SOURCE RECOGNITION OF ENVIRONMENTAL SOUNDS IN THE COMPOSITION OF SONIC ART WITH FIELD-RECORDINGS:
A NEW ZEALAND VIEWPOINT

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# TABLE OF CONTENTS

**ABSTRACT** ........................................................................................................ 1

**PART ONE: ENVIRONMENTAL SOUND AND SOURCE RECOGNITION AS A BASIS FOR COMPOSITION**

**INTRODUCTION** .................................................................................................. 4

**CHAPTER ONE: ENVIRONMENTAL SOUND AS MATERIAL FOR COMPOSITION: BACKGROUND**

1.1 Introduction ........................................................................................................ 7
1.2 Italian Futurists .................................................................................................. 8
1.3 Edgard Varèse .................................................................................................... 19
    1.3 (a) Sound-masses and the vision of new media ............................................. 19
    1.3 (b) The Poème Électronique ......................................................................... 26
1.4 Percy Grainger and Free-Music ....................................................................... 31
1.5 John Cage: Art as Life ....................................................................................... 37
1.6 Pierre Schaeffer ................................................................................................. 49
    1.6 (a) The advent of musique concrète ............................................................. 49
    1.6 (b) The sound object .................................................................................... 54
    1.6 (c) Schaeffer in relation to Varèse and the Futurists ................................ 59
1.7 Recorded Environmental Sounds in Relation to Instrumental Imitation in Programme Music ................................................................. 63
1.8 Conclusion ......................................................................................................... 73
CHAPTER TWO: THE CLASSIFICATION OF NATURAL SOUNDS

2.1 Introduction .................................................................................. 76

2.2 Pierre Schaeffer ............................................................................. 79
  2.2 (a) The typology of sound objects ............................................. 79
  2.2 (b) Balance and originality ......................................................... 85

2.3 Denis Smalley ............................................................................... 93
  2.3 (a) The nature of spectro-morphology ....................................... 93
  2.3 (b) Spectral types ....................................................................... 94
  2.3 (c) Morphological types ............................................................. 96
  2.3 (d) Spectro-morphological motion ............................................ 98
  2.3 (e) Summary to Smalley’s description of spectro-morphology .... 106

2.4 Trevor Wishart ............................................................................. 109
  2.4 (a) Natural sound morphology .................................................. 109
  2.4 (b) Archetypes for the classification of complex sound morphologies .................................................. 114
  2.4 (c) Vocal models ....................................................................... 119
  2.4 (d) Some final observations on Wishart’s natural morphology of sounds .................................................. 127

2.5 Imitative use of Natural Vocal Morphology: An example .......... 129

2.6 An Extension of Natural Morphological Phenomena ................. 134

2.7 R. Murray Schafer: The World Soundscape Project .................. 137
  2.7 (a) Introduction ....................................................................... 137
  2.7 (b) Sound classification (World Soundscape Project) ............... 141
  2.7 (c) Classification by reference .................................................... 146
  2.7 (d) Aesthetics ........................................................................... 149
Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.7 (e)</td>
<td>Cross-classification</td>
<td>151</td>
</tr>
<tr>
<td>2.7 (f)</td>
<td>Summary of Schafer’s approach to classification</td>
<td>157</td>
</tr>
<tr>
<td>2.8</td>
<td>Soundscape Analysis</td>
<td>159</td>
</tr>
<tr>
<td>2.9</td>
<td>Conclusion</td>
<td>166</td>
</tr>
</tbody>
</table>

CHAPTER THREE: SOURCE RECOGNITION OF NATURAL SOUNDS IN ELECTROACOUSTIC MUSIC

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Introduction</td>
<td>169</td>
</tr>
<tr>
<td>3.2</td>
<td>The Acousmatic</td>
<td>170</td>
</tr>
<tr>
<td>3.3</td>
<td>Reduced Listening</td>
<td>171</td>
</tr>
<tr>
<td>3.4</td>
<td>Schaeffer’s &quot;Four Modes of Listening&quot;</td>
<td>173</td>
</tr>
<tr>
<td>3.5</td>
<td>Mimesis and Composition with Environmental Sounds</td>
<td>180</td>
</tr>
<tr>
<td>3.5 (a)</td>
<td>The concept of mimesis</td>
<td>180</td>
</tr>
<tr>
<td>3.5 (b)</td>
<td>Duality of discourse</td>
<td>182</td>
</tr>
<tr>
<td>3.5 (c)</td>
<td>Categories of mimesis</td>
<td>192</td>
</tr>
<tr>
<td>3.6</td>
<td>Summary of Emmerson’s Concept of Mimesis</td>
<td>195</td>
</tr>
<tr>
<td>3.7</td>
<td>Sonic Landscapes and Landscape Composition</td>
<td>199</td>
</tr>
<tr>
<td>3.7 (a)</td>
<td>Introduction</td>
<td>199</td>
</tr>
<tr>
<td>3.7 (b)</td>
<td>Types of Landscape construction</td>
<td>201</td>
</tr>
<tr>
<td>3.7 (c)</td>
<td>Recognition of sources: the role of contextualisation</td>
<td>209</td>
</tr>
<tr>
<td>3.7 (d)</td>
<td>Contextualisation in Red Bird</td>
<td>212</td>
</tr>
<tr>
<td>3.7 (e)</td>
<td>Transformations within the sonic landscape</td>
<td>214</td>
</tr>
<tr>
<td>3.7 (f)</td>
<td>Vocal sounds in Red Bird</td>
<td>220</td>
</tr>
<tr>
<td>3.7 (g)</td>
<td>The role of symbolism</td>
<td>222</td>
</tr>
<tr>
<td>3.7 (h)</td>
<td>Ambiguity</td>
<td>224</td>
</tr>
</tbody>
</table>
### CHAPTER FOUR: COMPOSING WITH FIELD-RECORDINGS: SIGN AND SYMBOL

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Introduction</td>
<td>250</td>
</tr>
<tr>
<td>4.2</td>
<td>The Nature of Content</td>
<td>251</td>
</tr>
<tr>
<td>4.3</td>
<td>Field-recording: Definition</td>
<td>256</td>
</tr>
<tr>
<td>4.4</td>
<td>Recording as Documentation</td>
<td>260</td>
</tr>
<tr>
<td>4.4 (a)</td>
<td>Introduction</td>
<td>260</td>
</tr>
<tr>
<td>4.4 (b)</td>
<td>The role of recording</td>
<td>261</td>
</tr>
<tr>
<td>4.4 (c)</td>
<td>Listening experience and recorded document</td>
<td>268</td>
</tr>
<tr>
<td>4.4 (d)</td>
<td>Documentary photography: an established form</td>
<td>274</td>
</tr>
<tr>
<td>4.4 (e)</td>
<td>From field-recording to sign</td>
<td>276</td>
</tr>
<tr>
<td>4.4 (f)</td>
<td>Montage</td>
<td>283</td>
</tr>
<tr>
<td>4.4 (g)</td>
<td>Articulation of objects and natural forms: Christo</td>
<td>286</td>
</tr>
<tr>
<td>4.4 (h)</td>
<td>Further possibilities of context</td>
<td>292</td>
</tr>
<tr>
<td>4.5</td>
<td>Approaches to Compositional Language</td>
<td>300</td>
</tr>
<tr>
<td>4.5 (a)</td>
<td>Environmental sound as sign and symbol</td>
<td>300</td>
</tr>
<tr>
<td>4.5 (b)</td>
<td>Signs and meaning</td>
<td>303</td>
</tr>
<tr>
<td>4.5 (c)</td>
<td>Environmental references in electroacoustic music: three examples</td>
<td>312</td>
</tr>
<tr>
<td>4.6</td>
<td>Spoken Language as a Sign Element</td>
<td>321</td>
</tr>
<tr>
<td>4.6 (a)</td>
<td>Introduction</td>
<td>321</td>
</tr>
</tbody>
</table>
Table of Contents

4.6 (b) Abstract and poetic use of the voice .......................... 324
4.6 (c) The persona: Berio's Visage .................................. 327
4.6 (d) Spoken language in field-recordings ....................... 330
4.7 Articulation of Sign Sounds ...................................... 337
   4.7 (a) Two examples: Signs in the Vicinity of Memories and Tiger Balm .......................... 337
   4.7 (b) Balance between sign and morphology .................... 346
4.8 Performance Possibilities with Sign Sounds: Four examples; Music for Limbs, Black and White, Edit for Pauline, Rain from the Moon ............... 350
4.9 Symbolism ...................................................... 356
   4.9 (a) Symbolic archetypes .................................... 356
   4.9 (b) Use of symbols ......................................... 361
   4.9 (c) Symbolism through enigma .............................. 371
   4.9 (d) Summary to symbolism ................................ 380

CONCLUSION ....................................................... 383

PART TWO: NEW ZEALAND COMMENTARY: ENVIRONMENTAL SOUND IN ELECTROACOUSTIC MUSIC: ATTITUDES OF NEW ZEALAND COMPOSERS

1. Introduction ..................................................... 388
2. The Composers Interviewed ..................................... 388
3. Interview Précis ................................................ 390
4. Comparison and Context ....................................... 396
5. Lilburn's The Return ........................................... 399
6. The New Zealand Identity ...................................... 403
7. Conclusion ........................................... 405

8. Interview Transcripts .................................. 407
   8.1 Jack Body ........................................ 407
   8.2 John Cousins ..................................... 416
   8.3 Chris Cree Brown ................................ 435
   8.4 Ross Harris ....................................... 453
   8.5 Louise Johns ...................................... 462
   8.6 Douglas Lilburn .................................. 466
   8.7 Annea Lockwood .................................. 472
   8.8 John Rimmer ..................................... 487

PART THREE: ANALYSES OF SELECTED WORKS BY
NEW ZEALAND COMPOSERS

1. Introduction ........................................... 498

2. Analyses .............................................. 501
   2.1 The Return (1965) by Douglas Lilburn ............... 501
   2.2 Tiger Balm (1970) by Annea Lockwood ................. 509
   2.3 Earthworks (1971) by Philip Dadson .................... 516
   2.4 Christmasmusic (1973) by John Cousins ............... 521
   2.5 Horizons (1975) by Ross Harris ....................... 529
   2.6 World Rhythms (1975) by Annea Lockwood .............. 535
   2.7 Musik Dari Jalan (1976) by Jack Body ................... 539
   2.8 Soundscape with Lake and River (1979)
      by Douglas Lilburn ................................... 545
   2.9 Fanfares (1981) by Jack Body ......................... 553
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.10</td>
<td>Parade (1981)</td>
<td>John Cousins</td>
<td>558</td>
</tr>
<tr>
<td>2.12</td>
<td>Sound Map of the Hudson River (1982)</td>
<td>Annea Lockwood</td>
<td>574</td>
</tr>
<tr>
<td>2.14</td>
<td>You Must Remember This (1984)</td>
<td>John Young</td>
<td>585</td>
</tr>
<tr>
<td>2.15</td>
<td>Tense Test (1985)</td>
<td>John Cousins</td>
<td>591</td>
</tr>
<tr>
<td>2.16</td>
<td>Jangkrik Genggong (1986)</td>
<td>Jack Body</td>
<td>611</td>
</tr>
<tr>
<td>2.18</td>
<td>Signs in the Vicinity of Memories (1988)</td>
<td>John Cousins</td>
<td>628</td>
</tr>
</tbody>
</table>

**ACKNOWLEDGEMENTS** | 635

**APPENDIX: BIBLIOGRAPHY OF SOURCES**

1. Literary Sources: Books and Journals | 638
2. Literary Sources: New Zealand Section | 655
3. Journals: Places of Publication | 660
4. Musical Sources: Recordings and Scores | 663
5. Select Discography of New Zealand Electroacoustic Music | 673
5.1 Electroacoustic music on tape | 673
5.2 Electroacoustic music on tape, or live performance realised with electroacoustic media | 676
# LIST OF ILLUSTRATIONS

(EXamples, Diagrams and Musical Extracts)

## Written Musical Examples

<table>
<thead>
<tr>
<th>Example</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Varèse. <em>Octandre</em></td>
<td>23</td>
</tr>
<tr>
<td>2. Varèse. <em>Ionisation</em></td>
<td>24</td>
</tr>
<tr>
<td>3. Strauss. <em>Don Quixote</em></td>
<td>67</td>
</tr>
<tr>
<td>5. Cree Brown. <em>In Sympathy</em></td>
<td>132</td>
</tr>
<tr>
<td>6. Musical motifs in <em>Black and White</em></td>
<td>620</td>
</tr>
</tbody>
</table>

## Diagrams

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Schaeffer's Summary of Musique Concrète and Conventional Music</td>
<td>52</td>
</tr>
<tr>
<td>2. Recorded and Imitation Nightingale Song</td>
<td>71</td>
</tr>
<tr>
<td>3. Schaeffer's &quot;Recapitulation of Typological Criteria&quot;</td>
<td>88</td>
</tr>
<tr>
<td>4. Schaeffer's Typology of Sound Objects &quot;Schema in Principle&quot;</td>
<td>92</td>
</tr>
<tr>
<td>5. R. Murray Schafer's &quot;Description of a Sound Event&quot;</td>
<td>145</td>
</tr>
<tr>
<td>6. Schaeffer's &quot;Table of the Functions of Listening&quot;</td>
<td>175</td>
</tr>
<tr>
<td>7. Emmerson's &quot;Language Grid&quot;</td>
<td>185</td>
</tr>
<tr>
<td>8. Examples of Sound Transformations in <em>Red Bird</em></td>
<td>216</td>
</tr>
<tr>
<td>9. Birdsong as Sign and Symbol</td>
<td>223</td>
</tr>
<tr>
<td>10. Focus and Scale of Sign Reference</td>
<td>277</td>
</tr>
</tbody>
</table>
Table of Contents

11. Contextual Possibilities with Sign Sounds .......................... 294
12. Tiger Balm: Temporal/Spatial Organisation ......................... 515
13. Soundscape with Lake and River: Structural Plan .................. 546
14. Black and White: Structural Plan ..................................... 624

LIST OF TAPED EXTRACTS FROM WORKS BY NEW ZEALAND COMPOSERS

EXTRACT

1-6 The Return (1965) by Douglas Lilburn
7-12 Tiger Balm (1970) by Annea Lockwood
13-18 Christmasmusic (1973) by John Cousins
19-24 Horizons (1975) by Ross Harris
25 World Rhythms (1975) by Annea Lockwood
26-32 Musik Dari Jalan (1976) by Jack Body
33-34 Soundscape with Lake and River (1979) by Douglas Lilburn
40-44 Parade (1981) by John Cousins
45-51 Music for Limbs (1981) by Chris Cree Brown
52-59 You Must Remember This (1984) by John Young
60-70 Tense Test (1985) by John Cousins
71-77 Jangkrik Genggong (1986) by Jack Body
78-86 Black and White (1987) by Chris Cree Brown
87-92 Signs in the Vicinity of Memories (1988) by John Cousins
CONTENTS OF CASSETTE TAPES

TAPE

1. Side One: Extracts 1-12
   Side Two: Extracts 13-24

2. Side One: Extracts 25-37
   Side Two: Extracts 38-52

3. Side One: Extracts 53-62
   Side Two: Extracts 63-77

4. Side One: Extracts 78-92
   Side Two: You Must Remember This (1984) by John Young

5. Side One: The Return (1965) by Douglas Lilburn
   Soundscape with Lake and River (1979) by Douglas Lilburn
   Side Two: Musik Dari Jalan (1976) by Jack Body
   Fanfares (1981) by Jack Body

   Horizons (1975) by Ross Harris
   Side Two: Christmas music (1973) by John Cousins

7. Side One: Signs in the Vicinity of Memories (1988) by John Cousins
   Side Two: Tense Test (1985) by John Cousins

   World Rhythms (1975) by Annea Lockwood
   Side Two: Tiger Balm (1970) by Annea Lockwood

   Side Two: Black and White (1987) by Chris Cree Brown

The tapes of extracts and complete works presented here have been reproduced with the kind permission of the composers and, where appropriate, the performers and publishers.

Under no circumstances are these tapes to be copied, sold, hired, loaned, broadcast, or used for any purpose other than that of private study.

Note: Due to an oversight made in the original live concert performance recording of Chris Cree Brown's Black and White, the beginning of the opening sequence in the piece was not captured. The work in fact begins with the orchestra's tune-up, during which the percussion motif heard at the start of this tape emerges, signalling the entry of the conductor.
The use of recorded environmental sounds in electroacoustic music has led to the raising of fundamental questions concerning the aesthetic criteria with which such materials should be approached in composition. One of the most fundamental issues has been the compositional role of "source recognition", whereby the listener assigns environmental sounds to their physical source objects or situations.

This study deals with the potentials of source recognition in sonic art arising from the creative use of field-recordings, especially the potential for tangible "real-world" reference to be used as a criterion by which works are structured. Since recognition of sources is such an elemental aspect of the normal perception of sounds in the environment, this is regarded as a highly relevant basis from which to use field-recordings in composition. Particular emphasis is also given to the placement of this in the context of New Zealand work involving electroacoustic media, in an attempt to evaluate the compositional importance of New Zealand composers' concern for the environment in their works.

Chapter one provides a background to the increased concentration in music of the twentieth century on the sounds and stimulus of environmental phenomena, and especially the use of natural sounds in electroacoustic music as it became possible with sound recording. Chapter two examines four approaches to the classification of natural sounds, which are based on different ways in which environmental sound can be perceived - from details of source recognition to focus on morphological and spectral characteristics. Chapter three examines in more detail the use of source recognition of environmental sounds in
electroacoustic music by way of critique of two established approaches - namely, Simon Emmerson's writings on "mimesis" and Trevor Wishart's concept of "sonic landscapes". Chapter four explores the role of source recognition when working with field-recordings, both as a means of documenting the sounds of real objects and events, and as a structural force; particular emphasis is given to examples drawn from works by New Zealand composers. These four chapters together form part one of the study.

The second part comprises interviews with eight New Zealand-born composers of electroacoustic music, as well as commentaries on the use of field-recordings in the work of these composers.

Part three consists of analyses of selected New Zealand works in which field-recordings have been used.
PART ONE

ENVIRONMENTAL SOUND AND SOURCE RECOGNITION AS A BASIS FOR COMPOSITION
INTRODUCTION

The advent in the twentieth century of high quality sound recording and, in particular, portable sound recording has allowed any sound to be captured and replayed through loudspeakers into any new acoustic setting. In social terms, sound recording is clearly related to other technological processes which capture and store visual phenomena - namely, film and video - the basic characteristic and application of these technologies being to store and reproduce aspects of human perception. In turn, this very much defines their cultural application: to record and document images or sounds which are considered to be of value to the observer, and to allow a sensation of the original experience to be recalled or conveyed. Because the storage of environmental sound through field-recording produces materials which are able to be manipulated and repeated, the sound recording can be considered as an artifact in its own right. As such, environmental sounds not in themselves previously considered to be material useable in sonic art have been, through recording, brought into the working sphere of the composer.

The main thesis in this study is that the recognition of sound sources (the process by which a listener assigns to sounds their physical source objects or situations) is a fundamental aspect of aural perception within the environment, and constitutes a valid and powerful basis upon which to structure, in composition, sounds drawn from the environment. That is to say, in dealing with structural criteria which stem from such a basic aspect of human experience, sonic art forms might be made which allow a listener to respond with considerable empathy, in that the listener’s ordinary perceptual habits of source recognition can be utilised.
This study discusses the theory and practical application of contemporary ideas on source reference of environmental sounds (especially in electroacoustic music) and relates them to the process of field-recording. Field-recording is considered here as a process by which sounds from a given environmental location are documented, so that the resulting recordings can be considered as a fixed record of some aspect of the sonic parameters of that location or object. As such, source recognition criteria for composition stem directly from the use of sonic materials which are drawn from everyday realities and experiences.

Most of the works examined in this study are electroacoustic music on tape, "electroacoustic" referring to the involvement of transducers in sound storage or production (such as microphones and loudspeakers) which convert mechanical energy into electrical energy and vice versa. However, as well as purely electroacoustic work, other forms which involve theatrical, performance or other visual elements along with recorded environmental sounds have been considered. While in this context works which involve only sound as a constituent element can be thought of as "music" (such as electroacoustic music on tape), integration of other media with sound requires a broader terminology. Therefore, because sound recording has become embraced in creative disciplines such as performance art, conceptual art and sound/sculptural installations, the term sonic art has been used extensively here, so that a broad base of creative expression with environmental sounds can be considered. In this way, we are able to encompass works which exploit the source recognition of recorded environmental sounds through the integration of these with other types of materials and resources.

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1 The form of this term "electroacoustic" rather than "electro-acoustic" has been used, as it represents the most common current usage of the word.

2 The use of this term is derived from the writings of Trevor Wishart.
Specific works dealt with in this study are mainly of New Zealand-born composers, with many of the works cited in the text being drawn from New Zealand sources, while Part Two contains interviews with eight New Zealand composers and Part Three consists entirely of analyses of selected works by New Zealanders. There are two main reasons for this. Firstly, a great deal of New Zealand work in the electroacoustic medium has sprung from a concern for and involvement with the experience of the environment, as well as direct use of environmental sound and secondly because, in spite of this activity, there has to date been little critical evaluation of the work so far produced in New Zealand.

---

3 Concern for the environment is a characteristic of much New Zealand art in general, from the landscape painting of Colin McCahon to the found object sculpture of Don Driver.

CHAPTER ONE

ENVIRONMENTAL SOUND AS MATERIAL FOR COMPOSITION: BACKGROUND

1.1 Introduction

This chapter identifies and compares the work and ideas of certain twentieth century composers who contributed towards the realisation of a close, highly developed relationship between the sounds of the environment and musical composition. The enquiry embraces both the idea of environmental influence on music, realised through "manufactured" instrumental resources, and the use of sound recording for the capture and manipulation of materials drawn directly from the environment.

While fundamental beliefs in an implicit relationship between the environment and the arts have long existed (at least since the view of Plato and Aristotle on art as a human manifestation of the imitation of the forms, modes, rhythms and patterns of nature), sound recording has enabled the relationship between "art" and "life" to be refocused, since recording allows the sounds of life to be captured intact in a way never before possible. The desire for redefinition of the distinction between "art" and "life" (clearly enunciated by the Futurists early this century and demonstrated in the ideas and work of composers such as Varèse, Cage and Grainger) should also be seen as a factor in why sound recording should be grasped as a potential medium for musical expression.

The concern of the present background discussion is to establish a basis for the concentration of subsequent sections of this study on the nature of environmental field-
Environmental Sound as Material for Composition: Background

recording as an aspect of sonic art.

1.2 Italian Futurists

A rather quirky manifestation of the use in composition of sounds directly influenced by the sound of the human technological environment in the early twentieth century was through the art movement of Futurism. The ideal of the movement was to reflect in art - painting, sculpture, architecture, poetry and music - the effect of the increasing proliferation of twentieth century technology, machinery and speed and, especially, to characterise their art as a relevant contemporary expression through a complete rejection of the past.

It was a hectic herald of the recurrent concern in the art of our times to equate art and life, an equation which still remains unresolved. But in the heady years which led up to and into the First World War the small group of writers, artists and musicians who called themselves the Italian Futurists set out to do more than that. Their aim and their claim was to transform the mentality of an anachronistic society. Marinetti and his friends were determined to prepare Italy for what seemed to be the great adventure of modern times: "What we want to do is to break down the mysterious doors of the impossible".¹

The initiator of the Futurist movement was the Italian poet and dramatist Filippo Tommaso Marinetti (1876-1944), who on 20 February 1909 published The Founding Manifesto of Futurism on the front page of Le Figaro - the most highly regarded newspaper in Europe.

Although Marinetti's founding manifesto gave the impression that a large group dedicated to Futurism already existed, this was not the case. He was writing alone, with the goal of attracting to his polemic a large following of like-minded artists - a ploy in which he succeeded brilliantly. That the founding manifesto appeared in Le Figaro was significant because in such an important publication it could not easily be dismissed by the Italian press. Furthermore, in a Parisian newspaper, Marinetti had attacked the very basis of the establishment of Italian art:

It is from Italy that we launch through the world this violently upsetting incendiary manifesto of ours. With it, today, we establish Futurism, because we want to free this land from its smelly gangrene of professors, archaeologists, ciceroni and antiquarians. For too long has Italy been a dealer in second-hand clothes. We mean to free her from the numberless museums that cover her like so many graveyards.2

With the following kinds of ideas expounded in the Founding Manifesto of 1909, Marinetti quickly attracted the allegiance of a group of other artists, initially mostly painters, and the Futurist movement began to grow.

We intend to sing the love of danger, the habit of energy and fearlessness.

Courage, audacity, and revolt will be essential elements of our poetry.

... We affirm that the world's magnificence has been enriched by a new beauty: the beauty of speed. A racing car whose hood is adorned with great pipes, like serpents of explosive breath - a roaring car that seems to ride on

grapeshot is more beautiful than the *Victory of Samothrace*.

... Except in struggle, there is no more beauty. No work without an aggressive character can be a masterpiece. Poetry must be conceived as a violent attack on unknown forces, to reduce and prostrate them before man.

We stand on the last promontory of the centuries! ... Why should we look back, when what we want is to break down the mysterious doors of the Impossible? Time and Space died yesterday. We already live in the absolute, because we have created eternal, omnipresent speed.

... We will sing of great crowds excited by work, by pleasure, and by riot; we will sing of the multicoloured, polyphonic tides of revolution in the modern capitals; we will sing of the vibrant nightly fervour of arsenals and shipyards blazing with violent electric moons; greedy railway stations that devour smoke-plumed serpents; factories hung on clouds by the crooked lines of their smoke; bridges that stride the rivers like giant gymnasts, flashing in the sun with a glitter of knives; adventurous steamers that sniff the horizon; deep-chested locomotives whose wheels paw the tracks like the hooves of enormous steel horses bridled by tubing; and the sleek flight of planes whose propellers chatter in the wind like banners and seem to cheer like an enthusiastic crowd.³

Futurist music was initially "headed" by Francesco Balilla Pratella (1880-1955). Although essentially a fairly conventional musician, he was attracted to Futurism especially through his dislike of the conservative politics of the Italian musical scene. Pratella's own first *Manifesto of Futurist Musicians*⁴ produced in 1910, made comment on several contemporary European composers (praising the work of Elgar, Mussorgsky, Sibelius and Richard Strauss, though qualifying his approval of the latter as an innovator) with comments on the "aridity, commercialism and banality of his spirit with harmonic

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³ Ibid., pp. 21-22.

affectations and skilful, complicated and ostentatious acoustics . . ." of Strauss's music.

Pratella was critical of Debussy, not so much for what he acknowledged were Debussy's genuine attempts to "fight the past valiantly", but rather for the aesthetic results of the music, and what he considered to be Debussy's "systematic" methods of composition.

... he [Debussy] is not always able to mask the scanty value of his one-sided themes and rhythms and his almost total lack of ideological development. This development consists, as far as he is concerned, in the primitive and infantile periodic repetition of a short and poor theme, or in rhythmic, monotonous and vague progressions. Having returned in his operatic formulae to the stale concepts of Florentine chamber music which gave birth to melodrama in the seventeenth century, he has still not yet succeeded in completely reforming the music drama of his country.\(^6\)

Pratella's own feeling of the desire for musical freedom can be seen in this part of the 1910 manifesto:

The liberation of individual musical sensibility from all imitation or influence of the past, feeling and singing with the spirit open to the future, drawing inspiration and aesthetics from nature, through all the human and extra-human phenomena present in it. Exalting the man-symbol everlastingly renewed by the varied aspects of modern life and its infinity of intimate relationships with nature.\(^7\)

Others involved in the musical realisation of the ideals of Futurism were Franco

\(^5\) Ibid., p. 32.
\(^6\) Ibid., p. 32.
\(^7\) Ibid., p. 37.
Casavola (1891-1955), Nuccio Fiorda (1897-1975), Silvio Mix (1900-1927), Antonio Russolo (1877-1942) and, most importantly, Luigi Russolo (1885-1947). The Futurist musicians were highly motivated and a large number of manifesti and articles were produced between 1910 (beginning with Pratella’s manifesto) and the late 1930’s - with the last writings on the subject by Luigi Russolo.\(^8\)

The document which has remained the most significant expression of the Italian Futurist’s musical aims was produced by Luigi Russolo in 1913, entitled L’Arte dei Rumori (The Art of Noise).\(^9\) Although trained as a painter (his earliest contributions to the Futurist movement were paintings, mostly from 1911-13), Russolo devoted the largest part of his working life to Futurist music. In the manifesto L’Arte dei Rumori, Russolo described traditional "music" as being a sound world divorced from everyday experience (life) and as a form which existed in something of a sacred environment. He considered a direct relationship should exist between the sounds of the human environment and the harmonic, timbral and dynamic properties of his musical language.

The need for and the search for the simultaneous union of different sounds (that is to say of its complex, the chord), came gradually: the assonant common chord was followed by chords enriched with some random dissonances, to end up with the persistent and complicated dissonances of contemporary music.

First of all, musical art looked for the soft and limpid purity of sound. Then it amalgamated different sounds, intent

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upon caressing the ear with suave harmonies. Nowadays musical art aims at the shrillest, strangest and most dissonant amalgams of sound. Thus we are approaching noise-sound. This revolution of music is paralleled by the increasing proliferation of machinery sharing in human labour. In the pounding atmosphere of great cities as well as in the formerly silent countrysides, machines create today such a large number of varied noises that pure sound, with its littleness and its monotony, now fails to arouse any emotion.

To excite our sensibility, music has developed into a search for a more complex polyphony and a greater variety of instrumental tones and colouring. It has tried to obtain the most complex succession of dissonant chords, thus preparing the ground for Musical Noise. 10

It is important to point out that noise was considered by the Futurists to be an extension of abstract musical expression. Noise 11 was regarded as valid material in composition for hedonistic reasons, not for its directly metaphorical potential in the form and expression of a work (in a programmatic or documentary sense) but in a general sense. Because the sounds of machinery were a contemporary phenomenon, the manipulation of sounds similar to them as "musical noise" was considered highly relevant as a contemporary expression.

Noise accompanies every manifestation of our life. Noise is familiar to us. Noise has the power to bring us back to life. On the other hand, sound, foreign to life, always a musical, outside thing, an occasional element, has come to strike our ears no more than an overly familiar face does our eye. Noise, gushing confusely and irregularly out of life, is never totally revealed to us and it keeps in store innumerable surprises for our benefit. We feel certain that in selecting and

10 Ibid., p. 4-5.

11 The Futurists recognised "noise" as being caused by aperiodic vibrations, but also associated the term (as part of their political motivation) with the manifestation of loud and complex sounds produced by the machine technology of factories and motors.
Environmental Sound as Material for Composition: Background

coordinating all noises we will enrich men with a voluptuousness they did not suspect.

Although the characteristic of noise is to brutally bring us back to life, the art of noises must not be limited to a mere imitative reproduction. The art of noises will extract its main emotive power from the special acoustic pleasure that the inspired artist will obtain in combining noises.\textsuperscript{12}

We want to score and regulate harmonically and rhythmically these most varied noises. Not that we want to destroy the movements and irregular vibrations (of tempo and intensity) of these noises! We wish simply to fix the degree or pitch of the predominant vibration, as noise differs from other sound in its irregular and confuse vibrations (in terms of tempo and intensity).\textsuperscript{13}

In his manifesto Russolo listed six categories for noise which included not only mechanical noise of the human environment, but natural noise sounds as well. These six categories were devised as an aid to the composition of works in which different noises were combined.

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<td>roars</td>
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<td>claps</td>
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<td>noises of falling water</td>
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<td>whispers</td>
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<td>rustlings</td>
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<td>grumbles</td>
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\textsuperscript{12} Ibid., p. 10

\textsuperscript{13} Ibid., p. 9.
Environmental Sound as Material for Composition: Background

grunts
gurgles

5

percussive noises
using metal, wood, skin, stone, baked earth etc.

6

animal and human voices:
shouts, moans, screams, laughter, rattlings, sobs

We have included in these 6 categories the most characteristic fundamental noises: the others are hardly more than combinations of them. The rhythmic movements of a noise are infinite. There exists not only a predominant pitch, but as well a predominant rhythm around which more secondary rhythms are equally perceptible.\(^\text{14}\)

To this end, Russolo (in conjunction with his assistant - a painter named Ugo Piatti) designed and constructed a family of new, specialised instruments in order to produce the "noises" he required for his compositions. These were called intonarumori (noise-intoners)\(^\text{15}\) and included a number of instruments which produced individual noise sounds such as the "scoppiatore" (exploder), the "ronzatore" (buzzer), the "crepitatore" (crackler), the "stropicciatore" (scraper) and the "sibilatore" (hiss or whistler). These were demonstrated publically for the first time at the Storchi Theatre in Modena on June 2

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\(^\text{14}\) Ibid., p. 10-11.

Environmental Sound as Material for Composition: Background

1913\textsuperscript{16}, after which a violent debate ensued, wherein Pratella and Marinetti defended Russolo's instruments against a hostile audience. This was followed by a concert at Milan's Red House on August 11 1913, where the following compositions were premiered: \textit{Il Risveglio di una Città} (The Awakening of a City), \textit{Convegno d'Automobili d'Aeroplani} (Meeting of Automobiles and Aeroplanes), \textit{Si Pranza sulla Terrazza dell'Hotel} (Dining on the Hotel Terrace) and \textit{Combattimento nell'Oasi} (Conflict on the Oasis).

The orchestra comprised 15 intonarumori:\textsuperscript{17}

- 3 buzzers
- 2 gurglers
- 2 bursters
- 1 shatterer
- 1 thunderer
- 1 shriller
- 3 whistlers
- 1 snorter
- 2 rustlers

Further concerts took place in 1914 in Milan (April 21)\textsuperscript{18}, London (June 15) and Genoa\textsuperscript{19}, and in 1921 in Paris (June 17-24)\textsuperscript{20}. These concerts were not without controversy - after the Milan concert of 1914 in the Teatro del Verme, Russolo was actually brought to trial.


\textsuperscript{17} Ibid., p. 15.

\textsuperscript{18} Source: Russcol, Herbert. \textit{The Liberation of Sound}. Prentice Hall, Englewood Cliffs, New Jersey, 1972, p. 68. \textit{[The Liberation of Sound} (1972)].


\textsuperscript{20} Source: \textit{The Liberation of Sound}. (1972), p. 68.
After the afternoon rehearsal the performance had been banned by the police on the grounds that it would create a public disturbance, and it was on this occasion that the day was saved by the intervention of two parliamentary deputies, and of that some Maestro [Umberto] Giordano [a "respectable" musician] who had been reviled in Pratella’s manifesto. In spite of the dignified appearance of the musicians in their evening dress complete with gardenia buttonholes, there was the expected commotion, and Russolo finished up in court for striking the Honourable Agostino Cameroni, who had insulted and defamed both him and Futurism in the Catholic paper L’Italia. He was acquitted.\textsuperscript{21}

The concert, which was part of a "Futurist Evening" (serata futurista) involved eighteen intonarumori and featured the compositions The Awakening of a City, Dining on the Hotel Terrace and Meeting of Automobiles and Aeroplanes. Prior to this, in April 1914, there had been a private demonstration of music with eight or nine of the intonarumori at the home of Marinetti before a select, invited audience which included Stravinsky and Diaghilev.

