagmatic relationships between individual sounds that form the musical structure.

3.6.1 Juxtaposition and proximity

The most basic relationship between two sounds is juxtaposition. The most obvious use of juxtaposition in the manipulation of mimetic value occurs when a sound is placed in a

context in which you would expect to hear it, as in the opening and ending of the piece. The sound of the engine heard at the very end of *Grand Junction* is in fact a mimetic mutation, but it blends into the recording as if it were part of a real environment because the surrounding sounds are mimetically compatible with it. In this way the apparent 'reality' of the ending of the piece is established through contextual juxtapositions of compatible soundworlds. The transformed engine sound is accepted as having a real world source because its sonic context serves to confirm such a reading.

A more subtle contextual relationship occurs with the warbling pitched background material. On its own this may have little to link it in the mind with the sound of steam engines, it has a low mimetic value, but placed in the context of a pulsing machine sound (as for example in **sound example 3.1**) its rhythmic similarity may become apparent and a perceptual link established. In such a case the morphological similarity between two sounds of unequal mimetic value is used to hint at a possible source for the less recognisable sound. A similar effect can be heard in **sound example 3.2** where the rather ambiguous metallic sound is revealed to be of mechanical origin through juxtaposition and alternation with a more obviously engine-like sound that shares its clear succession of pitches. In both these cases the morphological similarity between two sounds of different mimetic value establishes a thematic link between them which hints at a common source. The focus of transformation[32] - rhythm in the first example, pitch in the second - may be regarded as a kind of pivot between the two sounds. Mimetic thematicism therefore arises out of morphological thematicism.

The importance of this to the notion of mimetic dissonance and its resolution becomes clear when we consider the positioning of sounds in time. As Nattiez has pointed out:

[32] *Focus of transformation* is defined above in 3.4.3.

> "'Ordinary' hearing, ... owes its characteristic to the *temporal* nature of music ... and to the successive perception of events, whose "being understood" is continually called into question by new musical events that subsequently appear"
>
> (Nattiez, 1990, p. 94)

This allows for the manipulation of source perception in time as a parameter of the musical structure. If the less recognisable sound occurs before the sound of higher mimetic value and the juxtaposition occurs later on the listener may perceive the same sound at two different locations on the *axis of source recognition*, the later instance having stronger *source-bond*. The newly established source awareness may be perceived as the answer to the question posed by the ambiguity of the initial encounter with the first sound. Thus the mimetic dissonance of that first encounter is resolved. This might be termed a resolution of mimetic dissonance through *recontextualisation*.

Once this has occurred in the piece and a possible *source-bond* has been established in the listener's mind a sound may retain an element of source relatedness in other contexts. Memory of a source established contextually at some earlier point in the work may be termed the *remembered context* of the sound. Remembered context is of particular interest in the development of large scale structures and the 'quasi-tonal' or 'theme and variations' approach to form in electroacoustic music relies heavily on this notion. Manipulation of mimetic value through recontextualisation is shown in Figure 3.3. An ambiguous *sound 1* is recontextualised by the entry of *contextualising sound 2*.

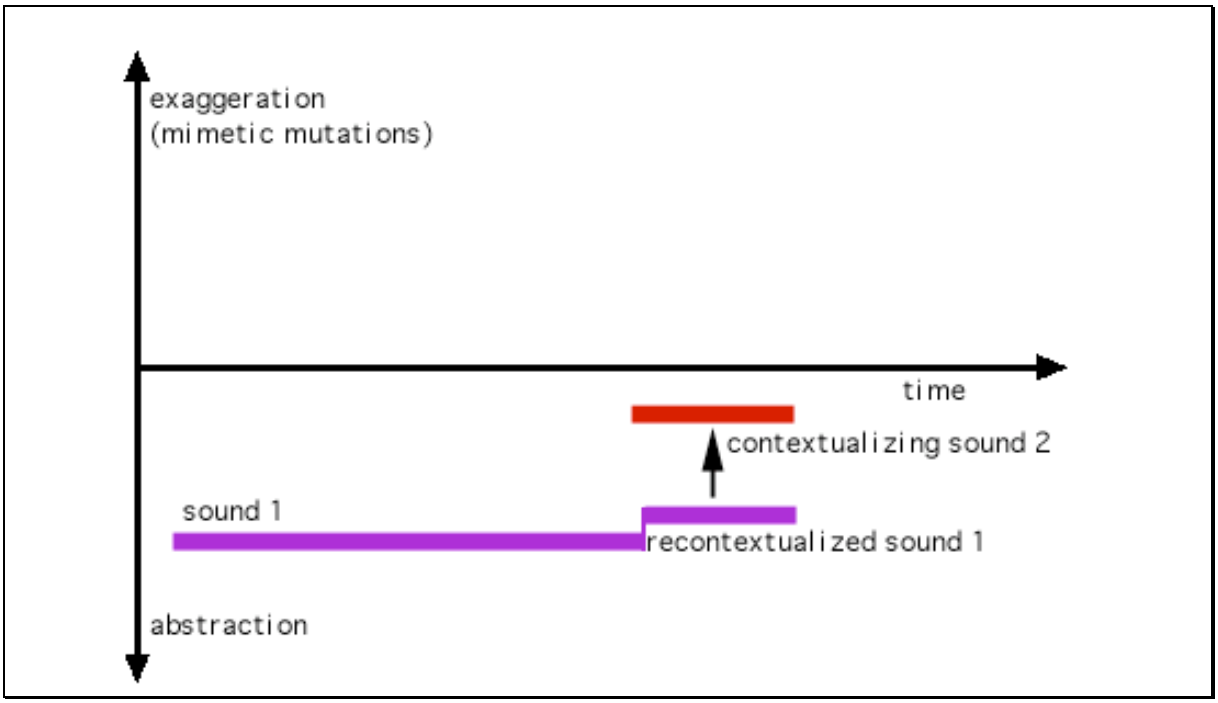

Figure 3.3 recontextualisation of an abstracted sound

3.6.2 Progressive transformation

While contextual juxtaposition and proximity are clearly of major importance in manipulations of mimetic value through time they are not the only way in which a mimetic dissonance may be resolved. This can also be achieved through the gradual or *progressive transformation* of a sound through time. A sound may mutate into a less distantly related sound thus revealing a potential source that had hitherto been obscure. This technique is of course very common in the acousmatic repertoire although it is sparsely used in *Grand Junction*. Again the focus of transformation may be regarded as a pivot, as it tends to remain relatively unaltered during the evolution of a transforming sound. We can identify both *progressive mutations,* in which one perceived source is replaced by another and *progressive abstractions* in which the mimetic value is altered, causing a sound to become more or less ambiguous through time.

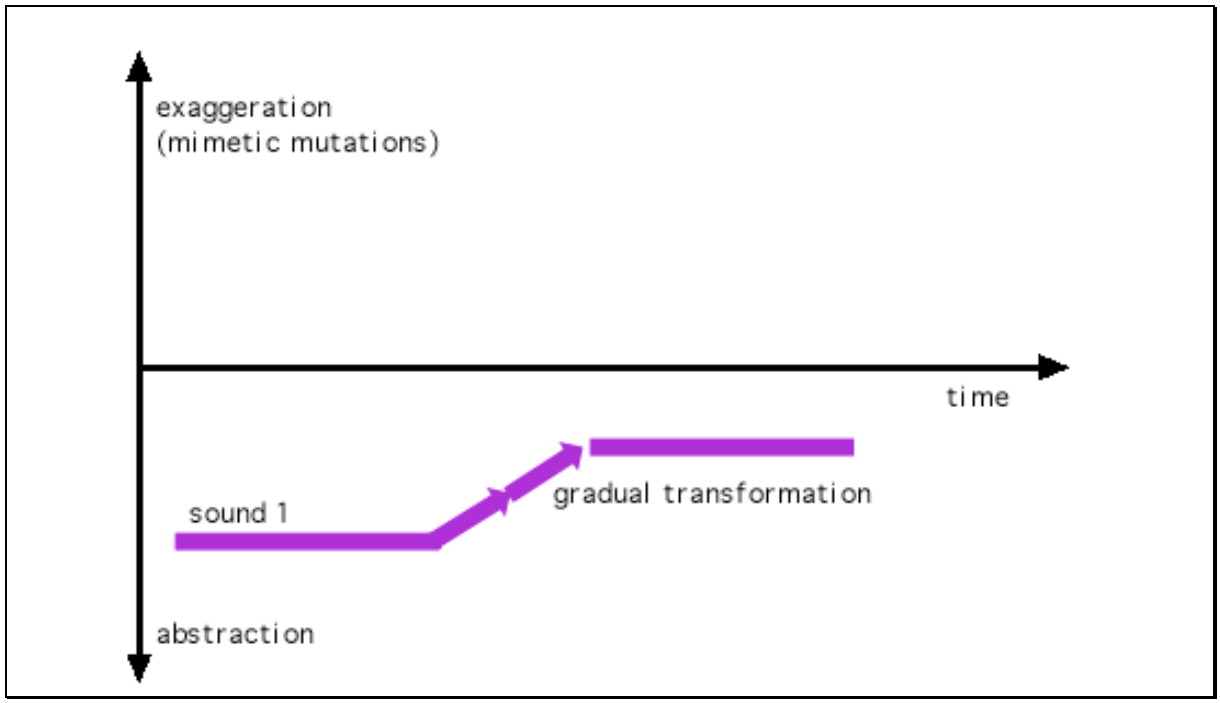

Figure 3.4 Progressive transformation of an abstracted sound

The representation of a progressive transformation shown in Figure 3.4 shows an abstracted sound becoming more recognisable over time, resolving the mimetic dissonance. It is interesting to consider the reverse situation of a sound being progressively transformed in such a way as to cast doubt on a previously clear *source-bond*, increasing the mimetic dissonance of the sound. The memory of the original source perception remains as a point of reference.

The final resolution back to a possible reality in *Grand Junction* uses a combination of progressive transformation and recontextualisation to resolve the mimetic dissonance. The sound of an exaggerated engine emerges from a mass of mechanical noises to dominate the soundfield. Gradually this sound is reduced in scale, the basic rhythm providing a focus of transformation while the frequency content is manipulated. The sense of resolution is emphasised by the way the emerging sound blends with its complementary context, the sounds of the recorded museum environment (**sound example 3.3**). We may consider this

final resolution and emergence into a 'real-world' ambience to be cadential in character, a final resolution of the dissonances established throughout the body of the work.

3.6.3 Context and transformation on the large scale

Thus the large-scale structure of *Grand Junction* displays elements of mimetic dissonance and resolution. The gradual replacement of increasingly recognisable engine sounds in the interlocking rhythms of the latter half of the piece may be considered as a large scale process of resolution by transformation, while the reality / dream framing mechanism as a whole relies on remembered context and *contextual resolution* to shape the work as a whole. A simplified representation[33] of the structure of the work may be plotted on to the graph introduced in 3.5.1 in the manner shown in Figure 3.5.

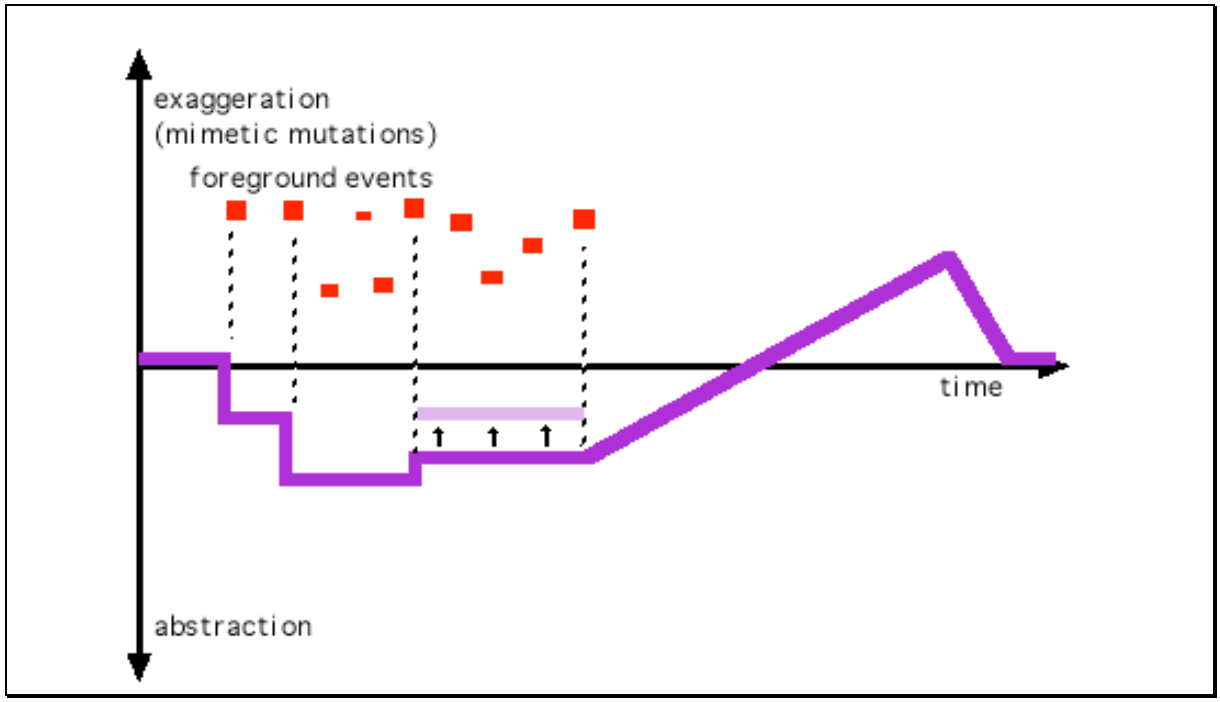

Figure 3.5 Structural sketch of *Grand Junction*

[33] While it is possible to identify major points in the structure on the graph, no attempt has been made accurately to represent the time scale or any details within the broad progressions.

The beginning and end of the work, the possible reality frame, is represented on the graph by those sections of purple line that coincide with the central axis. Following a statement of a *possible reality*, there is a stratified descent into an increasingly non - representational soundworld, as abstracted sounds replace more recognisable sounds in the background material. Each step of this descent is triggered by a foreground event which is recognisably mechanical but exaggerated through mimetic mutation.

After a prolonged section in which foreground exaggerated material and surreal background materials coexist fairly even-handedly, another foreground event, the coincidence of two loops which have been punctuating the structure throughout, triggers the introduction of a pulse which may be considered as forming a link between the background warbling and a more recognisably mechanical throb recontextualising the background sounds and emphasising their internal rhythmic qualities.

A further coincidence of looped foreground materials triggers a more dramatic textural change to a bright rhythmic chattering. Through substitution of increasingly engine-like sounds into the rhythmic textures, a gradual resolution of mimetic dissonance occurs in the second half of the piece. When this process has reached its climax, a single highly exaggerated engine-sound resolves into the 'possible reality' of the ending.

While the above description only gives a broad overview of the piece, in which many levels of mimesis interact in various combinations, it may be seen to outline the way source recognition operates at a fundamental and structural level of the composition. In the works discussed in the following chapters notions of mimetic dissonance and resolution are frequently employed on both the small and large scales. In the next chapter, however, the focus will be on the nature of ambiguous source recognition and the fundamental rôle played by ambiguity itself in electroacoustic music.

Chapter 4

4. Ambiguity in source recognition

4.1 Introduction

In the previous chapter a distinction was made between *analytical* and *synthetic* sound transformations. Thematic use of sound transformation was discussed with particular reference to the work *Grand Junction*. Ten Hoopen's *specific / surrogate continuum* model was used to establish a hierarchical structure for the discussion of *mimetic dissonance* and a specific adaptation of this model was used to describe its application in that work.

The next works to be discussed, the set of four *Seasons*, illustrate the use of synthetic sound transformation. That is to say that an initial vocabulary of sounds was produced through transformations of real-world sounds which are of no consequence - mimetically or thematically - to the final work. The original sounds include percussion instruments of various sorts as well as the sounds of polystyrene being torn, dropped and snapped. Analytical transformations and constructed thematic relationships begin to be of importance once a certain level of transformation has already occurred. At this point relationships based both on mimetic thematicism and morphological thematicism are evident.

4.2 *The Seasons*: Project description

The evolution of this cycle was quite involved and had a certain impact on the music produced. The first piece produced was a seven minute version of *Summer*. Having started this work with no particular programmatic content in mind the image of summer began to dominate as the material developed. The original idea was to produce a work that explored a still, and relatively non-gestural sound world. The association with summer was one which I started to perceive about halfway through making the work, which was in fact made during the summer, and this association was confirmed by other listeners. At this time I was also

interested in the impressionistic surface of what I was producing - the way the sounds evoked a mood by hinting at real world sources without being explicitly environmental. It was at this stage I determined to expand the work into a cycle of four *Seasons*.

When it was completed the short version of *Summer*, later retitled *Summer at Giverny,* was heard by the choreographer Charles Linehan who became intrigued both by the work and by a throw-away comment I had made about there only being two seasons, summer and winter, the rest being transition. Charles decided to choreograph a piece entitled *The Two Seasons*. This work would consist of two halves, *Summer* and *Winter*, for which these two movements were produced more or less in the form in which they appear in the final sequence. They were separated by a short transition which was later incorporated into the opening of *Autumn*.

The Two Seasons had a number of features that informed the development of the cycle. With the aim of producing a study of difference and similarity, it was decided to use exactly identical choreography for the two sections but danced by two different trios of dancers. This fitted in well with my desire to take the impressionist idea further by modelling the *Summer / Winter* relationship on the series-paintings of Claude Monet, for example the *Waterlilies* series or the *Haystacks,* in which the same view was explored in different lighting conditions or at different times of year. To accommodate the identical nature of the dances the structure of *Summer,* now expanded to about fifteen minutes, was adopted as a template for *Winter*. Some sounds were carried over in identical positions to serve as structural 'landmarks' (**sound example 4.1**). Other sounds in *Winter* were derived from their *Summer* equivalents by means of thematic transformation of the type discussed in the previous chapter (**sound example 4.2**). They remain morphologically and sometimes mimetically related. Some sounds are substituted on the basis of morphological similarities without being related at the

level of production. This is the case in the small foreground sounds in **sound example 4.3**. The background textures in the same sound example demonstrate the final type of substitution. An entirely unrelated pitched drone in *Winter* takes the place of a noise based texture in *Summer*.

The fact that in the dance performance identical or related sounds would accompany the same movements in the two halves served to accentuate these structural relationships. One could almost treat the dance as a kind of score or map of the musical structure or vice versa. The lighting was designed (by Lucy Carter) around a red / yellow theme for *Summer* and blue for *Winter* but the individual states and the cue points for lighting changes were otherwise identical.

Another decision that was taken jointly with the choreographer was that both *Summer* and *Winter* would be roughly symmetrical around a central 'still point'. This was represented in the dance by a tableau in silhouette at the back of the stage. The idea stemmed from the original seven minute *Summer* which had a 'still point' toward the end at a point when one might expect some kind of climax. I was drawn to the idea of a 'climactic' moment at which nothing very much happened, so in both *Summer* and *Winter* the music gets pared down to a simple texture over which a single low tone appears and disappears with no musical consequences (**sound example 4.4**). In *Summer* and *Winter* this still point underlines the theme of stillness that characterises these two movements as a whole.

In contrast to the static character of *Summer* and *Winter, Spring* and *Autumn*, which were written some time later, deal with growth and decay. While not as rigorously applied as the structural parallels of *Summer* and *Winter,* there is a structural symmetry between these two movements. *Autumn* is a loose retrograde of *Spring*. This is most noticeable in the larger subdivisions in the works, for example in the positions of the 'storm'-like sections. Like

Summer and *Winter* material is shared and re-transformed, though only a small amount of material is shared across all four pieces. The representation of growth in *Spring,* decay in *Autumn,* is more metaphorical than literal. In the opening section of *Spring* for example the frequency range expands as more and more tiny events trigger the 'birth' of ever more pitches. It is a combination of the quasi-natural sound of these events and their mode of accumulation and expansion that gives a sense of birth and growth.

The complete cycle runs continuously with no gaps between the individual pieces and may be set to cycle as an hour long 'year'[34].

4.3 Source coherence and thematicism

4.3.1 Source coherence in acousmatic music

Much has been made of the lack of a human presence in the acousmatic situation. It has been argued that many of the difficulties faced by audiences at tape music concerts arise from an unease at not seeing the source of the sounds they are hearing. However the vast majority of musical experience in the late twentieth century is acousmatic in nature.

From film music to canned supermarket muzak, walkman classics to dance music, sounds are presented without visual source cues. The fact that we can accept the sound of an orchestra on the radio or on a film soundtrack has been put down to knowing the sound to have originated in a human performance from previous experience, but film music (and indeed live operatic music) relies for its effectiveness on the fact that the orchestra is unseen. Indeed many film goers will never have seen a live orchestra in their lives, yet they will quite happily accept, say, the sound of an oboe doubling a flute two octaves above a piano cluster without the slightest knowledge of how that sound was produced.

[34] Index points are included on the CD for convenience at the start of each piece. However, due to the continuous nature of the cycle, this leads to some abruptness when index points are used.

Indeed, awareness of the presence of the performer can distract from the appreciation of the musical object even in concentrated listening to a musical performance. As Nicholas Cook has observed:

> " ... a sudden wrong note can put an end to the listener's absorption in the music in a concert, not because he cannot understand what he hears (hearing a note as wrong generally implies that one knows what it should have been), but because the mistake thrusts the performer's presence upon the listener."
>
> (Cook, 1990, p. 153)

This would imply that audiences of western art music tend to engage with the musical work as an aesthetic object as much as a performance, an observation that is supported by the elevation in western art music of the composer, and indeed of the written score, to a status that in popular and folk traditions is reserved for the performer. This being the case, the acousmatic situation should cause no problem, so why does it?

The presence of the orchestra at an orchestral concert is reassuring to the audience not because ignorance of the source of individual sounds is inherently disconcerting (after all, such sounds as thunder occur in nature without a visible source), but because the visual cues in a concert serve to delineate the musical object. Sounds coming from the instruments are interpreted as being part of the work. The cars outside are excluded or are perceived as a distraction. It is not the individual sound sources that are of importance *per se*, but the fact that they form a coherent body that is the locus of the 'work'.

In a tape music concert this context setting is lacking. Any sound from anywhere in the hall may or may not be part of the musical work. The audience is therefore sensitised to the *apparent* sources of the sounds as it attempts to sort them into a musical context. Instrumental coherence, supported by visual confirmation, may be replaced by timbral coherence[35] as the arbiter of the psychological boundaries of the work. We shall see in Chapter 5 that the

[35] Schaeffer's classification of sounds into *genres* plays this kind of rôle; see Dack (1993).

intrusion of the performer's presence into the musical space has its equivalent in electroacoustic music in the intrusion of a sound whose perceived source would suggest a context outside that of the work being listened to, a malfunctioning of the sound system, for example.

For this reason alone issues of source perceptions are of importance even in a totally abstract musical discourse as they contribute to the coherence of the musical context and definition of the boundaries of the musical work.

4.3.2 Mimetic thematicism

In 3.2.2 above, a distinction was made between *mimetic thematicism* and *morphological thematicism,* the former using source recognition to establish thematic relationships between materials, and the latter being based on morphological similarities and transformations. Unlike *Grand Junction,* in which mimetic thematicism occurs through the creation of numerous exaggerated forms of the mechanical source sounds which nonetheless maintain a link based on their recognition as metallic machinery, *The Seasons* uses mimetic thematicism in a less hierarchical manner. Sounds of similar perceived origin are used to create a coherent soundworld and preserve a sense of timbral coherence as discussed above. The prevalence of watery sounds in *Spring* and *Autumn* for example is an important factor in creating a coherent unity in these pieces.

4.3.3 Morphological thematicism

Morphological thematicism is a frequent occurrence in *The Seasons* and to this end certain thematic transformations have been used to emphasise morphological similarities between diverse materials. This can be heard for example in the pitch contours of the stormier sections of *Spring* and *Autumn* where watery sounds follow a pattern of frequency ranges also reflected in a more abstract set of accompanying pitches (**sound example 4.5**).

Examples such as these serve more to create abstract links between materials than to encourage similar source perceptions between them. Indeed, morphological thematicism may be seen as a way of unifying materials which may seem to originate from very different or even incompatible sources. One might imagine, for example, the sound of traffic and, say, whalesong living alongside each other in a piece, embued with a sense of belonging by a shared dynamic trajectory.

4.3.4 The interaction of systems of meaning

It is, however, important to be aware that both the morphological 'rightness' and the mimetic 'wrongness' may be perceived by the listener, leading to the interaction of different systems of meaning. In Chapter 1 an analogy was suggested between electroacoustic music and poetry as seen by the semiotician Yuri Lotman. Lotman views poetry as a 'system of systems' which:

> "gains its effects through constant clashes and tensions between these systems."
>
> (Eagleton 1983, p.102)

It is possible to observe the interaction of morphological and mimetic systems in electroacoustic music. In the above example of simultaneous whalesong and traffic sounds, for example, the coexistence of morphological compatibility and mimetic incompatibility create a higher order meaning through their coexistence.