Stravinsky was apparently very excited by the sounds of Russolo’s new instruments,\textsuperscript{22} and other major contemporary composers who were apparently interested in the noise concerts and the new instruments were Ravel, Milhaud, Honegger and Varèse (although Varèse later rejected the Futurist aesthetic of music) these having seen Russolo’s work in Paris (where Russolo lived after the Second World War) - although the Paris concerts too, took place amid great controversy.


\textsuperscript{22} See Ibid., pp. 117-118 for further details of this.
Futurist evenings were an effective and characteristic means for the Futurists to present their work and ideas. These were:

... a combination of theatre, concert, political assembly, discussion and riot. The theatres of cities up and down Italy were the regular venues for these events, since Marinetti realized that the theatre was Italy's most popular form of entertainment and a far more effective way of reaching the masses than the bookshops and news kiosks. Once a Futurist Evening had been announced in a city it was awaited as an event to be experienced at all costs. The initiates of whatever city it was would meet Marinetti and his friends at the station and carry them in triumph to their hotel. The police were always on the alert for trouble for hours before the Evening began, and the theatre was usually heavily surrounded by reinforcements, thus creating the desired tone of tension. The theatre was always packed an hour before the performance was due to begin, with insults and tomatoes already flying.

The Evening invariably began with Marinetti and his friends, protected from attack by the massive weight of the poet Armando Mazza, hurling insults at the host city and its illustrious men. The police rarely moved to protect the Futurists from their audiences. In fact, in Bologna on one occasion it seemed that the police too had joined the three thousand who attacked the eleven Futurists. 23

In the 1920's Russolo continued to develop his intonarumori making them more elaborate and combining their aural characteristics but he appears, however, to have eventually lost heart in his project and by 1941 had resumed painting. None of the instruments have survived as they were all destroyed while in storage in Paris during the second World War. 24

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24 Source: Ibid., p. 348.
The Futurist movement was an important early attempt to emulate, very directly, the noise sounds of the human environment and to manipulate them in musical composition. It is difficult to assess exactly how much influence the work of Russolo and others had on the continuing development of such aims in music. However, the efforts of their movement stand as a notable example of early efforts to compose with sounds which, while not actual environmental sounds, were sounds which stemmed directly from the experience of environmental phenomena and, in particular, those which were embodied in the particular sonic characteristics of the time - through technology and speed.

1.3 Edgard Varèse

1.3 (a) Sound-masses and the vision of new media

Edgard Varèse (1883-1966) was one of the most significant figures whose work contributed not only to the development of conventional instrumental music into areas of unprecedented rhythmic, melodic, harmonic and gestural complexity, but also to the actual realisation of electroacoustic music as a working medium. "A Varèse Chronology"\textsuperscript{25} by Chou Wen Chung gives an outline of the way the career of Varèse developed initially from that of a composer/conductor to that of a composer of electroacoustic music.

From an early age Varèse had been interested in sonority and unusual sounds and,

\textsuperscript{25} Chou wen Chung. "A Varèse Chronology". Perspectives of New Music, 1966 v. 5, n. 1, pp. 7-10.
near the end of his life, in an interview with Gunther Schuller in 1965, he said that his chief influences as a composer were natural objects and physical phenomena:

I was not influenced by composers as much as by natural objects and physical phenomena. As a child, I was tremendously impressed by the qualities and character of the granite I found in Burgundy, where I often visited my grandfather. There were two kinds of granite there, one grey, the other streaked with pink and yellow. Then there was the old Romanesque architecture in that part of France: I used to play in one of the oldest French churches - in Tournus - one that was started in the sixth century and built in the purest Romanesque style. And I used to watch the old stone cutters, marveling at the precision with which they worked. They didn’t use cement, and every stone had to fit and balance with every other. So I was always in touch with things of stone and with this kind of pure structural architecture - without frills or unnecessary decoration. All of this became an integral part of my thinking at a very early stage.

Varèse possessed a creative imagination with ideas which, for a considerable period of time, extended beyond the resources of traditional Western musical instruments and their conventional modes of sound production and combination. This led him to seek creative outlets through the new twentieth century technologies of electronics. He described the concepts and structuring processes of his work in terms of ideas such as: "expansion", "projection", "interaction", "penetration" and "transmission". He sought to create and control the growth and motion of "sound-masses" in space through processes such as those listed above - all of which stem essentially from the fact that he approached

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27 Ibid., p 34.
Environmental Sound as Material for Composition: Background

composition with a view of "sound as living matter."\footnote{Chou Wen Chung. "Open Rather than Bounded". Perspectives of New Music, v. 5, n. 1, 1966, p. 1.}

When new instruments will allow me to write music as I conceive it, taking the place of the linear counterpoint, the movement of sound-masses, of shifting planes, will be clearly perceived. When these sound-masses collide the phenomena of penetration or repulsion will seem to occur. Certain transmutations taking place on certain planes will seem to be projected onto other planes, moving at different speeds and at different angles. There will no longer be the old conception of melody or interplay of melodies. The entire work will be a melodic totality. The entire work will flow as a river flows.

Today with the technical means that exist and are easily adaptable, the differentiation of the various masses and different planes as well as these beams of sound, could be made discernible to the listener by means of certain acoustical arrangements. Moreover, such an acoustical arrangement would permit the delimitation of what I call Zones of Intensities. These zones would be differentiated by various timbres or colors [sic] and different loudnesses. Through such a physical process these zones would appear of different colors [sic] and of different magnitude in different perspectives for our perception. The role of color [sic] or timbre would be completely changed from being incidental, anecdotal, sensual or picturesque; it would become an agent of delineation like the different colors on a map separating different areas, and an integral part of form. These zones would be felt as isolated, and the hitherto unobtainable non-blending (or at least sensation of non-blending) would become possible.

In the moving masses you would be conscious of their transmutations when they pass over different layers, when they penetrate certain opacities, or are dilated in certain rarefactions. Moreover, the new musical apparatus I envisage, able to emit sounds of any number of frequencies, will extend the limits of the lowest and highest registers, hence new organizations of the vertical resultants: chords, their arrangements, their spacings, that is, their oxygenation. Not only will the harmonic possibilities of the overtones be revealed in all their splendor but the use of certain interferences created by the partials will represent an appreciable contribution. The never before thought of use of the inferior resultants and of the differential and additional
Environmental Sound as Material for Composition: Background

sounds may also be expected. An entirely new magic of sound!

(from a lecture given at Mary Austin House, Santa Fe, 1936.)

In his work for conventional media such as Hyperprism (1922), Ameriques (1922), Octandre (1923), Intègales (1924) and Ionisation (1931) Varèse was able to go some way toward the realisation of his conception of music, with extensive use of asymmetrical rhythmic groupings (often with instruments in groups of identical articulation but with vastly differing voice-leading), abrasive and extreme dynamics, syncopations, non-tonal harmonic combinations and extreme changes in instrumental register. In this short extract from Octandre (Example 1), can be seen the way in which Varèse created "static" blocks of sound, through which individual lines could "penetrate".

Ionisation (1931), which is written entirely for percussion instruments (tuned and non-tuned), has become something of a classic of music of this century as well as a tour de force for ensembles. As the first work composed for percussion ensemble alone (including sirens of various sizes), it has exerted a seminal influence on the liberation of percussion instruments as valid sonorities in their own right and further demonstrates the ideal of Varèse to work with "natural" kinds of sounds - with textures being created from aggregates of the intrinsically complex harmonic spectra of many of the instruments used. In Ionisation Varèse works with his characteristic "sound-masses", the movement of single lines through these masses and the extensive use of asymmetrical subdivisions of the beat in superimposed and juxtaposed rhythmic patterns, (Example 2).

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Example 1: Varèse: Octandre.
Example 2: Varèse: Ionisation.
During the late 1920's and 1930's, Varèse continued to search beyond conventional and traditional media, for instruments which could more fully realise his musical ideals and concepts of sound-material. He spoke of his desire to use the "total sonic resources available to us", and it would appear to be such a desire which continued to drive him to search not only for new ways of using the sounds of existing instruments, but also for new instruments, in the effort to find suitable media technically capable of achieving his aims.

In a lecture given at the University of Southern California in 1939, in consideration of the possibilities of the development of mechanical or electronic devices suitable for the realisation of his creative concepts, he said:

And here are the advantages I anticipate from such a machine: liberation from the arbitrary, paralyzing tempered system; the possibility of obtaining any number of cycles or if still desired, subdivisions of the octave, consequently the formation of any desired scale; unsuspected range in low and high registers; new harmonic splendors obtainable from the use of sub-harmonic combinations now impossible; the possibility of obtaining any differentiation of timbre, of sound-combinations; new dynamics far beyond the present human-powered orchestra; a sense of sound-projection in space by means of the emission of sound in any part or in many parts of the hall as may be required by the score; cross rhythms unrelated to each other, treated simultaneously, or to use the old word, "contrapuntally" (since the machine would be able to beat any number of desired notes, any subdivision of them, omission or fraction of them) - all these in a given unit of measure or time which is humanly impossible to attain.  


In fact, as early as 1927, Varèse had been exploring the possibilities of developing an electronic musical instrument for composition. In 1927 he began his association with Harvey Fletcher (of Bell Telephone Laboratories) and René Bertrand (French inventor or the "dynaphone") with the express aim of developing an electronic instrument which would satisfy him, and in 1933 Leon Theremin (Russian inventor) constructed two electronic instruments to Varèse’s specifications for his new work Ecuatorial. However, Varèse’s attempts to gain the funding and support he needed for the continuation of such work were continually frustrated, and in the years between the composition of Ecuatorial (1932-34) and 1953, Varèse wrote little music and felt increasingly frustrated in his attempts to further develop the possibilities he knew to exist in the use of electronics. In 1953, the gift of an Ampex tape recorder enabled Varèse to begin composing with new vigour, the chief results of this being a major work for orchestra and tape - Déserts (1954) - and the electroacoustic work Poème électronique (1958).

1.3 (b) The Poème électronique

I am fascinated by the fact that through electronic means one can generate a sound instantaneously. On an instrument played by a human being you have to impose a musical thought through notation, then, usually much later, the player has to prepare himself in various ways to produce what will - one hopes - emerge as that sound. This is all so indirect compared with electronics, where you generate something "live" that can appear or disappear instantly and unpredictably. Consequently, you aren’t programming something musical, something to be done, but using it directly, which gives an entirely different dimension to musical space and projection. For instance, on the use of an oscillator, it is

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not a question of working against it or taming it, but using it directly, without, of course, letting it use you. The same pertains to mixing and filtering. To me, working with electronic music is composing with living sounds, paradoxical though that may appear.\textsuperscript{33}

This statement made in 1965 is indicative of the way in which Varèse's attitude towards sound as "living matter" led him to the use of electroacoustic media - serving not only as a medium capable of allowing him to attempt serious realisation of his musical ideals and concepts, but also as a medium in which the compositional process felt appropriate to the nature of the sounds. The statement also closely parallels the notions of Pierre Schaeffer towards musique concrète and conventional work (which will be further discussed later in this chapter), in the sensation of the physical presence of sounds in the creative process of musique concrète, as opposed to the "imagined" or "projected" physicality of sounds in the making of conventional music.

In 1956, Varèse was invited by Le Corbusier to create an electroacoustic work for the Philips pavilion at the 1958 World's Fair in Brussels.\textsuperscript{34} Le Corbusier's own concept for the pavilion was that he would create an "electronic poem", the pavilion being the "vessel" which contained the electronic poem. In fact, Le Corbusier created "Une grande poème audio-visuel",\textsuperscript{35} which included the huge concrete structure of the pavilion itself, slides of a wide range of images projected onto the walls and electroacoustic music by


\textsuperscript{35} Rostand, Claude. \textit{Varèse}. CBS 575695 recording, sleeve notes.
Varèse (the Poème électronique) and Iannis Xenakis, who also collaborated with Le Corbusier in the architecture of the pavilion.

Le Corbusier designed the pavilion in the exterior form of a triangle tent, with an interior, in his own words, in the form of a cow's stomach. The outcome was a series of hyperbolic and parabolic curves, and it was from these that Varèse's music, which he called "organized sound", emanated unceasingly through countless loudspeakers. At the same time one could see projected images that Le Corbusier had himself selected - paintings, photographs, written characters and montages - in respect of which the two artists had attempted no matching of any sort between image and sound.³⁶

The sound materials used by Varèse for the Poème électronique are varied and wide-ranging in their sources, including organ chords, percussion sounds, machine and clock sounds, bells and human voices, as well as oscillators producing sine tones. Although there is some technical manipulation of these sounds (producing abstract sonorities) many of the sounds are clearly recognisable and the work possesses skilful flow and mediation between it's materials. The following comments by Karlheinz Stockhausen (with comments by Karl H. Wörner) were made in relation to the Poème électronique, which may well have exerted considerable influence of Stockhausen's electronic works of the 1960's such as Telemusik (1966) and Hymnen (1966/67).³⁷


³⁷ See ibid., p. 138, for discussion of this possibility.
[Stockhausen writes]:

"Varèse is alone in his generation in having composed a work of electronic music and furthermore in having heralded in this Poème a modern formulation of compositional relationships whose true significance can only today be recognized: namely the sequential presentation and superimposition - even though sometimes abrupt and unmediated - of events of a heterogeneous nature (for instance, extremely realistic events, events resembling musical hoardings, and freely invented events)."

"Anyone living today - Varèse was at the time living in New York - is confronted daily with the hurtling together of all races, all religions, all philosophies, all ways of life... of all nations. In works by the musician Varèse this bubbling of the cauldron is aesthetically portrayed... New York, that prime blueprint for a world society, is without question an indispensable experience for the contemporary artist. Ideas one might have about possible integration, about a coherent unification, or about possible syntheses of the influences issuing from all parts of the globe, all these must be tested against living experience if they are to lay claim to any truth."

Varèse remains a central figure in the historical basis underlying the realisation and consolidation of an aesthetic of new music which incorporates natural sounds. As a composer, his place in the development of the musical language of this century is significant not only for his contribution to the repertoire, but also for the consistency, strength and longevity of his aims and ideals. His aesthetic sense (the identification with and influence of natural and physical phenomena, the desire to work with "living" sounds and to compose from "inside" those sounds, and the view that all sounds as acoustical information or "atmospheric disturbance" are valid as compositional material), shows

38 Ibid., p. 139.

Environmental Sound as Material for Composition: Background

Varèse to have been not only a visionary, through his embracing within musical expression the full range of the sound world of the human environmental experience, but also as a pioneer in the practice of the electroacoustic medium - which was to offer technical solutions to the realisation of concepts and ideals that he had held all of his life.

As a musician of singular vision, Varèse was an individualist:

I have been called, erroneously, both a Futurist and a Dadaist composer.

I have always avoided groups and isms . . .

The futurists believed in reproducing sounds and noises literally; I believe in the metamorphosis of sounds into music. As for the Dada movement: though I have had good and very clever Dadaist friends, Tzara, Duchamp, Picabia, I was not interested in tearing down but in finding new means by which I could compose with sounds outside the tempered system, which existing instruments could not play. Unlike the Dadaists I am not an iconoclast.  

Initially his reaction to Futurist ideas was positive, as he responded to the notion of extending art out of "worn-out" formulas and allowing the phenomenon of "modern life" to be directly embodied in new work. In addition to this, he empathised with Futurism in its concern for freedom from excessively regularised rhythmic invention saying:

Rhythm is too often confused with metrics . . . Rhythm is the element of stability in a work - the generator of form.  

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Environmental Sound as Material for Composition: Background

However, Varèse subsequently became disenchanted with Futurist music, criticising its desire to replicate the mechanical and "technological" noise sounds which were at the base of their inspiration - for direct imitation was not an ideal that belonged to Varèse: "The futurists ... imitate, an artist transmutes".\textsuperscript{42}

1.4 Percy Grainger and Free-Music

Australian composer Percy Grainger (1882-1961) spent most of his life concerned with a search for the physical realisation of what he termed "free-music", which he briefly described as "scaleless, pulseless music". As early as the age of ten, Grainger began to wonder why music could not be "more like the movement of his boat and of the water which lapped against its side as he was taken for an afternoon out on Melbourne’s Albert Park Lake".\textsuperscript{43}

Personally I have heard free-music in my head since I was a boy of eleven or twelve in Auburn, Melbourne. It is my only important contribution to music. My impression is that this world of tonal freedom was suggested to me by wave-movements in the sea that I first observed as a young child at Brighton, Victoria, and at Albert Park, Melbourne.\textsuperscript{44}

Central to Grainger's conception of free-music was the idea of "gliding" pitch

\textsuperscript{42} Quoted in ibid., p. 106.


without the use or suggestion of metrical pulse.

It seems to me absurd to live in an age of flying and yet not be able to execute tonal glides and curves - just as absurd as it would be to have to paint a portrait in little squares (as in the case of mosaic) and not be able to use every type of curved lines. If, in the theatre, several actors (on the stage together) had to continually move in a set metrical relation to one another (to be incapable of individualistic, independent movement) we would think it ridiculous; yet this absurd goose-stepping still persists in music. Out in nature we hear all kinds of lovely and touching "free" (non-harmonic) combinations of tones; yet we are unable to take up these beauties and expressiveness into the art of music because of our archaic notions of harmony.45

Grainger insisted that in mechanical means lay the only way to fully realise his "free-music". In his conventional music, however, Grainger often used changing and asymmetrical time-signatures, as well as complicated rhythmical subdivisions (frequently linked to his interest in, and devotion to, the accurate transcription of British folk music tunes with all the rhythmic nuances of their performance), notably in the sketches for Sea Song (1907/1922/1946)46 which was an attempt to realise some "free-music" ideas in conventional notation. In these sketches, the following progression of time-signatures can be found (fast tempo):

\[
\begin{array}{cccccccccccc}
1 & 7 & 3 & 5 & 5 & 3 & 7 & 3 & 5 & 9 & 3 & 7 & 5 \\
4 & 32 & 32 & 64 & 16 & 8 & 64 & 32 & 64 & 32 & 8 & 64 & 16
\end{array}
\]

this in an effort to produce "beatless" music.


46 This work exists only as sketches. For reference see The Percy Grainger Companion. Op. cit., p. 226.
Grainger realised that this kind of writing was reaching beyond the capabilities of human performance, and began the building of machines which he designed (with the technical and practical help of Burnett Cross, a lecturer in Physics at Columbia University) for the production of "free-music", eliminating the need for instrumental performers in the conventional sense, eliminating the need for "interpretation" and freeing himself, as a composer, of problems of performance practicality.

...free-music demands a non-human performance. Like most true music, it is an emotional, not a cerebral, product and should pass direct from the imagination of the composer to the ear of the listener by way of delicately controlled musical machines. Too long has music been subject to the limitations of the human hand, and subject to the interfering interpretations of a middle-man: the performer. A composer wants to speak to his public direct. Machines (if properly constructed and properly written for) are capable of niceties of emotional expression impossible to a human performer. That is why I write my free music for theremin - the most perfect tonal instruments I know. In the original scores each voice (both on the pitch-staves and on the sound-strength staves) is written in its own specially coloured ink, so that the voices are easily distinguished, one from the other.48

From 1946, Grainger began a series of serious attempts to construct a machine for the performance of "free-music". Several machines were eventually made, initially based around a Duo-Art player piano (the piano roll facilitating performance) and using the reeds from reed organs, which were tuned to yield groups of tones with intervals smaller than a semitone. This was done in an effort to produce "gliding" motion of pitch.


To produce my closer intervals, and the impression of gliding intervals, I believe it would be enough if I used three of four divisions (keys) to the half-tone. Thus the notes C, C sharp, D, on the usual keyboard and on the paper roll, would have to be changed to three versions of C on my special machine (producing C, somewhat-raised C, and much-raised C). Similarly the notes D sharp, E, F, on usual keyboard and paper roll, would have to become C sharp, somewhat-raised C sharp, and much-raised C sharp, on my special machine...

With an old instrument of the air-roll operated Aeolian type, I think I would be able to undertake the necessary preliminary experiments - finding out how close intervals would need to be to produce a gliding effect and many other small details of effect in the new musical medium...

Later, Grainger abandoned the link with the keyboard and isolated the idea of the piano roll as the means of controlling such a machine. A further "free-music" machine consisted of appropriately tuned reed-pipes which were played with an air-stream modulated by a large cut paper roll. Then, in 1952, he began work on an electroacoustic instrument which used photo-electric cells controlled by a large roll of plastic sheeting with a painted pitch control graph to modulate the pitch and amplitude of electronic oscillators.

Though Grainger's "free-music" is not a form which shows direct use of the sounds of the environment or sounds which directly imitate the environment, it nevertheless stemmed from the composer's direct response and identification with natural sounds and patterns of movement. As well as this, the idea of "free-music" shows that

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albeit through the extension of conventional conceptions of musical instruments, Grainger sought to engender a kind of music which found parallels in the free-moving diversity of environmental sound and the natural flowing motion of many physical phenomena. Like the Futurists, he constructed his own instruments in order to realise the ideas peculiar to him but from a more personal basis - that is, a conception of music which stemmed from his own subjective preference, rather than a political notion of how art and music should reflect and stem from life. The observance of this kind of re-thinking of musical language and the re-appraisal of the relationship between the physical world and the art object is important in the move towards a more direct use and manipulation of environmental sound as a sonic art than had previously been apparent.

Grainger's terminology "free-music" was not unprecedented. In an article which appeared in The Blaue Reiter Almanac, Nikolai Kulbin (1868-1941), an amateur painter and musician and important personality in Russian artistic circles at the turn of the century, put forward a short manifesto for what he termed "Free Music". In this, he espoused a conception of music which included the use of quarter and eighth-tone intervals. Kulbin described the sensation of groups of such intervals in close proximity as being "extremely exciting". Stating that:

In such processes the irregular beat and the interference of tones (which is similar to that of light) are of great significance.

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The vibration of close connections, their unfolding, their manifold play, make the representation of light, colors [sic], and everything living much more effective than customary music does.\textsuperscript{52}

For the realisation of such structures he indicated the value of existing instruments capable of producing such micro-intervals (giving examples of the voice, double bass and cello - without mentioning other fretless stringed instruments), called for the retuning or modification of other standardised instruments (such as the harp, keyboards and fretted stringed instruments) and for the construction of new instruments (such as glass resonators tuned with different amounts of liquid inside), as well as suggesting methods of graphic notation.

Kulbin related his conception of "Free Music" to the perception of environmental sound as a way of emphasising the morphological and spectral complexity of natural sounds, stemming from a desire to integrate - into music - intervallic relationships which more closely resembled noise-like sounds, as they occur in nature, than is possible with the discrete pitch of the dodecaphonic scale. This was qualified by him, however, in saying of his environmental analogy:

\ldots [this does not] lead to a photographic reproduction of life, but it facilitates stylization.\textsuperscript{53}


\textsuperscript{53} Ibid., p. 141.
1.5 John Cage: Art as Life

John Cage (born 1912) has had a remarkable impact on the avant-garde of music. His remarkable vision and conception of musical forms and materials was evidenced early in his career.

I believe that the use of noise . . . to make music . . . will continue and increase until we reach a music produced through the aid of electrical instruments . . . which will make available for musical purposes any and all sounds that can be heard . . .

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

(From a talk given at a meeting of a Seattle Arts Society in 1930.)

Cage's use of environmental sounds in his works has come about largely through his desire to include the world of noises in musical composition. This has involved embracing in music the total world of sound, including sounds realised outside of the composer's specification - an idea which stems from the early 1950's onwards and links to Cage's notion of indeterminate musical structures being realised through chance processes.

Initially, Cage approached "noise" sounds through the use of found objects as percussion instruments. In the mid 1930's (1935 or 1936) Cage began to work with the

film maker Oscar Fischinger, who made abstract films articulated on pieces of music; initially these were conventional nineteenth century works, but later he asked Cage to write music specially for his films. Fischinger seems to have had some influence on Cage and his new sound world.

When I was introduced to him, he began to talk with me about the spirit which is inside each of the objects of this world. So, he told me, all we need to do to liberate that spirit is to brush past the object and to draw forth its sound. That's the idea that led me to percussion.55

All kinds of objects were sounded by Cage to discover their instrumental possibilities, sound sources from (in Cage's words) "a trash heap or a junkyard, a living room or a kitchen. . . we tried all the furniture we could think of . . . All noises interested me."56 Cage became fascinated with the world of noise sounds and the sounds of everyday objects. He was always testing objects around him for the sounds they would produce and wrote compositions for a percussion ensemble (which he formed specially) playing found objects, and later conventional percussion instruments as well.

Cage's development of the prepared piano in 1938 (with Baccanhal, music written for the dancer Syvilla Fort) stemmed from this same attitude towards sound,57 the initial desire being to allow the piano to produce noise-like or percussion-like timbres. While for


56 Ibid., p. 74.

Cage the influence of Henry Cowell\textsuperscript{58} in the use of the piano interior is acknowledged, the preparation of piano strings with screws, plastic and other items can be seen as an extension of Cage’s work with found-objects into the realms of conventional instrumental media.\textsuperscript{59}

In 1939, Cage realised \textit{Imaginary Landscape No 1}, a work which Cage has described as a piece of \textit{proto-musique concrète}. This work was made without the use of magnetic tape (which was not an available medium at the time), but used variable speed phono turntables playing records of constant and varying frequencies (used mainly for audio research) as well as cymbal and piano sounds. In Cage’s work, the prophecy of the 1937 document cited above was becoming a reality. In 1941 and 1942 he attempted the founding of an experimental music centre, of which the aim was to build a library of sounds recorded on cinema sound tape from which composers could draw on the material which would be catalogued and in 1942 Cage wrote:

\begin{quote}
Many musicians, the writer included, have dreamed of compact technological boxes, inside which all audible sounds, including noise, would be ready to come forth at the command of the composer. Such boxes are still located somewhere in the future. At present the choice is either to wait and lament the fact that they aren’t available now for experimental and musical purposes, or to continue to work with what "axes and buckets" can be found or made.\textsuperscript{60}
\end{quote}

\textsuperscript{58} Cowell, a pioneer of "inside piano" sounds and techniques such as playing directly onto the strings, taught Cage in 1933.

\textsuperscript{59} The use of modified and "inside piano" sounds was also an independently realised aspect of the early sound object work of Pierre Schaeffer. See Schaeffer, \textit{Solfège de l'objet sonore} [p. 22]. Companion recordings and booklet to Schaeffer. \textit{Traite des objets musicaux}. Editions de Seuil, Paris, 1966.

The "axes and buckets" mentioned are in reference to an article by Dr Vern O. Knudsen who in 1939 wrote of the possibilities for acoustical engineers to produce noise-making instruments, which he suggested would be more appealing to listeners than "instruments" such as a "fireman’s axe in a bucket." Cage’s response acknowledges the practical convenience he saw in readily available "instant" sound, while at the same time showing his determination to proceed with his aims, regardless of the lengths to which he had to go, in the embracing of all sounds into his musical language.

In 1942 Cage had pointed to what he considered might be the new compositional means necessary for the integration of noise and environmental sound into composition.

In writing for these sounds, as in writing for percussion instruments alone, the composer is dealing with material that does not fit into the orthodox scales and harmonies. It is therefore necessary to find some other organizing means than those in use for symphonic instruments. The sounds cannot be organized through reference to an underlying fundamental tone since such a tone does not exist. Each sound must be considered as essentially different from and independent of every other sound. A method analogous to the twelve-tone system may prove useful, but, in such a case, the "sound-row" would contain any number of elements. However, because of the nature of the materials involved, and because their duration characteristics can be easily controlled and related, it is more than likely that the unifying means will be rhythmic.61

Further works by Cage included the use of electroacoustic media, especially as a means of being able to use any conceivable sound. Early works of this type are Williams Mix (1952) and Fontana Mix (1958). In his version of Williams Mix, Cage made a "library" of sounds divided into six categories - country sounds, electronic or synthetic

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Environmental Sound as Material for Composition: Background

sounds, manually produced sounds, city sounds, wind produced sounds, and "small" (very quiet) sounds which required much amplification to make them audible. Williams Mix is a "tape montage" of these sounds, the composition involving the editing together of the sounds from each of the six categories, according to chance procedures derived from the I Ching.\(^{62}\)

A series of works which is particularly useful in looking at this aspect of Cage's work is that entitled Variations. These are works for any number of players and any means of performance, and show the way in which Cage's ideas of using any sound in any structure can be seen to be functioning interactively - that complete openness to the materials in a work is complemented by complete openness in the criteria by which they are combined and structured. In Variations IV (1963), for example, the score of the work consists of two pages of transparencies, one with dots, the other with a small circle. The dots are to be cut out and thrown at random onto a map of any area, the circle is also thrown onto the map and lines are drawn from the centre of the circle, intersecting with each of the dots. Sounds may then be taken by any means from any point or points along the lines from the area represented on the map. The dots and circle are then used in the same way on a plan of a performance space to denote the positioning of the sources of the collected or transferred sounds. Variations IV is a piece concerned with the random articulation of space, the use of an indeterminately derived structure to explore a given space and the use of indeterminately assembled sounds from unspecified locations with which to fill the space. The inherent freedom in the realisation of a structure in this work involves a similarity between the selection of sounds and the way in which they are

\(^{62}\) Described in ibid., p. 19.
organised - complete freedom with regard to the kinds of sound materials (drawn from any source) combined through a form which, by means of a structure derived by chance, allows for any combination of the sounds involved.

Cage has also attempted to integrate the areas of "non-volitional" environmental sounds and instrumental performance. To this end the distinction between "composed" and "environmental" sound is highlighted in the "silent" work 4'33" (1952) by Cage, in which a performer (usually piano) sits for the duration of the work (four minutes and thirty three seconds) with their instrument in front of an audience without actually playing. In making the determinate aspect of the piece (that is, the duration) silent, another sound world outside that of deliberately "played" music is revealed. Cage's piece allows all of the "incidental" sounds (humanly or otherwise produced) which can be heard in that space to enter into the work - through the context of what is normally associated with the focus of attention, listening. Sounds not intentionally made for the purpose of a musical expression are embraced in this piece, using the formality of the performance situation to generate an awareness of these sounds and to draw the listening experience out into the world of these sounds. The fact that a specific duration is required means that the incidental sounds are co-opted within a determined time-frame in a way usual to the finite temporal nature of a musical work and, of course, uniquely demonstrates Cage's view that all sounds are musical.

Environmental Sound as Material for Composition: Background

4'33" demonstrates then:

(1) that what would in the usual sense be regarded as extraneous sounds (which are always present) enter into the piece;

(2) that incidental sounds produced as a result of activities not necessarily intended to overtly contribute as musical or contrived gestures, have equal status as sonic elements. Or as Cage might put it, all sounds are allowed to be themselves;

(3) the singular importance of duration, as the only musical parameter that can be applied to both sound and silence.

This piece allows a listener to realise that "silence" itself is a relative, even conceptual value. When, in the context of the piece, the performer is regarded as being silent, the ongoing sounds of the environment (including those of the audience themselves) are present. However, human presence alone will always prevent this silence from being perceived as Cage has noted in that the body itself through the nervous system and circulatory system generates tangible sounds.

4'33" separates for the listener within the form of the work (that is, this is embodied within the materials of the piece) the difference between:

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64 In his description of his experience in the anechoic chamber at Harvard University; see Cage, John. A Year from Monday. Wesleyan University Press, Middletown, Connecticut, 1975, p. 134.
(1) "gestural music" (based around artifacts constructed specifically for the purpose of producing musical sounds); and,

(2) "life sounds" (which although no less related to gesture, exist as a result of natural action which may have nothing to do with the intentional production of sound).

The two, while separated at the level of their intention and purpose, are linked through the act of listening but utilising the conventional "contrived" means of achieving this in people (concert situation). By making the performance aspect all silence the other (incidental) sound world can be revealed, allowing an audience to become listeners in a broader sense. To leave behind the subjective or normal existence in which one does not always listen to the environmental or incidental sounds and to achieve a greater active aural awareness - listening within a temporal framework.

The visual aspect of the work is the element by which the temporal framework is defined (for instance, the performer seated at a piano) - the total world of sound which is tapped in this work as "co-opted" incidental sound is encased by the theatrical role of the performance. This may allow a more focused appreciation of the natural sound world for any listener and this type of listening experience may then extend beyond the defined temporal realms of 4'33".

Simon Emmerson has pointed to the two major influences of Cage's music - the area of method (chance procedures and indeterminacy) and material (the use of noise and
environmental sounds in music). The matter of Cage’s use of environmental sound in composition is best appreciated in terms of the concepts behind his methods. His use of environmental sounds is the result of the view that all sounds are of equal musical value, and that his own "ego" and subjective preferences should not be involved in the structuring of works. To this end Cage has no interest in the relationships between sounds (acoustic or symbolic) in the composition of his works.

These pieces, I said, are not objects, but processes, essentially purposeless. Naturally, then, I had to explain the purpose of having something be purposeless. I said the sounds were just sounds, and that if they weren’t just sounds that we would (I was of course using the editorial we) - we would do something about it in the next composition. I said that since the sounds were sounds, this gave people hearing them the chance to be people, centred within themselves, where they actually are, not off artificially in the distance as they are accustomed to be, trying to figure out what is being said by some artist by means of sounds. Finally I said that the purpose of the purposeless music would be achieved if people learned to listen. That when they listened they might discover that they preferred the sounds of everyday life to the ones they would presently hear in the musical program. That was all right as far as I was concerned.

Cage regards Pierre Schaeffer’s search for organising values in musique concrète (although attempted on the basis of the intrinsic qualities of the materials) to be an anachronistic imposition on the world of natural sounds.

... what always made me ill at ease with Schaeffer’s work from the very beginning was his concern for

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relationships - in particular the relationships between sounds. He could have taken advantage of various machines, but he never used them for anything more than to demonstrate the relationships between noises and tonality. That was always his problem. For example, the phonogene, he was convinced, had to run at twelve speeds; how could he not end up with anything but a twelve tone system? Even though he insisted that that was what he didn't want to do! It's the same problem with solfeggio. It's a mental tool, not a machine, but the result runs the risk of being the same thing. We inevitably fall back into sounds, in the "musical" sense of the term: noises which can go only with certain noises and not with others. Yet, what I wanted to accomplish was exactly the opposite: not the repetition of a situation to which we are accustomed and which can remain what it is without our feeling obliged to intervene, but an entirely new situation, in which any sound or noise at all can go with any other.67

Cage, then, rejects the notion of composition with environmental sound based on the inherent acoustic or referential qualities of the materials, as for him this interferes with the act of "letting sounds be themselves."

Cage's conception of "art as life" emphasises the real difference between Cage's view of the use and manipulation of environmental sound and that of the early European composers of "musique concrète", namely Pierre Schaeffer and those of the Groupe de Recherches Musicales (discussed later in this chapter). While Schaeffer's work centred on the search for relationships between sound objects based purely on their morphological and spectral characteristics with a view towards establishing a broadly applicable grammar to all "sound objects", Cage's view was to "allow" the structuring of sounds within a work to happen without the sounds being controlled at any stage in the process of composition by the subjective or perceptual preferences of the composer - just as in the environment (that

is, in life) sounds simply "happen" for the ears of the listener. This suggests, ultimately, the breaking down of conventional barriers between "art" and "life". 