It is worth looking at an example from *The Seasons* to see how a listener might react to the complexity of this kind of interaction It would be possible to analyse a passage such as the one in **sound example 4.6** as follows:

The bell-like sound has an obvious mimetic interpretation, perhaps suggesting a real environment with a distant church bell, perhaps momentarily evoking a piece of instrumental music.

Morphologically the bell may be considered a moment of pitch stability within a more noise-based section of the piece It also stands in a syntagmatic relationship to other pitched material occurring in the same work.

How might these two interpretations of the material interact? The artificially long sustain of the sound may forge a relationship between these two levels, perhaps encouraging a shift in perception from the mimetic to the abstract, perhaps producing a tension between the relative stability of the sound within the intrinsic sign system of morphological relationships and the instability of the sound's relationship to the real world expectations of the behaviour of bells.

It is therefore in the interaction of the systems of meaning that the overall effect of a passage of electroacoustic music lies:

> "If there is an *essential being* of music defined from a semiological vantage point, I would locate that being in the *instability* of the two fundamental modes of musical referring."
>
> (Nattiez, 1990, p. 118)

4.4 The nature of ambiguity

The bell example above serves to introduce an investigation of the area referred to in Ten Hoopen's diagram as 'ambiguous source perception'. On the one hand it is possible to analyse this sound in the terms of *mimetic dissonance*[36] introduced in the previous chapter. The sharp bell attack means that in the first instance this sound will be unambiguously recognised as some kind of bell. The *mimetic value* however decreases as the sound continues as the artificially elongated sustain raises a question as to the sound's origin. Listeners are unlikely to change their minds completely and assign another known source to the sound as no real-world sound behaves in quite this manner.

[36] the concepts of *mimetic dissonance* and *mimetic value* are defined and discussed in Chapter 3.

Neither will the sense of bell-ness be lost entirely as the memory of it will continue, although it is possible to imagine a listener focusing increasingly on the pitches that constitute this sustained section and losing interest in the sound as a mimetic object.

However a thematic interpretation of the increasing ambiguity is not necessarily the most apt, as the structure of the work as a whole does not invite a thematic interpretation of the mimetic content in the way that *Grand Junction* does. Nevertheless the sound will have a certain ambiguity that is common currency in electroacoustic music and must have a defining rôle in the experience of the music.

4.4.1 Ambiguity and metaphor

If the interaction of abstract organisation and the paradigmatic sign values of individual sounds leads to an 'organisation of associations' and secondary meanings it must lead to the production of metaphors. Metaphor is central to the character of artistic expression and relies on ambiguity of meaning. A useful term for the understanding of ambiguity is the German word *Mehrdeutigkeit*, having a plurality of meanings, in contrast to *Eindeutigkeit*, having only one meaning i.e. unambiguous.

The poet Paul Celan, when questioned about the difficulty of deciphering his work, rejected the idea of deciphering a coded message, pointing instead to the plurality of meanings, the *Mehrdeutigkeit* of his work.

> "Ich trachte wenigstens Ausschnitte aus der Spektral-Analyse der Dinge wiederzugeben, sie gleichzeitig in *mehreren* Aspecten und Durchdringungen mit anderen Dingen zu zeigen: mit nachbarlichen, nächstfolgenden, gegenteiligen. Weil ich leider außerstande bin, die Dinge *allseitig* zu zeigen."
>
> (Huppert, 1973, p. 32; quoted in Parry 1996, p. 27)
>
> I strive at least to represent extracts of the spectral analysis of things, to show them in *numerous* aspects and interpenetrations with other things, neighbouring, successive or opposite, as I am alas unable to show them in *all* aspects.

William Empson defines ambiguity in poetry as

> "... any verbal nuance, however slight, which gives room for alternative reactions to the same piece of language".
>
> (Empson 1930, p. 1)

As such, he claims, ambiguity is central to linguistic communication:

> "In analysing the statement made by a sentence ... one would continually be dealing with a sort of ambiguity due to metaphors, ... because metaphor ... is the normal mode of development of a language."
>
> (Empson 1930, p. 2)

The metaphorical use of sounds in electroacoustic music has been discussed by Wishart (1996). Wishart's approach is to create very deliberate sonic metaphors through juxtapositions and transformations from one sound into another. Such sonic metaphors as the well documented transformation of a book being shut into a door *in Red Bird* (Wishart, 1996, pp. 155-156), use the morphological similarities between two sounds to construct a transition between them in a deliberate association of two concepts. The connection between ideas is therefore effected at the abstract morphological level in a process similar to the transformations discussed in the previous chapter, the primary difference being that, rather than using the focus of abstraction as a pivot between recognisability and unrecognisability, the composer here moves from one recognisable sound to another recognisable sound via an abstraction.

Such a transformation is a carefully controlled transition from one (relatively) unambiguous case to another. This kind of metaphor, therefore relies on a perceptual shift from one meaning or interpretation of a sound to another.

Metaphorical potential is similarly revealed in any sound that has an ambiguous connection to source without the ambiguity necessarily finding a resolution in another unambiguous sound. In this case various possibilities may be tested in a game reminiscent of

the rabbit / duck drawing described by Ernest Gombrich (Gombrich, 1977, pp. 4-5). In this famous case a simple line drawing may be interpreted in one of two ways, either as a rabbit with long ears facing one way or as a duck facing the other, the ears becoming the beak of the duck. Here a single ambiguous image has two possible interpretations. This situation arises because as Gombrich succinctly puts it:

> "Ambiguity ... is clearly the key to image reading."
>
> (Gombrich, 1977, p. 198)

Perception of images, be they visual or aural, requires an act of projection on the part of the perceiver, testing hypotheses in an attempt to match the stimulus to our experience. The famous example of the Rorschach test, in which viewers see images in a random inkblot illustrates this well, and an equivalent can be found in the predilection for hearing voices in the most diverse of sound sources.[37] To appreciate the aural metaphor the listener must test various perceptual hypotheses against the aural stimulus and find the closest match. In the case of Wishart's transformations the perfect match at one point in time proves to be less appropriate as the transformation progresses and a new hypothesis is called for. Alternatively, for a single ambiguous sound any of a number of interpretations may be applicable and a tension might arise between possible perceptions.

4.4.2 Ambiguity and double intentionality

Aside from merely connecting two or more concepts in our minds the ambiguous sound has a perhaps even more fundamental rôle to play in the aesthetic experience, as ambiguity of this sort makes us conscious of the very act of projection. In Gombrich's example the rabbit / duck ambiguity:

[37] This phenomenon has been discussed in relation to so-called *Ghost Voices* by Banks (2000).

> " … allows us to test the idea that such interpretation involves a tentative projection, a trial shot which transforms the image if it turns out to be a hit. It is just because we are so well trained in this game and miss so rarely that we are not often aware of this act of interpretation."
>
> (Gombrich, 1977, p. 198)

The ambiguous image draws attention to the conscious act of perception. It is my belief that the awareness of the act of projection produced by the very ambiguity of the image or sound is crucial to the sense of double intentionality described in 1.1.3, because it allows us to be simultaneously aware of a represented object and the medium of representation, and ultimately of our own part in constructing that representation.

If metaphor requires the simultaneous reading of two meanings in a single object, then the simultaneous awareness of the medium and the message is essential to the metaphorical structure of the work identified by aestheticians such as Danto who observes:

> "From my perspective it will suffice to have shown that metaphors embody some of the structures I have supposed artworks to have: they do not merely represent subjects, but properties of the mode of representation itself must be a constituent in understanding them. It is after all a commonplace that every metaphor is a little poem. By dint of the features we have identified, metaphors are minor works of art."
>
> (Danto, 1981, p. 189)

The creation of source ambiguities in acousmatic music may serve, then, to make explicit this metaphorical structure, just as the visible brush stroke in a Van Gogh draws attention to the painting's duality of image and paint on canvas.

In *The Seasons* many sounds reassemble the sounds of nature: water, insects, storms. However most have been synthesised from some other source and have a certain ambiguity that prevents them from being illusionistic and the model of Impressionist painting was important in this respect.

4.4.3 Ambiguity and realism

A final aspect of source ambiguity should not go unmentioned. In some respects it seems to contradict the previous point, but in fact it is a result of the same act of projection described above. It is the idea that a certain level of ambiguity can lead to a greater sense of realism.

This is because the ambiguous image leaves more room for the 'construction' of reality that is the primary aim of projection in the act of perception. The viewer or listener, in an attempt to locate a stimulus within their experience of the world, draws on that experience to fill in the gaps left open by the stimulus itself. Gombrich writes:

> "We are back in the atmosphere and the period when the art lover discovered the joy of stepping back from the canvas to enjoy the sensation of visible brush-strokes disappearing behind the emergent illusion. Perhaps we can now describe this effect with a little more confidence. The distance from the canvas weakens the beholder's power of discrimination and creates a blur which mobilizes his projective faculty. The indistinct parts of the canvas become a screen provided only that certain distinctive features stand out with sufficient force and that no contradictory messages reach the eye to spoil the impression."
>
> (Gombrich, 1977, p. 186)

Perhaps the most famous example of this, and the one cited by Gombrich (Gombrich, 1977, pp. 185-186), is Leonardo's technique of *sfumato*. Here a slight blurring of the edges, adds a sense of realism by reducing the amount of explicit information in the painting itself. The Mona Lisa's smile, so famously 'enigmatic', is an instance of precisely this technique.[38]

[38] See Gombrich, 1977 p. 185-186

Ambiguity in source perception in electroacoustic music can have the same effect of allowing the imagination free rein to construct a reality in more detail than could be afforded by an unambiguous recording. This may also account for the preference for artificially produced sounds in radio sound effects. The precise sound of a particular storm may be less evocative than a storm made in the studio with a wind machine, a thunder sheet, and some dried peas simply because the latter is more generic, leaving the details to be filled in by the perceptive imagination of the listener.

4.5 The associative field model of source perception

We are now in a position to propose a model for source perception that is more specific about the ambiguous region[39]. While the *specific* / *surrogate* continuum discussed in Chapter 2 is of use in establishing a hierarchy of recognisability which may be used in structures based on a *thematic mimesis* and may therefore be used to explain *thematic transformation* of sound materials, the way it is constructed along a single axis may lead one to assume that the act of transformation necessitates a move along the axis of source recognition. While this is clearly not the intention, this model suggests a linear relationship between the transformed sound and its origin, in which distant transformations are surrogates of the perceived source of the origin. However, as we have seen, source perception is not dependent on the mode of production. It is frequently the case that a sound is perceived as a surrogate of a source-cause quite unrelated to the actual source from which it was derived. In such a case we can speak of a *virtual* source-cause to which the sound stands in a relationship of *virtual* surrogacy. This may be either a remote surrogacy or what Smalley calls a first order surrogacy (Smalley,

[39] The model proposed in this chapter represents the composer's visualisation of source recognition process as related to individual sonic experience and as such is not intended to reflect the complexity of the psychology of perception.

1986, p. 82) as in the case of certain sound effects which aim at a realistic representation of a sound of a different origin.

In the previous chapter much was said about the role of context in the establishment of a source relationship. The same is of course true here. The sound of crinkling paper in a radio play may be taken for the sound of a fire in a scene set in a Victorian living room but may equally well be heard as the crackle of leaves underfoot in the context of a walk in the park.

Source relationships are created in the mind of the listener, and, we have seen, draw on the accumulated experience of each individual. As Nattiez has pointed out:

> "An object of any kind takes on a meaning for an individual apprehending that object, as soon as that individual places the object in relation to areas of his lived experience - that is, in relation to a collection of other objects that belong to his or her experience of the world."
>
> (Nattiez, 1990, p. 9)

A multi-dimensional space or *associative field* can therefore be envisaged, unique to each listener, in which any given sound can be located. Distributed in this space are the personal *source concepts* or associations of a given listener, based on that individual's experience of the sounding world. In other words our previous experience of sounds has established a vocabulary of source relationships to which we can compare an aural stimulus.

Figure 4.1 Associative field model - ambiguous source recognition

Figure 4.1 shows a two-dimensional representation of an associative field. The black hexagon represents the aural stimulus, which is perceived as ambiguous. The listener perceives the sound as akin to rain, whispering or rustling paper, and switches between these various interpretations of the sound. Thus, these *source concepts* can be imagined as having a kind of gravitational field or an area of influence. The perceived sound lies roughly equidistant from the three source concepts 'rain', 'whispering voices' and 'rustling paper'.

On the other hand, a sound perceived unambiguously as 'rain', for example, would be close to the source concept 'rain' and further from the other source concepts, and a conscious effort would have to be made to perceive it in any other way. In some cases (e.g. voice) this may prove impossible.