In Cage's words:

If I want "life as art," I risk falling into aestheticism, because I would appear to be trying to impose something, a certain idea of life. It appears to me that music - such as I envision it, at least - imposes nothing. It can effectively change our manner of seeing, making us view everything around us as art. But that is not the goal. Sounds have no goal! They are, and that's all. They live. Music is this life of sounds, this participation of sounds in life, which may become - but not voluntarily - a participation of life in sounds. In itself, music does not obligate us to anything.68

Emmerson has demonstrated this clearly by comparing Cage's William's Mix to the Schaeffer/Henry work Symphonie pour un homme seul, showing that the types of sounds used in both are quite similar. The difference lies in the fact that the Schaeffer/Henry work is structured according to the intentionally realised preferences of the composers - while in Cage's work, preference and intention have been abdicated in favour of the realisation of a structure by means of the chance processes of the I Ching:

... while Schaeffer stresses the main human agency, Cage sees that as part of a much wider environment, embracing many random agencies of production; volition is totally absent from the origins of most of the sounds - at least volition to be part of the music!69


And adds... 

... there would be no reason for a composer of Schaeffer's group to avoid any of the sounds used in Cage's work - in practice, Cage's interest in sounds outside immediate human will and intention, lead to a greater emphasis on environmental sounds which were undoubtedly to "feed back" into the Paris studio in the works of Ferrari, Parmegiani and others in the 1960s.\(^0\)

Cage has also stated that the desire to control and consciously "compose" with sounds is an aspect of Varèse's work which did not appeal to him. Although he had heard, and enjoyed Varèse's music in the 1930's,\(^1\) it was Fischinger rather than Varèse who influenced Cage in the exploration of noise.

What I appreciate about Varèse is obviously his freedom in choosing timbre. He, along with Henry Cowell, has very greatly contributed to getting us used to the idea of a limitless tonal universe. No matter how refined Schoenberg's timbres may be, they hardly ever get away from the number twelve.

... While with Varèse, whatever his "organizational" [sic] notions may have been, you feel that everything is possible. Nevertheless, there is still in Varèse a prejudice towards controlling [sic] sounds or noises. He tries to bend sounds to his will, to his imagination. And that is what very quickly bothered us. We knew that he wouldn't let sounds be entirely free. What we were looking for was in a way more humble: sounds, quite simply. Sounds, pure and simple.\(^2\)

\(^0\) Ibid., p. 244.


\(^2\) Ibid., p. 74.
1.6 Pierre Schaeffer

1.6 (a) The advent of musique concrète

Pierre Schaeffer (born 1910, Nancy, France) occupies a singular and rather special place in the history of the development of electroacoustic music as the initiator of a musical form dubbed by him as musique concrète. The circumstances surrounding Schaeffer’s early work have been extremely well documented, by himself in his own extensive writings and in the commentaries of subsequent authors.73

While a full historical perspective shows that Schaeffer was not the first to manipulate or work with natural sounds through electroacoustic media,74 it was his work from 1948 to 1953 which was unprecedented as a central point of activity and influence in the electroacoustic medium. Schaeffer has produced not only a body of compositions, but also has written the largest single contribution to the literature on the subject of the early development of electroacoustic music; this in relation to his own musique concrète. A là recherche d'une musique concrète75, Traité des objets musicaux76, and La Musique Concrète77, are his major treatises on the subject of musique concrète.78

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Schaeffer, who began his professional career not as a musician but as a radio engineer and broadcaster with RTF (Radio-Diffusion-Télévision Française), started experimenting with a view to composition early in 1948 with the mixing and manipulation of natural sounds using the studios and large library of sound effects recordings at RTF - having, since 1942, already been responsible for a research unit at RTF devoted to the study of musical acoustics. He spent several months experimenting with the equipment and materials at his disposal, which included phonograph turntables, phonograph recorders (magnetic tape recorders were not yet a fully practical or available tool), mixers, and a large library of sound effects recordings. Then in April 1948 he produced his first work of musique concrète, Étude aux chemins de fer (railway study) in which he montaged the sound of trains.

By the end of 1948 Schaeffer had realised six works of musique concrète including, in addition to Étude aux chemins de fer, Étude aux tourniquets using the sounds of toy whistling tops (or tourniquets), xylophones, zanzis (African finger pianos) and four small bells as source material, Étude violette (Étude aux piano I) and Étude Noire (Étude aux piano II) using piano sounds as source material (played by Pierre Boulez), Étude aux Casseroles (Étude pathétique) using the sounds of saucepan lids twirling on a table top, accordions and harmonicas, the chanting of monks, Balinese music, canal boats, the piano,


Environmental Sound as Material for Composition: Background

human voices and coughing as source material, and Diapason Concertino using piano sounds recorded for Schaeffer by Jean-Jacques Grunenwald. On October 5 1948 all five of the Études were broadcast on French radio under the title of "Concert de bruits" - the first public presentation of musique concrète.

Though Schaeffer was not the first person to experiment with the manipulation of recorded sounds with a view to musical expression, he certainly did approach the new medium with a previously unheard of commitment and consistency. He was in fact the first to really begin a codification of a language of sonic art based on the manipulation of recorded sounds, and his creative and experimental persistence produced a stream of works as well as important writings. Lowell Cross has commented on Schaeffer's early work in relation to the experimenters and composers who preceded him in the exploration of the electroacoustic medium.

The innovation that distinguished Pierre Schaeffer's work from earlier experiments was his isolation of the sound event ("l'objet musical") by means of the recording process. The "compositional" techniques he employed to combine, repeat, transform, and organize his sound objects were a natural outgrowth of his long experience with the equipment of radio broadcasting. With this background, it was natural for him to view the significance of his work from a musical standpoint rather than as an application of technology.82

Schaeffer originated the term "musique concrète", as for him it described the nature


of the sound materials with which he worked, as well as the actual method of composing with recorded sounds. The creative process in musique concrète now involved physically extant sounds and, rather than proceeding from the conceptual notational basis identified with conventional music (and therefore the calculated projection of sounds ahead of their realisation), Schaeffer focused on the fact that working with recorded sounds dictated that materials be directly tangible to the ear at all stages in the process of composition. He summarised this attitude in an article in *Polyphonie*\(^3\) with the following graphic description:

Diagram 1: Schaeffer’s Summary of Musique Concrète and Conventional Music.

<table>
<thead>
<tr>
<th>MUSIQUE HABITUELLE (dite abstraite)</th>
<th>MUSIQUE NOUVELLE (dite concrète)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHASE I:</td>
<td>PHASE III:</td>
</tr>
<tr>
<td>Conception (mentale);</td>
<td>Composition (matérielle);</td>
</tr>
<tr>
<td>PHASE II:</td>
<td></td>
</tr>
<tr>
<td>Expression (chiffrée);</td>
<td></td>
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<tr>
<td>[calculation, encoding]</td>
<td></td>
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<tr>
<td>PHASE III:</td>
<td></td>
</tr>
<tr>
<td>Exécution (instrumentale)(^1)</td>
<td></td>
</tr>
<tr>
<td>(de l'abstract au concret)</td>
<td></td>
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<tr>
<td>[from the abstract to the concrete]</td>
<td></td>
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<tr>
<td>PHASE I:</td>
<td></td>
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<tr>
<td>Materiaux (fabrication)(^1)</td>
<td></td>
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<tr>
<td>(du concret à l'abstract)</td>
<td></td>
</tr>
<tr>
<td>[from the concrete to the abstract]</td>
<td></td>
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</tbody>
</table>

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Environmental Sound as Material for Composition: Background

The importance of Schaeffer’s early work is summarised by Lowell Cross and Barry Schrader:

It is interesting to consider that such a modest little piece, composed by reconstructing in time the sounds of trains, could have a position in music history. The significance of Etude aux chemins de fer results from the following attributes: 1. the act of composition was accomplished by a technological process, 2. the work could be replayed innumerable times in precisely the same manner, 3. the replaying was not dependent upon a human "performer", and 4. the basic elements were "concrete", thereby offering the listener a mode of audition quite different from that of perceiving "abstract" music. But as we have already noted, the outstanding feature of Schaeffer’s work was his establishment of a trend, one which was capable of development and increasing sophistication.84

Schaeffer developed a theory of composition based on available technology. His procedures and aesthetics were linked with his belief that the abstraction of any concrete sound was possible. Sounds could be removed from their usual context and changed by manipulation. This meant that any sound source could be used for musical purposes.85

Schrader adds that a feature of Schaeffer’s early work with gramophone technology was that one of the devices he used was the locked groove "boucle" disc which enabled sounds to be repeated over and over, allowing the building of metrical patterns, anticipating the later technique of tape loops possible with electromagnetic tape. This also functioned as a link for Schaeffer with the underlying metricality familiar in conventional


With the work of Pierre Schaeffer can be seen the beginnings of a defined musical language comprising the use and manipulation of recorded sounds, and a consideration of the organisational framework that would be derived from such materials. Unlike Cage, Schaeffer was concerned with the extrapolation of structural methods from the intrinsic qualities of the materials with which he worked.

1.6 (b) The Sound Object

Central to Schaeffer's conception of a language of musique concrète, is the idea of the "sound object" and this in itself stemmed from the nature of recording media, which engenders a process by which sounds are isolated from the presence of their physical sources - a process which, for Schaeffer, suggests that recorded sounds be regarded as acoustical phenomena in their own right. The notion of "sound object" seeks to define a self-contained acoustic event involving the initiation of sound and the associated resonances or continuation of the vibrating medium. This in itself is tied very much to Schaeffer's exploration of the attributes of sounding phenomena on the basis of the perceived energy input into the sounding medium, and the resultant acoustic response of that medium with the emergence of a particular morphology of sound - the way the acoustic event evolves in time. For Schaeffer, the important aspect of the "causality" of sound is the apparent relationship between the type of energy applied to the medium and

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86 See Heikenheimo, Seppo. The Electronic Music of Karlheinz Stockhausen. Suomen Musikkitieteellinen Seura Musikvetenskapliga Sällskapet I Finland, Helsinki, 1972, p. 79, for Knut Wiggen's comments on this aspect of Schaeffer's work.
the natural resonating properties of the medium which give rise to the "sound object". Thus, Schaeffer's conception of musique concrète is the way sounds themselves can be integrated in a language of composition without regard for recognition of the physical objects which produce the sounds.

In general, Schaeffer was concerned with describing three basic types of energy inputs in the production of sounds⁷⁷: pulses (single, short input of energy); sustained (a continual flow of energy); and iterative (repeated application of "pulse" inputs), as well as "hybrid" morphologies of sound which might combine continuous and iterative friction in the application of energy (which could be described as a continuous energy input marked by pulse-like points of emphasised input). Schaeffer described these groupings as "facture gestuelle" [gestures of execution]. This approach to the sound object as the acoustic phenomenon removed from the image of its actual source, with emphasis placed on the interaction of energy input and the resonance of the sounding medium, is to a large extent an attitude which allowed Schaeffer to seek a unity of description and usage for all sound objects. Schaeffer was concerned with the fact that studio transformations of the same initial sound object could give rise to a variety of new objects not reconcilable by the "parentage" of the original sound,⁷⁸ which would require different classification according to their new morphologies.

... the fact that a sound is emitted by the vibrations of wood or brass, a string or a membrane is not sufficient to

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⁷⁷ As described in Solfège de l'objet Sonore [pp. 30-31] recordings of sound examples with accompanying booklet, companion to Schaeffer. Traité des Objets Musicaux. Op. cit. Trevor Wishart's consideration of these sound object principles is discussed in Chapter two below of this thesis.

⁷⁸ Examples are given in Solfège de l'objet Sonore [pp. 23-24].
qualify it. The main point is to compare objects which have something in common, even if they are produced by different sounding bodies.\textsuperscript{89}

A further and significant aspect of Schaeffer's exploration of sound objects is concerned with the perception of timbre and the role of the morphological characteristics of a sound object in defining timbre. Schaeffer found that the kind of attack transient which initiated a sound object is a vital factor in the differentiation of timbres. He demonstrated this by removing the attacks of different instrumental sounds (by editing recordings on magnetic tape),\textsuperscript{90} showing that in some instances, two timbres that can be differentiated when the attacks normally associated with the sounds are present, could not be differentiated when the attacks are removed.\textsuperscript{91}

The notion of the sound object involved the broadening of the perception of musical phenomena to include an appreciation of the "internal" characteristics in the resonances and shifts in resonances as a valid part in the making of musical relationships, simply by acknowledging this as a discursive element of sound. That is, that the intrinsic nature of the morphology of sounds was recognised by Schaeffer as being a feature of sound capable of sustaining an argument of musical relationships through the similarity/dissimilarity of morphologies. In this way Schaeffer was searching for a language of music not based purely on the construction of aggregates of discrete pitches, controlled durations and the mixing of pre-existing instrumental timbres, but in the

\textsuperscript{89} Ibid., [pp. 23-24].

\textsuperscript{90} See ibid., [pp. 13ff].

\textsuperscript{91} For example, the timbres of "flute" and "piano" sounds. See ibid., [p. 17].
exploration of the inner life and detail of acoustic events. The recording of sound allowed
the disembodiment of the sound from its physical source, so that durational, harmonic and
envelope characteristics would abstracted to the level of "sound object"; and studio
procedures allowed the subsequent manipulation and/or revelation of the details of these
qualities. Many of the examples in Solfège de l'objet Sonore present sounds of complex
internal shifts in spectral content and amplitude, such as those of suspended metal sheets,
tam-tams or the stroking of piano strings.\footnote{92} In considering the complex patterns of
resonance of such sound objects, Schaeffer pointed to the inability of conventional "score"
notation to cope with description or plotting of such events saying:

\begin{quote}
We must take courage and go in the opposite direction, i.e. [sic] take sound as the point of departure for a new, more
general set of values which will doubtless include the
conventional values as special and outstanding instances.\footnote{93}
\end{quote}

Schaeffer also acknowledged that in certain instances sound objects might be able
to be broken down into smaller "cell" units, an obvious application of this being in the
nature of "iterative" morphologies - groups of pulses and resonances, or single pulses
themselves,\footnote{94} a notion that rests on what unit the listener might ascribe the status of an
individual "cell" or the importance within the form of a work given by the composer to
particular units.

The kinds of possibilities Schaeffer saw in structuring relationships from such

\footnote{92} See ibid., [pp. 28ff].

\footnote{93} Ibid., [p. 28].

properties of sounds are described briefly in an article entitled "L'objet musical". Here, Schaeffer outlines some variants that could be constructed from an initial sound source: the stroking of piano strings with a finger. Schaeffer acknowledges that the way in which the sound is drawn from the piano strings (whether with the ball of the finger, nail or plectrum, the speed of the gesture, the amount of pressure and the number of strings touched) determines the potential for subsequent variation of sound objects:

What can we make with such a sound? First, a melody in the classical sense. Our equipment permits us to play with this complex note in terms of tessitura, or rhythm etc. [sic] . . . We can also try, without seeking to realise such a banale melodic development, to create a family of objects similar to the prototype but in which the factor of form would intervene: a progression of attacks in intensity, or in clarity, a widening of the internal rhythm, an accent placed on the start or end of a sound.

This succession, by transforming the intrinsic form of the object, constitutes a series, a sort of anti-melody. It is rather as if one viewed the piano-stroking as a separate little piece of music, and then created a series of variations on the formal theme it offered.96

Schaeffer offered a dual view of such a process, either as "variation" in a more or less "conventional"97 sense, or as a process of "plasticity" in that "the phenomenon of plasticity consists of arranging some objects in relationships with others"98. For Schaeffer these processes meant:

95 In La Revue Musicale, n.222, 1952, pp. 65-76.
97 Schaeffer's own terminology is "classical".
... renouncing for good the **playing of one note**, but aligning a series of musical objects which have intrinsic relationships between them, like the raw materials in architecture... A complex note does not just correspond to one tone of the scale, to one letter of the alphabet of sound; it forms often a whole word, sometimes a phrase, of the new musical language. Perhaps, if it is sufficiently considerable, it can be understood on its own. Such a note (the piano-stroking was taken as an example but there are thousands) can be heard once, twice, three times, in appropriate gradations of appropriate intensity, and this can constitute a brief work, or at least an intrinsically valid fragment of a work.99

1.6 (c) **Schaeffer in relation to Varèse and The Futurists**

The similarities between many of Schaeffer's conceptions of sound as shown in the notion of the "sound object" show striking similarity to those of Varèse, especially "sound masses", the feeling for blocks of sound, the sensation of sound as physically tangible, "concrete" material and the movement and transformation of such objects in relation to one another are characteristics of both these composers conceptions of musical forms. What also links these two is their appreciation of the intrinsic qualities and characteristics of natural phenomena (see above for Varèse's description of childhood observations of granite) and the degree of strength they felt in the perception of extant structures and "objects". A major disparity is found however, in the relative support offered to each by institutions. Schaeffer had at his command a vast amount of material and technological resource at RTF, as well as having around him other composers of the Groupe de Recherches Musicales, while Varèse continued to work in spite of an absence of institutional backing and resources, or without enormous appreciation for his work.

99 Ibid., pp. 70-71. Trans. Peter Low.
In 1959, in an article which appeared in *Biennale di Venezia*, Schaeffer wrote of his own ideas and work in relation of those of the Futurists. Basically, this is a review and re-evaluation of Russolo's manifesto of 1913, with Schaeffer indicating points on which he considered his work to be both similar and dissimilar to the aims and attempts of the Futurist musicians, providing point by point commentary on the conclusion of Russolo's manifesto. Schaeffer begins by stating:

When, in 1948 in the French Radiotelevision studios I started to research noises, I knew nothing of my predecessors. It did not matter much really, except for those who are interested in the mixed historical routes in which we individuals, apparently operating in full liberty and full integrity, are unaware that we will be deeply affected by circumstance. Convinced that if I had not been the first, in 1948, to discover musique concrète, someone else would have done so some years after (just as someone could have some years before as a result of the invention of the phonograph), I feel completely at ease in reclaiming the absolute fatherhood and also completely at ease in confessing the absolute ignorance in which I found myself regarding Russolo's experiences. It has often happened that several researchers (each in his own little corner) will make the same discovery.

Schaeffer identified the Futurists' lack of electroacoustic technology as being linked to two fundamental problems in the overall realisation of their aesthetic. Firstly, that they

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100 Schaeffer, Pierre. "La galleria sotto i suono ovvero il futurismo anteriore". ["The Tunnel Underneath the Sound or the Future Before its Time"]. *Biennale di Venezia*, v.9, n.36-37, 1959, pp. 65-71. This title refers to the analogy Schaeffer makes at the end of the article of a tunnel through Mont Blanc with his own independent realisation of the aims of Futurist musicians in the use of noise (as a kind of symbol of the transference of an idea from Italian to French soil).

101 See ibid., pp. 70-71.

102 Ibid., p. 66. Trans. Tarcisia Young.
were forced to construct actual instruments which would produce the kinds of noise that they sought to use, thus causing their work to be not the iconoclastic form of musical composition they wanted to achieve, but an extension of the tradition of instrumental and ensemble music. Secondly, that without sound recording (and therein the potential to isolate and work with "sound objects") they had only the actual experience of the sounds by which they were motivated - which Schaeffer resolved would involve linking the "sound" to the "source" in a way completely opposed to the idea of the sound object, dismissing this as:

... putting together aeroplanes and engines, factories and tractors, which will condemn him to surround himself in a theatrical context, intensified all the more when it is a matter of obvious, present, trivial causes.\(^{103}\)

Schaeffer considered that the way in which Russolo went about realising the Futurist ideal of enriching and redefining musical language was by drawing on the materials of contemporary life as a model of the kind of sound world which would have great impact for contemporary listeners. He asserts that it was the possibilities enabled by electroacoustic technology which offered what he considered the appropriate means of musically exploring the sounds of the environment, due to the potential of the recording medium to produce "sound objects" from any physical source.

On the question of noise itself - the whole basis of the Futurist musical aesthetic - Schaeffer (who was concerned with linking the development of musique concrète into the

\(^{103}\)Ibid., p. 68. Trans. Tarcisia Young.
conceptual framework of a continuous history of music) considered the continuum between "pure musical sound" and "noise" to be an artificial barrier created on the basis of the perception of degrees of morphological and spectral "richness". For Schaeffer, the Futurists deserved the credit of understanding that the greater or lesser richness of comparative sound objects is a natural phenomenon, by which it is not appropriate to classify sounds as "musical" or "non-musical".

Schaeffer concludes by commenting on what he identifies as the "mountain" which separates intention (of ideas) from realisation (in reality) - that in his case, technological possibilities meant that the use of environmental sound was no longer an ideal, but that this meant (once "sound objects" were a working phenomenon) concepts of their use had to be discerned from the observance of their morphological makeup.

One can even depart from opposite sides of the mountain. Here the conception, there the facts. Sometimes tunnels, radically divergent, initiate ideas and facts which are different to what we assumed, sometimes they touch lightly, sometimes they meet again, paying the price of severe loss of direction.

It seems to me that this is the way my union with the friends of another world, of another epoch, operates. I started from the facts, without any aesthetic intention, fascinated with all that reality was teaching me along the way. On the other side of the mountain, on the side of intention, others have preceded me, departed too soon. They had nothing else but their hands, their stick and their hand had to scratch, to dig, to clear the debris. But they had the feeling of the future. So they have done the right thing after all, to call themselves Futurists.104

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104 Ibid., p. 71. Trans. Tarcisia Young.
1.7 Recorded natural sounds in relation to instrumental imitation in Programme Music.

As we are considering the use of recorded natural sounds as a means of bringing the materials of music closer to the sounds which are ordinarily heard in the environment, it is useful to contrast the use of sound recording with the aspirations of much conventional programme music; namely, the desire to manipulate instrumental sounds such that they imitate the sounds of "concrete" objects and form into environmental references and analogies. Here, differentiation will be made between the imitative or associative functions of instrumental sounds in programme music, and the reproduction of the sounds of the environment through sound recording.

English composer Trevor Wishart (born Leeds, 1946) has argued strongly that the use and manipulation of recorded natural sounds in electroacoustic music is not a development of conventionally-realised programme music.

The loudspeaker has in effect allowed us to set up a virtual acoustic space into which we may project an image of any real existing acoustic space such as that of the concert hall, or, e.g. [sic] in the case of a wildlife recording, that of a wood at night.

The existence of this virtual acoustic space, however, presents us with new creative possibilities. The acoustic space which we represent need not be real and we may in fact play with the listener's perception of landscape. This aspect of sonic architecture was not an aspect of the traditional craft of the musician because, before the invention of sound recording it was not open to the composer or performer to control. It is therefore easy to dismiss it by linking it with the somewhat cruder and culturally circumscribed procedures of associationism (programme music) and mimicry which exist as a somewhat marginal aspect of the central vocal and instrumental tradition of Western art music. This, however, would be foolish. Not only does the control and composition of landscape open up large new areas of artistic exploration
and expression, in the sphere of electro-acoustic music, it will enter into the listener’s perception of a work regardless of the composers’ indifference to it.\textsuperscript{105}

Wishart’s definition of \textit{sonic landscape} is important.

With the arrival of sound recording the question of source-identification of sounds became of great importance. On the one hand, it allowed the electro-acoustic musician to isolate a sound physically from its producing medium by recording it on tape and hence enabled Schaeffer’s conceptualisation of the Acousmatic. At the same time the reproduction of sound on loudspeakers caused the question “what is the source of the sound?” to become problematic.

Whereas previously we have defined the landscape of a sound to be the perceived physical source of the sound, what are we to make of a recording of Beethoven’s "Pastorale" symphony played on loudspeakers\textsuperscript{1)? In this case the physical source of the sounds is the vibration of the cones of the loudspeakers but, of course, the loudspeaker is able to reproduce sounds from any other source so that noting that a sound originates from loudspeakers tells us almost nothing about that sound, except that it has been recorded. We must therefore seek a redefinition of the term \textit{Landscape}. If the term is to have any significance in electro-acoustic music, we must define it as the source from which we imagine the sounds to come.\textsuperscript{106}

In consideration of the historical or developmental basis for the emergence of a sonic art form based on the use and manipulation of recorded sounds, the question of the relationship of such a form to the previously well-established tradition of programme music, in which conventional instruments are used in such a way as to mimic natural

\textsuperscript{105}Wishart, Trevor. \textit{On Sonic Art}. Imagineering Press, York, 1985, p. 73.

\textsuperscript{106}Ibid., p. 73. The acousmatic concept (the disembodiment of a sound from its source) is described in Chapter three of this thesis.
Environmental Sound as Material for Composition: Background

sounds, would seem an important point to address.

Wishart's statement that it was the invention of sound recording which gave composers the tool with which to embark upon the area of composition involving the use and manipulation of sonic landscape, while true, points to a dichotomy between the accountability in historical terms of the development of programme music *per se* and the impact of the new technology. Music in which the attempt to imitate natural sounds with conventional instruments existed in abundance prior to the invention of sound recording. However, with the advent of musical forms involving the manipulation of sounds directly referential to the sonic environment of life, previously impossible ways of using sound were realised, as the materials involve an intact reproduction of environmental sound. As a result of this, the idea of reference to a particular aspect of the natural sound environment at any desired time became directly possible, without recourse to the use of another medium - the characteristics of which are controlled in a contrived or structured way (a musical instrument or voice). The traditional concept of Western music bases the art form around the manipulation of discrete pitch, with a stylised metrically-based method of dealing with duration, realised through instruments of relatively fixed timbral resource. As such, musical materials of this kind form into a specialised set of values, with instruments constructed especially for the production of sounds which are easily integrated into such a system. Working with sounds drawn directly from an environmental context involves a more receptive approach, in that already existing sounds are abstracted from an extant physical source or context.

Music with programmatic or associational content in which a composer has been directly influenced by environmental sound to the point of writing music which seeks to
imitate some aspect of the environment, but using conventional instruments for their realisation, has a long history - from the "meteorological" pieces of John Munday depicting "Faire Wether", "Lightning", "Thunder", "Calme Wether" and "A Cleare Day" or the Battle Pieces of Andrea Gabrieli or Célemé Jannequin, to the orchestral Tone Poems of Richard Strauss such as Don Juan (1888-89), Macbeth (1886-88), Tod und Verklärung (1888-89), Till Eulenspiegel's lustige Streiche (1894-95), Also Sprach Zarathustra (1895-96), Don Quixote (1896-97), Ein Heldenleben (1897-98), Sinfonia Domestica (1902-03), and Eine Alpensinfonie (1911-15). Strauss' work takes the description of visual or physical phenomena and the realistic imitation of natural sounds with conventional instruments within a tonal harmonic resource to the probable limits of its practicality. Take, for example, the depiction of bleating sheep with muted flutter-tonguing brass in Don Quixote.
Example 3: Strauss. Don Quixote.
The dichotomy of compositional attitude between associational programme music and the use of electroacoustic media to record and replay actual environmental sounds can be seen in one particular work, Pini di Roma written in 1924 by Ottorino Respighi. Respighi provided a written programme for the work as a preface to the score. Written programmes such as these are a way of the composer fusing with the work a concrete imagery to which the sounds can be related.

I. THE PINE-TREES OF THE VILLA BORGHESE.

Children are at play in the pine groves of Villa Borghese; they dance round in circles, they play at soldiers, marching and fighting, they are wrought up by their own cries like swallows at evening, they come and go in swarms. Suddenly the scene changes, and.

II. PINE-TREES NEAR A CATACOMB.

We see the shades of the pine-trees fringing the entrance to a catacomb.

From the depth rises the sound of mournful psalmsinging, floating through the air like a solemn hymn, and gradually and mysteriously dispersing.

III. THE PINE-TREES OF THE JANICULUM.

A quiver runs through the air: the pine-trees of the Janiculum stand distinctly outlined in the clear light of a full moon. A nightingale is singing.

IV. THE PINE-TREES OF THE APPIAN WAY.

Misty dawn on the Appian Way; solitary pine-trees guarding the landscape; the muffled, ceaseless rhythm of unending footsteps. The poet has a fantastic vision of bygone glories: trumpets sound and, in the brilliance of the newly-risen sun, a consular army bursts forth towards the
Sacred Way, mounting in triumph to the Capitol.\textsuperscript{107}

In the third section, as a means of depicting the nightingale, Respighi called for the replay of a gramophone recording of the actual song of a nightingale.

Example 4: Respighi. \textit{Pini di Roma}.

In this way, Respighi has bypassed the whole matter of "synthesising" the song of a nightingale with the use of conventional orchestral instruments, overcoming the technical difficulties involved (creating a musical line or texture which adequately conveys the aural sign of "nightingale") by reproducing the actual sound.

Therefore, what has been established is the potential for an altered conception of musical materials and the use of a new medium for the production of sound, a medium able to record and reproduce any sound. On the one hand, as far as the representational or associational aspects of this kind of orchestral programme music are concerned, the use of the recorded song of a nightingale in Pini di Roma represents a kind of "final answer" in terms of the creation of an aural image of a natural sound in a context other than its natural environment. On the other hand, new questions of aesthetics and form arise. The creation of an aural sign which indicates a "nightingale" is no longer a question of "portrayal"; rather, it is one of direct presentation of the real sound. The way in which art and life are considered discrete requires reinterpretation, for in a work such as Pini di Roma the acoustical reinterpretation of the sound of an imitative medium is no longer at work (orchestral instruments - whose basic mode of sound production is determined by the physical properties and dimensions of the design of the instrument as well as the constraints of the musical language of discrete pitch, stylised conception of note values and restricted timbral flexibility). The recording process is the means by which the sound of a real life nightingale has been abstracted from a "life" context but such that the song is, on replay, acoustically the same as that of the original (see diagram 2).

Rather than the sound being suggested through the modification of the "musical language" to which orchestral instruments are disposed - as an analogy to the original
Environmental Sound as Material for Composition: Background

sound - the recording provides a reproduction of the actual sound of a nightingale. Within this work the concept underlines an important structural point. The nightingale recording produces a sudden shift in the sound materials of the piece - taking the sound world into a new dimension - one identical to the real-life existence of the nightingale’s song.

The use of the nightingale recording in *Pini di Roma* as a means of achieving a new degree of dimensional depth, both sonically and conceptually, shows the major difference between the use of natural sound in this kind of context as a purely descriptive element and one in which natural sounds are used in their own right, as the basis for a musical language.

Diagram 2: Recorded and Imitation Nightingale Song

Diagram illustrating the relationship between the actual sound of a nightingale and its reproduction in music. The diagram highlights the concept of imitating certain spectral and morphological traits of the nightingale song, despite being interpreted through stylised "musical" conventions that remain within a conventional musical language regardless of sign reference.
Environmental Sound as Material for Composition: Background

It holds true that the use of recorded environmental sound as the basis of a sonic art exists on a fundamentally different plane to previous musical practice involving the depiction or imitation of natural sounds through conventional instruments in the light of the conceptual aspects of Respighi's use of recorded birdsong in *Pini di Roma*. It can be seen that in relation to conventional programme music which involves the "association" of one sound with another, the direct use of recorded natural sounds involves a process of reproduction of nature, rather than a synthesis or imitation of the sounds of the environment.

No matter how miraculous the nature of the imitation of natural sounds with conventional instruments, the sounds are occurring within the gestural, spectral and morphological framework of a fundamentally self-contained language: one which as a sonic art, in relation to the life experience of the natural sonic event which is being imitated, is already functioning at a level removed from the direct life experience.

While conventional instrumentally realised programme music departs from sound elements which are manipulated to create the impression of an experience or some aspect of concrete reality, the use of recorded environmental sounds themselves departs from that reality itself, and may move towards more abstract concepts or the expressive articulation of some aspect of the concrete experience. The notion of depiction of natural sound phenomena through particular manipulations of otherwise unrelated resources (such as orchestral instruments) is to be clearly separated from the recording and replay of the actual sounding objects.
1.8 Conclusion

One of the most basic attitudes towards environmental sound shared by Russolo, Varèse, Grainger, Cage and Schaeffer is that their work should not involve purely mundane imitation of natural objects or events. They were not concerned with directly transferring the experience of the environment into their works, but with building abstractly on the sensation of those experiences. The Futurists were prompted by the desire for their music (and all art) to be a strongly tangible contemporary expression, and that the materials with which they worked had to be rooted in the acoustic phenomenon which they felt reflected most strongly the sonic environment of their own times - noise. But they were clearly concerned that the works they produced (despite their programmatic titles) could be considered in an "abstract" musical sense, rather than a purely descriptive one. Varèse, who in defining for himself all sound as being potential working material for composition, was similarly concerned that music should remain an abstractly realised expression. His strong identification with the sensation of sound as a concrete "living matter" has two important consequences in his work. Firstly, the embracing into a language of music the entire field of sound, rejecting the notion of the paramount importance of the artifice of existing musical instruments and their modes of sound production based on discrete pitch and stylised, metrical durational patterns. This led him to a search for media of greater plasticity (that of electronics and recorded sound) which could allow him a sense of direct interface with the kinds of environmental phenomena which moved him. Secondly, the concept of a musical discourse based on "sound masses" or blocks of particular harmonic, textural and timbral entities, thus perceiving and responding to self-contained environmental phenomena as creative stimulus, and allowing musical structures to have the same kind of tangible sensation of concreteness.
The influence of the sensation of environmental patterns on Grainger led him also to the construction of new purpose-built devices which would develop a sound-world of his own unique conception. The bringing of creative expression closer to an environmental awareness of this kind was, as the examples of Grainger and the Futurists show, naturally associated with new materials of expression, materials which were realised by the re-appraisal of existing instrumental resources. The stylistic associations of the families of instruments, developed around musical forms based on discrete pitch and oriented towards tonal harmonic languages are very strong, with the desire to gain (in Varèse's words, quoted above) "liberation from the arbitrary, paralysing tempered system" and "a sense of sound-projection in space" was an ideal for which the tape recorder was to provide a medium.

Cage, in his philosophy of the acceptance of all sounds as music, leaves behind all notions of "meaning" or "values" in sounds, especially the idea of sounds, being placed in some kind of temporal or structural relation to each other for the purpose of differing emphasis or subjectively defined formal function. He rejects, at the same time, the role of volition in the creative process with the aim of letting sounds "be themselves" without the control or preference of human ego, or without any regard for defined aesthetic criteria as the basis of manipulation of sounds towards the realisation of works. In this way, Cage is set apart from Varèse or Schaeffer who were determined to form definitive expressions on the basis of the perceived intrinsic qualities of their materials.