This represents what Ten Hoopen (Ten Hoopen, 1994) calls *specific source recognition* (see also 3.4). The precise location in the field is context dependent, hence the sound of

rustling paper may, under the right circumstances, be taken for the sound of rain. In Chapter 3 we saw how a composer might manipulate the context to create shifts in perception from one source concept to another or resolving the ambiguity or mimetic dissonance one way or another. This would be represented graphically as a shift in position of a sound closer to a particular source concept (Figure 4.2).

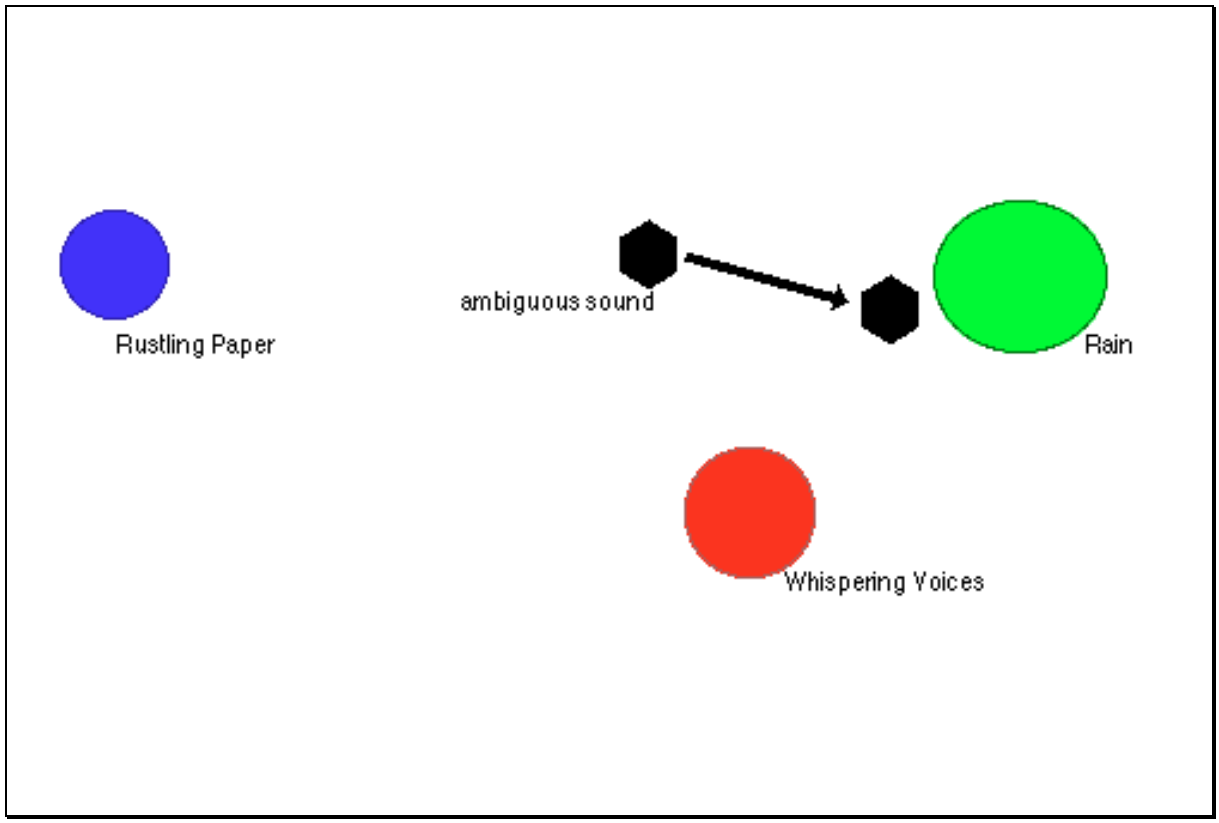

Figure 4.2 Resolution of mimetic dissonance

It is important to keep in mind that each listener has an individual field of associations based on his or her particular experiences of the sounding world. This can easily be demonstrated with the example of the recognition of individual voices. A listener apprehending a familiar voice, say the voice of her mother, will locate the sound close to the source concept 'mother' (Figure 4.3).

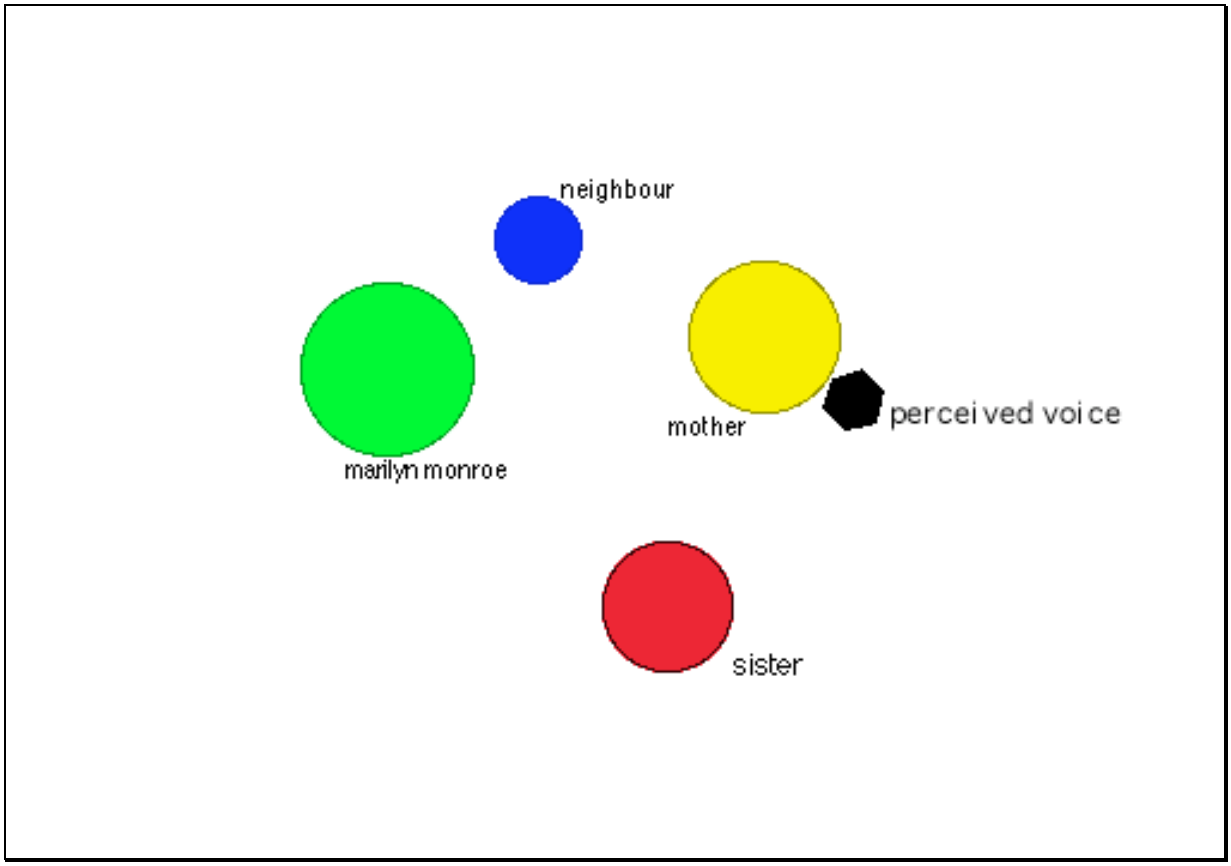

Figure 4.3 Unambiguous source recognition

A second listener will perceive the same voice more ambiguously, locating it in the vicinity of other female voices with which he is acquainted (Figure 4.4). The voice may remind him more of one person than another, but it is likely that the combined influence of a group of 'female voice' source concepts will exert more influence than any individual concept.

This grouping of source concepts into 'constellations' that have a combined field of influence is shown in Figure 4.5 where the combined group 'female voice', shown in green, exerts a greater influence, say, than the 'woodwind' group. The grouping of source concepts according to morphological characteristics allows us to recognise types of sounds even if specific recognition is impossible.

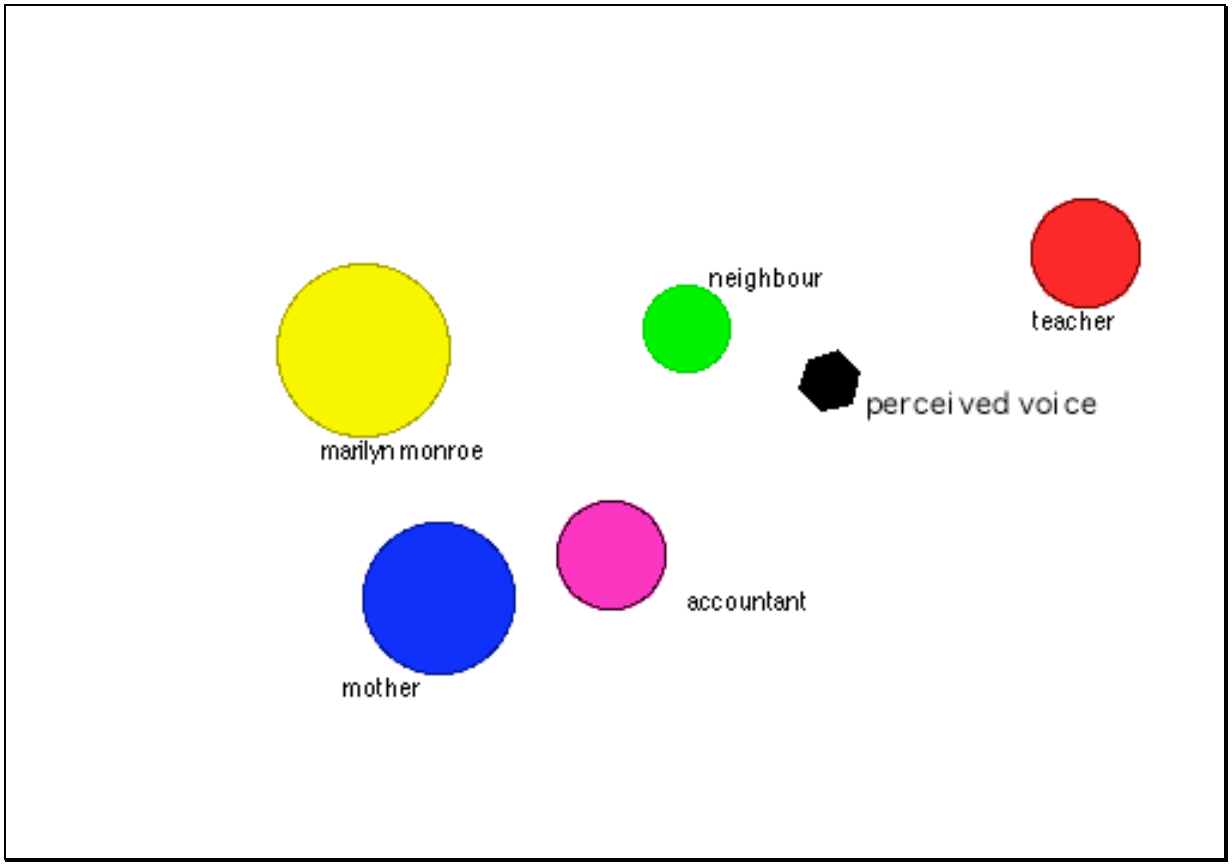

Figure 4.4 Ambiguous voice recognition

A good example of the difference between the associative fields of individual listeners is found in the engine sounds in *Grand Junction* and *Living Steam*. A listener who has never been to the Kew Bridge pumping station will perceive the sounds as mechanical, metallic, of a certain size possibly. These perceptions are based on the combined influence of source concepts drawn from previously experienced industrial machinery. Someone aquainted with the individual engines, however, may have a much more specific experience, recognising each particular engine individually.

Clearly, groups of related source concepts are more likely to be similar among numerous listeners than specific instances of recognition. We all have a concept of 'female voice' or ‘mechanical device’, while more specific source concepts will be shared by relatively few listeners. The common experience that a manipulated or artificially constructed sound (like a thundersheet or wind machine) may often sound more convincing than a

recording of the real thing may be related to the way such a generic interpretation is supplemented by each listener's specific experience. As we saw in 4.4, the precise 'reality' experienced by each listener is projected on to the perception according to the individual's personal associative field.