Ultimately, the technology of sound recording allowed environmental sound to be brought under the composer's control and naturally, from an historical basis, Schaeffer's work stands out in this respect. With the realisation of "sound objects" from any natural
sounding phenomenon, an immediately closer relationship between the total field of environmental sound and creative expression was brought about. As an integral part of such direct environmental awareness, the need was also felt by such artists to also attempt to define and describe their aims by literary means, to ally with actual creative effort clearly articulated verbal arguments of their aspirations - the "manifesto", the "artists statement" and the "treatise" being significant outlets for the ideas of these composers. In this area the contribution of Pierre Schaeffer is of considerable dimension and importance, and in the following chapter, beginning with the example of Schaeffer, a basic outline of some significant attempts to define the environment as a material resource of sonic art through classification will be given. With recorded environmental sounds accepted as a musical resource, attention will be directed to questions of how the materials can be used in composition.
CHAPTER TWO

THE CLASSIFICATION OF NATURAL SOUNDS

2.1 Introduction

For some composers who work with recorded environmental sounds, the process of sound classification has proved to be a useful way in which:

1. component details of sounds can be identified;

2. individual sounds can be compared;

3. such information about sounds can be evaluated in attempting to discern their potential use in composition.

Essentially, models of environmental classification deal with either of the two fundamental ways in which such sounds can be approached, as being either; concrete (as literal references or indicators of the objects and situations in the environment from which the sounds arise) or; abstract (the purely acoustical sensation of the phenomenon of sound itself, as patterns of initiation and resonance, without regard for the literal source of the sound).

Classification itself involves the comparison of perceived information so that categories of related materials can be formed. For the composer, this may involve
realising what effects or sensations in sounds are of value and how these might be used for the purposes of creative expression. Before going on to outline four approaches to the classification of sounds, it is useful to look at the view of a composer who has no interest in the structuring of sounds in a work according to their perceived characteristics, namely, John Cage. This is his reasoning for the rejection of "meaning" or comparative values in music:

If two sounds bump into each other, there is no problem; in the case of choreography, a slightly violent collision between two dancers may prohibit one of them from continuing to dance. You have to consider the opposition between utility - this time I am using the word in the sense of a necessity you cannot avoid - and aesthetic experience. This opposition doesn't exist, or no longer exists, in music; it maintains its rigidity in the case of the dance. Thus music offers us the model for a life disengaged from all utility. While choreography is an example of what must be done in order to live with utility.¹

However, if a composer requires that specific messages be received from a work by a listener, more detailed consideration of the potentials of the medium of sound are required. Therefore, four individual approaches to classifying sounds are outlined in this chapter.

Firstly, the summary of Pierre Schaeffer's approach to sound typology is a useful introduction to the idea of classification and is worthwhile in the implication that, because sounds are perceived in time, the duration of a sound in relation to its complexity contributes to the way sound objects are perceived.

Denis Smalley, in describing the basis of a language based on the spectral and morphological characteristics of sounds, is concerned especially with the way in which changes in these acoustic components can be used to imply various kinds of motion and expectation in the mind of a listener. These two approaches to classification deal only with morphological and spectral shape and componentry of sounds (that is, the "abstract" criteria) and do not attempt to embrace the recognition of sound sources. However, they form a valuable basis for the qualitative and quantitative consideration of sounds.

Trevor Wishart's approach to "natural sound morphology" examines the classification of sounds through analogies between the morphology of sounds and the behaviour of archetypal natural materials and events. This extends the Schaefferian notion of sound continuance, but from an openly metaphorical viewpoint; that certain morphologies link to particular basic types of perceived action and behaviour of physical objects.

R. Murray Schafer's approach to sound classification attempts to embrace both the literal reference of sounds as well as their perceived acoustic characteristics. In basing this approach on "life" models (that is, the function and perception of sounds in the environment - as is the ordinary habit of listening) he acknowledges that the same sound in different contexts can have different meanings.
2.2 Pierre Schaeffer

2.2 (a) The typology of sound objects

Schaeffer, in his description of the means by which he arrived at his typological criteria for sound objects in *Traité des objets musicaux*, pointed to the difficulty inherent in the establishment of such typologies. He described this by way of an analogy - that of the "attic".

... let us show the difficulty of sorting material objects.

The best pedagogical situation, though the worst for the teacher, is to climb up to the attic: does not each thing piled up there correspond to the notion of object? No one thinks to deny that anything we touch there deserves to be sorted somehow, unless out of weariness we renounce the whole task (and that is actually what justifies the existence of attics).

Some of these objects, having a simple morphology, are easily classified: planks of different lengths, widths, thicknesses, Bottles with different liquid in them. If these articles spring to mind, it is because in trying to facilitate the attic task I think quickly of what is simple and measurable: these are objects which in fact coincide with solids and capacities, and so correspond to the notion of physical objects. But what is the relation between these planks and the old clothes, the stuffed bird, the shavings of wood?

Will I measure my bird so as to shelve it with the planks? Will I pour a decilitre of shavings into my bottles? You see here that physics is no help to me, but a hindrance. Someone suggests I sort the clothes by size: that doesn’t help me to relate them to the bird, or the bottles. And can I sort a swimsuit, a dresscoat and a piece of armour all by size? Or according to what their monetary value might be? Although I can bring out some criteria to evaluate objects, they are no help to me in the prior sorting which is the task of typology.

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One might then be tempted to give up, to remark that sorting miscellaneous objects is not only impossible but perhaps even ultimately useless. One has the feeling that the planks belong with the carpenter, the clothes with the tailor the bottles with the chemist; well, it is not the same with sounds. All sounds belong to the musician; and if the musician refuses some, he must know why: because they don't fall within his typology. But he can only decide if he has first examined a sufficient range of sounds to know the norms whereby he can keep or reject them. If for example he considers only sounds that are scientifically definable, then he is like a housekeeper who keeps in her attic only what can be measured on the scales or with the metre-rule.

Let us pursue the parable, not having exhausted its lessons. What about classifying objects by substance? The wooden ones would go together, the cloth ones, the metals etc. That is already a more realistic suggestion than measurement, but it doesn't lead far: would I put the barbed wire with the forks? The violin with the firewood? Or should we classify them by destination? Or distinguish manufactured objects from raw ones? These are better suggestions because they are linked with the use of the object, with its situation among other objects and with the two intentions that meet in each object: the maker's and the user's.³

Schaeffer describes his classificational criteria in three dimensions, although later in reaching an overall, workable model for classification - he amalgamates the first two dimensions (of morphology and time) into one.

These are the three basic areas of sound categorisation as put forward by Schaeffer:

1. **Morphological**: consisting of mass and makeup.
2. **Temporal**: consisting of duration and variation.

³ Ibid., pp. 429-430. (Trans. Peter Low).
(3) Structural: consisting of balance/imbalance of the object and the degree of originality.

Each of these descriptions requires definition, according to the explanations given by Schaeffer.

In acknowledging the musical applications of such a system of typology, Schaeffer looks first to a description of sounds based on the aspect of pitch, not necessarily discrete pitch in the conventional sense but in a broader sense, which Schaeffer uses to describe the mass of sound (so that discrete pitch would be a special case within this category).

... if we restricted ourselves to speaking of the object having the possibility of being heard in terms of pitch, either definite and fixed, or variable, or multiple, or more or less locatable, then it would be as if we said of material objects that they have one or more fixed or elastic spatial dimensions. Proceeding thus, we will not claim to sort the objects by value, but only to judge whether they present more or less clear, more or less "plural" aptitudes towards possessing this value. Thus, relative to the mass of sound we are instituting a typological criterion of fixity, of simple or complex variation, and (in the case of fixity) of how clear or vague it may be judged to be.4

The makeup of sound forms the other part of Schaeffer’s morphology category. This describes the way sounds continue in time (and has been taken up by Trevor Wishart in his discussion of "natural sound morphology and Denis Smalley in his discussion of "spectro-morphology").

4 Ibid., p. 432.
Schaeffer describes makeup as "the qualitative perception of the energy-sustenance of the objects . . .". These fall into three basic areas, listed below.

(1) Sounds which constitute short impulses - "an energy communicated briefly a single time."

(2) Sounds with continuous intrinsic sustaining properties.

(3) Sounds which are essentially discontinuous, but sustain through repetition of the sounding impulse.

Although the situation is more complicated in reality than such a brief résumé:

However general these variables may be, have we chosen, in mass and make-up truly independent variables, as all good classification demands? No. These are not simple variables, but perceptions that are already complex ones. Since they are related to two intentions, two different ways of making and hearing objects, nothing assures us that these perceptions are not more or less linked. If the energy-history is simple, then there is a good chance that the matter will not be affected by very complicated variations. But if not, the matter may very well follow fluctuations of energy.

In discussing temporal aspects of sound objects, Schaeffer takes into account the scale of sound objects as they evolve in time - recognising here that the relationship

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5 Ibid., p. 437.
6 Ibid., p. 437.
7 Ibid., p. 432.
between time and the degree of complexity affects the perceived nature of sound. The temporal aspect falls into two areas - duration and variation. Duration is a quantitative category while variation takes into account quality through quantity. As well as this there are dimensions of macro and micro of sound objects which relate to the overall period of time in which sound objects are heard.

In Schaeffer's argument, duration and variation are linked closely with the qualities of mass and makeup - in other words the way a sound evolves in time is qualified by the way in which the input of energy into the vibrating system determines both the actual duration in time and the variations of internal activity within that duration, relative to the natural properties of the medium itself. Duration and variation integrated with mass and makeup into the dimension of time give rise to a new view of an overall focus on the nature of sound objects.

... we find duration, not in the totality of the sound-object, but in a relationship similar to speed which is the quotient of a shift (the thing that changes) divided by the duration of the change. Let us therefore recognise that a typology cannot ignore these two factors, that it must try not to treat them as values, limiting itself to evoking them only as characteristics linked to our first criteria: we will take account of durations or variations in objects by referring them to the criteria of mass and make-up.8

Schaeffer's broad terminologies here are of macro and micro objects. The descriptional basis used by Schaeffer forms a crucial part of his argument.

8 Ibid., p. 433.
Here, the analogy of a sheaf of wheat is used. From a certain distance, the object is satisfactorily described in terms of the qualification "a sheaf of wheat". However there are levels of focus on the construction and placement of such an object which reveal both higher and lower structural levels of the object's existence. On one level, the sheaf of wheat is made up of stalks packed together and the stalks themselves formed of smaller grains; or, on the other hand, the sheaf of wheat may be part of a stack or has been selected arbitrarily in a structure of aligned sheaves, as a detail of a surface marked with these points, a single granulation in the middle of huge harvested fields.

We find here two infinities, common to Pascal and structuralists, which must be remembered as we form a typology. As soon as we have aimed at an object (arbitrarily then), we must expect that it is decomposable into elements and integratable into an ensemble. As long as we safeguard its coherence, its uniqueness, we can put it into one or other square of our chart. But when we come to distinguish its microstructure it will change its place and end up probably in a square accepting less simple objects. But if it is integrated into a macrostructure, it ceases to be the object we isolated in the preceding classification and becomes a simpler element in this macrostructure: its personality is dissolved: and the macrostructure tends to impose itself as the object to be classified.9

Schaeffer then applies this kind of approach to the world of sound objects. A bowed staccato on a stringed instrument, as Schaeffer describes, can be taken as a series of impulses as the bow bounces on the string. If they are taken together in a gestural sense10 they resemble the wheat sheaf analogy - in that they are a group of similar discrete

9 Ibid., p. 434.

10 Trevor Wishart’s discussion of gestural morphology in relation to the nature of energy input into a vibrating medium is discussed later in this chapter.
identities which contribute to a whole gesture - and will have one kind of classification.

If however, attention is taken of the "component impulses" a new area of classification will be in order.

In the same way, if numerous bows execute the same staccato at almost the same time, or random staccatos, the typology must permit a classification of the more complex objects constituted by these macrostructures.\footnote{Ibid., p. 434.}

There is obvious virtue here in the flexibility of this approach of Schaeffer's which is taking into account an integration between time as well as the nature of the morphology. He recognises that scale, both in terms of temporal evolution and acoustical qualities, of sound objects are important parameters in the consideration of the relative nature of sound objects.

2.2 (b) Balance and originality

In his overall view towards a unified and structured approach to the classification of sounds, Schaeffer attempts to integrate variability of focus in his typology. For Schaeffer, the central objects of the classification system should be "on a good perceptual level" (like the sheaf of wheat) "neither too elementary nor too structured".

If they were too elementary they would tend to integrate themselves into structures more worthy of remembering. And if they were too structured, they would readily decompose into more elementary objects. You see here that duration is going to intervene into the determining of our central objects: the adjective memorable, indicating a
precipitate form, implies also a convenient duration: not too short nor too long, in the order of the optimal hearing duration for objects.\(^\text{12}\)

Schaeffer points out that the key problem here is that simplicity of a sound object does not necessarily equate with brevity, nor complexity with length.

While short objects tend to seem elementary and long ones have room to contain complexity, the contrary can occur: a short object may be very complicated and long one very simple.\(^\text{13}\)

The result of attempting to account for all sound objects in terms of discrete classificational criteria would be, according to Schaeffer, a prohibitive number of dimensions. For this reason, Schaeffer arrives at the first compromise in his classification of sound objects, establishing the following parameters:

Let us limit ourselves to indicating here that we describe objects as balanced or imbalanced according to whether they appear to be a good compromise between the overstructured and the oversimple, or whether they approach structures that sin on perceptual grounds either by omission (too elementary) or by excess (too complex).\(^\text{14}\)

This of course, introduces a relatively subjective view into the classificational


\(^{13}\) Ibid., p. 435.

\(^{14}\) Ibid., p. 435.
method, but one which hinges upon the relative natures of different sound objects.

The second area of compromise is in the area described by Schaeffer as the originality of the object. Again, Schaeffer uses the analogy of the sheaf of wheat.

Let us imagine a field of stacks, of which some are true grainstacks but others are only cones or pyramids of cardboard, or bundles of branches; or further, that amongst them are found irregular, or truncated, or hybrid ones containing the same elements: wheatstalks, branches or objects with straight lines. There would then be an equal degree of balance, but a greater or lesser degree of originality. The cardboard pyramid would be called "redundant", since one of its fragments would be enough for us to reconstitute it in our minds. But not so the natural sheaf, unless we neglect the fluctuations represented by the stalks and ears. The degree of originality is what we did not foresee. A violin vibrato, similar in originality to the natural sheaf, will be more original than a flat electronic sound, but less original than this same electronic sound profiled in an unexpected way.\textsuperscript{15}

This consideration of the duration of sounds in relation to the complexity or amount of change implicit to the sound object is crucial. Originality describes the amount of complexity of internal detail in a sound object, but the notion of balance reminds us that the duration of the sound affects just how "original" or "redundant" the sound object will seem. That is, the perception of change or fluctuation in the makeup and mass of a sound object is to do with how much time we have in order to perceive it. Therefore, very short complex morphologies and very long simple morphologies will tend not to be perceived as "balanced".\textsuperscript{16}

\textsuperscript{15} Ibid., pp. 435-436.

\textsuperscript{16} Ideas and conceptions of balance do not stop at the perception of individual or even grouped sound objects. In compositional terms, structural balance, redundancy (continued...)
Schaeffer’s initial recapitulation of the typological criteria shows a schematicisation of the basic areas of typology. There are, as we have seen, three areas of categorisation, each possessing two aspects, they are:

(1) **morphological**: constituting **makeup** and **mass**;

(2) **temporal**: constituting **duration** and **variation** within the duration, according to the qualitative aspects of **makeup** and **mass**;

(3) **structural**: the **balance** of the object and degree of **originality** within it, according to the structural level.

Schaeffer compresses these three areas of description into a two-dimensional plan.

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16(...continued)

and overoriginality are all states that stem from the same perceptual basis - how change is perceived as a function of time. Denis Smalley’s system of classification (outlined below) takes this into account.

The criteria of morphology and temporal aspects are considered together in this summary of typological criteria, so that the overall categories may function in two instead of three dimensions - for the purposes of serviceability.

The horizontal plane on this graph integrates into makeup the characteristics of qualitative sustaining (the nature of the energy input into the medium - impulse, reiterative or continuous, being the means by which the sound is extended in time), while the nature of the extension in time of the sound object also depends on the natural resonating properties of the medium. The horizontal axis is therefore oriented from a middle point - that of short duration, or sound objects of the single impulse type. To the left are sounds which possess continuous sustaining properties, while to the right are sounds which require continuous energy input for their extension in time towards what might (in relative terms) be called long durations. To which Schaeffer adds:

This is of course only an approximative arrangement summing up diverse phenomena. There are resonant sounds, of considerable duration, whose energy however comes in points. Our table will therefore have to cope with them although it doesn't explicitly predict them.\(^{18}\)

The other two criteria which Schaeffer pairs together for the purposes of creating a two-dimensional plan are mass and variation - which are oriented along the vertical axis in from the mid-point of sound objects that are considered to have a fixed mass. Described by Schaeffer as:

\(^{18}\) Ibid., p. 437.
The Classification of Natural Sounds

... a more general case than that of defined pitches, it conveniently localises a range of musically interesting sounds halfway between sounds with precisely definable pitches (situated above this point on the vertical axis) and sounds with variable masses (situated below).19

Schaeffer continues:

The two axes oriented in this way mark out four quadrants on our plan. Our classification then has a centre. Does this centre have a meaning relative to the objective being pursued, namely the goal of ordering objects according to balance and originality? We hope it does, if this classification manages to present as central types the objects with a good balance and neither too much nor too little originality. In fact, and more precisely, we can expect to find in the middle of the schema a "flight-line" (micro-objects), but all round the centre a zone of balance and at the edges, on the circumference a large zone of objects lacking good balance.20

Placed in the centre of the chart are objects of fixed mass which are therefore balanced and "sufficiently original" in terms of makeup, but as we move closer to the central vertical axis there are durations defined by Schaeffer as the tendency towards "micro-objects".

... we must make in the middle of our page a vertical band in which there are objects that are temporally imbalanced, and apparently elementary in structure, although if stretched in time their details could show up as quite complex (the ear cannot perceive this if the time is too short). We will find excessive originality linked with micro-objects when there is an accumulation of micro-sounds in a memorable temporal duration (a cell).

19 Ibid., p. 437.

20 Ibid., p. 437.
In the vertical direction, originality will obviously grow from the top to the bottom. The more the sound is bare, of precise pitch and tending to electronic purity, the less original will it be. The more the sound varies in mass, the more original it will be, but the more it risks (further down) being imbalanced both by the complexity of its structure and by its unpredictability.21

Schaeffer’s overall approach to sound typology is summarised graphically (see Diagram 4 reproduced below). This allows for (albeit in a complex way) the unification of all the dimensions and cross-classificational possibilities for sound objects already outlined. Useful concepts by Schaeffer which background this are those of balance, redundancy and overoriginality, all of which are functions of mass and makeup (the nature of the continuance of the sound) in relation to the perceived duration of sound objects. Redundancy is a state in which the extended duration of a sound object does not reveal new information or change in the morphology or spectrum of the sound, while overoriginality is where all the details in the evolution of a sound object cannot be discerned within the duration of that sound, and balance is a state in which duration and information are mutually supportive.

A zero makeup refers to a sound object which can intrinsically head towards redundancy (Schaeffer gives examples of "the monotonous repetition of an impulse" or a "sound held continuously"),22 while well-formed makeups are those of "good balance and originality". Sound samples refers to the state where small, asymmetrical component gestures can be regarded as a complete sound object, but in which the makeup is

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21 Ibid., p. 438.

22 Ibid., p. 438.
Diagram 4: Schaeffer's Typology of Sound Objects "Schema in Principle".\(^{23}\)

| MAKEUP | CONTINUOUS \(
\downarrow
\) SUSTAINING \(
\rightarrow
\) DISCONTINUOUS |
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<tr>
<td>MASS</td>
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<td>ZONE S OF NOTES</td>
<td>UNPREDICTABLE</td>
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<td></td>
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<td>UNPREDICTABLE</td>
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<td>UNPREDICTABLE</td>
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<tr>
<th>PURE PITCH</th>
<th>MALES</th>
<th>SAMPLING WITH</th>
<th>(ZONES) OF (NOTES)</th>
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<tbody>
<tr>
<td>M1</td>
<td>11</td>
<td>12</td>
<td>13</td>
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<td>M2</td>
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<td>M3</td>
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<tr>
<th>FIXED MASS</th>
<th>OBJECTS</th>
<th>(BALANCED)</th>
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<tbody>
<tr>
<td>M3</td>
<td>31</td>
<td>32</td>
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<tr>
<td>M4</td>
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<td>M5</td>
<td>51</td>
<td>52</td>
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<tr>
<th>MASS WITH LITTLE VARIATION</th>
<th>OBJECTS</th>
<th>(LITTLE ORIGINALITY)</th>
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<tr>
<td>M4</td>
<td>41</td>
<td>42</td>
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<td>M5</td>
<td>51</td>
<td>52</td>
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<table>
<thead>
<tr>
<th>VERY VARIABLE MASS</th>
<th>FORMED OBJECTS</th>
<th>MICRO-OBJECTS</th>
<th>FORMED OBJECTS</th>
</tr>
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<tbody>
<tr>
<td>M5</td>
<td>51</td>
<td>52</td>
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MACRO-OBJECTS

[ Durations increase with movement from the centre (micro-objects or impulse morphologies) towards the left and right extremities of the chart ]

\(^{23}\) Ibid., p. 442
"unpredictable" or irregular. *Sound accumulations* describe the reiterations of brief sounds which are unified through apparent basic similarity of causal energy input and sounding medium as "abundant reiteration of brief elements that are all more or less similar".\(^{24}\)

Schaeffer also acknowledges that in departing from the areas of well-formed mass and makeup, sounds can become unclassifiable - the patterns gestural, morphological and spectral change can involve so much variation that specific categories are too narrow to accommodate all the variations. His answer to this problem is to regard the sound as an aggregate of smaller, composite structures of classifiable type, or to search for an overall unity of makeup or causal gesture. These two approaches to very complex sounds are described respectively as the *cell* and the *fat note* (French: grosse note), and these lie on the lower horizontal portion of the table reproduced above.

2.3 Denis Smalley

2.3 (a) The nature of spectro-morphology

Composer Denis Smalley (born Nelson, New Zealand 1946) has used the process of classification in outlining a descriptive language for electroacoustic music based on what he terms *spectro-morphology*.\(^{25}\) In the broadest sense, Smalley defines spectro-morphology as:

\(^{24}\) Ibid. p. 439.

The Classification of Natural Sounds

... an approach to sound materials and musical structures which concentrates on the spectrum of available pitches and their shaping in time.\textsuperscript{26}

This involves not only the perceived character and qualities of the spectral componentry of sounds (however complex and transitory) and their morphology (the way the dynamic structure of the sound evolves in time) but also the phenomenon of change and movement of these aspects, and the way this can be applied and manipulated in the process of composition. The process of classification is used to define certain basic typologies of sound spectra, morphology and "motion" types (transitions and shifts in the emphasis of spectra and morphology in complex sound objects). In addition, Smalley seeks to relate these properties of sounds to the more general concerns of structure in making work.

2.3 (b) Spectral types

Smalley outlines three basic spectral types: note, node and noise, and these are considered as specific areas of reference in the overall sound continuum from note to noise; spectrum describing the "totality of perceptible frequencies".\textsuperscript{27} They can be qualified and defined in the following ways:

(1) \textbf{Note}: the perception of discrete pitch(es). This can be divided into three subsidiary areas which describe the way note-oriented spectra can be stratified texturally,

\textsuperscript{26} Ibid., p. 61.

\textsuperscript{27} Ibid., p. 65.
The Classification of Natural Sounds

-describing the behaviour of individual and/or aggregates of pitch.

(i) **Note proper**: perception of absolute pitch, such that the fundamental frequency is perceived as the primary information.

(ii) **Harmonic spectra**: where the intervals of the harmonic series are tangibly perceived as a composite of pitches in a sound - where, for example, the overtones of a fundamental frequency are discernable in their own right.

(iii) **Inharmonic spectra**: these are made available especially through technological means of synthesis or exist in certain very complex metallic sounds, and constitute a spectrum of pitches which are tangibly perceived in their own right but not related to the harmonic series.

(2) **Nodal Spectra**: these are bands or "knots" of sound which are complex enough to defy the identification of discrete pitch and "can also be regarded as a sound density whose unified compactness makes it difficult to hear its internal pitch structure".  

(3) **Noise Spectra**: such spectra possess a compression and density of the composite frequencies such that the internal pitch structure cannot be discerned. Internal movement within such spectra may be perceived as "granular" or "particled" motions of a complex of frequencies (a complex of nodes, for example) rather than discrete pitches.

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28 Ibid., p. 67.
Smalley describes the "blur" between these perceptions of note and noise as the pitch-effluvium continuum ("effluvium" referring to the phenomenon in which the ear can no longer resolve spectra into component pitches). In acknowledging the possibility of this state, Smalley describes the necessity of shifts in aural awareness between the "mapping" of the behaviour of internal component pitches and the "momentum" of the more generalised sensation of "external shaping".

2.3 (c) Morphological types

In Smalley's terms, morphology refers in the simplest sense to the description of the dynamic profile of a sound event:

The dynamic profile articulates spectral change: spectral content responds to dynamic forces, or conversely, dynamic forces are deduced from spectral change. This aural congruence of spectral and dynamic profiles, and their association with energetic phenomena, are the substance of everyday perceptual practice.29

Smalley begins by outlining simple morphological archetypes which are based on conventional instrumental sources. These are described by way of the evolution in time of the dynamic profile - as onset, continuant and termination. These archetypes are:

(1) Attack or impulse: modelled on a single dry, detached note - where the onset is immediately followed by the sound's termination.

29 Ibid., p. 68. Smalley provides graphic representation of morphological types, see ibid., pp. 69-71.
(2) **Attack with decay**: modelled on sounds where the onset is followed by a resonance which decays (gradually or quickly) until termination. These are divided into two further categories:

(i) **closed attack-decay**: a rapid decay follows the initial attack, resulting in a strong gestural association between the attack transient and the decay.

(ii) **open attack-decay**: where there is a very gradual decay of the resonance such that the ear is drawn away from the sensation of the attack transient and towards the continuing nature of the resonance itself as it moves towards termination.

(3) **Graduated continuant**: this is modelled on sounds which are sustained (presumably through continuous application of energy, rather than natural resonance, although Smalley does not state this). This archetype is described as having a gradual onset which settles into a continuant phase and reaches termination gradually. As with the open attack-decay, Smalley suggests that the attention of the ear is drawn towards the continuance itself rather than the nature of the initiation.

In continuing the description of morphology, extensions of Smalley's archetypes are considered under the description of morphological models. These include; variations of the "graduated" continuant archetype - with more rapid phases of onset and termination than the archetype of graduated continuant - and is described as **swelled graduated continuant**; linear onsets and decays, characterised by perfectly even rise and fall in dynamic profile - these are more readily associated with synthetic rather than natural sound sources; and
reversed dynamic profiles of the attack-decay and impulse archetypes of morphology - for example, as graduated onset reaching an instantaneous termination.

At this point Smalley introduces the notion that characteristics of different morphologies can be melded and mixed into complex morphologies or morphological strings. An attack-decay archetype, Smalley argues, involves expectation - that there is an initiating energy input which induces a spectrum of resonance which normally decays towards termination. This is open to intervention by the composer such that the "expected" patterns of resonance and decay may be extended or manipulated as a process of "spectral expansion". Creating morphological strings through the merging of different morphological types involves the principle of correspondence - that there is a temporal phase at which an apparent shift in the morphological pattern is experienced. Further to this, Smalley outlines the idea of the attack-effluvium continuum, which describes the temporal experience of the stringing of attack-impulse morphological types. This continuum ranges from: the perception of discrete attacks; then to the phenomenon of iteration where impulses are compressed to the point at which they are perceived as a single object (but that the impulses are still discernable); and, with further compression of impulses, the perception is of grain rather than linked impulses; and, at the furthest extreme, an effluvial state in which the ear cannot resolve the evolution of specific or grouped morphological detail.

2.3 (d) Spectro-morphological motion

It is with the idea of spectro-morphological motion that Smalley attempts to provide more detailed descriptions and observations of complex shifts and changes in spectral and
morphological patterns, and the full potential for spectro-morphological "design" in composition. Motion itself, in this sense, relates to the following factors listed below.

(1) It requires time in order to be realised and perceived - axiomatic to the perception of sound.

(2) It may be perceived through the development or contour of a gesture or the internal shifts and detail of a texture.

(3) It implies direction, or phases which appear to have a particular goal. For example, Smalley states:

All motion types have inherent orientations. Motion always implies a direction, however open, limited, ambiguous, minimal, or complex an implication or simultaneous implications may be. For example, a sustained, linear ascent is implicative because the line cannot continue indefinitely. It may fade into oblivion, it may reach a stable ceiling, it may attain a goal, or its implied motion may be interrupted or excised by a new event.\(^{30}\)

Three central typologies characterise Smalley's descriptive categories of motion:

(1) **Linear**: indicating a change of progress of morphology and spectra in one direction;

(2) **Curvilinear**: embodies three phases, ascent-peak-descent or descent-trough-
The Classification of Natural Sounds

ascent, such that motion in one direction is reciprocated (fully or partially) by motion in
another direction;

(3) eccentric/multi-directional: in which there is a lack of central "focus" or
ambiguity of specific motion type.

Extending from the category of linear motion are those of:

(1) unidirectional: where there is motion in one direction, such as "ascent",
"descent" or "plane";

(2) bi-directional: in which there are stratified layers of motion towards a
particular point or axis\(^3\), such as "divergence" and "convergence".

And extending from the category of curvilinear motion are these motion types:

(1) reciprocal: in which motion in one direction is balanced by motion towards
another, such as "parabola" or "undulation";

(2) centric/cyclic: in which there is the impression of a central reference point,
which is suggested through the recycling of particular groups or individual elements, such
as "vortex" or "helix".

\(^3\) The definition here is suggested by this author as Smalley suggests this motion
type to be "self-explanatory". See ibid., p. 75.
Smalley concedes that in a spectro-morphological approach to composition there is no consistent low-level unit to which structuring processes can be reduced (such as in the ordering of "notes" in conventional tonal music around the centricity of a tonic phenomenon), and that single objects or units can be difficult to discern where there is dense fusion of spectral and morphological motion. In this sense, it is reasonable to point out that works of a spectro-morphological nature tend often to be involved with the initiation and determination of their own base-levels within the structure, according to the processes and materials which characterise the work. However, Smalley does focus on three relatively general but ubiquitous aspects of spectro-morphological music; gesture, texture and surrogacy.

Gesture describes processes of movement from one "goal" to another and is especially related to the sensation of changes in the application of energy to a sounding medium ("actual" or "surmised"). Smalley applies this in a broad sense:

Causality, actual or surmised, is related not only to the physical intervention of breath, hand, or fingers, but also to natural and engineered events, visual analogues, psychological experiences felt or mediated through language and paralanguage, indeed any occurrence which seems to provoke a consequence, or consequence which seems to have been provoked by an occurrence.32

Texture describes the internal patterns of the spectral and morphological makeup of sound objects. While "gesture" is concerned with the sensations of movement and changes in the shaping of sound objects, texture relates to the qualities inherent in all phases of the

32 Ibid., p. 82.
evolution of a sound object. Further to this is the idea that extended gestures can allow greater focus on textural makeup (as in the case of open attack-decay morphological archetypes, when an extended resonance draws the ear away from the nature of the initial impulse and towards the nature of the continuing spectra):

The more gesture is stretched in time the more the ear is drawn to expect textural focus. The balance tips in texture's favour as the ear is distanced from memories of causality, and protected from desires of resolution as it turns inwards to contemplate textural criteria.\(^3\)

**Surrogacy** describes the process of re-shaping and/or magnifying the gestural and textural makeup of an initial sound source by means of electroacoustic transformation. **First order** surrogacy extends to transformations in which the original identity of a sound object is still recognisable. **Second order** surrogacy involves transformations such that the actual physical or concrete cause of a sound object is not discernable, but the perceived gestural and textural evolution can be related to the original. In **remote** surrogacy, a sound is so far removed from the nature of the original source that a corresponding physical cause cannot be ascribed to the new sound, so that a listener "enters the realms of psychological interpretation alone".\(^4\) A common and basic form of spectro-morphological surrogacy is through the use of analogue tape recorder speed change - in which increase in replay speed compresses the dynamic profiles of sounds so that gestures become more rapid, while decreasing replay speeds can enlarge and extend internal details of spectral makeup.

\(^3\) Ibid., p. 84.

\(^4\) Ibid., p. 83.
In discussing the overall control of structure in spectro-morphological music, Smalley suggests that the three related phases of morphological design (onset, continuance and termination) can be applied as models for structural design by extrapolating these into broader or "higher" levels of the organisation of sounds. This line of thought seeks to define ways in which different kinds of structural emphasis can be achieved through the perceived narrative of the materials - onset is related to concepts of initiation such as "anacrusis" and "downbeat", continuant is linked to central or pivotal areas of exposition such as "statement", "maintenance" and "transition", while termination, in being linked with notions of "plane" or "resolution", indicates goals or areas of cadence. An example of Smalley's application of these notions to a hypothetical structural design is as follows:

1. initiation/statement?=initiation/statement
2. statement=plane/transition?=transition
3. transition → closure?=immersion/insurgence/emergence

The beginning of the structure (the onset-initiation) and the continuant statement are dual attributions. Right at the outset we diagnose the structural importance of the statement function. As the statement continues we begin to invest both planar and transitional qualities in the context but finally settle for the transition, which we surmise as heading for closure. But the closure turns out to be the more committed immersion occurring simultaneously with two onset functions, the more impetuous insurgency, and the more careful emergence. Eventually, therefore, we prefer not to separate the interwoven functions of initiation, statement and transition, and we definitely cannot separate out the triple immersion, insurgency and emergence. There is no time for a real feeling of resolution, and any semblance of termination is negated by the superimposed onsets. 35

35 Ibid., p. 87.
A work by Smalley himself which attempts to sustain a large-scale structure on the basis of spectro-morphological design is *Pentes* (1974). In this piece natural models of attack, iteration and resonance constitute both low-level "details" of individual elements and "higher" levels of structural organisation. The title of the work means "slopes" or "inclines" and this suggests the broad progressions, transformations and extensions of sound morphologies and spectra.

*Pentes* consists of four main sections. The first is constructed around both individual and grouped attacks which are gradually extended through "explosive" gestures (where the initiation of the gesture gives rise to an extremely rapid increase in the density of attack morphologies and then subsides more gradually) forming into more continuous iterative "pulse" morphologies. As this first section evolves, the iterative morphologies become more and more extended and prominent, until they constitute the main momentum of the section. Initially "pulsed" decays which extend from these gestures, as well as fragments of granular textures (which later assume greater significance in the piece), are distanced spatially from the gestures. As the piece evolves, all these elements become more integrated. Towards the end of the first section a texture in which "pulses" move in cycles (punctuated by "explosions" of grouped attacks) increases continually in amplitude with the associated sensation of a linear motion towards a new state of some kind - of either statement of closure (as the increase in amplitude cannot continue indefinitely).

This texture eventually reaches a state of "plane" - a maximum amplitude is reached and sustained until truncated by a final and extended explosion which functions as a "closure" to the overall gesture. This allows the realisation that changes in the amplitude of a continuous or cyclic morphology can carry strong implications of "motion".
A brief coda to this section follows - that of two single, dry attacks of inspecific pitch followed by a similar sound, but in an apparently "resonant" or reverberant space. This small section typifies the overall distinction outlined in the work between impulse and resonance, and the ultimate "goal" of the impulse-based gestures towards a "resonant state".

The second section is characterised by sustained sounds with "sloping" gradual movements of pitch (usually downwards). The continuity of these sounds allows the ear to focus on details of texture, which exist on several levels - layers of dense granular activity, and undulating dynamic patterns which eventually reach a planar state in the pulsating drone morphology of the next section.

In the third section, sounds of the Northumbrian pipes are heard - initially underlined by a low-pitched pulsating bass drone mirrored by a high-pitched, abrasively granular sound, through which layers of conventional melodic material played by the Northumbrian pipes are briefly superimposed. In the fourth section, materials of earlier sections are recapitulated ("explosions" of grouped pulses and "sloping" continuous textures) but on a vastly compressed timescale. The pulsating drones of the pipes' section continue, but are disturbed by the re-introduction of the pulsed explosion morphologies while high-pitched "metallic" resonances appear to develop out of the high-pitched granular texture previously associated with the drones. This point in the work indicates the value of apparent spatial motion in the linking of sound materials in a "generic" gestural sense. The high-pitched granular textures are enhanced by an apparently circular motion from right to left within the stereo space. A further more distinctly iterative sound is introduced and this appears to "track" or "imitate" the spatial motion of the granular
sound. The similarity of their motion makes them readily associated with each other, while their morphological differences (as "granular" and "iterative" morphologies) helps to suggest that the continuity of the granular texture is breaking down into the more readily perceptible pulses of the second texture. In other words, similarity in spatial motion links two different textures as a gesture. This overall progression is subsequently clinched with the sudden recapitulation of an "explosion" gesture of the kind which characterises the first section, suggesting that the "breakup" of the granular texture has been leading to this point. A fragile harmonic spectrum consisting only of a fundamental and resonances of high-pitched partials evolves briefly towards the end of the piece and the high "metallic" resonances finally continue alone, seemingly revolving in the stereo space.

Overall, the structure of the work can be seen to model a process of gradual evolution of different morphological and spectral types - from "dry" attack-impulse morphologies through to extended textures of iterative and granular makeup towards the final realisation of true "resonance" spectra.

The role of surrogacy in this work is also significant in relation to the appearance of the Northumbrian pipes melody, for at this point there is a strong sense of humanly "played" gestural material. As such, this forms a focal part of the piece in which the listener is brought to the surface of a soundscape which is otherwise remote from the sensation of tangible instrumental sources.

2.3 (e) **Summary to Smalley's description of spectro-morphology**

In general, Smalley's approach to spectro-morphology gives rise to the following
central points:

(1) The clear identification of definite successive phases and typologies of the temporal progress of sound objects.

(2) The integration, by way of descriptive analogies, of the interaction of morphology and spectrum towards the perception of spectro-morphological motion - further suggesting ways in which expectations might be initiated and manipulated on that basis.

(3) The possibility of perceiving different aspects or levels within the gestural and textural makeup of sounds according to the amount and complexity of information received, relative to the timescale (the amount of time) in which it is perceived. In other words, that if redundancy of information at one level is reached, or there is an imbalance between the composite elements of sounds, another level of information may be sought or focused on by the listener - and furthermore, that it is important for the composer to grasp such potentials in the materials of a work.

This idea can be applied to the different levels of spectro-morphological design in the following ways.

(i) In an open attack-decay archetype where the resonance is very extended, the ear can be drawn towards the ongoing nature of the resonance in its own right, with less significance accorded the initiating gesture of attack.

(ii) The greater extent to which gestures are extended in time, the more
opportunity the ear has to focus on textural details. Conversely, the more complex the dynamic profiling of gestures, the less likely is the ear to focus on internal textural detail in favour of the overall momentum and contouring, unless the contours of morphology are so complex that they reach a state of effluvium in which case texture may again be perceived, but at a higher level.

(iii) In terms of overall structure, sensations of progression, stasis, or ambiguities in motion, can be set up and manipulated by a composer. For example, that increase and decrease in amplitude or frequency cannot continue indefinitely, and therefore might be treated as being goal-orientated (reach a stable or planar state) or imply motion from or towards oblivion (through increase or decrease in amplitude respectively).

Smalley does also acknowledge that all sounds can potentially be regarded as carrying abstract and concrete information. While the scope of the essay "Spectro-morphology and Structuring Processes" is concerned with the description of the spectro-morphological potentials of sounds in an abstract musical language, Smalley recognises that sound reference is an aspect by which the composer can deal with the significance of the actual sound-producing objects. Further to this, he indicates that a "balance" between spectro-morphological and literal reference criteria may be possible in electroacoustic music which uses sounds drawn from the environment - in the context of which he makes the following remarks:

... the abstract and concrete aspects are not always

what they seem. Music is always related in some way to human experience, which means that mimesis is always at work even in music regarded as abstract, though such mimesis is notoriously difficult to explain, particularly as language often proves an inadequate filter for interpreting musical experience. On the other hand, a musical context which appears to depend entirely on mimetic impact is equally deceptive. The power of a concrete sound-image to portray things, events or psychological circumstances, rests not just on the immediacy of the images themselves but on how the sounds are constructed and combined - their spectro-morphology - and that involves using reduced listening to investigate the more abstract dimension.37

2.4 Trevor Wishart

2.4 (a) Natural Sound Morphology

A further attempt at the classification of natural sounds has been put forward by Trevor Wishart38, on the basis on what Wishart considers might be a "natural morphology" of sounds. Through the consideration and analysis of the intrinsic sound-producing potential of a medium and the nature of the input of energy which results in the sounding of the medium, Wishart seeks to relate these physical properties of the production of sound to the aural impact and the nature of that impact on the sensibility.

As a starting point, Wishart begins with one of the acousmatic descriptions of sound events given by the Groupe de Recherches Musicales - the category of continuation.

37 Ibid., p. 64. Pierre Schaeffer's concept of "reduced listening" is discussed in Chapter three of this thesis.

which (as we have already seen in relation to the ideas of Pierre Schaeffer and Denis Smalley) describes the way in which sounds may be continued in time through the application of different types of energy input.

Wishart confines most of the simple or low level descriptions of sound events to the world of conventional instruments, as they convey a simplicity of energy/sound relationship.

There are three basic categories of the nature of the continuation of sound in time as considered by Wishart:

(1) **discrete**: single dry attack (unresonant). For example, a single drum stroke;

(2) **iterative**: continuation of discrete value through the re-application of energy (repetition). For example, a drumroll;

(3) **continuous**: (i) **continuation through imposed morphology** sound produced with even flow of energy into a system. For example, a flute note;

(ii) **continuation through intrinsic morphology** after the initial energy input the internal resonating properties of the body cause the energy to be emitted slowly. For example, the striking of a tam-tam.

In dividing the last category into two parts, Wishart points to a further
differentiation in the nature of the morphology of sound events, that of imposed and intrinsic morphology. This is useful because, by nature imposed morphology can be regarded in two dimensions - in that the nature of the application of the energy not only results in the sounding of the medium, but also assumes a gestural significance of its own. Wishart relates this ultimately to the gestural structure of sounds which, broadly speaking, describes the way in which a sound event reflects or maps aurally the process of it's formation.

Clearly we can gain more information about this energy input where it is continuous and least where it is in the form of an initiating impulse. Where energy (mechanical, hydraulic, aerodynamic or electrical) is continuously applied to the system, we can follow its ongoing subtle fluctuations. The sounding system is gesturally responsive. Where a sound-event is initiated by an impulse, however, (drum-stroke, bell) very little gestural information can be conveyed (effectively, only a difference in loudness relating to the force of the impulse). Iterative continuation is ambiguous in this respect. Iteration may be entirely an aspect of the applied force (as in the case of the xylophone "trill"), purely an aspect of the physical nature of the medium (vocal fry or slack double bass strings), or an interacting mixture of the two (a drum-roll).39

Because the relationship between the type of energy input and the intrinsic properties of a medium as a sounding body relates to both the resulting imposed or intrinsic morphology of the sound of the medium and the overall resulting gestural morphology, different types of energy inputs may give rise to different sensations of aural impact (in the acoustical sense) which may involve corresponding different impact in terms of expressive potential (in the emotional sense).

Wishart adds that sound events can be generated (for example with synthesisers) without the need for bodily energy producing actions (the transfer of energy) directly related to the nature of the sounds, but that the "mode of continuation" of the sounds will tend to be interpreted or felt in terms of the types of physical characteristics outlined.

The distinction between e.g. [sic] continuous and impulse-based excitation is not a mere technical distinction but relates to our entire acoustic experience and "tells us something" about the sound-object even though it may have been generated by an electrical procedure set up in an entirely cerebral manner. We can, of course, transcend these categories of the physical experience of sound-events, but I would suggest that we do so in the knowledge that this background exists . . .

The forms of sound-objects are not arbitrary and cannot be arbitrarily interrelated.\(^\text{40}\)

An important point here - which is especially pertinent to the discussion of the intrinsic morphology of natural or environmental sound objects - is that in nature, sounds which are continuous (as the result of continuous excitation of a medium, the two examples given being those of the sea and the wind, or sounds produced by the wind, though we may add to this other types of water movement, such as rivers and rain) tend to possess an "interesting ongoing morphology". Natural sounds "speak" through the intrinsic resonating properties of the sounding media relative to the nature of the energy input, which in Wishart's view "gives a greater sense of life".

As Wishart puts it:

Sounds undergoing continuous excitation can carry a

\(^{40}\) Ibid., p. 98.
great deal of information about the exciting source (this is why sounds generated by continuous physiological human action (such as bowing or blowing) are more "lively" than sounds emanating, unmediated, from electrical circuits in synthesizers).41

For the analytical description of complex sound objects Wishart adopts a new category of imposed sound morphology - that of unsteady continuation. This involves the transformations of an ongoing energy source and applies to sound objects which have complex or unstable intrinsic morphology (unlike most musical instruments which have a stable intrinsic morphology - and a relatively simple acoustic response to the input of energy).

Wishart argues that, with the removal of a sound from the direct context of its source or the nature of the sound production, a sense of imposed and intrinsic morphology remains in the perceived nature of the sound.

One important critique of the acousmatic analysis of sound-objects is that it reduces the two dimensions of imposed (gestural) morphology and intrinsic morphology to a single dimension, even though the distinction between these two is not totally clear-cut and in the virtual acoustic space of loudspeakers the problem of sound-origins can be problematic. I would argue that the two-dimensions continue to enter into our perception of sound-objects. Different kinds of intrinsic morphology affect us differently and this is something to do with the assumed physicality of the source (which is not the same thing as source-recognition). Imposed morphology we react to more directly, having an immediate relation to the workings of our own physiological-intellectual processes.42

41 Ibid., p. 99.

42 Ibid., p. 99.
On the basis of this principle, Wishart outlines a series of sound archetypes of a complex morphological nature: sounds which evolve or transform in a complex manner, as a result of fluctuating or extreme energy sources. The value of this in musical terms rests with Wishart’s assertion that the two dimensions of imposed and intrinsic morphology relate directly to the perception of all sound objects and that an awareness of such factors may be of use to the composer in discerning the implications and potentials in materials.

Given below is a summary of Wishart’s outline of categories of the morphology of complex sound objects.

2.4 (b) Archetypes for the Classification of Complex Sound Morphologies: T.Wishart (abridged).43

Turbulence: Analogy - liquid flowing in a pipe normally does so in a well ordered manner - increase in pressure may result in turbulence. The characteristics of the flow becoming difficult to predict. A continuous sound object could possibly show turbulence - at one extreme white noise [which may have an electroacoustic equivalent in electronic distortion through over-modulation].

Wave -break: A natural kind of anacrucial tension and resolution (of one type). Increase in internal activity during crescendo followed (especially) by a spectral broadening near the point of maximum amplitude followed by diminuendo [which may be quite extended].

43 From Ibid., pp. 100-103.
Open-close: Continuous sound of relatively constant mass with low pass filter imposed followed by opening of filter to reveal high frequencies gives the aural image of opening or closing [relating to open or closed spaces - a shift from acoustic confinement (less high frequency) to exposure (more high frequency)].

Siren/Wind: Where the pitch or mass of a continuous sound rises and falls in parallel with the dynamic level.

Crack/Creak: The increase in pressure to certain systems results in stress sounds. The application of pressure may give rise to stress sounds (creak) - which will finally give way to a low instantaneous wide-spectrum sound (crack). [Separates itself as a "stress induced" morphology from the nature of turbulence in that this indicates a less continuous and more iteratively based morphology].

Unstable-settling: If an object which resonates when struck (for example, a long thin plate of spring steel) is held in a state of complex artificial tension and then struck and at the same time released from tension the morphology of the sound reflects the nature of the natural resolution of the medium to a state of relaxation as the object eventually settles onto its natural resonance. [An imposed morphology achieved not through the nature of the energy input, but through a gross transient alteration in the physical form of the object].
The Classification of Natural Sounds

Shatter: The vibration of certain types of media to the point where they respond by fracturing. Sonically, an aggregate of smaller sounds emerging from an initial louder, wide-spectrum sound. Spectral components vary with the material, morphological components fairly constant.

Explosion: A sudden wide-spectrum attack followed by a low-spectrum aftermath of unstable morphology (rumbling).

Bubble: Brief sound, attack simultaneous with opening of filter and decaying with rapid closing of filter, may include pitch of mass of the sound moving slightly. This morphology relates to the nature of the physical process of a bubble breaking the surface of a fluid.

Wishart also extends this concept into the area of grouped phenomena, where individual sound sources are in combination.

Alarum: The disturbance of a colony of animals or birds gives rise to a characteristic sound morphology. A loud individual cry rising rapidly in pitch and/or amplitude to a maximum level, giving rise in the process to the triggering of other individual cries until a mass of cries is built up. Gradually this breaks down, becoming less dense, and possibly lowering in amplitude and pitch.
The dunlin-effect: A more generalised version of the alarum. [Based on Wishart's observation of the flight patterns of flocks of Dunlin - a gregarious English Wading bird]. If disturbed, a group of birds take to the air and fly in a flocked rising and falling, swirling pattern.

Characterised by three phases:

1) Birds at the leading edge of the flock set the course and change direction only in a curving motion.

2) the other birds follow, in the same pattern of motion in a general way, each with their own variations of trajectory.

3) the pattern of variation of a following bird to a lead bird is random. The motion is therefore cohesive, never abrupt but unpredictable. Can be related easily to the spatial motion of sounds (for example, in a multi-channel set-up).

Streaming effect: Certain changes of "regime" in continuous streams of sounds, such as:

(1) Coalescence/Individuation

44 These are Wishart's own diagrams. See ibid., facing p. 101.
(2) Desynchronisation/Synchronisation

(3) Filamentation/Granulation

(4) Iteration/Separation

[these concern the way in which continuous sounds form or separate as sound masses and the apparent interactions involved].

It is important to realise here that Wishart has not so much attempted this categorisation of sounds for the sake of codifying or compartmentalising all of the types of sound objects that exist, but rather to begin to come to terms with what he feels to be criteria of cause and effect "matching" which are already applied intuitively by the human sensibility.

From working with sounds of dynamic morphology in the studio, one begins to sense that there is some kind of mental categorisation of the sound-objects related to the nature of physical processes of change or instability. I am suggesting, therefore, that a particular sound has a certain impact, not because it merely reminds one of e.g. [sic] breaking glass of bubbling soup, but that there is a deeper-level morphology of natural processes which is revealed through the sounds which they make.45

Therefore, we are presented with a kind of "nth degree" of sound morphology, dealing with the interface between the natural physical processes which occur in a medium when sounds are produced and related human responses to the phenomenon of sound - linking the two in a cause and effect system. In stressing the "deeper level of morphology" as the aspects of sounds through which we tend to make inferential links, Wishart is suggesting a more universal view of the expressive relationships between sounds and people. The kinds of links described above (with the examples of the bubbling soup and breaking glass) when viewed purely in terms of their perception as aural signs (that is indicators of concrete objects or events through the recognition of the source) are bound by cultural prescriptions; that is, the necessity of recognising the object for its functional relevance, as well as for its spectro-morphological characteristics. However, such metaphorical links of description (with particular substances or objects) may derive from the particular objects through which, in a given culture, such archetypes are ordinarily perceived.

2.4 (c) Vocal Models

Wishart approaches natural sound morphology with the view that spectro-morphological properties reflect certain aspects of the behaviour of matter, and that natural materials have physical qualities which may intrinsically relate to the way sounds drawn from an object behave and are perceived. Furthermore, in applying referential metaphorical classifications, an area of interface between the world of signs (source recognition) and acoustical qualities and quantities is suggested.
The Classification of Natural Sounds

Wishart extends this approach (mainly for the purposes of example) into the area of linguistics:

The sort of approach we are discussing may be extended to verbal sounds. Although the linguistic sign is essentially arbitrary (i.e. [sic] there need be no intrinsic relationship between the sounds of vocal speech and the objects referred to) some words in any language do seem to bear some morphological relationship to the sound-events (or even visual objects) which they stand for. This effect may be consciously aimed-at, as in a poet’s use of onomatopoeia. It may also be that sounds originally mimicking natural events were absorbed into the language as apparently purely conventional signs (like most words).46

At this point the relative sophistication of human language and the nature of its abstraction from the environmental world of sound makes such connections with actual words rather tenuous, and it becomes relatively easy to manipulate onomatopoeic connections either through variations in vocal inflection or a mental "filling in" of such mimetic criteria. More appropriate may be less contrived types of vocal utterance which may tend to link with emotional or internal human states - of the type suggested by Wishart in the group phenomenon of alarum - for example, shrieks, groans, laughter. These kinds of vocal morphology are certainly more widely applicable and function at a deeper level than verbal morphologies. We may, for example, differentiate between say, the type of groan associated with the response to a bad joke, a cry of pain or types of erotic vocal production. In such cases the sound morphologies relate directly to our internal process or feeling, and function more as sound indicators, rather than, in the case of verbal communication - syntactical units. Similarly, certain types of touch or physical

46 Ibid., p. 102.
gesture (which can be used as communicators in their own right or as reinforcing agents for verbal communication) have more general functions.

In the case of vocal morphologies of this kind, we might list some types of human feeling states and morphological variants typically associated with them. For example:

- **pain:**
  - scream archetype;
  - continuous, loud, high pitched, often broad spectrum utterance,
  - may be suppressed to a considerable degree.

- **surprise:**
  - large downwards quite rapid glissando of pitch, in males may begin with falsetto voice in extreme case, with quick portmanto to low pitch.

- **uncertainty:**
  - initially downwards curving glissando ending in an upwards, unresolved bend - indicative of questioning.

- **frivolity:**
  - complex, laughter based sound with rapid frequency and amplitude modulation, strong diaphragm impulse.

- **ecstasy:**
  - small shift in pitch (usually downwards) in relation to envelope length, may include "breathy" end to envelope.

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47 A list of vocal inflectional typologies was used by Wishart in the making of Red Bird. See Wishart, Trevor. Red Bird: A Document. Published by Trevor Wishart, York, 1978, p. 10.
However, the extreme flexibility of morphology inherent in the human voice results in a huge number of subtly varying modifications of such basic morphological types. This may also relate to links between certain types of emotion which may be quite complex. For example, a single grunt, with short envelope with downwards curve, strong diaphragm impulse but a spectrum shift from a breathiness to a short, low pitch, voiced "grunt" may extend from a laughter (or frivolity) based morphology and reflect an internal state of a forced kind of humour-response, whereas the same basic morphology but with a high voiced pitch at the end of the envelope (instead of the low grunt) may indicate a more incredulous emotion (fancy that!) - the high pitched end to the envelope being a strong questioning indicator. Again, a simultaneous more continuous breathiness and voiced pitch (high or low with possibly a slight downwards shift) may be a more erotic indicator.

The almost limitless extent to which it is possible to mediate between these kinds of morphologies (which ties closely with Wishart's analysis of the human voice as a sound object of virtually completely imposed morphology, outlined below) may give rise to ambiguity when there is a lack of contextual repleteness.

Wishart, in On Sonic Art, goes on to discuss "utterance" in greater detail and points out in this area the difference between intentionally and involuntarily made sounds.

... certain emitted sounds are involuntary indicators of an internal state (sneeze, cough, belch) and some of these may be involuntarily emitted and received signals (laughter, screaming, both of which may elicit the same response in a human being without passing through the process of conscious decision to emit a signal) ...

48 See Ibid., Chapter 11, p. 121ff.
The "intrinsic morphology" of the sound event would be a function of the involuntary conformation of the organism (resonance of the oesophagus in belching, tense glottis and wide open vocal cavity in screaming) and the "imposed morphology" would be an involuntary kind of articulation (such as the deep ululation of breath flow in laughter).

Of course, in human beings it is possible to utter all these sounds voluntarily. The contention here is, however, that such basic indicators/signals always retain some of their primeval communicative power. Such Universal Indicators not only transcend our attempts to formalise them, they even transcend the barriers between species.49

In discussing the nature of such "universal" signals through morphology, Wishart divides these into three classes.

(1) Involuntary physiological Indicators

They include coughing, sneezing, vomiting, yawning, biting, chewing, belching - indicators produced by many primates including humans. The nature of breathing can also determine general physiological states - tiredness, ill-health, sexual arousal.

(2) External Indicators

The scream is the main external indicator, emitted by a huge variety of animals and birds - usually indicating a state of extreme pain or terror. Wishart considers this

49 Ibid., pp. 126-127.
such a universal indicator that any such sustained, high-frequency, loud, broad
spectrum signal will carry connotations of terror or pain.\(^{50}\)

(3) Other

Wishart here cites examples of "trans-special" indicators in which species as diverse
as the Great Northern Diver, the Wolf, the Whale, and the Red Squirrel produce
very similar signal utterances without inter-communicative intent. The question
remains as to whether there is "some shared, internal, gestural experience which
creates this particular sustained contour".\(^{51}\)

However, the example of verbal language does illustrate the important value in
informational as well as expressive terms of imposed morphology. We continually modify
the morphology (and spectra) of words for anything from emphasis or a natural reflection
of a particular psychological state (for example, excitement or sadness) to the potent
communication of specific meaning, which may be extremely subtle or alarmingly extreme
- for example, the extended, loud, high pitched cry "HELP!" to the surprised exclamation
"help!(?)". In such cases the morphology of gesture conveys (as paralanguage) a
significant part of the meaning.

Wishart regards the voice as an extreme example of a producer of sound objects
almost entirely through imposed morphologies, as the larynx and vocal tract are so
completely linked with human physiology that there is no real sense of intrinsic morphology.

... the human voice is an almost infinitely flexible source of sound-objects. Except in extreme cases (extreme distress generating screaming, for example) the particular formation of the larynx and vocal tract and hence the morphology of the resultant sound are the result of the intentional disposition and motion of the vocal physiology. The morphology of the sound object is almost exclusively an imposed morphology.52

In the light of this, Wishart's subsequent drawing in of the relationships between electroacoustic music technology (especially computer or digital processes) for the "hybrid" production and control of sounds on the basis of imposed and intrinsic morphologies suggest further observations. The voice is an extremely important part of the bodily sound-world of the human body as communicator and expresser. Extending from this, the idea presents itself that the flexibility in manipulating environmental sounds offered by the electroacoustic medium could reflect potential for control of natural (external) sound objects with the freedom and flexibility of the morphological behaviour of the voice, and beyond, into new areas and dimensions of sound manipulation.

We may take a source like (or akin to) a struck bell and then articulate its ongoing morphology in several dimensions at once, if we so wish, using analogue and digital studio techniques. Similarly, we may take the human voice and impose upon it a physically impossible intrinsic morphology while at the same time retaining its typical articulation. In a sense, the distinction between imposed and intrinsic morphology breaks down and to the composer it becomes a matter of aesthetic or ideological bias whether one regards creating sounds in the studio as a matter of carefully

52 Ibid., p. 103, see also p. 123.
modelling gesture or building analogues of physical objects. The age-old debate about music as human expression and music as objective "harmony" develops a new and intriguing twist.\textsuperscript{53}

The idea of the existence of innate links between human vocal production and the flexibility of gestural morphology now possible in electroacoustic music has also been commented on by Denis Smalley:

\begin{quote}
Even if the actual sound of structures based on a spectro-morphological approach often appears to leave voices and instruments far behind, their formative influence nevertheless persists through gesture: the spectral shapes and shape-sequences created by the energy of physical and vocal articulation. Though the internal spectral behaviour of sounds may no longer mirror overtly the inspiration of instruments and voices, tangible links with humanity demand to be preserved through gesture.\textsuperscript{54}
\end{quote}

The conclusion of Wishart's argument broadens this notion of the relation of all sounds to certain types of physical process to those of human receptive experience, as well as those of utterance.

One final and strangely bizarre possibility presents itself. We might imagine a music whose logic was based entirely upon the logic of the evolution of natural events, as evidenced by the natural morphologies of the sound-objects used. The sound-objects themselves, however, might be

\textsuperscript{53} Ibid., p. 104.

entirely artificial in origin (and not merely attempting to mimic natural sound-sources). Is this "anecdotal" music?\textsuperscript{55}

2.4 (d) Some final observations on Wishart's natural morphology of sounds

The exploration of the idea of a natural sound morphology by Wishart allows the following points to be acknowledged.

(1) A view is offered by Wishart, of a broad base for sensitivity to the way in which sound objects are perceived, through intrinsic and imposed morphology and the nature of the energy applied to them with the resultant gestural morphology.

(2) It allows for the identification of interface between areas of acoustics, psychoacoustics and the source recognition of the physical sources of sounds, possibly suggesting why certain sound morphologies might be usually or easily identified with certain objects - given the conventions of a particular culture.

(3) The widely applicable qualities of the natural morphology of sounds may be an area through which recognisable sound sources can function at a deeper level of expression. Further value can be seen here through a new view of the two-edged nature of sound as being:

(i) indicative of certain types of phenomena - in a purely spectro-morphological sense - of the relationship between the gestural energy applied to a medium and the

intrinsic acoustic response of that medium, as well as constituting a broader set of references through recognition of environmental sounds and;

(ii) capable of being used as a medium of creative expression and inducing emotional responses where the listener perceives an affinity between the nature of the sound (either morphological or referential) and some internal requirement within that listener.

(4) In showing integration of sound in terms of its morphological evolution and the physical nature of matter, a holistic view of sound as an expressive factor at the core of human sensibility is suggested. This is also related to the linking - through broad, physically based references - of sounds with certain states, behaviours or properties of natural objects.

(5) The view of the voice as a medium of completely imposed morphology creates a further point in relation to the evolution of electroacoustic media as a method of sound manipulation. Electroacoustic recording and playback allows a sound to be removed from the confines of its physical source and manipulated morphologically in ways that may be impossible within the physical limitations of the object (intrinsic morphology). If we take environmental sound as the prime sound source, then we may view human manipulation of sound through constructed instrumental media as a self-contained stylisation of the aural world around us, achieving a gradually evolving state of complexity. We may take the view that, with the entry of sound taken directly from the natural world into musical composition (as an aspect of the total language), the use of technology to impose morphologies of any kind onto any sound represents a control of
environmental sound by humans similar to that inherent in their own voices - with possibly the same models of expressive capability. In this sense, electroacoustic music may offer humans a way of re-situating themselves and their sensibilities in the environment and the world of natural phenomena.

Humans, as well as being sensitive to the stimuli of natural phenomena, have been imposers on and manipulators of the world around them - for utility and survival as well as art - and while the model of the voice may not be solely at the core of the nature of human intent or will expressed through the imposition of morphology, within the context of the world of sonic art and the control of sound morphology, it may nevertheless be a useful area of analogy.

(6) That morphological (and spectral) characteristics may be fundamental to the way sounds reflect particular gestures or suggest a particular emphasis (such as in the case of vocal inflection to enhance the meaning of words) by indicating or alluding to certain natural, even primal, states of matter which are overtly indicated acoustically.

2.5 Imitative use of natural vocal morphology: An example

Imitation of vocal morphologies through a non-vocal medium can be seen as a basic influence in the music/sculpture work In Sympathy (1981) by New Zealand composer Chris Cree Brown (born Christchurch, 1953). The work is for solo trumpet

56 This work has also been produced in a film version, featuring Mary Robbie, trumpet. The score, with commentary by the composer is reproduced in Canzona, v.7, n.21, 1985, pp. 5-10.
player who is also required to "play" two other trumpets suspended from the ceiling, on either side of the performer, by means of elastic. The suspended trumpets are sounded using compressed air forced through stretched rubber membranes attached to the mouthpipes of the suspended instruments - the air flow being controlled by rubber valves which the player operates with the ankles. These two suspended trumpets (one E-flat and one B-flat) can produce a variety of sounds within three basic types, according to the amount of air pressure applied to them: a "breathy" sound (low air pressure, membrane not vibrating), a "foghorn" sound ("fundamental" tone) and a "squeal" sound (high air pressure), both of the last two sounds being rich in harmonic content. The performer is also required to play two duck callers, one blown by the trumpet player into a harmon mute, the other played using a foot-operated pump connected to the duck caller by a rubber membrane.

The live playing of the trumpet is of special interest in that the means of playing the instrument involves the establishment of a kind of "persona" through the sounds produced on the instrument. The player is required to interpret on the trumpet (and later on a duck caller played into a harmon mute) an intricate undulating line of graphic score in a vocal manner, involving a large pitch range (although discrete pitches in the conventional sense are not called for) from low pedal tones to high "squeals" using altered embouchure techniques and "half-valving" on the instrument. At certain points the player is also required to make exaggerated inhalations and exhalations (see Example 5). The player must literally think in terms of vocal morphology, with tongue, lip, throat and diaphragm movements, for the appropriate emission of sounds - which may reflect specific speech morphologies, or more general gestural ones such as pain, questioning, anger, indignation, grumbling, extreme effort or resignation. The inability of the instrument to
allow actual speech to surface through its sound results in a highly expressive form of humour/pathos.

Later in the work, the player manipulates the rubber membranes attached to the suspended trumpets in order to attempt to make these instruments speak in the same way, and a "conversation" between the performer and the inanimate, sounding instruments emerges. A successful performance of this work is one in which typical vocal gestures and morphologies have been successfully captured and conveyed.

In the film version of In Sympathy the persona idea is taken a step further than in the performance version, with the player suddenly becoming absent at the end of the film, having "turned into a trumpet", indicated by a miniature trumpet necklace which was worn by the player during the filmed performance left hanging on one of the suspended trumpets seen at the end of the film.
Example 5: Cree Brown: *In Sympathy.*
The imitation of vocal morphologies and persona can have striking effect in this work. Performance of the piece hinges very much on the instrumentalist playing from the vocal kind of basis outlined, as well as from a "sound" or instrumental point of view. In this respect the role played in the piece by the duck-caller is significant. Initially the piece involves two polarities of the types of morphologies executed by the player using the trumpet, and the initial sound of the piece - that of a duck-caller activated by the player using a car-tyre foot pump. The duck-caller produces in this instance a single, characteristic envelope, (rather like a single cry or wail) and the instrumentalist producing a more complex line of sound in a more "articulate" vocal manner though, of course, never actually semantic. At the end of the piece a second duck-caller is played directly into a harmon mute by the performer, with similar gestural, "vocal" morphologies to those played using the actual trumpet and the foot-operated duck-caller is made to sound again - "conversing" in its own limited way with the efforts of the performer. In this way the initial polarities are drawn together.

The example of this work demonstrates the way in which gestures which suggest the inflections of vocal morphologies can be imposed on an object (a trumpet) which normally is made to resonate in quite a different way. With In Sympathy, the success of this is not as an abstract process (that is, the simple "extension" of instrumental possibilities) but in the "meaning" which results from the imitative process. That the emulation of vocal morphologies are perceived by the listener as such stems directly from the intrinsic importance ascribed by humans to vocal sounds, and the affinity that is felt with them.
2.6 An Extension of natural morphological phenomena

Mention was made earlier of the universally communicative implications of certain types of touch and body movement, which can be seen to function through the types of gestural morphology involved. As Wishart's models of the elements classified under his category of complex morphological archetypes relate to natural forms and processes which result in sound typologies (the archetypes of "wave-break", "turbulence" and "unstable-settling", for example, have strong parallels in morphology with the visual sense of evolution and dissipation of energy involved) it may be useful to view such phenomena from the standpoint of a different sensual (and artistic) aspect through the kinetic/visual morphologies which are also embodied in such processes.

Such a view is extant in the work and writings of New Zealand artist Len Lye (1901-1980), which bear examples of the way in which concepts of natural morphology may be integral to an art form other than music. Lye spent virtually all of his life in the production of works; abstract film and especially kinetic sculpture, which involved motion - something that he had wanted to use in art from a very early age. Lye said [of himself]:

... one fine morning this 15-year-old art student was standing up on a hill watching the way the clouds were rolling through the sky at sunrise. They reminded him of how the early English painter, John Constable, did oil sketches of clouds to try and show their movement. Then it hit him: why not make cloud shapes that actually moved instead of simulating their motion? But then he saw that cloud
movements were fairly limited. Why not make his own shapes and compose his own motion? And that was it.\textsuperscript{57}

Len Lye had a strong feeling for visual morphology (expressed as motion) and the relationships between intrinsic and imposed morphologies of the outward motion of natural occurrences. He worked a great deal from this basis, transferring the sense of natural movements into his own bodily sensations - \textit{imposing} and \textit{relating} the feeling of external natural gestural morphology onto his own physiological sense. He described this as "bodily empathy" and shows feeling for the natural morphology of the physical gesture inherent in motion.

From time immemorial the Muse of Motion has promoted not only humanity's most simple pleasures but also some of its most poetic feelings. It's the touch of Kinesthesia we feel when we aim for something and - Eureka! - we hit the mark. The golfer responds to it when he gives way to a display of body English; we feel Aesthetic Kinesthesia's presence when we watch a tennis serve socked home, a home run hit.

Again, it is our sense of bodily weight which stirs when we see a mighty missile slowly lift off the pad. I feel a kinesthetic touch on my shoulder when I see the porpoise hump its back down to the deep. It's Kinesthesia's presence which seeps into my bones when I relax on the beach. She's by my side when I watch the big comber break, or when my eye follows the white crests travelling along the long lines of the incoming waves. From our earliest days we've all basked in the pleasures which this muse offers. It was she who first got me to wiggle my toes.

Her charms include the delights we get out of nature when most at one with ourselves, such as when we are on holiday, note a sloping field of grain flurried by the wind, contemplate the currents and eddies of a stream, stare into the

\textsuperscript{57} Lye, Len (Wystan Curnow and Roger Horrocks eds.). \textit{Figures of Motion}. Auckland University Press, Auckland, 1984, pp. 81-82.
dancing flames of the fire, follow the soaring flights of birds, catch shimmers of light.  

I watch a black cat get off its mat to take a luxurious low down stretch. I empathize purposefully as I watch it stretch out its front legs and raise its haunches well up to create a great curve of its back while it stretches, stretches, and I think:

Now, Len, where do I feel that cat's stretch in my own anatomical makeup the most? And I transfer the thought to the feel of my body. Ah, ha, I have it. In the stringy sinews of my instep when I pull my toes back tight trying to touch my shin, that's where with my body I feel that cat's stretch the most.