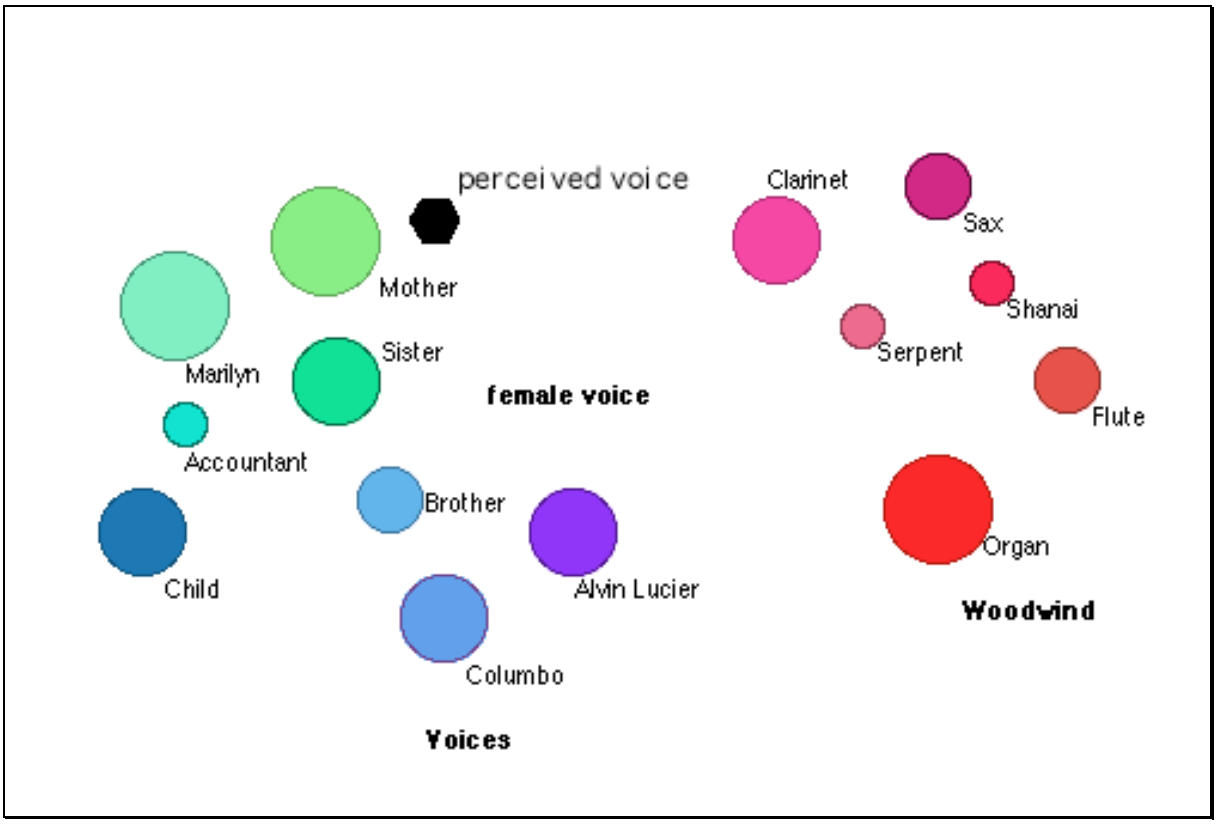

Figure 4.5 Grouping of source concepts

In *The Seasons* the fact that most of the more representational sounds were created by means of synthetic transformations rather than being recordings of real-world phenomena gives them a generic quality, suggesting types of sounds rather than evoking specifically remembered experience. This allows the listeners' imaginations to 'fill in the gaps' from their own experience.

Contextual cues play a large part in guiding the interpretations of individual sounds and these come not only from within the work but inevitably also from supplementary information such as knowledge of the title of the work. The work cannot therefore be viewed

in isolation from its physical and cultural context, and it is these extra-musical influences that are the subject of the final chapter of this thesis.

Chapter 5

5. The contribution of extra-musical contexts

5.1 The role of the literary

Throughout these discussions the importance of contextual information in the formation of musical meaning has been emphasised. The juxtaposition of paradigmatic and syntagmatic organisation has been seen greatly to influence the interpretation of the sounds of the piece, particularly in terms of their representational character. In this chapter we shall leave the confines of the sounding materials to discuss the rôle of extramusical cues in the formation of meanings in the electroacoustic work.

In *The Seasons* an obvious influence on the listening experience comes from knowledge of the title. While the title may be thought of as essentially external to the work its contribution to the interpretation of the work both in terms of mimetic content and structure is not to be underestimated. Smuda has pointed out the importance of the title in forming the illusion of the object in painting:

> "Alles, was nicht durch rein malerische Mittel sichtbar zu machen ist, bezeichnet Cezanne als Literatur. Das Literarische an der Malerei aber - Bildtitel, die einen erklärenden Hinweis auf die dargestellte Gegenständlichkeit geben oder Idealisierungen der Natur im Landschaftsgemälde - trägt u.a. auch dazu bei, die Konstitutionsbedingungen des imaginären Gegenstands in der traditionellen Malerei zu unterstützen."
>
> (Smuda,1979, p. 80)
>
> Everything that cannot be made visible through purely painterly means, Cezanne refers to as literature. However, the literary in painting - titles, which give an explanatory indication of the portrayed physicality or idealisation of nature in landscape painting - also serves to support the conditions for the constitution of the imaginary object in traditional painting.

Of course a title may also be used precisely to call into question the representational meaning of a painting. Magritte's famous *Ceci n'est pas une Pipe* is an obvious example. The relationship between work and title is a level of meaning in which different relationships are

possible. Just as within the work two ideas may support each other or negate each other, by means of their structural juxtaposition, the interaction between the work and its title can and indeed must produce hybrid meanings. At the very least the title is an indication of the artist's own reading of the work. As Danto has pointed out:

> "A title in any case is more than a name or a label; it is a *direction* for interpretation. Giving works neutral titles or calling them "Untitled" does not precisely destroy, only distorts the sort of connection here. And, as we saw, "Untitled" at least implies it is an artwork, which it leaves us to find our way about in. As a final implication of the practice, since the title itself is given by a painter, it presumably implies what he intends by way of structuring of the work. And this is ipso facto to admit the possibilities of different structurings. If it is an artwork there is no neutral way of seeing it, or, to see it neutrally is not to see it as an artwork"
>
> (Danto, 1981, p. 119)

In the visual arts of the twentieth century the importance of the physicality of the work has declined and the literary support has in many cases become the primary carrier of meaning in a work. Indeed in the early conceptual works of the *Fluxus* artists for example the work is sometimes entirely embodied in the literary dimension, without any material manifestation. To take a more recent example, Damien Hirst's pieces rely heavily on the relationship of the title to the work. The giant shark in formaldehyde reveals a complex network of meanings when the title *The Physical Impossibility of Death in the Mind of Someone Living* (1991) is known. This complexity is entirely lacking in others of his works such as the two sliced cows entitled *Mother and Child Divided* (1993), in which the title reduces the work to a crass pun.

It would be wrong to assume that the meaning-forming potential of the title has only recently been exploited by artists. The complexity of the relationship between the work and its title is discussed at length by Danto who uses the example of Breugel the Elder's mannerist painting *Landscape with the Fall of Icarus* (c.1558). In this painting Icarus is

present only in the form of a pair of legs sticking out of the water of a lake and might easily be overlooked:

> "The legs in Breugel's picture need call for no special explanation, not if, as the title indicates, it is a landscape. But with the further identification of the legs as belonging to Icarus, the whole work changes. The work will have a different structure than it would have had were you not to have noticed the legs at all, or not to have known they were Icarus' legs, and hence have believed something else central to the painting than what actually is: these legs are the focus of the whole work, not in the sense that the legs are the subject and the rest background, but in the sense that the whole structure of the painting is a function of these being Icarus' legs, the rest not being background at all; or, though there is some background, a decision has to be made as to what belongs to it and what does not. Take, for instance, the orange sun, which could just give the information that it is a sunny day if you did not know that it is causally related to the boy in the water who made the mistake of flying too close to it at the cost of melting the wax that held the feathers in place: if the sun were not *there*, the boy would not be *here*."
>
> (Danto, 1981, p. 116)

What is important, then, is the transformative power of the title. Once the title is known it becomes part of the experience of the work which can be considered as consisting of a hybrid of physical object and text. Indeed it is not just the title that has this effect, but any other additional information known to the receiver. Programme notes, biographical information, even this thesis, contribute to the creation of hybrid meanings, for better or worse.

Danto refers to Auden's poetic interpretation of Breugel's painting as an additional text that has the power to transform the work:

> "To see the painting in these terms, if one had not so seen it before, works to transform the entire composition, to pull it into a different shape and hence to constitute a different work than it would have been without benefit of interpretation. The painting suddenly becomes organized around Icarus, and classes of relationships spring up which simply could not have existed before the identification. "
>
> (Danto, 1981, p. 119)

It is important to note, then, that the transformation is not just one of facilitating the interpretation of individual elements within the work but that it is structural. In the case of *The Seasons* for example, the four movement structure may appear arbitrary until the title is

known at which point the relationship between the movements themselves takes on a greater importance. Similarly our knowledge of the title of the movement *Spring* may facilitate an appreciation of the metaphorical structure of the opening as somehow related to growth or awakening. One listener, knowing only the title, commented "it sounds like cell division". Without knowledge of the title it is possible that this connection would not have been made.

These observations are of course equally true of text used within the work itself, which can form yet another layer of meaning, with the power to transform both the moment to moment perception of sound sources and larger scale structures and meanings. A work in which text plays a major part in this way is the sound installation *Boomtown,* in which the use of text and the human voice creates a quasi-documentary style which, while highly representational, is still rooted in musical form. As we shall see, spatial characteristics of this work also serve both the musical structure and the storytelling capacity of the work, forging a link between them and introducing another layer of metaphor.

5.2 *Boomtown*: Music, text and space

5.2.1 *Boomtown*: Project description

Commissioned by Oldham Museum as part of Oldham borough's eponymous 150th anniversary exhibition, *Boomtown* was an aural accompaniment to a part of the exhibition entitled *Radical Thinkers*, dealing with the political history of the borough and focusing in particular on the 19th Century Radical Movement, trades unionism and electoral reform. Included in the exhibition were trades union banners, pamphlets and portraits of political figures from Oldham. One particular set of exhibits dealt with the so-called Peterloo Massacre[40] which, while not actually taking place in Oldham, was felt to be a relevant indicator of the political climate in the Manchester area at the time.

[40] "(Aug. 16, 1819), in English history, the brutal dispersal by cavalry of a radical meeting held on St. Peter's Fields in Manchester." (Encyclopedia Britannica 97).

The sound installation has a time-based structure with a clear beginning and end and a duration of 15 minutes. It was heard in alternation with a Vox Pop video documentary examining contemporary political attitudes in Oldham, and consequently ran every 40 minutes for the seven-month duration of the exhibition. The curator's brief was very open: to respond in some way to the theme of the exhibition and enliven a largely text-based presentation through the use of sound.

5.2.2 The exhibition space

The space in which the exhibition took place was a rectangular room at the top of a large staircase with double doors in the centre of one of the shorter walls and another smaller door in the corner on the wall opposite, leading to the rest of the anniversary exhibition, rooms devoted to industry, multicultural life and entertainment. The *Radical Thinkers* room was the first room one came to (after a video piece in the stairwell).

One prominent feature of the space that was of immediate appeal was that the longer pair of walls, which were free of doorways, had a false wall built out in front of the original wall to conceal recently installed air conditioning. Three buttresses on either side connected the ceiling to the original walls and where these met, there were 6 small niches in the false walls, three in each, roughly at ear height, in which loudspeakers could be placed flush with the exhibition wall (see Figure 5.1).

Another notable aspect of the space was the fact that the centre of the room was inaccessible due to a covered glass ceiling of the Library below, so while visually, and aurally, spacious, the architecture restricted movement to a narrow corridor around the sides of the room. This became an important consideration in the composition of the musical space as the audience was forced to file past the loudspeakers and was never at an equal distance from each speaker. This seeming limitation was turned to an advantage and became a major part of the overall conception and form of the work.

The usefulness of the niches to conceal loudspeakers was confirmed in my mind when, in the curator's office, I saw a photograph of the inside of a textile mill with rows and rows of industrial looms. The idea of recreating the sound of multiple looms through multiple loudspeakers in a similar configuration along parallel walls sprung immediately to mind along with the sound of many voices, symbolising the massed political activity that led to reform. It was decided then to place small loudspeakers in each of the six niches and four larger speakers (partly to compensate for the poor bass response of the wall speakers) at the four corners of the room. Car speakers were used in the wall niches and these were covered with speaker baffle material. A set of four hi-fi speakers was used for the four corners.