Or you are up in the country and you see a heron with its slow big flapping wings and you ask: Where do I feel the motion most? In no time at all you relate it to the in-and-out of your breathing. There's nothing like motion for direct bodily empathy.

Lye's bringing of himself into this kind of intimate relationship with the motion of things around him acted as a direct catalyst to his creative work. In kinetic sculpture (with work such as Universe, Trilogy (A Flip and Two Twisters) and Fountain he "composed" motion - his sculptural forms made of highly polished metal (to reflect light), these either hanging or standing freely, or fastened in an imposed state and attached to motors causing them to vibrate or rotate - constantly changing shape and sound. This can also be seen in scratch films such as Free Radicals (1958, revised 1979) and Particles in Space (1979) where Lye achieves rhythmic synchronisation of abstract images scratched directly onto 35 mm film with musical soundtracks. These scratch films are remarkable for their suggestion of three-dimensional motion. Lye was then using principles of

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58 Ibid., p. 79.
59 Ibid., p. 32.
intrinsic and imposed morphology gleaned from a deeply and inwardly felt empathy for the natural morphologies of motion as formal elements in his work. For Lye, establishing the kinds of links he did with natural morphology was central to the "living" quality of motion - to be acutely aware of its subtleties and to feel it deeply - ultimately manifesting itself in his works, abstracted and transformed from his real world observations. Len Lye's observations of this kind describe the bodily affinity he felt with the phenomenon of the physical motion of objects - that "morphology" of this physical kind could be related and translated to the sensations of the human physiology.

2.7 R. Murray Schafer: The World Soundscape Project

2.7 (a) Introduction

An attempt to construct a system for the classification of natural sounds which embraces both physical/acoustical and semantic/situational aspects of sounds has been put forward by Canadian composer R. Murray Schafer, (born Sarnia, Ontario, 1933).

Schafer's work in the area of environmentally based music has been through the World Soundscape Project, founded by Schafer in 1971 and centred at the Sonic Research Studio of the Department of Communication, Simon Fraser University, British Columbia. 60

The members (mostly composers) including Schafer, Barry Truax, Howard Broomfield,

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Bruce Davis, Peter Huse and Hildegard Westerkamp. The aim of the project (now disbanded) was to study the sonic environment and especially in relation to humans and human activity - Soundscape being the term used to describe the acoustic environment; technically, any portion of the sonic environment regarded as a field for study. The term may refer to actual environments, or to abstract constructions such as musical compositions and tape montages, particularly when considered as an environment. 61 This is also described by Barry Truax in the context of "Soundscape Studies" as "... the relationship of man [sic] and sonic environments of every kind." 62

The project emerged largely out of conservational concern for the state in which the contemporary soundscape has found itself, with a proliferation of noise from machinery and technology - from jet aircraft over residential areas, to the 50 kHz or 60 kHz mains hum caused by electric currents and appliances, 63 the severely detrimental effect that much of this has on peoples' hearing and, in psychological terms, the effect on the ability to listen (the loss of many subtle natural sounds in the city soundscape, as well as the effects of "muzak") and the loss of a sense of value of the listening experience - especially for quiet or near-silence. The World Soundscape Project sought to foster a new and


63 One of the realisations made by the World Soundscape Project is that before the advent of electronic technology and "hums" there hardly existed in the world any continuous, unchanging sounds, water movement and the action of the wind being the natural phenomena which approach this most closely - although these possess far greater complexity and internal modulation and fluctuation - characteristics which are considered to be characteristics of aesthetic value by the Soundscape Project.
heightened awareness of the aural sense and apply this critically to the shaping of the world around us. R. Murray Schafer, for example, has stated:

We have ignored our ears, hence the noise pollution problem.\textsuperscript{64}

Schafer describes some further reasons for the setting up of the World Soundscape Project:

Soundscape is the term we use to describe the acoustic environment. You will not find it in any dictionary. We have derived it from landscape but its properties are different. Consider the number of people who have helped to define the meaning of landscape for us: geologists have studied its structures, geographers its surface formations, painters and poets have described it, gardeners and engineers have shaped it, architects and planners have embellished it. As for the soundscape, who has studied that? It is a discipline we must now learn, or rather relearn.\textsuperscript{65}

Activities included the observation and analysis of as many different soundscapes as possible - all over the world - taking into account the type of environment (urban, village, mountain, bush) or the way in which a society uses sounds in communication or for aesthetic reasons (including language) and the effects of technology, as well as the role of animal sounds and sounds of natural physical phenomena (wind, sea, rain, geysers). In other words, the way in which sounds in any given environment interact, the reasons for their existence there and the way they affect or are used by life forms. Three examples of


the kind of focus and observation by the World Soundscape Project are here briefly outlined by Schafer:

Different species of insects, animals and birds complement each other in daily and seasonal rhythms of synchronized beauty. For instance, during the months of June in British Columbia, frogs will leave off chirping at precisely the moment when birds begin their dawn chorus and will only return as the last bird is fading at sunset. Geese will be heard only a few days each year in Ontario as they streak north in May and return in huge honking flocks on their way south in October.\(^66\)

When we studied the mountain village of Cembra in Northern Italy we found that life centred on annual and seasonal cycles of festivals and special events, each with its prominent acoustic soundmark.

Church bells were rung in different ways on different occasions, small cannons or mortaretti were fired on fixed days; there were certain days when the goatherd’s horn conducted the sheep to summer pasture; there were special days for folk songs and special horns that were blown when youths and girls were courting.

The whole village was enfolded in periodic sound cycles that only began to disintegrate when a new road brought mountain buses up to connect the village with the cities in the valley below.\(^67\)

Sometimes hearing at a distance is vital to the survival of a community. In the Breton fishing village of Lesconil we conducted a study which illustrates this clearly. A daily onshore-offshore wind cycle carries a complete circumference of distant sounds to the village, some as far away as 12 kilometres. Bells from distant villages are heard, sounds from inland fields, buoys in different locations at sea, each appears at its appointed time. Any change in the accustomed pattern indicates a change in the weather, a matter which each

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\(^{66}\) Ibid., p. 5.

\(^{67}\) Ibid., p. 6.
fisherman and fisherman's wife picks up immediately with practiced ear.68

The project was involved in monitoring sound levels of the soundscapes studied, as well as extensive field-recording and subsequent studio analysis, also the preparation of documents and educational tools for the public presentation of "soundscape studies" (for example, the pictorial graphing of natural soundscapes and seasonal variations) tending strongly towards a conservational view of sound, and the serious development of "acoustic design"; the planning of soundscapes for human environments.

As well, the World Soundscape Project has attempted to reconstruct, with written descriptions, soundscapes of previous historical periods, using literary references to the soundscape and descriptions of sound events and sound objects from ancient Greek writings to the present day. This is a means not only of documenting otherwise irretrievable information but also of mapping the development of soundscapes through the ages, and assessing the continuing nature of the soundscape in relation to human and technological developments.

2.7 (b) Sound Classification (World Soundscape Project)

In The Tuning of the World69, Schafer outlines at least four different ways in which natural sounds can be classified - according to particular aspects of our perception of sound. The four categories for sound classification given by Schafer are:

68 Ibid., p. 7.
(1) physical characteristics (acoustics);

(2) the way in which they are perceived (psychoacoustics);

(3) function and meaning (semiotics and semantics);

(4) emotional or affective qualities (aesthetics).

One of the most useful aspects of this attempt at defining a sound classification method is that Schafer puts forward a system of cross reference for the simultaneous four-way analysis of sound in context. In this way we can at least see the beginnings of an understanding as to the ways in which the different facets of our perception of environmental sound interact.

In describing his basis for the classification of sounds according to their physical characteristics, Schafer acknowledges the work of Pierre Schaeffer and the value offered within that system of sound categorisation for the analysis of single sound objects. R. Murray Schafer, however, suggests that in a context of soundscape, field-work information regarding the real-time sonic habitat of sounds is of great value:

In line with our desire to comprehend sounds as events as well as objects, it would be useful first to give some general information on setting: the distance of the sound from the observer, its strength, whether it rises clearly out of the ambiance [sic] or is barely perceptible, whether the sound under consideration is semantically isolable or is part of a larger context or message, whether the general texture of the ambiance is similar of dissimilar, and whether environmental conditions produce reverberation, echo or other effects such as drift or displacement.
The Classification of Natural Sounds

[Footnote]
Drift (fading) or displacement (ambiguous point of origin) often result from atmospheric disturbances such as wind or rain.\textsuperscript{70}

These parameters are described by Schafer as the \textit{setting} of the sound, for which a set of six basic criteria are given.

\begin{itemize}
\item SETTING
\item 1. Estimated distance from observer: (in meters).
\item 2. Estimated intensity of original sound: (in decibels).
\item 3. Heard distinctly / moderately distinctly / indistinctly (over general ambiance).
\item 5. Isolated occurrence / repeated / part of larger context or message.
\item 6. Environmental factors: no reverberation / short reverberation / long reverberation / echo / drift / displacement.\textsuperscript{71}
\end{itemize}

The terminology hi-fi and lo-fi are useful and deserve explanation. A hi-fi soundscape is one in which there is low ambient noise level\textsuperscript{72} so that individual sounds or sound events can be clearly heard. A lo-fi soundscape is one in which there is a density of acoustical information which obscures the keen perception of the individual signals.

In the hi-fi soundscape, sounds overlap less frequently; there is perspective - foreground and background . . .

The quiet ambiance of the hi-fi soundscape allows the listener to hear farther into the distance just as the countryside exercises long-range viewing . . .


\textsuperscript{71} Ibid., p. 135. [Abridged].

The Classification of Natural Sounds

The pellucid sound - a footstep in the snow, a church bell across the valley or an animal scurrying in the brush - is masked by broad-band noise. Perspective is lost. On a downtown street corner of the modern city there is no distance; there is only presence.  

Schafer goes on to adopt a two-dimensional system for the general physical description of sounds. On one plane he divides a sound into the three basic parts of its envelope: attack, body and decay, while on the other are shown the relative duration, frequency/mass, fluctuations/grain and dynamics of each of those parts. (See diagram 5 reproduced below).

The terms "mass" and "grain" derive from the terminologies of Pierre Schaeffer, and are intended as a means of identifying the transient, internal fluctuations within sound events; aspects which are frequently complex, but may be important aspects in the intrinsic individuality of sound contexts.

"Mass" describes the degree of harmonic complexity of a sound whether, at one extreme, simple (as clearly defined frequencies or pitches) or at the other extreme complex, as "entangled frequency clusters". In the latter case, examples of broad-band traffic noise and the pounding of surf are cited by Schafer:

The Mass of a sound is where its bulk seems to lie. It is regarded as the predominant bandwidth of the sound.

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74 Ibid., p. 135.
Diagram 5: R. Murray Schafer's "Description of a Sound Event".\textsuperscript{75}

<table>
<thead>
<tr>
<th>Physical Description</th>
<th>Attack</th>
<th>Body</th>
<th>Decay</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Duration</strong></td>
<td>sudden</td>
<td>non-existent</td>
<td>rapid</td>
</tr>
<tr>
<td></td>
<td>moderate</td>
<td>brief</td>
<td>moderate</td>
</tr>
<tr>
<td></td>
<td>slow</td>
<td>moderate</td>
<td>slow</td>
</tr>
<tr>
<td></td>
<td>multiple</td>
<td>long</td>
<td>multiple</td>
</tr>
<tr>
<td><strong>Frequency/Mass</strong></td>
<td>very high</td>
<td>steady-state</td>
<td>rapid</td>
</tr>
<tr>
<td></td>
<td>high</td>
<td>transient</td>
<td>medium</td>
</tr>
<tr>
<td></td>
<td>midrange</td>
<td>multiple transients</td>
<td>pulsation</td>
</tr>
<tr>
<td></td>
<td>low</td>
<td>rapid transients</td>
<td>slow throb</td>
</tr>
<tr>
<td></td>
<td>very low</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fluctuations/Grain</strong></td>
<td>steady-state</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>transient</td>
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<td></td>
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<tr>
<td></td>
<td>multiple transients</td>
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<td></td>
<td>rapid</td>
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<tr>
<td></td>
<td>warble</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>medium pulsation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>slow throb</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dynamics</strong></td>
<td>ff</td>
<td>very loud</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>loud</td>
<td></td>
</tr>
<tr>
<td></td>
<td>mf</td>
<td>moderately loud</td>
<td></td>
</tr>
<tr>
<td></td>
<td>mp</td>
<td>moderately soft</td>
<td></td>
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<tr>
<td></td>
<td>p</td>
<td>soft</td>
<td></td>
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<tr>
<td></td>
<td>pp</td>
<td>very soft</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f&gt;p</td>
<td>loud to soft</td>
<td></td>
</tr>
<tr>
<td></td>
<td>p&lt;f</td>
<td>soft to loud</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{75} Ibid., p. 136.
"Grain" is described by Schafer as "a special type of internal fluctuation", or the steady or regular internal modulations of sound whether of frequency or amplitude. The perception of this aspect of sound is dependent upon the speed of the modulations, for if they occur very rapidly the sense of the individual impulses merge into continuous sound.

Grain gives texture; it roughens up the surface of the sound and its effects consist of tremolo (amplitude modulation) or vibrato (frequency modulation).\(^6\)

2.7 (c) Classification by Reference

Schafer is concerned next with the classification of sounds according to their referential aspects - the relating of sounds to their sources. In consideration of this he points to difficulties resulting from the fact that cultural conditioning may lend differing emphases to the interpretation or grouping of certain sounds - a point which is further demonstrated later in his discussion of the aesthetic qualities of sounds.

Most sounds of the environment are produced by known objects and one of the most useful ways of cataloguing them is according to their referential aspects. But the system used to organize such a vast number of designations will be arbitrary, for no sound has objective meaning, and the observer will have specific cultural attitudes toward the subject. Even a library cataloguing system is stylized and reflects the interests and reading habits of librarians and library users. The only framework inclusive enough to embrace all man's undertakings with equal objectivity is the garbage dump.\(^7\)

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\(^6\) Ibid., p. 135.

\(^7\) Ibid., p. 137.
This part of the classification system of Schafer is put forward as an extensive index of sounds, and the framework presented is in the format of one of the projects undertaken by the World Soundscape Project. This is a world catalogue of descriptions of sounds, based not only on present day sounds, but augmented by the inclusion of descriptions of sounds from literary, anthropological and historical documents. In this way, the attempt has been made to gather information about sounds from the past, the basis being the writings of "earwitnesses".  

The catalogue headings are arbitrary, and have been built up empirically. There are six major groupings of sounds:

1. Natural sounds
2. Human sounds
3. Sounds and Society
4. Mechanical sounds
5. Quiet and Silence
6. Sounds as indicators.

Within each of these groupings are subgroupings and within those are specific sounds and sound sources. For example, the first grouping Natural sounds has the following sub-categories:


A. Sounds of Creation
B. Sounds of Apocalypse
C. Sounds of Water
D. Sounds of Air
E. Sounds of Earth
F. Sounds of fire
G. Sounds of birds
H. Sounds of Animals
I. Sounds of Insects
J. Sounds of fish and sea creatures
K. Sounds of Seasons

With sub-category C, Sounds of the Water, the following specific sounds are listed:

1. Oceans, Seas and Lakes.
2. Rivers and Brooks.
3. Rain.
4. Ice and Snow.
5. Steam.
6. Fountains etc.

The ubiquity of many sounds is acknowledged in this classification system, and sounds are therefore frequently cross-referenced with many sounds appearing in several different places. Certainly, being able to see the same sound from several different points of view is valuable in terms of the understanding of the role of sounds as signifiers of
literal meaning, and the exploration of the expressive qualities of sounds derived from their referential and contextual makeup. As much of this index is based around "historical earwitness" descriptions of sounds, Schafer attempts to extrapolate this kind of information as a means of showing attitudes to the changing patterns of the human soundscape - particularly though technology. One example cited here is that of the saw, the sound of which was disliked by Virgil, Cicero and Lucretius (the saw being a fairly new tool in the time of these writers), another being that there were no complaints by writers about factory noise until nearly one hundred years after the advent of the Industrial Revolution.

From this kind of information, we can learn something of the way in which sounds alter as society does, and is a powerful indicator of the kinds of changes that humankind continues to bring to the world. Sound is one avenue of the definition of those kinds of environmental changes. In that sense, if we view sound objects as "found objects", their relative classification as "natural" or "human-made" is of great expressive potential. This lends powerful argument to the potentials of rigorous classification of sounds as a means of beginning to achieve a heightened sensitivity to the value of the auditory sense.

2.7 (d) Aesthetics

Schafer uses this term to embrace the area of sound experience of "emotional" or "affective" qualities including the area of like or dislike of sounds, the latter definition being the aspect from which he approaches most of his discussion on the subject.

Sorting sounds according to their aesthetic qualities is probably the hardest of all types of classification. Sounds affect individuals differently and a single sound will often
stimulate such a wide assortment of reactions that the researcher can easily become confused or dispirited.

Reduced to its simplest form, aesthetics is concerned with the contrast between the beautiful and the ugly, so a good place to begin might be by simply asking people to list their most favorite [sic] and least favorite sounds. It would be good to know which sounds were especially pleasing or displeasing to people of different cultures; for such catalogues, which might be called sound romances and sound phobias, would not only be of inestimable value in a consideration of sound symbolism, but could obviously give valuable directives for future soundscape design.\(^8^0\)

Schafer continues by outlining a test conducted by the World Soundscape Project in which people (mostly students from high schools and universities) of different countries were asked to do two things. Firstly, they were asked to list the five sounds they liked best and the five sounds they liked the least; secondly, to take a short "soundwalk" around their environment and to repeat the first exercise on the basis of the sounds they had just heard. In his outline of the results obtained from this test, Schafer concludes that cultural, geographical and climatic dissimilarities result in people of different nations being not only exposed to different sounds, but having different reactions to sounds.

We note, for instance, that while in countries which touch the sea, ocean waves are well liked, in an inland country like Switzerland, the sounds of brooks and waterfalls are a much greater favorite. Where tropical storms may blow in suddenly from the sea, strong winds are disliked (New Zealand, Jamaica). It is also clear that reactions to nature are affected by the degree of proximity to the elements. As people move away from open-air living into city environments, their attitudes toward natural sounds become benign. Compare Canada, New Zealand and Jamaica. In the two former countries, the sounds of animals were scarcely ever found to be displeasing. But every one of the Jamaicans interviewed disliked one or more animals or birds - particularly at night.

\(^8^0\) Ibid., p. 146.
Hooting owls, croaking frogs, toads and lizards were mentioned frequently. Barking dogs and grunting pigs were also strong dislikes. The animal sound most universally liked was the purring of a cat.

While the Jamaicans had no attitude concerning machine sounds, these were strongly disliked in Canada, Switzerland and New Zealand. Jamaicans also approved of aircraft while the other nationalities did not. For all nations except Jamaica traffic noise was especially objectionable. There can be little doubt about this. From the present as well as similar tests we have run with smaller groups of other nationalities, it appears clear the technological sounds are strongly disliked in technologically advanced countries, while they may indeed be liked in parts of the world where they are more novel...

Among other striking cultural differences is the intense fondness of the Swiss for bells, while in other countries they are scarcely mentioned. On the phobia side, the dentist's drill elicits some mention in all countries except Jamaica (where it is less familiar?). But the sound of fingernails or chalk on slate is mentioned as a sound phobia in all countries...

2.7 (e) Cross-classification

The most valuable part of Schafer's work in the classification of natural sounds is his attempt to draw together the separate aspects of classification in a unified approach towards the understanding of the significance of sounds for both their acoustical and referential aspects - which contribute to our total experience of sounds as a life phenomenon. Schafer sets out examples of sample sounds with analyses based on the individual classification categories already outlined: Acoustics (what the sounds are in physical terms), Psychoacoustics (how the sounds are perceived, or how the acoustic information attracts attention), Semantics (the meaning of the sounds - what object or

81 Ibid., pp. 147-148.
concept they signify) and **Aesthetics** (the qualities of appeal or the potential for emotional signification of a sound). The division of these aspects is shown below in one of Schafer’s examples:

<table>
<thead>
<tr>
<th>SAMPLE SOUND</th>
<th>ACOUSTICS</th>
<th>PSYCHOACOUSTICS</th>
<th>SEMANTICS</th>
<th>AESTHETICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm bell</td>
<td>sharp</td>
<td>Sudden arousal;</td>
<td>Alarm</td>
<td>Frightening,</td>
</tr>
<tr>
<td></td>
<td>attack;</td>
<td>continuous</td>
<td>signal</td>
<td>unpleasant,</td>
</tr>
<tr>
<td></td>
<td>steady -</td>
<td>warble;</td>
<td></td>
<td>ugly.</td>
</tr>
<tr>
<td></td>
<td>state</td>
<td>high pitch;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>with</td>
<td>loud;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>rapid</td>
<td>decreasing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>amplitude</td>
<td>interest;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>modulation;</td>
<td>subject to</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>narrow</td>
<td>auditory</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>band noise</td>
<td>fatigue;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>on center</td>
<td>sensitive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>frequency</td>
<td>pitch area.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>of 6,000 hertz;</td>
<td>85 decibels.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Schafer goes on to show that in differing circumstances, the same acoustical information can signify entirely different things with different aesthetic results as well, citing the following example:

<table>
<thead>
<tr>
<th>SAMPLE SOUND</th>
<th>ACOUSTICS</th>
<th>SEMANTICS</th>
<th>AESTHETICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car horn</td>
<td>Steady-state, reiterative; predominant frequency of 512 hertz; 90 decibels.</td>
<td>Get out of my way!</td>
<td>Annoying, unpleasant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Festive, exciting.</td>
</tr>
</tbody>
</table>

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82 Ibid., p. 148.

The factor which Schafer omits to point out, however, is that the crucial aspect in the above example is that which tells us which way to interpret the acoustics as semantics - which is one of total context. On the basis of the acoustical information given it might well be difficult or impossible to tell from aural information alone which semantic meaning was implicit. This highlights an important point in the nature of sound as an indicator - its potential for ambiguity. By taking into account source recognition of sounds in his approach to classification, Schafer is able to demonstrate this clearly. For the sound artist who wishes to make use of the potential of sound for communication of meaning and content, this is a crucial problem to address.

If then we take the last example shown from Schafer's discussion, we may add information to achieve a more full description of the sense of overall context for the use of the sound of the car horn as an indicator. The main problem with this particular example is that the car horn is first and foremost a sound source designed for the express purpose of signalling warning associated with motoring - as an alarm signal which may relate to a variety of possible scenarios. Given this, car horns are sounds which are designed to attract attention, loud, possessing a sudden onset transient and are capable of producing continuous sounds or shorter bursts of sound. In the consideration of the message indicated by a car horn, none of the primary aspects relates to the nature of the morphology given to the sound. While a car horn is limited in its range of morphologies to relative durational lengths - in purely acoustical terms some information can be taken from this as there are certain types of morphology which may be more readily associated with one situation than another. For example, the difference between the protracted sounding of a horn in the stress situation of a traffic jam or the possibility of an accident, and the light "tooting" of a horn as a parting "goodbye" gesture reflect entirely different
intentions and meanings. The car horn functions as an aural indicator which communicates meaning by virtue of its role as an amplified gesture-producing sound object. The modification of the acoustic elements of a predetermined sound object is part of the nature of the codification of messages.

However, with a sound object so limited in its acoustical modification as a car horn, there still remains room for ambiguity. In such examples, where we are relying on acoustical signals alone, we must therefore take into account wider contexts of meaning and how this relates to sound.

The interface between the acoustics and the semantics of such a sound pivots on larger contexts of grouped information where the sound is the carrier of some message relevant to the moment. We will look then for other signifiers which help in the communication of particular messages. In the example of the car horn signifying marriage we might include the following other discrete pieces of information:

(1) Wedding vows
(2) Wedding music
(3) Bells
(4) Confetti/Rice
(5) Dress
(6) Church/Registry Office
(7) Guests
(8) Cake
(9) Photographs
These types of discrete images or icons may together or in part all contribute towards the interpretation of the acoustics of the car horn as "I've just been married." These kinds of signs contribute to the correct semantic interpretation of what could otherwise be an ambiguous or alternatively interpreted piece of acoustic information.

If, however, we wished to use only sound in the construction of an aural environment or image which included the car horn as a signifier of the message "I've just been married", we must look to the signs which will reinforce this image strongest through sound - to which end the first three signals listed above are the only ones of value. We may imagine a scenario in which the juxtaposition of such elements may contribute to the desired interpretation of the car horn. Trevor Wishart calls this kind of imaging process contextualisation and has used this process in his electroacoustic work Red Bird (1978) (a discussion of Wishart's use and description of this process will follow in Chapter three).

Further examples given by Schafer of communication through sound are those dealing with the area of verbal language. The two examples given highlight the difference between pure information (which, through the semantics of speech, can be highly specific) and the recognition of the source of the acoustical information which, given different contextual or social circumstances, may have the same specific message but differing aesthetic results.

<table>
<thead>
<tr>
<th>SAMPLE SOUND</th>
<th>ACOUSTICS</th>
<th>SEMANTICS</th>
<th>AESTHETICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I say, &quot;Pierre, how are you?&quot;</td>
<td>My crimped baritone</td>
<td>Pierre is called</td>
<td>Friendship</td>
</tr>
<tr>
<td>Margaret says, &quot;Bonjour, Pierre.&quot;</td>
<td>Margaret's glorious contralto</td>
<td>Pierre is called</td>
<td>Friendship</td>
</tr>
</tbody>
</table>
The Classification of Natural Sounds

But supposing we are ringing up the Prime Minister of Canada, whose name is also Pierre. Margaret is his wife. I am not. Everything else remains the same, but the aesthetic effect is different:

<table>
<thead>
<tr>
<th>SAMPLE SOUND</th>
<th>ACOUSTICS</th>
<th>SEMANTICS</th>
<th>AESTHETICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ditto</td>
<td>Ditto</td>
<td>Ditto</td>
<td>Annoyance</td>
</tr>
<tr>
<td>Ditto</td>
<td>Ditto</td>
<td>Ditto</td>
<td>Pleasure</td>
</tr>
</tbody>
</table>

Schafer goes on to point out the potential for contextual ambiguity inherent in many sounds when they become isolated from their sources, or when their physical context becomes altered; for example, with tape recording. Two sounds with similar acoustical characteristics may be confused for each other, or even some other sound source. Schafer gives examples of the hissing sound which may come from a kettle, a snake or a green log on a fire! The aesthetics of sounds will also be affected by the presence or lack of knowledge of a sound source.

It has always surprised me how even quite a common sound can be completely mistaken by listeners, dramatically affecting their attitudes toward it. For instance an electric coffee grinder was described as "hideous," "frightening," "menacing" by a group after listening to it on tape, though as soon as it was identified their attitudes immediately mollified.\(^85\)

This kind of problem stems from the role our aural sense (through aural memory and cultural conditioning) plays in the perception and definition of the objects around us. There are certain objects with which we naturally have strong links through sound such as birds, water movement or aeroplanes. With some other objects we do not necessarily

\(^84\) Ibid., pp. 149-150.

\(^85\) Ibid., p. 150.
relate so strongly through sound alone, either; because of a lack of habitual identification of a sound with its source (or alternatively a low intrinsic significance being ascribed to the sounds of particular objects) which does not necessarily mean that a sound is not able to be recognised given more concentrated aural focus; or, as Schafer has indicated, because of confusion through the similarity of the acoustical nature of different sources. This again points to the value of context - that groups of sounds may combine to enable the successful discernment of sources which might otherwise remain amorphous or indistinct.

2.7 (f) Summary of Schafer's approach to classification

Schafer's approach to the classification of sounds through the identification of acoustics, psychoacoustics, semantics and aesthetics offers a valuable insight into the nature of sound as a communicative and expressive experience.

The divisions made by Schafer in the relative areas of the functions of sounds point to the different forms of expressive potential as well as literal meanings inherent in the world of environmental sounds. It also points to the nature of the listening experience (as active and interpretive use of the auditory sense): we do not always do it, and analysis of sound objects in this way helps in the understanding of why we enter a listening process, through conscious or predisposed effort, with the particular qualities of a sound (whether acoustical or referential) that may trigger a listening reaction.

Schafer's comments on the dislocation of a sound from its source through recording (for instance, the "coffee grinder" example already described) are also useful and
indicate the possibility for exploration of the broader areas of contextualisation; how sounds function within the real-time experience of our lives, from sign indicators through the daily contact with domestic/social objects and the natural environment - to the view of sounds as events which have the potential for a strong emotional impact upon the sensibility. Also, the way in which these criteria continue or cease to function through the recording process - which is of direct relevance to the use of such materials in electroacoustic music.

Of course, single sound objects are neither always at the centre of our conscious aural experience, nor are they always capable or responsible for the imparting of a particular message or information - often it is a much broader picture, in which the complex contribution of all sensory stimuli is important. However, through the different aspects of Schafer's classification system - the breaking up of sample sounds into separate categories of the function and roles of sounds and the integration of the parameters of classification into a more unified picture - we may gain a valuable sense of the way these separate aspects of sounds interact and contribute to the whole sensation and interpretation of sound.

Schafer asserts that there are "interfaces missing" between the component areas of his classification of sounds, but it is these areas of interface and their enigmatic and ambiguous connections which are valuable points of consideration, and certainly have much to do with the traditional "mystery" associated with sound as a potentially expressive medium. In this respect, the work of Trevor Wishart in the definition of natural sound morphology shows one possible way to the filling in of some of these missing areas of interface information, by attempting to link, through metaphorical associations, the
perceived morphology of sound objects as interactions between the sound-initiating gestures and the intrinsic morphological potential of the object (as well as related sensation of bodily empathy).

2.8 Soundscape Analysis

Embracing this method of sound classification is, within the work of the World Soundscape Project, the overall idea of "Soundscape Analysis". In attempting to classify sounds not only according to acoustical criteria but also semantic, signal or referential criteria sounds are being investigated for the social, interactive meaning and significance - the nature of their existence as we perceive sounds in relation to the environment.

Soundscape analysis of the kind undertaken by the World Soundscape Project embraces not only physical parameters of sound, but also "perceptual and cognitive primitives and procedures or concepts derived from them". Barry Truax has stated that "primitives" such as "foreground, background, contour, silence, density, acoustic space, rhythm (or acoustic time perception) and volume (in its sense of the psychological totality of a sound's perceivable content which varies with intensity, reverberation, and timbre, among others)" are more basic parameters (rather than descriptions through physics) by which many people verbally discuss their understanding of their experience of soundscapes.

Disintegrating a total sound impression into its component physical parameters appears to be a skill that must be learned; and while it is probably one that is necessary for acoustic design, a soundscape cannot be understood merely by

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a catalog [sic] of such parameters (even if that were possible)
but only through the representations formed mentally that
function as a basis for memory, comparison, grouping,
variation and intelligibility.\(^7\)

Truax identifies the following areas of "primitive" in the analysis of soundscapes.

(1) **Keynote sound**: normally sounds in the background of the perception and therefore seldom explicit or centrally focused in the attention. A "fundamental and prevailing" sound in any soundscape to which all others are related - in the way in which a figure is seen in relation to a ground.

(2) **Signal**: foreground sounds, often encoding specific information or simple messages. "Some may be thought of as drawing people together or regulating and unifying life, that is, as centripetal forces; others may disrupt or seek to dispel, and as such are centrifugal in character".\(^8\)

(3) **Soundmarks**: highly unique sounds which are specific to certain locations (analogous to landmarks) and may be affectionately regarded by the public.

(4) **Sonic Symbols**: described by Truax as being the acoustic equivalents of Jung's visual symbols (a word or image which implies something more than its obvious or immediate meaning). Truax states that symbol is **implicit** (or potential) in most sounds or acoustic rituals, but seldom made **explicit**.

\(^7\) Ibid., p. 37.

\(^8\) Ibid., p. 38.
According to Truax, the development of symbols which began with natural and human sources, shows the effects of every social and technological development that occurs in a society "until the transformations weave a rich web of related variations that condition the design of every new artifact and the understanding of many older ones".89

The carrying out through active perception of this kind in soundscape analysis is capable of achieving considerable detail in the understanding of natural soundscapes and the placement of sounds into context especially by concentrating on social and environmentally interactive sounding phenomena. This may have immense value for the composer concerned with making works using recognisable sound events and images drawn from the environment through field-recording (even to the extent of discerning what aspects of the soundscape best communicate the desired result).

The kinds of perceptions and observations of relationships involved in Soundscape Analysis are valuable in working with sound on a referential basis. For this type of approach to composition, concern for the ways in which environmental sounds combine and interact (because of social or ecological factors and confluences) may be closer to the starting point of the creative process than concern for gestural morphology or spectra where such criteria may be readily applicable to sonic art concerned essentially with the patterning of sounds on the basis of their abstract perceptual qualities (as in the musique concrète of Schaeffer). Trevor Wishart has, however, used similar principles to those of Soundscape Analysis in his construction of sonic landscapes by making detailed...

89 Ibid., p. 38.
observations of the behaviour of different types of natural acoustic spaces and the objects within them.  

An important way in which the kind of awareness of the soundscape encouraged by the World Soundscape Project through active analysis can be achieved is through the idea of "soundwalking", described here by Truax:

Soundwalking and listening involves not simply a passive monitoring, but an active mental and physical participation as well in the ongoing composition forever being created. Awareness begins with one's own sounds and works outwards, and sometimes inwards again. When you can hear your own footsteps, the environment is still scaled on human dimensions, you still make an impression on it, communication is possible, sounds are heard clearly in their own place and time, the environment has a favorable signal to noise ratio, that is, it remains high fidelity in character. Too often in both urban and rural areas we are cut off from our own sounds, alienated from our basic source of reference to the environment, surrounded and attacked by broad band noise which destroys all sense of time and space with an unbreathing, unending cacophony. The environment has a poor signal to noise ratio; that is, it has become low fidelity in character. When the balance is destroyed, the first victims are the delicate and beautiful sounds of man and nature. Unless we can listen critically and act on our awareness, the balance will not be regained.  

The perception of soundscape in terms of figure and ground in real-time is a matter of attentional focus and intent - and has an important bearing on the way the categories outlined by Truax are allowed to function. What may function as a keynote sound for one person might function as a signal for another depending on what the listener is doing.

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90 Wishart's landscape concepts are discussed later in Chapter three.

91 Ibid., p. 38.
what state the listener is in or what information is being sought - or whether in fact they are seeking aural information at all. For example, the sound of cars in the street heard from the distant interior of a living room may normally be keynote or "ground" sounds of one's perception of the soundscape - even though the sounds may have different level or rhythm depending on the time of day or the type of street (city, country, busy, quiet). However, in a different context, if one is awaiting the arrival of someone in a car, the sounds will take on the importance of signals as the attention is telescoped out into the distance in the anticipation of the particular car sound which is of significance. Alternatively, in a normal situation a sudden burst of sound from a very noisy vehicle might grab the attention and focus one's perception, for a moment at least, on the keynote sounds of distant traffic, so that the sound behaves briefly as a signal - extending itself out of its ground role. Again, in a backcountry area in which sounds of motor vehicles may be few, such a sound might act as a soundmark, indicating the delivery of mail or some other essential. Here again we can see the value of R. Murray Schafer's cross-classification and the use of context to fully understand and explain the makeup of any soundscape.

Schafer has described more of these perceptual aspects of Soundscape Analysis in Chapter ten of *The Tuning of the World*.92 Schafer describes "figure" and "ground" of soundscape in the context of the overall "field" in the following way:

> According to the gestalt psychologists, who introduced the distinction, figure is the focus of interest and ground is the setting or context. To this was later added a third term, field, meaning the place where the observation takes place. It was the phenomenological psychologists who pointed out that what

is perceived as figure or ground is mostly determined by the field and the subject’s relationship to the field.

. . . the figure corresponds to the signal or the soundmark, the ground to the ambient sounds around it - which may often be keynote sounds - and the field to the place where all the sounds occur, the soundscape.

The terms figure, ground and field provide a framework for organizing experience. As useful as they may be, it would be injudicious to presume that they alone could lead to the goal announced at the beginning of the chapter, [namely, to determine the variations in listening acuity of people of different cultures throughout history!] for they are themselves the product of one set of cultural and perceptual habits, one in which experience tends to be organized along perspective lines with foreground, background and distant horizon. How accurately they may apply to another society, remote from this one, is the big question we want answered. 93

The perception of sound as figure or ground is, according to Schafer, to do with; aculturisation (trained habits), the state of mind (mood, interest) or the relationship of an individual to the field (native or outsider). Physical dimensions do not strictly have any bearing - the loud sounds of the Industrial Revolution were not noticed until their social relevance was questioned, and small sounds too may be heard as figures when they are novel. As Schafer says:

. . . I notice the scraping of the heavy metal chairs on the tile floors of the Paris cafés each time I visit that city as a tourist. 94

93 Ibid., pp. 152-153.

94 Ibid., p. 152.
In discussing the nature of *gesture* and *texture*, Schafer defines these in a way which allows them to be applied in terms of sound reference as well as purely spectral and morphological terms:

*Gesture* is the name we can give to the unique event, the solo, the specific, the noticeable; *texture* is then the generalised aggregate, the mottled effect, the imprecise anarchy of conflicting actions.  

Clearly, for the composer working with natural sounds as sound referents, it may be useful to discern when sounds are functioning gesturally or texturally, (say, when references are heard as an unified group or as individual signs) and how specifically the sounds are projecting the composer’s desired image or information. A broadly applicable aspect of Schafer’s argument in this area is that of the concept of *sonological competence*, a term which seeks to unite aural discrimination as a receptive function of the perception, but also as an initiating, expressive function. In this idea can be seen the identification of the mechanics of acute aural perception. For example, Schaeffer puts forward the idea that by attempting to emulate or "synthesize" natural sound phenomena (either vocally or by means of manipulated tape montage for more complex events) important details in the makeup of sounds - subtle variations in spectra and morphology or contextual cues - which contribute to the way we perceive and are affected by sounds may be realised and understood.

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95 Ibid., p. 159.
2.9 Conclusion

These four approaches to sound classification can be summarised thus:

Schaeffer (typology): three dimensional description of sound events for the comparison of sound objects.

Smalley (spectro-morphology): identifies structural levels at which spectra and morphologies can be perceived - with a view to deriving patterns of expectation from the materials.

Wishart (natural sound morphology): suggests interfaces between sound morphologies and the physical properties of the source-morphology as a tangible reflection of the internal properties of a sounding medium and the possible natural association of the sensibility with these properties.

R.M. Schafer (cross-classification): outlines the way environmental sound meanings are context-dependent and the vital role of source recognition in that.

The methods of sound classification discussed in this chapter demonstrate the range of information that can be discerned from the detailed classification and comparison of sounds - in terms of both the component aspects of individual and grouped morphologies, as well as the wider context and reference of natural environmental sounds. For in defining and responding to the constituent and composite details of the natural sounds which form the composer's materials, a strong sense of their structural possibilities and
implications may be gained. This is indisputably linked with the temporal nature of the perception of sound and our dependence on the evolution of time to provide aural information. Patterns of expectation can be constructed and manipulated on the basis of how much and what kind of information is received. Denis Smalley’s discussion of "spectro-morphology", for instance, takes this expressly into account building the entire argument from the "lowest" levels of information in spectro-morphological terms - the impulse and associated patterns of resonance, continuance and decay. R. Murray Schafer’s attempt to describe a more complete classification model for the role of context in the perception of environmental sound takes into account what is a significant dimension in the response to the natural sound world - that of source recognition. Schafer points out that depending on context, the same sound may have different implications arising from its basic referential meaning. Trevor Wishart’s concept of "natural sound morphology" attempts to articulate the notion that there are morphological archetypes which can be felt as external "mirrors" to certain internal emotional/physiological states or sensations within the human sensibility. Also, Wishart’s view of natural sound morphology is linked to source recognition criteria, retaining referential or metaphorical descriptions of sound objects - such as "wave-break", "siren/wind" or "bubble". Denis Smalley’s criteria, on the other hand, generally tend more towards the abstract - such as "divergence/convergence", "accumulation/dissipation".

In general, R. Murray Schafer’s consideration of source recognition is particularly useful at this point, since it indicates the critical role of that faculty in the fabric of ordinary environmental aural perceptions. Assigning sounds to their physical sources is a vital part of the way environmental sounds are interpreted, as a means by which objects in a physical space can be identified, and enabling orientation within the environment. As
such, source recognition is a process by which concrete meaning is ordinarily ascribed to natural sounds. The important factor is that reference meaning as it is being considered here indicates a tangible, culturally defined value in sounds other than perception on (abstractly based) aesthetic criteria alone.

From this point on, attention will be directed towards ways in which source recognition - extending from its role in the normal perception of environmental sounds - can be transferred into criteria for the use and manipulation of recorded environmental sounds in sonic art.
CHAPTER THREE

SOURCE RECOGNITION OF NATURAL SOUNDS IN ELECTROACOUSTIC MUSIC

3.1 Introduction

This chapter consists of review and discussion of two major contributions to the literature of electroacoustic music which deal with ways in which the source recognition of recorded natural sounds can be used as a basis for electroacoustic music composition.

Firstly, Simon Emmerson's consideration of the use of source references as sound-images in a process termed "mimesis" - the imitation of reality. In defining certain typologies of mimesis, Emmerson seeks to show that imitation of natural phenomena as a material element and/or organising basis of musical structures are widely applicable concepts, and that literally presented sound recording forms one polarity of the overall process of imitating natural events and sequences in sonic art.

On the other hand, Trevor Wishart (in considering recorded natural sounds) has sought to define that aspect of musical experience which ascribes physical or situational sources to the sounds themselves as sonic "landscapes". An outline is given in this chapter as to the way in which Wishart contends that sonic art structures can be made, always with the recognition of sound sources as a primary aim. The review of Wishart's writing on this includes commentary of compositional processes (that Wishart has himself described) involved in his large-scale electroacoustic work Red Bird (1978).
This focus on possibilities in using source reference of recorded natural sounds as a structuring element in electroacoustic music will be prefaced, however, with the description of two significant concepts put forward by Pierre Schaeffer: the "acousmatic" (the separation of sounds from their sources); and the variations in human "listening modes". These form relevant background to the present discussion; the acousmatic because it is a phenomenon implicit to sound recording; the description of listening modes because it defines clearly the polarities of:

1. perceiving sounds purely as acoustic events;
2. the possibility in discerning from the perception of sound, the definition and interpretation of the source.

3.2 The Acousmatic

In describing the experience of sound recording and playback as a process by which sounds are isolated from their physical sources (and therein becoming sound objects) Pierre Schaeffer used the term "acousmatic" (French: acousmatique). This is derived from the name given to a particular group of the followers of Pythagoras who are understood to have undergone a period of probation of five years as initiates to his teaching, during which time they were required to listen (while keeping completely silent themselves) to the lectures of their teacher, which were given from behind a curtain. Schaeffer drew a

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1 The "acusmata" (also called "symbola") were a set of orally transmitted maxims and codes of behaviour adhered to by one group of Pythagorean disciples called "acusmatici". For description of the acusmata and the practices of the acusmatici, see Burkert, Walter (trans. Edwin L. Minar, Jr.). *Lore and Science in Ancient* (continued...)
parallel between this and the phenomenon of sound recording and telecommunications.

The principle of the acousmatic is a way of describing the way in which sound recording and playback through loudspeakers achieves a disembodiment of sound from its physical source - separation of sound itself from any other sensory perception of the cause of the emission of that sound. This is a concept which, in Schaeffer's terms, is tied to the concern for the "sound object" to be a viable unit of composition in terms of the "shape and fabric of the object perceived". The acousmatic is not, therefore, a question of whether the sound source is known, but whether the source is actually perceived along with the sound itself, allowing an emphasis on purely aural experience and, for Schaeffer, a process which meant disregarding any residual experience of the source. The phenomenon of the acousmatic is tied directly to the nature of the "sound object" - an experience of sound on its own terms - which, while not ruling out knowledge or curiosity of the actual source of the sound, is a process which allows perceptions directed toward the characteristics of a sound object to be intensified, by virtue of the exclusively aural nature of the process.

3.3 Reduced Listening

In describing the "originality of the acousmatic way of proceeding" Schaeffer wrote:

Deliberately forgetting any reference to instrumental causes or preexisting musical meanings, we then seek to

1(...continued)


concentrate exclusively and entirely on listening, to catch thus the instinctive paths that lead from what is purely "sound" to what is purely "music". Such is the suggestion made by acousmatics: to deny the instrument and all musical conditioning and to confront what is sound and what its musical possibilities may be.3

This line of thought leads directly to what is a crucial attitude in Schaeffer's overall conception of musique concrète - that of "reduced listening" (French: écoute réduite)4 - by which the causal reference of sound is disregarded and not taken into account in the structuring of sound objects into a work. Schaeffer's argument is that with reduced listening one can concentrate fully on the experience of sound objects as abstract, self-justified materials:

... as soon as one brings in the causality context, one enters into the psychology of hearing. At this stage, there will be a choice between two different focuses of hearing: either on sound as the clue to the cause which produced it, or as a sound object in the strict sense of the word. This "écoute réduite" [translated in here as "reduced hearing"] enables us to grasp the object for what it is and to try and describe it by reference to other objects.5

In this way, Schaeffer was seeking to define an attitude which would unify the perception of all sounds as abstract acoustic entities through the imposed frame of mind of reduced listening, a process which allows one line of criteria to be brought to bear on the analysis and finding of relationships between sound objects, through simply eliminating


4 Described in ibid., pp. 270-272.

from conscious perception the whole dimension of source reference of sound objects. In Schaeffer’s words:

... this naturally means giving up meaning, no longer turning to the context for help and finding criteria for identifying sound which go against the habits of instinctive analysis.6

3.4 Schaeffer’s "Four Modes of Listening"

In the Traité des objets musicaux7 Schaeffer put forward a descriptive model of human listening modes - functions of listening according to four main areas of perceptual criteria, determined by the listener's response and attentiveness to sounds. This is a flexible model, which allows for the fact that a particular kind of perception may inform or follow from several others, and that in the course of a listening experience there will be shifts in emphasis. Broadly speaking, Schaeffer identifies here the potential for sounds to be responded to either in a true "sound object" sense (the patterns and structure of the sound morphology and spectrum) or as reference elements involving a literal, direct meaning external to the acoustic makeup of the sound itself.

The first quadrant is the domain in which the reception of sound events is towards the listener's desire to seek orientation within the environment by defining the object or action which is the physical source of the sound. In this way a listener uses sounds as what Schaeffer terms "pointers" (French: Indices). Schaeffer acknowledges this as a

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6 Ibid., [p. 29].

primal and frequently used mode of listening, possibly linked to early uses of sound and hearing as a means of survival (warning of danger, to guide an action).

The second quadrant describes the simple perception of sound itself, in which mode a sound can be thought of as an object in its own right. Schaeffer points out that, in this process, repeated listening (as is made possible through sound recording and playback) allows one each time to hear new details of the sound object.

The third quadrant of listening involves the focus on certain aspects of the morphological makeup of the sound object. This selection and appreciation of detail in a sound object Schaeffer calls "qualified listening", and suggests that the exact nature of this part of the process will vary according to the particular listening biases of any individual.

The fourth quadrant outlines the way in which sounds can be oriented within the perception of the listener such that they are ascribed abstract meaning or signification. In this sense the sound acts as a "sign" for a meaning external to the qualitative and quantitative acoustic aspects of the "sound object" and the source reference, such as sounds which are used or interpreted as signals of alarm or gathering. Speech is regarded by Schaeffer as a prime example of such signification embodied in sounds, the morphology of phonetics being ascribed values as semantic signs which carry specific meaning (to those who speak the language). Although Schaeffer is concerned with the description of such signs as "abstract" in their implication of some wider meaning or value, he suggests that in such functions the source reference is reduced to the level of a "supporting role".8

8 See ibid., p. 116-117.
Diagram 6: Schaeffer's "Table of the functions of Listening".\(^9\)

<table>
<thead>
<tr>
<th>4. UNDERSTANDING</th>
<th>1. LISTENING</th>
</tr>
</thead>
<tbody>
<tr>
<td>- for me: signs</td>
<td>- for me: pointers</td>
</tr>
<tr>
<td>- in front of me: values (meaning/language)</td>
<td>- in front of me: external events (agent - instrument)</td>
</tr>
</tbody>
</table>

Emergence of a sound-content and reference, confrontation with notions external to the sound

Emission of the sound

<table>
<thead>
<tr>
<th>3. HEARING</th>
<th>2. PERCEIVING (OUIR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- for me: described (qualified) perceptions</td>
<td>- for me: raw perceptions, sketches of the object</td>
</tr>
<tr>
<td>- in front of me: described (qualified) sound object</td>
<td>- in front of me: raw sound object</td>
</tr>
</tbody>
</table>

Selection of certain particular aspects of the sound

Reception of the sound

3 and 4 abstract | 1 and 2 concrete

---

It is important to note, as Schaeffer points out, that this scheme, with its numbering of discrete quadrants of listening modes, should not be interpreted as though the structure of the table implies a chronology or logic as a definite temporal succession of perceptions. On the inter-relationships of the quadrants Schaeffer writes:

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\(^9\) From ibid., p. 116. (Trans. Peter Low). [Translator's note on the word "ouïr". This archaic word is usually just a synonym of "entendre" (to hear). But Schaeffer, knowing that in some contexts "entendre" includes the idea of understanding, chooses to distinguish between them: he uses "ouïr" for a kind of "raw" hearing in which no element of cognitive understanding is involved]. "For me" describes the nature of the response, "in front of me" describes the external nature of the stimulus.
Source Recognition of Natural Sounds in Electroacoustic Music

... if we have isolated in sector 3 what we call "qualified [described] perceptions" we should not forget that they are refined and enriched by the tacit references that the hearer makes to events in sector 1, to the values in sector 4 and to the sound-detail of the raw object in sector 2.¹⁰

Schaeffer also describes ways in which the same level of perception can lead to different objective and subjective results, according to the disposition of the listener. The outer (bottom and right-hand) portions of the listening table are labelled "abstract/concrete" and "objective /subjective". These describe the fact that "signs" in quadrant four can emerge from a selective mode of listening (in quadrant three) and that raw sound object listening (in quadrant two) can be organised into "pointers" as described in quadrant one. In terms of overall perception this indicates a shift from subjective to objective analysis - that the sensations of sounds are coded towards some kind of definition or realisation of their content or meaning.

Further to this, Schaeffer introduces a third dimension to the model, that of the two pairs of perceptual criteria; natural and cultural listening, which are associated with quadrants one and four; and banale and specialised listening, which are associated with quadrants two and three. Natural listening describes the process by which one attempts to ascribe a physical source to a sound event, while cultural listening describes the particular conditionings prevalent in a given society towards the use of sounds as a means of sending messages. In this way, quadrants one and four are identified as being areas of perception in which information external to the "sound object" itself are relevant for the listener. Banale and specialised listening similarly link with the third and fourth quadrants

¹⁰ Ibid., p. 117.
but, as areas of perception which are directed towards the sound object, with banale listening indicating a general non-selective awareness of sounds, and specialised listening indicating a more actively discerning appreciation of details in the qualitative and quantitative characteristics of sound object morphology.

Of Schaeffer's work, only the large scale *Symphonie pour un homme seul* (1950), realised in collaboration with Pierre Henry (born 1927), was made with consideration for the source recognition of the recorded sounds used. The idea in this piece was to establish two basic groups of sounds, those of human vocal origin and those of "external" origin - especially instrumental sonorities, notably those of prepared piano and other orchestral instrument sounds. As such, source recognition is applicable in a very general sense, in order to distinguish the elements of the two groups of materials. There is also some mediation between "literal" and "studio-transformed" use of vocal sounds in the middle of the work, so that the intrinsic qualities of vocal morphologies are considerably extended. However, the use of source recognition in *Symphonie pour un homme seul*, although very generalised, is not characteristic of Schaeffer's overall output and philosophical stance towards musique concrète, which centred strongly on the notion that reduced listening should dictate the perceptual approach towards acousmatic sound objects.

Of the composers working at the Groupe de Recherches Musicales studio, Luc Ferrari (born 1929), who joined the "Groupe" in 1958, had a particular interest in what he himself described as the "anecdotal" use of recorded environmental sounds. For instance, in *Music Promenade* (1969) he created a complex "montage" work which uses the source recognition of sounds as a structural device. In this piece, sounds of street parades (with the playing of military bands, parade commentaries and associated crowd ambience),
recordings of theatrical dialogue (with audience responses) are juxtaposed and
superimposed with fragments of orchestral music (such as The Blue Danube - which is
heard in "melded" orchestral and accordion versions), closely microphoned instrumental
motifs and sonorities, vocal fragments, and abstract studio-transformed and electronic
sounds. Music Promenade attempts unity in the handling of source reference in that the
studio recordings of instrumental sounds relate as referents to the sounds of the parade
bands, the perceptible changes in recording ambience and source/microphone proximity
(from the outdoor setting of the parade, to the studio recordings of instruments) suggesting
a process of shifting realities - instruments "in context" in the parade setting being
juxtaposed with instrumental sounds which appear "abstracted from context".
Similarly, with vocal materials, a range of different "focuses" on sounds can be heard;
material which appears in context or out of context - such as an isolated word or shout.

Schaeffer's description of listening functions effectively outlines the range and inter­
relationships of varying responses in the experience of sound. Within these, the
recognition of sound sources is a major area of natural perceptual focus and discernment
tied directly to the process of orientation in the general acoustic field of the environment.
This forms, as Schaeffer acknowledges, part of a chain of response and selection - the
active focusing of aural preference and the interpretation of data according to the objective
and subjective requirements of the individual.

Because assigning sources to sounds occupies such a basic role in the human
interpretation and processing of sound stimulus, it can be seen as a prime area of aural
meaning; that is, an aspect of the perception of sound from which definite and substantial
information about the concrete world is derived. Further discussion in this study will
proceed from this basis - that sound references of this kind can be seen as having value in working towards expression in sonic art because they are capable of embodying significant aspects of ordinary experience. As such, concern will be directed towards what Schaeffer himself has called the "habits of instinctive analysis" and their consequences and potentials.

The acousmatic is a phenomenon which is axiomatic to the process of sound recording and playback and as such is a process which can allow the realisation of a close focus on the properties and potentials in all the listening states. Conversely, "reduced listening" (as a deliberate rejection of the tendency towards defining the source reference of sounds) is a restriction of the full operation of listening functions. By including the source recognition of natural sounds drawn from the environment in a language of sonic art, the mechanisms of the listening process which discern actual meaning from the environmental field are utilised, while the qualitative and quantitative nature of sound spectra and morphologies remain intrinsically identifiable aspects of the materials.

At this point the discussion will turn to the arguments put forward by Simon Emmerson and Trevor Wishart towards defining source recognition and "sound-image" derived from environmental sounds as a means of structural organisation in electroacoustic music.
3.5 Mimesis and Composition with Environmental Sound

3.5 (a) The Concept of Mimesis

Simon Emmerson (born Wolverhampton, 1950) has written on the potential in electroacoustic music, through the use of recorded environmental sounds, for the possible relation of sounds to "images" in the mind of the listener. This is a musical process which he terms "mimesis" - the imitation of natural events. Emmerson neatly describes such a concept of image in this sense as:

... lying somewhere between true synaesthesia with visual image and a more ambiguous complex of auditory, visual and emotional stimuli.11

Two writings by Emmerson on this topic will be examined here, that were initially put forward as Chapter Four of his doctoral thesis (1982)12 and later in a reworking found in The Language of Electroacoustic music.13

Emmerson is concerned with the way in which the evocation of imagery can interact with more abstract aspects of composition and is essentially concerned with a
redefinition of the continuum between naturally occurring environmental sound and "abstract" musical expression.

The use of natural sounds in the composition of electroacoustic music on tape allows us to claim that this is the first musical genre ever to place under the composer's control an acoustic palette as wide as that of the environment itself. Hence the vastly increased possibility that sounds may appear imitative. This contrasts strongly with the clear distinction, dominant in Western music aesthetics of recent centuries, between potentially "musical" material based on periodic (pitched) sounds and "non-musical" aperiodic sounds (noise). The evocation of image is further 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! By deliberately removing the visual clues as to the cause of sounds, indeed by removing or reducing visual stimulation of any kind, the composer is almost challenging the listener to re-create, if not an apparent cause, then at least an associated image to "accompany" the music. The data for such a construction are entirely aural.\(^\text{14}\)

Emmerson's argument is based around the view of Claude Lévi-Strauss concerning the two levels of articulation of language as put forward in Levi-Strauss' *The Raw and the Cooked*.\(^\text{15}\) The first level being that of "universal" general structures - a field in which individual messages are encoded and decoded, the second level being that of individual messages themselves. Lévi-Strauss' argument is that the encoding and decoding of individual messages is possible through their prior systematisation in the first level of articulation:

\(^{14}\) Ibid., p. 18.

... the elements, in addition to being drawn from nature, have already been systematised in the first level of articulation ... In other words, the first level consists of real but unconscious relations which ... are able to function without being known or correctly interpreted.\(^{16}\)

In view of a compositional language based around the sounds of natural objects it would seem that there is the prime possibility for two levels of articulation to function fully and completely. The rationale behind this is that there exists a "given" field of real-world environmental references which is systematised according to ordinary, everyday perceptions of the world - whether from an ecological or cultural basis of observation. Within this, individual messages (of grouped or discrete events) are able to be perceived as part of the fabric of environmental phenomena.

In the perception of environmental sound a basic source of meaning is in the perception of sounds as data which defines or relates to concrete objects and experiences. As such, the interpretation of sounds in terms of their physical sources is an aspect of perception which can form a base from which sonic art can be made.

3.5 (b) **Duality of Discourse**

Emmerson identifies the potential duality of discourse within all natural sounds, as both reference information relating to the object(s) (the aspect of the sound information which allows us to identify the source) and as purely acoustical information, in terms of

morphologies and spectra. In compositional terms this duality may appear, as Emmerson points out in the early work of Pierre Schaeffer, as:

... two conflicting arguments: the more abstract musical discourse... of interacting sounds and their patterns, and the almost cinematic stream of images of real objects being hit, scraped or otherwise set in motion.\(^\text{17}\)

Duality of discourse in this sense might, then, be thought of as a compositional consequence of the way in which perceptions can be directed towards sounds, such as are outlined in Schaeffer's "listening functions": abstract and concrete, subjective and objective.

Emmerson arrives then at two polarities in the continuum of musical discourse.

(1) **Mimetic discourse** which involves the use of sounds which are intended to evoke real-world images through the imitation of natural or environmental sound objects. There are two basic types of mimetic discourse according to Emmerson:

(i) **timbral mimesis** involving a direct imitation of the timbre of natural sounds;

(ii) **syntactic mimesis** involving the imitation of the relationships between natural events through parameters such as rhythm.

(2) **Aural discourse** which involves the manipulation of sounds purely on the basis of their perceived acoustic properties.

The two together form the total field of **musical discourse**. Emmerson also describes a further dimension in language for electroacoustic music involving sound-images as the concepts of **abstract syntax** and **abstracted syntax**. **Abstract syntax** describes a method of composing which involves the organisation of sounds according to pre-determined laws or principles which are applied to the materials,\(^\text{18}\) while **abstracted syntax** describes the derivation of organisational principles from the materials themselves.\(^\text{19}\) With sound-image composition the relationship to discourse becomes quickly apparent: whether to take into account in the structuring of a work the source references and metaphorical potentials in natural sounds; to deal solely with morphological properties; or to work with both reference and morphology. A two dimensional continuum of discourse and syntax has been constructed from this basis by Emmerson - the **language grid**.

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\(^{18}\) Such as in Stockhausen’s use of the fibonacci series to determine structural durations in *Telemusik* (1966), Cage’s translation of the patterns of stellar constellations into the score of *Atlas Ellipticalis* (1961-62), or the preconceptual determinations characteristic of serial music.

\(^{19}\) Which links more naturally to the intuitive structuring of musical forms, which may lead to more universally applicable “principles”.
Diagram 7: Emmerson’s "Language Grid".\textsuperscript{20}

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>4</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combination of abstract and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>abstracted syntax</td>
<td>2</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Abstracted syntax</td>
<td></td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

I: Aural discourse dominant
II: Combination of aural and mimetic discourse
III: Mimetic discourse dominant

musical discourse

To which Emmerson adds:

It cannot, however, be stressed too strongly that these nine "compartments" are arbitrary subdivisions of a continuous plane of possibilities, the outermost boundaries of which are ideal states which are probably unobtainable.\textsuperscript{21}

With regard to the polarities of abstract and abstracted syntax in electroacoustic music, Emmerson considers the question of composition as a process directed towards a "search" for general structures of organisation (such as in the first level of language articulation put forward by Lévi-Strauss).

It is true that the aims of both these kinds of music [musique concrète and serial music] may be summarized as the discovery and use of "universal laws". These correspond

\textsuperscript{20} Ibid., p. 24.

\textsuperscript{21} Ibid., p. 25.
to the "general structures", referred to by Lévi-Strauss, which ideally form the basis of their communicability. However, the ambiguity in the term "law" or "rule" now emerges. The philosophers of science tell us of two traditional interpretations of these words*: law as an "empirical generalization", that is, a summary of all observed instances of a particular event, and law as a "causal necessity" having some sort of status "above" the events and determining their occurrence. These interpretations are often confused in the arguments of musicologists and composers. The determinist and serial tradition tends to favour the latter interpretation, while (although some of the writings of Pierre Schaeffer appear to aim at a similarly universal "solfège") the GRM group in Paris has developed a systematic approach favouring the former interpretation. 22

[*Footnote: These and related discussions, are covered in such text-books as R.B. Braithwaite, Scientific Explanation (Cambridge University Press, 1968), especially Chapter 9]

And continues:

It must not be thought that the composer seeking this type of [empirical] solution to musical organization starts entirely without preconceptions. Sound-objects do not suggest their own montage in an objective way! There lies, above the process of aural choice advocated in this approach, a set of beliefs as to what it is that "sounds right" in any given situation. . . . Such value systems remain to a large extent unconscious; we are not aware at the moment of perception why it is that a particular combination of sounds "works", although we may rationalize our choice later and attempt a full explanation of what we have done.23

In considering musique concrète in such terms, a very significant point in this argument is the strong conceptual grounding of the genre on non-referential criteria of

22 Ibid., p. 21.

23 Ibid., p. 21.
sound perception - epitomised by the "reduced listening" process advocated by Pierre Schaeffer. In denying the value of reference in literal environmental sound recordings, a whole area of generalised language structure is ignored, a generalised framework which already exists and is intrinsic to the field of environmental relationships and confluences from which such sound materials are drawn.

However, Schaeffer himself made the following comments on the relationship between experimentation and expression in a discussion of the musical object through musique concrète.

The situation of a contemporary musician, if he consents to approach music in its concrete aspect, is very different from the impasse where he seems to be at present. He seeks, I think, to create something unheard-before, to form a style so personal that his originality could not be questioned, to write as no one before him has ever written. In doing this, he tends to create a work of discovery rather than a work of expression. To the extent that only the twelve-tone policy seems (to some contemporary musicians) to open a new path, we observe that unwittingly they do not create works of expression but works of experimentation. They will no doubt disagree, but I am forced to maintain this affirmation: there is failure of expression when, from the composer's and the hearer's point of view, there is no longer compatibility of language nor easy approach, both for the inspired creator to construct an expressive object, and for the recipient to perceive the expression of this object. The former, in applying a priori schemas, so restricts his choice that he is no more than an artisan in the service of a sort of aesthetic automatism; the latter, in fitting his impressions only into false relationships borrowed from the past or into relationships not directly perceptible to musical sensibility but only by analytical intelligence, is no longer a hearer, but the commentator of a supersubtle text or of a diagram. When that happens there is no longer a musical language. There is not even any musical relationship between composer and hearer,
by the intermediary of what I am forced to call a musical object.\textsuperscript{24}

This statement indicates clearly consequences of the kind of determinist approach commented on by Emmerson, in which formulations that are derived ahead of, or which completely constitute the act of creation can give rise to a situation in which organising principles are not perceivably unified with the given attributes of the materials. The polarities implicit to this whole argument exist as:

(1) structural criteria conceived outside of the perception of materials themselves (or formulated prior to the execution of the composition) allowing adaptation of materials to the required organisational ends and;

(2) the empirical search for organising methods based on experimentation with materials themselves.

Both are fundamentally linked with the notion of the possibility of unity between creative conception and execution, and the degree to which the composer is successful in embodying the attitude underlying the creative process within the form of the final object. In this way, the empirical search for organising criteria through which successful forms can be made, aims to identify the aspects of sound which are able to be manipulated by the composer with tangibly meaningful results for the listener - so that a unity can exist between materials and processes.

While the desire to seek an all-embracing concept of the basis of new musical languages may give rise to pre compositional dogma, the development of musical language through empiricism has also received perceptive comment from Denis Smalley, in relation to a discussion of structural matters in electroacoustic music.

Each time we attempt to tackle aesthetic questions this same dilemma arises: the relative lack of useful concepts and terminology as tools for deeper understanding and discussion. We should note that such an understanding can only exist once an extensive body of relevant music exists: practice precedes successful theory.\(^\text{25}\)

The nature of electroacoustic music as an exploratory medium and the relevance of this to the broad base of listeners has been discussed by Jon Appleton (an American composer) and Lars-Gunnar Bodin (a Swedish composer).

We suspect that this is because the sound itself, rather than its structural references and implications, is the more significant parameter. We would like further to propose that one's intentions, when listening to electroacoustic music, differ from the mindset employed with traditional pitch-and rhythm-oriented music. We suggest that electroacoustic music succeeds with those listeners who seek an exploratory experience, in contrast to those who seek connections to known procedures and traditions.

One of the reasons that there is a limited audience for electroacoustic music is that few people approach music as an exploratory experience. In contrast to traditional music, where the manipulation of materials in a given style is expected, in

electroacoustic music it seems essential to create only new sounds, if possible, and to avoid working in a familiar style.\textsuperscript{26}

Emmerson's argument continues by examining the term \textit{exploration} in relation to the objectification of compositional parameters, a term which he claims has been confused by the rationalist (and determinist) tradition. Perfect explanations allow an event to be predicted (given that the premises are constant) possessing a symmetry between exploration and prediction.

... a complete explanation as to why the sun has risen this morning and on previous mornings will allow us to predict with certainty that (given the same premises as pertained today) the sun will rise tomorrow; explanation and prediction are thus ideally symmetrical.\textsuperscript{27}

Emmerson argues that in art and human sciences "complete" or "ideal" explanations are never attained - that there is a "flaw" in the symmetry between explanation and prediction.

It is not merely in post-war serial and other rationalist theories of pedagogy that analysis (explanation) of what has gone before is used as the basis for composition (prediction); it is in many ways the basis of the pedagogy of tonal music as well. Works are analysed, principles of an abstract nature deduced; works are then created from these principles (pastiche composition). Such a process may work reasonably well given an environment which encourages criticism and the serious reconsideration of its principles - in other words a simple feedback loop to enable the composer to modify his ideas. But one which fails to embrace this empirical and


\textsuperscript{27} Emmerson (1986), p. 21.
critical approach cannot hope to develop its language significantly.28

Emmerson summarises polarities of abstract and abstracted syntax in the following way:

So we may interpret the contemporary music polemic of the post-war era - in Europe the divide between "elektronische Musik" and "musique concrète", in America the divide between the legacy of serialism from Europe and the freer approach of many younger composers - as the opposition of an "abstract" syntax to one "abstracted" from the materials. In practice these two Utopian positions are rarely found in isolation, and many composers wander somewhat uneasily between the two.29

In the two-level approach of discourse and syntax adopted by Emmerson, and the recognition of continua between mimetic and aural discourse on the one hand, and abstract and abstracted syntax on the other hand, we have a way of viewing the variety of languages, materials and approaches of composers of electroacoustic music in a broadly unified way - and this from the point of view of all art as "imitation". Emmerson's approach has been to view the whole field of musical discourse as the use of sounds in a system of musical relationships (whether determined by factors intrinsic or extrinsic to the materials themselves) and to define two polarities in the overall continuum. Combinations of sound as non-referentially based morphological and spectral patternings as aural discourse and sounds which bear direct relationship to the environment in morphology and/or spectra as mimetic discourse. Within this, the notion of "abstract" and "abstracted"

28 Ibid., p. 22.

29 Ibid., p. 23.
syntaxes defines the two approaches as seeking organisation of materials on concepts either intrinsic or extrinsic to the natural perception of materials. The descriptions of both polarities of syntax attempt to find ways in which some tangible meaning can be crystallised from each approach to the structuring of materials.

3.5 (c) Categories of Mimesis

In his earlier writing on the subject of mimesis in electroacoustic music\(^{30}\), Emmerson put forward two categories of mimesis which, although abandoned in his most recent article, deserve mention. They are poietic mimesis: the conscious imitation or use of environmental sounds, out of their original context in a work of art - and aesthetic mimesis: the tendency to associate the sounds of music with the sounds or situations of the concrete world, even when not intended by the composer.\(^{31}\) These give rise to important compositional considerations. In the case of poietic mimesis the question arises as to the realisation of the composer's intent and whether or not this has been objectively realised. This is not to suggest that the composer's intent must either function at the level of rationality or be clearly discernable in only one possible way at every level of a composition - such a circumstance would rapidly result in a musical stagnation and the redundancy of sonic art as a form of expression. If however, for the purposes of communication of an image (to which there may be an underlying network of aural and synaesthetic associations) it is necessary for the composer to accurately or effectively deal


\(^{31}\) The terms poietic and aesthetic are used extensively by Emmerson in order to describe and differentiate respectively; the outwardly active and formative (poiesis) and; the receptive, responsive (aesthesis).
with sounds which relate directly to their source, the potential for ambiguity of reference must be examined and/or accounted for. Alternatively, when working with relatively untreated natural sounds in a discourse which is based upon their acoustic rather than referential properties, one must be prepared to encounter interpretations (aesthetic) and responses which derive from source references.