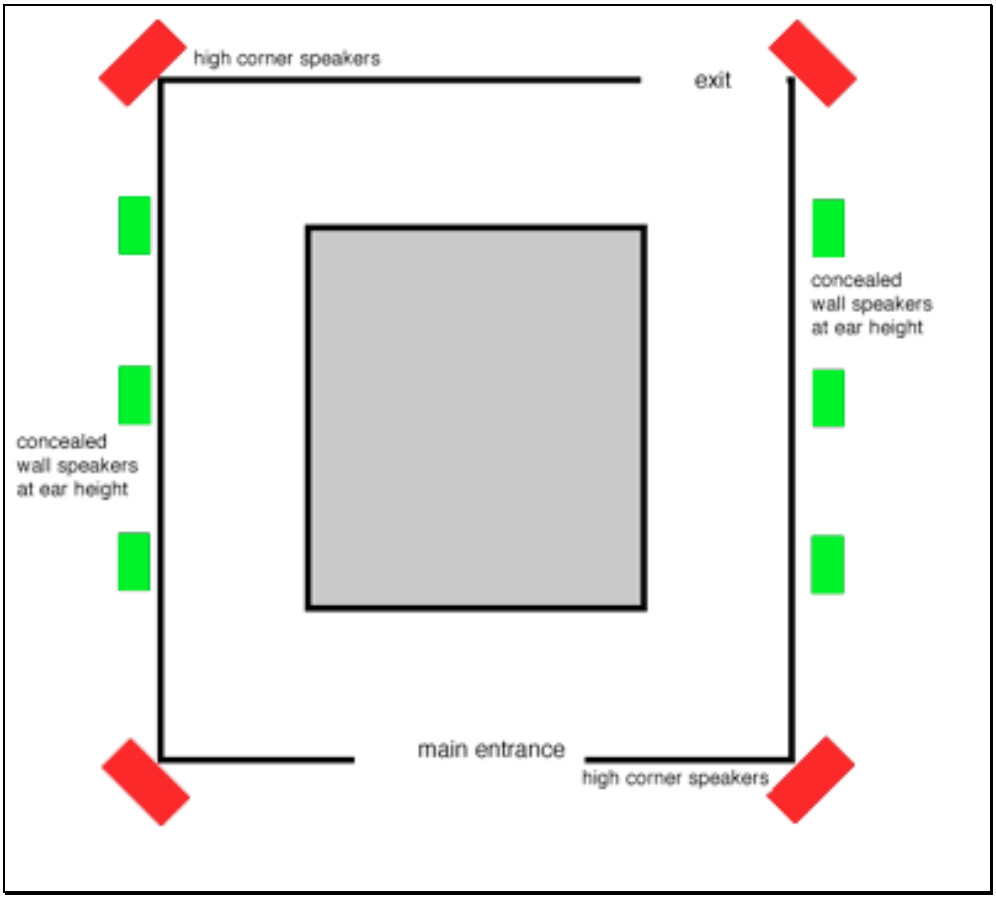

Figure 5.1 *Boomtown* loudspeaker placement

The piece was conceived to run off four CD players[41], one for the four corner speakers and three for the six wall speakers. The piece was composed in such a way as to allow for a slight drift in timing between the individual CDs but identical players were used and started from a single remote control unit so as to minimise this problem[42].

5.2.3 The musical / textual material of *Boomtown*

The materials used in *Boomtown* all came from the North-West Sound Archive, an oral history archive based in Clitheroe. Two sorts of material were used:

[41] Folio presentation is on ADAT.

[42] In fact some phasing was quite desirable, particularly in the section in which a single voice appears on all six wall speakers as the resulting delay effect is very appropriate to this moment in the piece.

1. Recordings of industry and environment:

These included mill-hooters, various looms, printing presses and some street sounds, including a May Day parade.

2. Interviews with local people:

These were mostly former mill workers, people from politically active families and a lady whose grandmother had witnessed the Peterloo Massacre.

Interview material was presented in the wall speakers along with processed and unprocessed industrial recordings, the corner speakers being used for more environmental, harmonic and ambient material.

5.3 Representational space, metaphorical space, structural space

Just as individual sounds may have a directly representational significance, a metaphorical significance and a structural significance within a work[43], the spatialisation of the sounds can itself perform representational, metaphorical and structural roles.

5.3.1 Representational or illusory space

At various points during *Boomtown* space is used as a representational device, enhancing the 'realism' of the sonic experience. The spatial distribution of sounds contributes to the possible reality of a virtual world. This is exemplified by the multiple chattering looms and other industrial machinery near the beginning of the work or the passing overhead of the May Day Parade. In these passages an illusion of "being there" is produced. This is akin to

[43] In *The Seasons* for example, the rain sounds in *Autumn* are directly representational and the expanding frequency range of the opening is a metaphor for growth as well as having a structural significance as the opening of the whole cycle.

Trevor Wishart's very representational approach to space as advocated in Wishart (1986, pp. 44-49)[44].

5.3.2 Metaphorical space

Metaphorical use of space is exemplified during the more text-based parts of the piece. Individual loudspeakers carry the voices of local people (recordings from the North West Sound Archive) remembering their early experiences of industrial life and their parents' political involvement. These overlapping stories are often heard against a background of voices, other stories and background babble, yet due to the unusual layout of the room one is always closer to one or another loudspeaker, so each listener can follow an individual story[45]. The stories are therefore presented both as individual experiences and shared communal experience, an aural metaphor for the individual as part of a wider society.

5.3.3 Structural space

Again in common with the use of individual sounds, space can function structurally to delineate the form of the work. The opening of *Boomtown* is a good example, where the sound of a mill-hooter is heard in one speaker after another, gradually filling the room with activity.

Clearly all these approaches to space interact so that the structural and the representational in the above example coexist, the emergence of a representational space at the beginning, for example, performing a structural role in relation to the rest of the piece.

Furthermore the existence of a representational space, a sense of realism, creates a situation in which a lack of realism takes on a strong structural significance. A good example of this is the moment after the May Day Parade when the story of the Peterloo Massacre is

[44] Wishart's separation of space as a pre-existing or pre-composed entity into which sounds are placed is somewhat misleading, as space is an inherent characteristic of sound. One cannot create an empty soundscape.
[45] This effect is lost in the stereo mix.

related on all the wall speakers against an increasingly abstract background on the four corner speakers. This occurs at a point in the structure toward the end of the piece, and its quite traditional climactic role (a sudden unison after the complexity and counterpoint of earlier sections) is emphasised by the very lack of realism in its spatialisation. Surrounding the listener with duplicates of a single voice may create a feeling of internal dialogue of more global significance than merely one woman's memory.

5.3.4 Interaction of text and source recognition

This passage is worth discussing a little further, as the story being told is in fact two stories intertwined. One is the story of the Peterloo Massacre and the two frightened children being rescued by a stranger. The other is the story of the three year old having to work in the mill, cleaning out the equipment while it was still running. These stories both have significance in terms of the oppression of working people in 19th-century England and illustrate the need for political reform at the time. However both stories also have an influence on the possible interpretation of the following sounds, a re-emergence from abstraction of the sounds of mill machinery. At a seminar at the BBC in March 2000, I played the work to a small group of people. In the following discussion the group was divided between those who interpreted the ambiguous sounds in relation to "the soldiers on horseback cutting people down" and those who related them to the young girl cleaning the machinery in the Mill. I myself for the first time had enough distance from the piece to fall into the former camp although this relationship had not been explicit at the time of composition. Thus a metaphorical meaning emerged from representational material due to its structural proximity to the two interlaced stories.

5.4 Contemporary dance

Another area in which hybrid meanings are paramount is in the interaction of acousmatic music with other artforms. The structural relationships between the dance and music in the *Two Seasons* version of *Summer* and *Winter* has already been mentioned in 4.2.

The use of acousmatic music in contemporary dance has a long history. In 1952 Merce Cunningham created a work to excerpts from Schaeffer's and Henry's *Symphonie pour un Homme Seul,* introducing an American public to *musique concrète* (Vaughan, 1990, p. 82). Interestingly this was also the first piece in which Cunningham made a work without making any deliberate connection between the music and the dance, thereby allowing connections to emerge purely by chance, an approach he continues to adopt to this day.

It is interesting to compare the methodology of contemporary choreographers and electroacoustic composers as this may shed some light on the compatibility of the two media and the interesting combinations of meaning that emerge as a result of even their juxtaposition. Electroacoustic composers and choreographers both work interactively with their materials. Choreography is frequently created specifically for the dancers who will dance the piece. Material is developed with the dancers in an interactive creative situation where dancers suggest materials specifically suited to their physical styles and the choreographer shapes and combines this material to form larger structures in a way that is not dissimilar from the process of studio composition in which creation is similarly balanced with discovery.

Furthermore much contemporary choreography takes gestures from real world non-verbal communication as a starting point. These are then transformed into more abstract forms. The real-world meaning may be completely obscured or may still be present in an

ambiguous form. Just as the composer may use a combination of abstract[46] forms and material-derived transformations, the choreographer may manipulate material through formal devices such as repetition and canon, or may derive transformations from the material itself, for example magnifying a wave of the hand by translating it onto the whole body or transferring a movement from the arms to the legs. The result of these transformations and formal relationships is a work in which a high level of abstraction, focusing on syntagmatic relationships, interacts with paradigmatic references to the outside world.

It is worth observing that while the movement material may become very abstract, the fact that dance is always performed by bodies in space means that it is always possible to read some form of narrative, even in the most formal of material. A duet between two dancers can always be read as being about some kind of relationship, simply because we are conditioned to interpret interaction between human beings in this way.

Notably the advent of new technology in dance has encouraged some choreographers to explore much more abstract forms. In Merce Cunningham's piece *Biped* (Barbican Theatre, London, October 2000), for example, the use of motion capture technology allowed the choreographer to create projected virtual dancers made up of lines and abstract shapes. The human-derived movement material in these projections allows us to recognise human shapes in this material, but the occasional use of extreme close up, for example, is also used to produce moments of extreme abstraction in which the human source is no longer recognisable at all. Indeed the viewer is sometimes led to recognise quite different forms, such as the falling of autumn leaves, in the dance-derived material. This process of transformation is very similar to those described in Chapter 4.

[46] *Abstract* is here used in Emmerson's sense, see Chapter 2.

These similarities in the medium of acousmatic music and of dance allow readings of one to affect readings of the other when they are brought together. A specific example of this can be found in the dance piece *Symbiosis*[47] when a piece of movement involving the dancer shaking his cupped hands up and down combines with a sound that may be interpreted as suggesting stones being shaken. Neither the movement nor the sound necessarily evoke this idea on their own and the specific connection was not deliberately planned by either the choreographer or the composer, but the combination seems apt, and when armed with the knowledge that the piece uses movement derived from Tai Chi, some audience members may well be led to make the connection: the movement is in fact derived from a specific Tai Chi technique in which stones are indeed shaken in cupped hands.

The above is perhaps an overly literal example of the kind of relationships that may emerge from the combination of the two media. Connections are frequently ambiguous and associated images are complex. However they allow the music to suggest a possible world in which the dance is taking place, taking the dance out of the real space of the theatre and into an illusory space conjured up by the audience's imaginations.

The Killing Floor was created for a dance piece entitled *Hamsters in Mirrorshades* (ch. Richart Lord, The Place Theatre, London, Jan 1996), in which this context setting was particularly important. The piece was based on the novels of William Gibson and the image of a technological world gone wrong was strongly evoked by both the staging and the music. The lighting was very dark and used on-stage warning lamps obtained from building sites as well as theatrical lights. These gave both a sense of realism and a sense of crisis, of technological breakdown. In the music the deliberate use of distortion and glitches gives an uneasy sense of realism, blurring the boundary between portrayed breakdown and actual

[47] 1997, choreographer: Colin Poole (Cisenhale Dance Space, London, Dec. 1996); not included in the folio.

breakdown, leading (at least temporarily) to an uncertainty as to whether the glitches are a part of the composition or a genuine failure of the sound system. Under these circumstances the boundary of the work becomes ambiguous, leading to blurring of illusion and reality as the listener feels momentarily wrenched away from the coherent world of the work only to find that the sudden impinging reality is after all a part of the work. This kind of source perception, which challenges the boundaries of what is a part of the music and what is external to it, I will call an *anxious sound* after Rosenberg (1966) and forms a major part of the discussion of the installation *Living Steam,* which concludes this thesis.

5.5 *Living Steam*: performance space = representational space

5.5.1 *Living Steam*: Project description

Living Steam was a site specific installation for the Kew Bridge Steam Museum, which had provided the source material for *Grand Junction.* A kind of concerto for eight-channel tape and live steam engines, the piece has a duration of 20 minutes and ran on the hour every hour for two weeks over Easter 1999. Listeners were free to wander among the engines and come and go as they pleased, constructing their own individual experience.

The piece was composed for an eight-channel surround system and was designed either to be played on its own (on weekdays) or as an accompaniment to the live sounds of the working steam pumping engines (at weekends, when the museum is "in steam"). In particular one performance was given in which the live engines were specifically coordinated with the tape. It is this version of the piece on which I will focus for the most part.

The intention was to include the environmental sounds, which had been the inspiration for the piece, in the musical experience and to encourage an appreciation of the musicality of those sounds, even after the composed music had come to an end.

It was therefore considered important to allow visitors to hear the engines on their own as well as in the context of the piece. Consequently the piece was programmed hourly for twenty minutes.

Kew Bridge Steam Museum is housed in a former pumping station which supplied Thames water to south-west London throughout the late 19th and early 20th centuries. The museum houses many large stationary pumping engines including the Grand Junction 90", the largest working beam engine in the world.

Four engines were recorded as source materials for the piece. Three of these, the *Waddon*, the *Eastern Amos* and the *Dancer's End* engines are housed in the main Steam Hall where the piece was installed. The fourth, the massive Grand Junction engine has its own hall connected to the steam hall by a short corridor. The sounds were processed and composed in the studio and then returned to the Steam Hall for performance.

Even on weekdays, when the engines were static, the installation enhanced the atmosphere of the hall giving a strong impression of the engines in motion. The piece functioned both as illustration and interpretation: realistic recordings gave an idea of the actual engine sounds, while the processed sounds enhanced the perception of the machines as something beyond the merely mechanical. Like great dinosaurs of the industrial age the engines were brought to life by the music.

At weekends the ambiguity arising from the combined live sight and sound of the real engines and the sounds emanating from loudspeakers concealed in the engine enclosures created a unique symbiosis of sound and space in which the environment was as much a part of the musical experience as the music was a part of the environment. The live sounds also provided an element of variation as no two performances were exactly the same. During the special performance the three engines in the steam hall that had been used in the piece were successively started up as the piece progressed so that by the end all three were working. The Grand Junction engine next door (also used in the piece) had been running when people entered the building.

5.5.2 Speaker placement in *Living Steam*

The loudspeakers were divided into two basic groups of four (Figure 5.2). The first group was associated with particular engines, one real stereo pair behind the *Waddon* engine and two mono sources associated with the *Dancer's End* engine and the *Eastern Amos* engine. These local speakers often carried the untreated sound of the engine they were associated with. Four additional speakers were hung high in the roof rafters. At various times the sound grew outward from the floor speakers to the roof to fill the hall with sound. At other times the speakers were used for antiphonal effects and various frequency-based spatialisations e.g. low drones at floor level and more active high pitched material in the roof. At one point a sound is built up by introducing individual frequency bands in different spatial locations. The mixed use of point sources and various stereo axes created a wide variety of spatial possibilities which were enhanced by the live engines and pipes, letting off little bursts of steam all around the room.

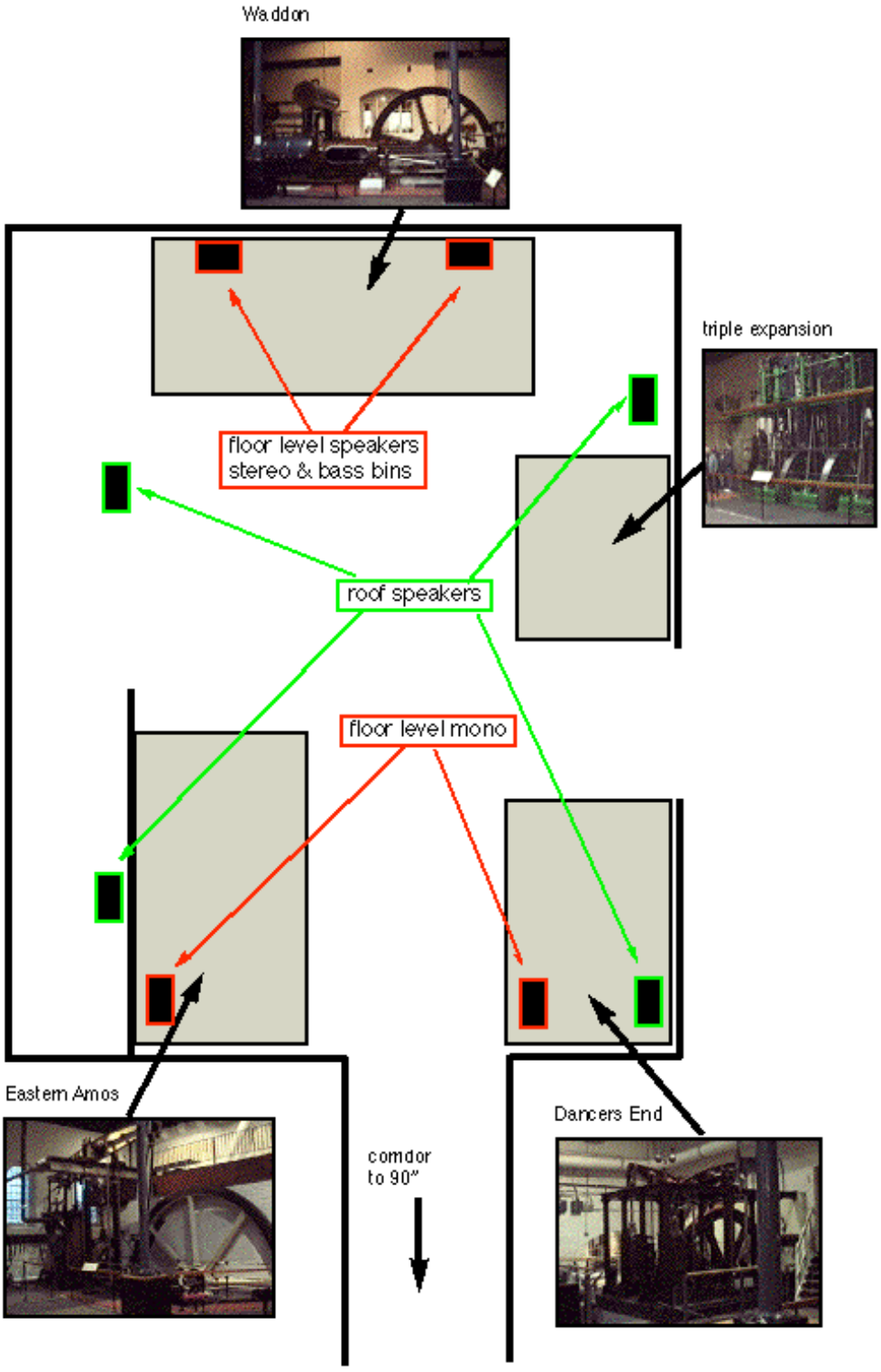

Figure 5.2 ***Living Steam*** **loudspeaker placement**

5.5.3 The boundary of the work: anxious objects

The use of representational space in *Living Steam* takes a different form from that in *Boomtown*. Rather than transforming a space by creating an aural illusion of a different space, the representational sounds of the piece are returned to their original context, the actual space in which they were recorded. A complex relationship is created between the work and the space that calls into question what is real and what is illusory.

> "The evocation of image is enhanced by a specific property of Western art: its deliberate removal from original context. Rarely does one view a landscape painting or listen to Beethoven's Pastoral Symphony in a setting which is its apparent subject."
>
> (Emmerson, 1986 p. 18)

I have long been interested in the effect that returning transformed sounds to their original setting would have on the perception of their source. In a project proposed in 1995 (*Cuisine Concrète* in collaboration with artist Tim Diggins) the transformed sounds of kitchen equipment were to be played through loudspeakers embedded in actual kitchen equipment in a fitted kitchen installation. The visual cues would provide a frame of reference for the transformed sounds allowing them to be perceived in relation to a known quantity and emphasising their nature as transformations of an original rather than just sounds in their own right.

This idea was taken forward into the *Living Steam* installation. Emmerson's assertion (above) is that the removal from original context enhances our imaginative involvement and our ability to create an illusion. This is certainly a powerful aspect of art, particularly of sonic art and is the way representational space was used in *Boomtown*. However, particularly in the visual art of the 20th century, for example in the found objects of Duchamp, the removal of objects from their original context has a rhetorical function, transforming an object into art by selecting it for aesthetic contemplation. This is an invitation to *read* the object as part of a

semiotic system and is what Danto has described as the "transfiguration of the commonplace" (Danto, 1981). The object becomes more than itself by inviting the viewer to contemplate its symbolic nature. It is both object and a reference to itself. In effect, by being removed from its original context it has undergone a transformation.

Just as in visual art transformation emphasises the dialectic between what is represented and the act of representation[48] the transformation of sound in electroacoustic music can serve a rhetorical function inviting an interpretation of the sound. Again, the very fact of hearing a sound out of its natural context is a transformation in this sense. The sound of an approaching car on a main road, it has already been observed (1.1.3), causes one to look round to avoid getting run over. A recording of an approaching car may cause one to consider the fact that one would try to avoid being run over. The sound has been transformed into an aesthetic object[49].

Consider, however, a work such as Janet Cardiff's soundwalk through Whitechapel, London, entitled *The Missing Voice (Case Study B)* (1999). Participants were given headphones and asked to follow a particular route around the neighbourhood of the Whitechapel Library. The headphones carried a binaural recording of the very walk they themselves were taking along with a commentary, some footsteps to pace themselves by and occasional music. In this work it became very hard to distinguish recorded traffic sounds from real ones causing great unease when crossing the streets as recorded cars made one look

[48] Lotman gives as an example the device of the convex mirror in Jan van Eyck's *The Marriage of Fiovanni Arnolfini and Giovanna Cenam*" as a rhetorical device: "The convex surface of the mirror transforms the figures, a fact that focuses attention specifically on the reflection. This makes it self-evident that every reflection is at one and the same time a dislocation, a deformation which, on the one hand, emphasises certain aspects of the object, and on the other hand shows up the structural principle of the language into whose space the given object is being projected."(Lotman 1990 p.56).

[49] Roger Scruton refers to "the coming together in a single perception of asserted and unasserted thought" (Scruton, 1997, p.90).

round anxiously at the empty road or real cars would unexpectedly loom up having been aurally written off as a part of the recording on the headphones.

This is an extreme case of the anxiety raised by objects of extreme realism for which Suzy Gablik has adopted Harold Rosenberg's term the *anxious object*:[50]

> "The difficulty is to discover why this is art, or even if it is art. Consider, for instance, one of Jasper Johns's painted bronzes. How do we know if what we are seeing is a sculpture or just an old coffee can with somebody's paint brushes in it? Can we find the answer to the question by simply looking? Anxious objects often contribute to the confusion of one thing with another. What Johns has done is to "reconstruct" the Savarin coffee can that holds his paint brushes by first casting the real objects in bronze and then painting the cast to look exactly as the objects looked before he cast them. The result is so true to life that a genuine confusion arises as to its identity. By creating a situation of tension and ambiguity, anxious objects raise questions about how we know what we perceive."
>
> (Gablik, 1984, p. 36)

This, then, is a manifestation of the "great realism" predicted by Kandinsky as the second great direction for art in the 20th Century, along with the "great abstraction" discussed in 1.4.1 (see Smuda, 1979, pp. 124-140).

The anxious object functions by being so "realistic" that it is not immediately obvious whether it is a sign, standing for another object in an artistic language or merely an object. The boundary between art and reality is blurred. When the surrounding reality is that of the art gallery, this effect is perhaps merely implied, but coming across Johns's can of paint brushes in the artist's studio would have an even stronger effect because the surroundings would favour neither interpretation. A can of brushes and a completed artwork are equally at home in an artist's studio[51].

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[50] Rosenberg's own definition of the anxious object as arising out of the tendency "to liquidate art as a classification of objects and to re-define it in terms of the intellectual acts of artists" (Rosenberg 1964/82 p.17) is perhaps a little broader.

[51] The famous trompe l'oeil painting of the back of a canvas by Gijsbrechts is a case in point, as "the painting is probably intended to be placed against the wall rather than hung, with the intention that the unsuspecting viewer attempts to turn it around - only to see the back of an unframed painting" (Koester, 1999, p.55).

What is perhaps more interesting than the questionable status of the work itself is the effect of the work on the surrounding reality, which is called into question by the general unease created by the anxious object. By interrogating the boundary between art and reality, the artist questions both the nature of reality and the nature of art. The found object, site-specific work and Land Art all play with the relationship of text to context.

A more subtle perceptual game is played by works that have an ambiguous boundary with reality. I would like to term this an "anxious boundary". These works play with the edges of the object allowing it to merge into its environment in a seamless way, raising questions about where one begins and the other ends. The movement of art out of the gallery with the advent of site specific work and Land Art is a manifestation of the increasingly blurred distinction.

> "Any act of semiotic recognition must involve the separation of significant elements from insignificant ones in surrounding reality."
>
> (Lotman, 1990, p. 58)

It is this very act of separation, deciding what contributes and what does not contribute to the artistic text, that becomes a subject of art when dealing with an anxious boundary as parts of the surrounding reality are included in the reading of the "work" and parts of the "work" (as created by the artist) may be excluded and may be deemed irrelevant or, to be more exact, the experienced boundary is in a constant state of flux as different limits are tested.

One such work is Beuys' *Blitzschlag* (Lightning) (1982-5, Anthony D'Offay Gallery), now in the Tate Modern gallery in London. In this piece an enormous (6 metre) bronze sheet with a rough texture is held aloft by a thin pole attached to a steel girder fixed to the walls of the gallery. It is quite ambiguous as to where the work ends and the gallery begins. Is the pole part of the work or part of the mounting mechanism? Is the girder or even the gallery wall part of the object under consideration? A similar dilemma is found in Robert Ryman's white

and grey paintings which interface with the gallery wall in various ways. Some are taped to the wall, while others are conspicuously pinned. It is again unclear whether the means of attaching the work to the gallery wall is a part of the painting or external to it[52].

This situation merely makes explicit the way every text is related to the surrounding reality and experiences of the audience:

> "Where does one end and the other begin? The issue corresponds to elements in deconstructionist thinking about the relation of text to context, where distinctions between the two (as between art and nature) are held to be culturally constructed rather than essential and absolute. Text can be defined as such only by reference to the *con*text from which it is artificially separated. Text depends for its supposedly independent identity on its relationship to that which it is *not*; but a dependant cannot be said to have a fully separate, autonomous existence. Everything therefore is 'text'; or everything is 'context': '*Il n'y a pas de hors-texte*', in Derrida's striking assertion.
>
> (Andrews, 1999, p. 205)

5.5.4 The anxious sound

The question arises: what would constitute an anxious object in music? Sonic "photographs" such as Luc Ferrari's *Presque Rien* series or some of the soundscape compositions of Barry Truax and Hildegard Westerkamp present a possible parallel to the found object (perhaps the most obvious form of anxious object) in visual art. However these works, when presented in concert or on CD, declare themselves as art by virtue of the juxtaposition of virtual space on to real space. As we have seen, the presentation of the virtual space of the recording in a different environment is an act of transformation, transforming both the recorded space and the listening space.

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[52] The role of the frame in landscape painting is discussed by Andrews: "... just as the frame is implicated in the totality of the landscape representation (in a sense it is that which defines it as 'landscape'), so the art gallery may be seen as a further kind of frame, since it helps to constitute the work - say a landscape painting - which it is ostensibly simply clearing space for." (M. Andrews 1999 p. 202).

Warhol's soup cans are of course also transformed by their removal from the everyday environment into the environment of the art gallery, and that is why they are contemplated as art. However there is a difference. The soup tin in the gallery is not *materially* transformed by its removal to the art gallery. It may still contain soup which may be eaten. If it does not, then it does not announce this fact. It merely happens not to contain soup. The viewer, however, is unaware of this. The gallery environment does not mitigate against the possibility. The recording, on the other hand, is a material transformation and announces itself through its new context. The soundworld is inherently incompatible with the performance space as experienced by the other senses[53].

Perhaps the most obvious example of an anxious object in music is John Cage's 4'33'' in which all the sounds heard are in their real-world context, becoming music only through the will of the composer and the complicity of the audience[54]. The sounds that occur are transformed by the act of listening and the act of framing. David Revill has written:

> "As Noel Carrol observed, "Cage's noises are not like everyday noises"; they are samples - exemplifications - of everyday noises "in the way that tailors' swatches of material are symbols but at the same time physical samples"
>
> (Revill, 1992, p. 156)

Clearly it is the relationship between the natural context in which one might expect to hear sounds and the performance environment that is of importance here. As Trevor Wishart has observed:

> " … imagine a recording of a vocal performance accompanied by piano. Imagine that a vocal performer uses many types of vocal utterance not normally associated with the western musical repertory, such as screaming, glossalalia or erotic articulation of the breath. The presence of the piano in this context will lead us to interpret these events as part of a musical performance"
>
> (Wishart, 1986, p. 49)

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[53] This is to some degree mitigated by presenting sound work in darkness.

[54] It would be hard to continue to appreciate the environmental sounds as music if one of them happened to be the venue's fire alarm going off.

If the context does not suggest a musical performance or a sound is presented in such a way as to exclude it from the performance context (e.g. off-stage or from the audience) an ambiguity will arise. Such a sound may be categorized as an *anxious sound*.

I would suggest three sets of circumstances in which this may occur:

1. The perceived source = the real source:

In the first category one might find some industrial music in which real machinery used in a musical context functions as a signifier of real machinery, or in an electroacoustic piece where the sound from a loudspeaker is used to signify a loudspeaker. This is the case in the recent fashion, both in electroacoustic circles and in more adventurous avant-garde popular music, for the "glitch" piece - music made of the sounds of malfunctioning audio equipment. In the dance piece *The Killing Floor*, described above, the image of technology on the brink of breakdown is conjured by noises, pops and distortions, which at first sound disconcertingly like the sound system cracking up. The audience is unsure whether they are hearing a piece about technology breaking down or whether they are merely hearing technology break down. In the context of the piece this unease may resolve as the glitches become accepted as part of the language of the piece.

2. The real source (i.e. the loudspeaker) is concealed:

The second category in which the loudspeakers are concealed is exemplified by a section of the 1995 installation *H.G.* in Clink Street Vaults, London by Robert Wilson and Hans Peter Kuhn (*ArtAngel* commission) in which one room contained nothing but the eerie sound of footsteps on the ceiling above, pacing to and fro across the creaky floor boards. Of course these were recorded sounds played through loudspeakers in the

room above, but the illusion was real enough to raise doubts in the listener's mind, and only after some considerable time did the repetitive pattern of the footsteps give the game away.

3. The sounds in the music belong naturally to the performance environment:

In the third category one might find pieces containing birdsong played in outdoor locations or pieces involving crowds played in public places. The effect was for example very noticeable when I played an early composition of mine entitled *Crowd Control* (1987), in the busy foyer cafe of the York Theatre Royal. As the piece opened with the sounds of voices approaching it was some time before the audience became aware that there was a piece being played. The Whitechapel soundwalk discussed in 5.5.3 above is another example of this category.

5.5.5 The anxious boundary in *Living Steam*

Living Steam uses all three of the above techniques to blur the boundaries between the work and its surrounding reality:

1. Some of the sounds are being made by the actual engines during the performance.

2. Speakers are concealed among the engines making them hard to spot.

3. Many of the recorded sounds are untreated and merge with the real engine sounds.

The effect of this is as much to encourage a musical interpretation of the real sounds as to increase the source awareness of the recorded and transformed sounds. In *Living Steam* a deliberate confusion arises between the reality surrounding the musical work and the work itself such that elements of the real soundscape of the performance space become conflated with the sound from the loudspeakers and vice versa.

In *Living Steam* "realistic" or representational spatial distribution of sound serves, then, less to represent a possible reality, as it does in *Boomtown*, than to call into question the actual sonic reality of the performance space itself. It is not only the real sounds of the steam museum that are heard but of those of an imagined steam museum, in which the sounds are the *raison d'être* of the engines, in the hope that when the piece is over the aesthetic mode of perception will remain, and the audience's perception of the everyday soundscape of the museum will be transformed.

The tape opens with the sound of the *Waddon* engine starting up. This engine has a very characteristic deep growl (bass bins were positioned in the *Waddon* enclosure to reproduce this sound accurately). During the performance it was arranged that the *Waddon* itself would be activated toward the end of the piece. The result was a kind of recapitulation of the opening sounds, so most of the audience were unaware that this sound was, on its second occurrence, coming from the engine itself until the tape finally dropped out and the live sound continued on its own.

Another moment of strong interaction between the recorded sounds and the live sound came from the *Dancer's End* engine which needs to be set to a start up position using a thick iron bar. The sound of this features prominently in the piece and is placed in its untreated form in the loudspeaker associated with that engine (sometimes along with a resonated echo in one of the further roof speakers. During the performance the engine driver was cued to start up the *Dancer's End* at the first entry of the barring sound (which is introduced by a long stretched out transformation of itself moving freely through the space) resulting in an eerie duet between engine driver and tape.

5.5.6 Actual audience reaction

In practice many people were surprised how little of what they assumed was live actually came from the engines. In particular, the recordings often magnify details of the sound that are normally inaudible. Another common experience reported by listeners was an inability, after the event, to remember the music separately from the overall impression of the space. Other visitors, while obviously displaying a heightened awareness of the aural dimension of the experience, seemed unaware that they were hearing anything other than the sounds of the engines, asking which engine was responsible for the "musical" sounds.

The overall effect could be summed up by Walter Siegfried's useful expression a "soundtrack to reality" (Siegfried, 1996). The work is experienced as a part of the environment rather than as an external object for contemplation. Where *Boomtown* attempts to evoke images and enliven a relatively neutral space, *Living Steam* is a part of its surroundings interacting with and emphasising the natural aesthetic potential of the space.

5.6 Conclusion

In this chapter we have seen how the structure of the work is bound up with numerous extra-musical factors. While the pieces discussed above were conceived to exploit this interaction, it is clear that every musical performance contains such extrinsic elements that colour our perception of the work.

Having started this investigation into the complex relationship between abstract and representational aspects of electroacoustic music firmly within the confines of the immanent level of the work as it appears on tape or CD, it has become necessary to expand ever further outwards, discovering interactions with text, performance space and the individual experiences of each listener.

In *Grand Junction* the emphasis is clearly on syntagmatic relationships within the sounding material. Representation is used as a structural device to form hierarchies of material. In *The Seasons* the use of representational sound is more pictorial, linking the work to our experience of the sounding world while maintaining a level of ambiguity and emphasising the dual awareness of the act of representation and that which is represented.

The addition of text in *Boomtown* opens another level of interpretation which, like the choreography of *The Killing Floor*, has a direct bearing on the interpretation of the sounds. Finally in *Living Steam* the boundary between the work and the environment in which the work is performed is called into question. The sounds of the surroundings and the sounds on tape become hard to distinguish, reality and representation merge and the environment becomes a part of the aesthetic experience.

Electroacoustic music produces a network of interacting meanings which stand in a complex relationship to the world outside the work. The continuing dialogue between sounds as carriers of extra-musical meaning and their positions in the syntagmatic musical construction is key to the understanding of the acousmatic listening experience. As such the electroacoustic work probes the limits of abstraction, as it takes its place within the wider context of lived experience.

Programme notes

Grand Junction: (for Bill Hepper) **1994**

Grand Junction was inspired by a visit to the Kew Bridge Steam Museum, formerly the main pumping station of the Grand Junction Water Company, supplying much of London's water in the late nineteenth and early twentieth centuries.

The piece, created entirely from the transformed sounds of the steam engines housed there, takes the form of a journey through a surreal dream world in which the pounding rhythms of the large engines and the frenetic activity of the smaller machines take on an abstract musical significance. However the industrial roots of the sounds are never far from the surface, and in the anecdotal opening and ending of the piece the present life of the museum provides a waking alternative to the dream that constitutes the main body of the work.

The Killing Floor: **1996**

The Killing Floor was written for the multimedia dance piece "Hamsters in Mirrorshades" by Richard Lord. The event, held at the Place Theatre in January 97, was inspired by the cyberpunk world of William Gibson (The Killing Floor itself is a kind of ritual dancefloor featured in *Johnny Mnemonic*). At a time when I had been writing a lot of quiet music I saw this as an opportunity to "let my hair down" a little. The piece takes from Gibson the sense of a world where the organic and mechanical are fused in a strange symbiosis - a highly advanced, yet by no means squeaky clean, technological society on the brink of collapse.

Cyborgs on the verge of a nervous breakdown.

Boomtown: **1998**

Commissioned by the northern English borough of Oldham for the Radical Thinkers room of its 150th Anniversary exhibition at Oldham Art Gallery, Boomtown explores the history of the area through interviews with local people and sounds from the textile industry. Childhood memories of life in the industrial town and stories of the political involvement of ordinary people are set in an environment of representational and abstracted industrial sound..

Living Steam: **1999**

The 8-channel installation Living Steam was commissioned by Sonic Arts Network (with funds from the Arts Council of England and Thames Water) for the Kew Bridge Steam Museum. Originally sited in the magnificent Steam Hall the piece uses sounds from the museum to create an industrial Jurassic Park in which the grunts, sighs and roars of the massive steam engines (including the largest working beam engine in the world) are brought to life through the use of new technology. Living Steam has subsequently been re - sited in Victoria Tower, Huddersfield as part of the 1999 Huddersfield Contemporary Music Festival and in the National Railway Museum in York.

The Seasons: **1995/8**

The Seasons explore an impressionistic landscape of familiar and unfamiliar sounds. From the extreme stasis of Summer and Winter to the delicate birth of Spring and the gradual decay of Autumn, the Seasons evokes the shifting moods of the passing year. The Seasons plays continuously for and hour long year, however the pieces may be played individually.

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