These two above mentioned categories, according to this set of terminologies, arises out of Ur-mimesis, which in Emmerson's words:

\[\ldots\] may be seen as the use of environmental sounds or imitation of them as the basic material of music, unconsciously absorbed, developed, codified and transmitted.\textsuperscript{32}

Further to the two general mimetic categories, of "poietic" and "aesthetic" mimesis, Emmerson identifies two distinct types of mimesis.

(1) \textbf{Spectral mimesis} a direct imitation of the timbre (spectrum) of the natural occurrence.

(2) \textbf{Syntactic mimesis} in which the imitation is centred on the relation of some specific parameters of a sequence of sound objects in the real world.

Before continuing this strand of Emmerson's argument, we need to define some general terms used as analytical tools by Emmerson and described earlier in this writing, as they are useful in describing compositional processes in "mimetic" forms of music.

**Model:** an entity (sometimes an object but not necessarily) to be used as the basis of the music. [A physical object, or set of values].

**Analogue:** a true description of the behaviour of the model.

**Analogy:** the relation of the terms of the analogue to musical variables or objects, essentially a mapping procedure.\(^3^3\)

Emmerson argues that the acousmatic nature of recorded sound allows for further distinctions to be made in his typologies of mimesis - which until this point he acknowledges could have been applied to any music.

**Spectral mimesis** is divided by Emmerson into the two types shown below.

(1) **Literal mimesis:** the use of the original sound (recorded).

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\(^{33}\) Ibid., p. 15. These are described in greater depth in Chapter 2 (p. 92ff) including an extensive description of a theory of the application of models in electroacoustic music.
(2) Analogic mimesis: an imitation (in the more usual sense of the word) of the sound using a different sound (whether concrete or electronic).\(^{34}\)

To this he adds the significant comment:

\[
\ldots \text{literal mimesis does not involve a model, strictly speaking; model/analogue/analogy have been rolled into one, imitation has become identity and the analogy has ceased to function. With analogic mimesis, however, the chosen sound of the environment is the model, its spectral description the analogue, the relations constituting imitation the analogy.}\(^{35}\)
\]

Although Emmerson relates literal mimesis specifically to its derivation from spectral mimesis - in the case of literal environmental sound recordings themselves the syntax of the sound image will of course be retained.

3.6 Summary of Emmerson’s Concept of Mimesis

Several points arise from this line of argument followed by Emmerson.

(1) No real account is taken of the distinction between imitation and use of environmental sound, and it is assumed that "use" of recorded environmental sound is merely a special "ultra-realistic" case of spectral mimesis (in fusion with syntactic mimesis). This is true even in Emmerson’s initial description of Ur-mimesis as "use of environmental sounds or imitation of them as the basic material of the music". Even at

\(^{34}\) Ibid., p. 217.

this level of the definition, the linking of recorded sound to instrumental or electronic imitation of natural sounds under one terminology which assumes a similarity of conceptual base, is open to question. The concept of mimesis as Emmerson describes and applies it does not take into account in any substantial way the difference between recorded literal environmental sound and the use of a certain (say, instrumental) means of sound production (with its own innate acoustical characteristics) to imitate that of another. This draws to attention the difference between mimetic structures which are fabricated or manipulated towards the imitation of a given sound and natural sound artifacts - the capture and replay of which is possible through recording media.

(2) The definition of literal mimesis as the "use of the original sound (recorded)" gives rise to a series of important questions as to the relevance and function of the recording medium itself - its role as a context-altering and documentary tool. The shift acknowledged here by Emmerson from imitatio...
for Emmerson's purposes - to unite sound-image evocation in composition (even in its most completely literal sense - the use of literal recordings) with abstract musical expression in one continuum, but through the Western concept of art as imitation. In his initial (1982) use of the term imitation, Emmerson states that there is a "more usual sense of the word", but does not give a more complete definition for his analytical purpose other than in the general description of mimesis as the "imitation of nature as art".36

Emmerson's revised definition of mimesis and successive discussion (1986) as not only "the imitation of nature [as art] but also aspects of human culture not usually associated with musical material"37 attempts not just to unify the whole world of sounds as innately musical material but attempts to set up a means by which the entire spectrum of sound materials can be viewed as having a continuity of language association, despite the "polarising" of the extreme elements (abstract and literal). This does not, however, allow us to tackle in a more complete way the points discussed above. We may, in fact, be just as happy with the more general view put forward by Cage of his definition of music:

Music is sounds, sounds around us whether we're in or out of concert halls.38

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36 Ibid., p. 215.


This is a view which although all-embracing is tempered by our knowledge of Cage's refusal to deal in his own work with relationships between sounds of the kind at least attempted by Emmerson.

One further point in our discussion of the concept of mimesis remains to be resolved. The question of the distinctions between imitation and use, and imitation and identity are not fully resolved in Emmerson's latest (1986) writings, in fact, they have been ignored as significant aspects of the recording and manipulation of natural sounds.

Emmerson's use of the term mimesis with regard to recorded environmental sound must be placed in perspective, if not questioned. The view that the tape medium allows and induces imitation of the environment lies precariously close as a descriptive concept to the area of associationism in programme music which uses conventional instruments - a link which can be easily formulated as a neat extrapolation of historical successions. A more productive line of thought lies in the notion that the whole possibility opened up with the advent of recording media involves the transcendence of imitation through an intermediary object (such as the conventional instruments of the orchestra) with particular language patterns of its own - and especially with an historical/developmental basis of manipulation and use behind it. This can be seen for example, in the case of orchestral instruments which have been manipulated according to varying musical values and languages, constructed with the advent of new technologies through the desire for new timbral resource (thus extending the language resource), or for the extension of the language resource of particular established timbre types (for example, keys and later valves for brass instruments).
If mimesis involves the imitation of one object with another, then part of the expressive potential of this concept is in the manipulation of one body or object in a way which involves a modification of the established or normal behaviour of the mimetic medium, so as to imitate the other. Emmerson's view of mimesis in this sense takes into account the construction of direct analogues through appropriate media, into which category the tape recorder and its capabilities is placed. If, however, we regard the tape recorder and loudspeakers as a means of storing and retrieving sonic information, this suggests an area somewhere between the actual environment and the imitation of the environment. Tape recorders and loudspeakers have no intrinsic acoustical qualities or ways of enunciating sounds of their own, but are designed for the reproduction of the sonic characteristics of the environment. From this point, then, in considering Trevor Wishart's description and application of landscape composition, we will be dealing specifically with real, recorded natural sounds.

3.7 Sonic Landscapes and Landscape Composition

3.7 (a) Introduction

In chapter seven of On Sonic Art, Trevor Wishart has questioned the complete validity of Schaeffer's application of the acousmatic concept (towards the notion of reduced listening) and put forward an argument for a sonic art using the recognition of sound sources as an integral compositional and formal element. We have already seen Wishart's basic definition of sonic landscape (in the context of the discussion on

programme music) as the source from which we imagine a sound to come, and his argument that the use of sonic landscapes projected via loudspeakers into any acoustic space represents a different approach to composition than the "associationism" of conventional programme music. Landscape composition involves the use of real recorded sounds which are structured in a work on the basis of their reference to the source: that is, as "referents". Landscape composition is a genre afforded the composer with the advent of suitable technological means: high quality sound recording and playback with the ability to control the placement and relationships of individual elements within the "virtual" acoustic space of loudspeakers.

Wishart begins by putting forward the idea that the source recognition of sounds around us is a vital and integral part of our existence, as a valuable part of the total information we rely on for continued survival.

... in our common experience, we are more commonly aware of the source of a sound than not and studies of behaviour and aural physiology would suggest that our mental apparatus is predisposed to allocate sounds to their sources. We can see in a very crude way how this ability was essential for our survival in the period before our species came to dominate the entire planet. One needed to be able to differentiate between harmless herbivores and dangerous carnivores, predator and prey, friend and foe.40

In comparing this to the languages of conventional instrumental music Wishart suggests that, generally, the restricted "stylised" nature of conventional music is in fact a

means of directing the listening focus away from the recognition of the sources of the sound objects and towards the nature of the manipulation of the discrete pitches - as a formal aspect of the language.

The formalisation of musical parameters, the lattice of the tempered scale, the rhythmic co-ordination required by harmonic structuration, the subordination of timbre to pitch and its streaming in separate instrumental layers, is in many ways an attempt to negate the impact of the recognition of the source (human beings articulating mechanical sound sources) and focus our attention upon the lattice logic of the music. Part of our enjoyment of the music, however, remains and appreciation of the human source of the sounds themselves . . . 41

This is a point which leads directly to the wider sphere of source recognition of all environmental sounds as a basic attitude towards composition with recorded natural sounds. Source recognition is the major criterion by which sonic landscapes are constructed and controlled by Wishart.

3.7 (b) Types of Landscape Construction

Wishart has identified four different types of landscape construction, according to the technical possibilities afforded by the electroacoustic medium and these are outlined below.

(1) **Actuality**: the literal recording of an event.

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41 Ibid., p. 71.
(2) **Staged**: the real-time contrivance and recording of an event which would normally be difficult or impossible to capture, a rare event or an historical recreation.

(3) **Studio**: the use of objects (normally unrelated to the desired sound) to mimic the intended sound object for the creation of the image of that object.

(4) **Mixed**: the transformation and combination of sound sources in order to attempt the simulation of a sound object.

The reason for the adoption of these different approaches to the capture of referential sound images varies according to questions of practicality or expressive intent. For example, with regard to the field of early "Radiophonics" (sound effects for the suggestion of realistic landscapes in radio drama) Wishart outlines the following practical consideration involving studio landscape construction.

To generate the sound of horses’ hooves . . . it was typical to use a pair of coconut shells in a tray of sand. For most listeners, and with the added cue of human speech (possibly modified to suggest that the speakers were being jogged up and down by horses), this was an acceptable acoustic analogue of the sound of horses’ hooves. In some cases indeed studio-produced sound-effects proved to be more acceptable than the real thing! In the case of the horses’ hooves it may be largely a matter of getting a clear recording of the type of horse movement that we want (how do we get away from the sounds of modern traffic, how do we get the horse to behave in exactly the way we want and so on).  

42 Ibid., p. 74.
The kind of technical procedure alluded to here has a place in Wishart's conception of composition with sonic landscapes - the possibility of control and "orchestration" of landscapes which may model the spatial properties and object relationships of existing environments, or which may seek to create imaginary or surreal movements or relationships within a perceived acoustic space. The essential point here is that this approach is based on the acknowledgement that actual sound objects can be manipulated in a musical structure on the basis that they refer to the source objects or situations from which they spring (that is, in a theatrical-image sense) and that the composer has control over the individual identities and their placement and treatment within the space.

Wishart separates the aspects of landscape composition into three parts which together define the characteristics of landscape.

(1) The nature of the perceived acoustic space

(2) The disposition of the sound objects within the space

(3) The recognition of the individual sound objects.

These three aspects of course interrelate strongly, each parameter contributes to the definition of the other, and will now be discussed more fully.
(1) The Nature of the Perceived Acoustic Space.

This aspect of landscape perception is concerned with the overall acoustic properties of the environment in which a sound object occurs. This includes the nature of the reverberation and general resonances of the space. Wishart compares examples of moorland (wide open space), valley (semi-enclosed space) and forest (enclosed, but dense space) for their specific and characteristic acoustical properties.

We take from Wishart's argument that these are, of course, natural environmental acoustic spaces and there are many more types of acoustic space each of which carry their own trademarks. Caverns and canyons are more enclosed natural spaces comprising highly reflective surfaces - with naturally highly reverberant qualities. As well as this, acoustic spaces may have more complex internal characteristics and objects in our path add their own localised alterations to the overall space. For example, in an otherwise open physical landscape we may perceive reflection of sound from an isolated object such as a building, and in fact may be able to physically follow the reflection of sound off such an object, in the manner of sonar.

In terms of the human world, "room" or interior spaces are of great relevance to the perception of space, small or large rooms with differing construction materials, furnishings and ceiling heights and the lack or presence of windows all have distinct acoustic characteristics. In general terms this will give us information about the overall type or size of a room and may contribute to overall feelings of intimacy or vastness - according to the scale involved. However, the information may be more specific (especially in the light of the types of sound objects within the space) so that we may
differentiate clearly between a bathroom, bedroom, living room or kitchen, and find within these particular localised kinds of resonances from space to space, such as the possibility of the distinctive pitched resonance of a staircase, or the flutter-echo created by reflective parallel surfaces.

Wishart also introduces the description of formalised acoustic space, which is a phenomenon stemming directly from the presentation of recorded sound and the conventions that have become associated with this. In formalised acoustic space, the potentials of electroacoustic transmission of sound can allow consistent but not necessarily "natural" landscapes to be created, in which a variety of differently-sourced sounds can integrate. For example; the montage of voices and music that is created in commercial radio broadcast; control of mixing balances, reverberation or equalisation in commercial music production (as Wishart suggests); or in cinematic musicals, the sudden accompaniment of singers by an (unseen) large orchestra, where the singers are presented in some other incongruous spatial setting or surrounding. In general, Wishart is dealing here with basically a constructional view of landscape. By analysing the behaviour of different acoustic spaces, these properties can be applied to the establishment of a real or imaginary spatial field in which sound objects can be manipulated.

(2) Disposition of Sound Objects in Space.

The disposition of objects within a space and their perception through sound is crucial not only in that it conveys information about the relationships between the objects, but also in that it helps define the properties of the acoustic space.
Given that we have established a coherent aural image of a real acoustic space, we may then begin to position sound-objects within the space. Imagine for a moment that we have established the acoustic space of a forest (width represented by the spread across a pair of stereo speakers, depth represented by decreasing amplitude and high-frequency components and increasing reverberation) we may then position the sounds of various birds and animals within this space. These sound-sources may be static, individual sound-sources may move laterally or in and out of 'depth' or the entire group of sound-sources may move through the acoustic space. All of these are at least capable of perception as real landscapes. If we now choose a group of animals and birds which do not, or cannot, coexist in close proximity to one another, and use these in the environment, the landscape would be, ecologically speaking, unrealistic, but for most listeners it would remain a real landscape.\footnote{Ibid., p. 79.}

Wishart continues from this basis with the following conceptual scenarios. By replacing sounds which naturally belong in the established acoustic space with sounds which do not naturally belong (either through gradual transformation or gradual substitution) so that the space is filled with sounds which have no real-world reference a new type of landscape may result. The intrinsic acoustic behaviour of the space is retained as "realistic", for example, that of a forest (as above), a cave or bathroom, while the sound objects - and hence the sources from which we imagine the sounds to come - are not realistic. Wishart summarises this type of "imaginary" landscape construction as \textit{unreal-objects/real-space}. If the original sound objects within the acoustic space (for example the birds and animals of the forest space) were manipulated electronically so that the nature of the acoustic space in which each existed was different - through filtering, alterations of the amplitude to scale relationships or the assigning of inconsistent reverberation characteristics - then a complex combination of apparent acoustic spaces
could be constructed. Wishart summarises this as a real-objects/unreal-space imaginary landscape.

In a third possible scenario, Wishart describes a context in which the sound sources are real and the perceived space is real, but the relationships between the objects is impossible - such as a duet between a howler monkey and a budgerigar or a whale and a wolf. This kind of real-object/real-space/relationships-between-object-impossible landscape is described by Wishart as surreal. This of course relies heavily on our ability to recognise the sound sources "howler monkey" and "budgerigar" or "whale" and "wolf", which depends very much on cultural or experiential knowledge, as only then can we understand the impossibility of such combinations. With surreal landscapes the nature of the relationships between the perceived acoustic space and the sound objects within it can be seen as closely interrelated. That is to say, the combination of sound objects in a communicative interaction which is impossible will contribute strongly to a sense of surreality and therefore to a sense of a surreal spatial setting, the objects themselves helping to define the reality of the space because the behaviour of the acoustical properties of the space are consistent. In such a scenario it would be the consistency of the acoustical space which naturally allows mutually exclusive sound objects to be linked conceptually. Furthermore, the individual sounds themselves as referents, carry their own connotations of spatial setting (for example; the wolf, a forest; the whale, the sea) so that their combination in a consistent spatial setting could be thought of as surreal.

Spatial Motion is also considered here by Wishart. The listener may be made to feel movement of the aural space from a fixed vantage point through the movement of different sound objects in different directions, the listener feeling "at rest" -or alternatively
through consistent motion of the different sound objects within the space so that the "entire frame of reference [is] made to rotate", the listener may feel to be moving in the opposite direction, while the sonic landscape remains still.

Wishart continues with a simple "closer to life" consideration of aural perspective with regard to landscape:

... differences in amplitude and also in timbral qualities caused by the closeness or distance of the microphone to the recorded object alter not only the listener's perceived physical distance from the source but also the psychological or social distance. With vocal sounds, depending on the type of material used, closeness may imply intimacy or threatening dominance, distance a sense of 'eavesdropping' or of detachment and at various stages in between a sense of interpersonal communication or more formalised social communication. A similar kind of psychological distancing which parallels the social distancing may be experienced even in the case of inanimate sound-sources. To hear sounds in our normal acoustic experience in the same perspective that close-miking provides we would usually need to be purposefully directing our aural attention to the sounds (by, for example, bringing the sounding object very close to our ear).

Further to this, we might add that a potential expressive device lies in the area of "real" or "unreal" movement in space of sound objects. Physical objects which naturally move in space in real life give rise to naturally moving sound objects - their movement through space is part of the natural definition of the sound object and its source (such as

44 Ibid., p. 80.
the sound of a bird or an aeroplane). In such cases the sound objects define the space in which they exist - we expect them to move and therefore give us information about themselves and the physical as well as acoustic space in which they are situated. Some physical objects however, do not move in space (inanimate or non-motorised objects) and therefore the sounds they produce do not actively explore acoustic space, but function as static referents (even though the sound may modulate in a complex way, such as the rustle of leaves on a tree so as to create a fairly stiff model of the illusion of spatial movement through shifting patterns of sound). Such sound objects do not move freely about an acoustic space unless (in electroacoustic music) they are manipulated, or our perspective of them is manipulated (the alteration of the vantage point). In this way a sound object may define an acoustic space, but with an expressive result - opening up the possibility of surreal motion.

3.7 (c) Recognition of Sources: The role of Contextualisation

Wishart begins here by acknowledging that sound is only one aspect of the information that we process through our senses, in order to define and understand our environment and how we orient ourselves within it.

In our normal working lives our experience of the environment is a multi-media one. In particular we rely very heavily on the visual medium to assist in our recognition of objects and events. This recognition may be direct, in the sense that we see the object or event which emits the sound or indirect, in the sense that a physical location (e.g. a railway station or a particular type of terrain) or a social occasion (e.g. a concert performance) may enable us to identify a (perhaps indistinctly heard) sound source. Once we remove
the visual and other clues to sound recognition, we must rely entirely on our aural perspicacity.\textsuperscript{47}

In light of the previous discussion concerning the manipulation of real and unreal objects and spaces, the question of source recognition needs careful consideration.

In the virtual acoustic space of an electro-acoustic work projected on loudspeakers, even where sounds directly recorded from the real world are presented, they may be completely devoid of aural context. Furthermore, where sounds which would normally be individually recognisable are placed in an imaginary space or in imaginary relationship to one another, the problem is compounded.\textsuperscript{48}

Given that we have defined the possibility of the construction of surreal sonic landscapes, a useful view on this can be taken - as Wishart does - through a comparison with the nature of visual material. The established form of surrealist painting has different consequences and effects than the surrealist manipulation of sound objects. Because of the degree to which we rely on the visual for the identification of objects, in painting, the placement of recognisable images in impossible environmental relationships is not so problematic aesthetically - although for the surrealist painter a prime objective is the attainment of a highly realistic image of the object. However, in sonic art, the redisposition of sound objects in relation to one another so as to create a surrealist sonic landscape may itself be prone to perceptual problems, in that the recognition of sound sources involves linking the sound back to the physical object from which it arises. For this reason, the mechanics of how environmental sounds are recognisable are of importance

\textsuperscript{47} Ibid., p. 81.

\textsuperscript{48} Ibid., p. 81.
Source Recognition of Natural Sounds in Electroacoustic Music

in landscape composition. In order to define the means by which source reference of natural sounds can be ensured a distinction is made by Wishart between intrinsic recognition and contextual recognition. Sounds have intrinsic "recognisability" when the source of the sound is discernable entirely from the acoustical information which it possesses alone. Certain sounds will also retain their recognisability even when combined electroacoustically with otherwise contextually incongruous sounds. According to Wishart, the sound with the greatest degree of intrinsic recognisability is the human voice - especially language - deriving from the general formant structure of vocal sound.

... the human voice itself has a high intrinsic recognisability for human beings. This is partly due to the obvious immediate significance of the human voice to the human listener, but also the unique complexity of articulation of the source. The ability to produce a rapid stream of timbrally disjunct entities is uncharacteristic of any other source (except perhaps bird mimics of human beings, such as parrots).49

Certain sounds rely on spatial motion or disposition in space for recognisability and Wishart gives an example here of the sound of a fly50. When Wishart made a recording for use in his piece Red Bird (1978)51 of the "buzzing" sound of a bluebottle fly beating its wings while attached to a rod (that is, in a fixed position) the aural image "fly" was not successfully created. It was only after spatial motion of the sound had been simulated that the characteristic aural image of a fly was satisfactorily achieved, and the sound proved to have considerable intrinsic recognisability.

49 Ibid., p. 82.

50 See Ibid., p. 82.

51 Subtitled A Political Prisoner’s Dream.
The sound [of the fly moving in space] thus recorded / created, resisted fusion / confusion with its vocal imitation and was even recognisable in unlikely aural landscape contexts. In certain other cases our recognition of a group of sources may be strongly correlated with a mutual disposition of motion through the acoustic space.52

3.7 (d) Contextualisation in "Red Bird"

Some sounds create, in Wishart's words, "fairly inspecific aural image[s],"53 and may rely on more replete aural information or "cues" for the recognition of the source of the sound, for example, the relationships between different sounds which belong to the same situation or overall context, or exhibit different sonic aspects of the same object (such as the sound of a car engine and the screeching of brakes). This relates specifically to the recognition of sources, not the congruity of the acoustic space (although that is in itself an important part of the perception of temporal continuity and perspective). Here Wishart gives an example of the kind of contextual cues used in Red Bird:

... I wished to achieve the transformation of a sound-object from a recognisable book being slammed on a surface to a recognisable door being slammed. In this particular instance the door-slamming sounds could be made recognisable by subtle cues related to the mechanical noises of door-handles (!). Door sounds of this type could thus be differentiated from arbitrary "slam" sounds. An arbitrary "slam" sound might be taken to be a door if presented in the context of doors-with-handles. A book-slam is, however a fairly unspecific aural image. In order to ensure recognition of this sound, (particularly in a context where it would be juxtaposed with slams from other sources) it was necessary to provide a contextualising cue, i.e. the sound of the pages of a

52 Ibid., p. 83.
53 Ibid., p. 83.
book being turned which has a much higher intrinsic recognisability.\textsuperscript{54}

Wishart states that the inverse of contextualisation is masking, or the covering of one sound with another. In other words, masking in a landscape sense is the combination of sounds whose acoustic properties are not constructive to the recreation of their particular source-images. There is, therefore, a wider meaning in the landscape definition of masking (than in the purely acoustical sense) involving spatial and temporal considerations in the imparting of the desired information.

Loud sounds in particular frequency bands may prevent us from hearing those frequencies as constituents of another sound. This kind of masking is of particular importance in the virtual acoustic space projected on loudspeakers as we have no visual cues from which to get alternative information. The building of a representational aural landscape is not therefore merely a matter of assembling the appropriate recognisable sound-objects. Spatial and temporal disposition (and relative placement within the frequency spectrum) will affect our ability to recognise individual objects and must therefore enter as compositional criteria in sonic art projected on loudspeakers.\textsuperscript{55}

However, Wishart does point out that masking need not always obscure the source recognition of some sounds, even if the exact nature of the acoustical information is disguised. The brain is often capable of reconstructing a masked source or image from the information which is perceivable through the masking.

\textsuperscript{54} Ibid., p. 83.

\textsuperscript{55} Ibid., p. 83.
This reconstructability applies particularly to objects with a clear and well-known structure, for example pictures of objects or icons with which we are very familiar or the structured sound-stream of language or music where we are familiar with the "text" or at least with its style.56

Contextualisation, as a part of the process of mixing sounds in landscape composition, can be seen as an integral part of the creative process. Because in Wishart's conception of landscape composition recognition of sound sources is a crucial factor in the development of a work's formal coherence, the technique of contextualisation is a means by which combinations of sounds can be - where necessary - set up to ensure or aid the recognisability of an otherwise potentially ambiguous referent. Furthermore, as an aspect of composition on the basis of source recognition, contextualisation is a process which extends from the observation and understanding of the mechanics of ordinary perceptions - every day we process groups of aural references in order to define or recognise sound sources. In terms of landscape composition, contextualisation forms an integral part of the grammar and mechanics of source recognition.

3.7 (e) Transformations within the Sonic Landscape

Also in Chapter seven of On Sonic Art, Wishart gives a description of some of the sound transformation processes which were used in Red Bird and later (in Chapter eight) shows how these contribute to the establishment and manipulation of sounds in a metaphorical way. Metaphor describes the juxtaposition of recognisable sounds to achieve a deeper, more symbolic meaning than is present in the simple recognition of sound sources.

56 Ibid., pp. 83-84.
sources, to link the individual identities and source reference of separate sounds into more complex relationships of sound images and potential emotional response. To this end, Wishart has developed a means of transforming sounds which involves the transfiguration from one sound to another, achieved through melding of the acoustical properties of the sounds themselves. We will, however, follow Wishart's argument directly, dealing with the metaphorical implications of this later, and for the present summarise some of the descriptions of the transformational processes in *Red Bird*. Wishart says of sound transformation:

>This opens up the concept of the composition of landscape to include the notion of landscape transformation, not merely in the simple dimension of recognition or lack of recognition, but in the transformation of one aural image into another. We can thus contemplate the construction of a mode of composition concerned with the interplay of recognisable aural images which is quite different from the use of degrees of recognisability in an otherwise formalised musical landscape.  

57

By *transformation*, Wishart means to describe a process in which a recognisable sound object evolves into another, the characteristics of the initial sound dissolving into the gradually emergent characteristics of another sound object, often with a state of referential "limbo" or ambiguity between the two.

Examples of this kind abound in *Red Bird* and include among others the transformations shown here schematically.

57 Ibid., p. 84.
Diagram 8: Examples of Sound Transformations in Red Bird.

(1) "ble"  \[\rightarrow\] bubbling water
(from "reasonable")

(2) "Rea"  \[\rightarrow\] gunfire -
(from "listen to reason" -
short envelopes developing into
regularised iteration of
noise-sound)

(3) Book slam  \[\rightarrow\] door slam
(Dry "thump" contextualised
with sound of
pages of a book being
turned. The "slam" is a
initiated as a series
of attempts to swat a
fly which is buzzing
around the stereo space).

(4) "LISS"  \[\rightarrow\] birdsong
(first syllable of "listen").

(5) "Reas"  \[\rightarrow\] fly buzzing
(from "reasonable").

(6) Breath  \[\rightarrow\] wind
(Exhalation of breath,
contextualised by voiced
sound at the beginning
of the envelope).

(7) Scream  \[\rightarrow\] birdsong
(Two short cries - of terror -
followed by continuous scream
morphology; short, initiating cries
contextualising vocal source).

(8) "Ah"  \[\rightarrow\] flocking birds
(short, loud vocal
exclamation - related to those in
the above transformation).
The areas of arrow (→) between the two poles of recognisable sounds are the areas of transformation or the sound "shifts" from one recognisable morphology to another. This may include gradual "mutation" or extension in time of, say, a vocal syllable or the gradual establishment of a "hybrid" - potentially ambiguous - sound which lies somewhere between the two recognisable sounds, and which gradually assumes the morphological or spectral characteristics of the emerging recognisable sound object.

Wishart has described, in particular, the conceptual intent and technical means of achievement for two of these examples from Red Bird in On Sonic Art and these will also be discussed here. The recognisability of the sounds is important to Wishart given his desire to construct metaphorical relationships and much of this depends in the third example shown (book slams to door slams) on the specific contextualisation of the sounds.

As we have seen in the discussion above, the sound archetype "slam" can be a fairly difficult morphology to ascribe to a particular source object capable of producing such a sound. The archetype suggests more to do with the causal gesture or energy input than the medium itself. In this case, in order to convey the sound image "book", Wishart uses another, more idiomatic "book" sound - the "turning-of-pages" - prior to the sound of the book slam, in an attempt to set up a reference context in which the slam sound would be understood as the slamming of a book on a surface (a table, perhaps). The idea, then, is that the sound of pages turning is a sound more intrinsically related to the image "book" and therefore that the "slam" is more likely to be recognised as coming from a book.

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At the other end of this transformation, in order to contextualise the "door slam", Wishart includes clear metallic sounds of handles and latches which aid the correct recognition of the source of the sound. The handle sounds are added to the morphology gradually so that the "door" image emerges slowly out of the transformation as the sound becomes more definite and recognisable. Between the two extremes of the sounds which are intended to be recognised, the "slam" morphologies of the recorded door and book are interspersed through time - creating the impression of an evolving transfiguration - and added to this are speed changes to both sounds in the "interleaving" stage. This creates a more dreamlike or illusionary shift in image as well as a morphologically more interesting sound image, and the gradual addition of contextualising information (the handles and latches) is integrated as part of the transformation process.

The other example described by Wishart is the transformation of a vocal syllable "LISS" (from "listen" - taken from the phrase "listen to reason") into the song of a single bird. The two polarities of the transformation here are much more distinct acoustically and the transformation is achieved without the kind of additive morphology heard in the door handle example or the contextual cue of the turning-of-pages. Instead, the process involves a simpler overlapping of more extended morphologies. The "LISS" syllable has been extended with staggered entries of the sibilant "sss" sound overlaid. Gradually a chorus of birdsong is mixed with this, the vocal sound fades and the chorus of birds subsides into a "solo" birdsong. The overall effect is the metamorphosis of a vocal sounding coloured noise into the clear, delicate song of a bird. The one contextual aspect to this is in the syllable "LISS" which is derived from "inquisitorial" utterance.

59 See Ibid., facing p. 85 for Wishart's graphic representation of this mix.
"listen to reason". The high intrinsic recognisability of language for humans (here in the context of the English language for English speaking humans!) allows the link to be made between "LISS" and "listen" and from "listen" to "listen to reason" - a phrase which has appeared earlier in the piece, prior to the transformation in question. The birdsong has a high intrinsic recognisability on its own and the characteristic morphology of birdsong which emerges from the transformational mix of the two sounds is easily discernable.

Overall, the kinds of transformations from one recognisable sound object to another effected by Wishart in Red Bird involve a metamorphosis from one polarity to another, in the manner of:

SOUND OBJECT A \[\rightarrow\] TRANSFORMATION \[\rightarrow\] SOUND OBJECT B

Wishart describes such transformations as being of two types, which relate to the intrinsic sustaining properties of the recognisable sound objects, as listed below.

(1) **Sequential transformation**: where brief sounds are repeated with successive alterations to the morphology each time, until a new recognisable sound is reached (such as the book/door transformation);

(2) **Continuous transformation**: where the continuous morphology of a recognisable source is melded into another recognisable sound (such as the "LISS"/birdsong transformation).
These processes of transformation enable Wishart to ensure that a link is made between two different sound referents - as one appears to emerge from the other, suggesting a kind of genetic interrelationship - while also extending the morphological characteristics of each into a more ambiguous and abstract dimension. For instance, in the example cited above of the transformation from the syllable "LISS" to the song of a bird, there is a period in the transformation during which the sound as an actual reference is perceived as being ambiguous. Although the transformation remains related to the initial source (the gradual nature of the transformation ensuring this) we do know that a morphological development or extension of some kind is taking place, but one which does not obscure or destroy the overall sense of source recognition. Therefore, while the transformations do not extend to the point of being abstract in their own right, so as to lose relevance to the original source, they function as an embellishment or extension of the initial sound, through which a new referent can emerge.

By revealing, through the transformational process, that two distinct sound referents have shared morphological characteristics, an interface between the reference meaning of each is suggested - allowing the potential for metaphorical meaning to be utilised. This is further discussed below.

3.7 (f) Vocal Sounds in "Red Bird"

The semantic content in Red Bird (revolving around the phrases "listen to reason" and "reasonable") plays an important role in defining the overall communicative potential of the work as being "about" notions of freedom and oppression. Extending from this is the use of verbal material and vocal typologies to suggest certain characters; the nasal,
"croaky" voice of the philosopher ("here, in our book of knowledge, we are developing a rationale for all things . . .") which is associated in the piece with the sound of book pages-being-turned (the verbal material giving a moderate degree of contextualisation to the recognition of that sound) and, especially near the end of the work, the interrogator ("we ask merely that you listen to reason") which has a distant, "loud-hailer" quality. Such elements are strong reference points within this piece as they give clear indication of the kind of attitudes and forces which lie behind the stream of "theatrical" sound-image processes.

Gestural and inflectional typologies are also an important factor in the way vocal sounds impart particular meanings in Red Bird. To this end, a large range of archetypes of vocal inflection were assembled by the composer in making the work and these, through the enormous gestural flexibility of the voice, enable links to be made between semantic fragments and the morphologies of other sound-referents, such as: the transformation of the (interrogator's) syllable "reazzzz[onable]" into the sound of a fly; the philosophers' "reeeea" into the sound of a squeaking door (this being a subtle transformation which develops over an extended period in the middle of the piece); or the short, multilayered attacks of the syllable "rea" transforming into the sound of hounds barking. These transfigurations unleash possible metaphorical meanings. For example; it could be argued that the interrogator's voice, in being linked to the "fly" image suggests an underlying decay (symbolised by the fly) as being implicit to the political oppression represented by the interrogation; the philosopher's voice, by being transformed into the sound of a door squeaking in the wind is linked to an image of desolation and also to the

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overall "door" symbolism in the work (with the door as a motif for both escape and enclosure); and the syllable "rea" (from reason) is through a transformation linked to the aggressive "wild" imagery of the barking dog sound. These kinds of transformations between voices and concrete or animal imagery might be thought of as a way of metaphorically implying the underlying character or intent of the owner of the voice.

The consistent use of a basic "set" of verbal content allows a unity of basic meaning to be worked with but, due to the vast resource of vocal inflections applied to these (for instance, "aggressive", "screeching", "indignant" or "supercilious"), allows this prime material to be modulated towards a variety of other sound objects in the piece - so that the natural morphological variants of the characterisations and the inflections of spoken language become fused with non-human aural phenomena. Vocal sounds are also used in the creation of "machine" imagery, where sounds are streamed into a regularised metrical pattern of repetition. By the use of vocal material in the construction of this image, the sensation is created whereby human presence appears to be incarcerated or enclosed within a systematised framework.

3.7 (g) The Role of Symbolism

Another significant aspect of the manipulation of sounds through transfiguration as Wishart has done in Red Bird is in the area of sound symbolism. In the example we have already seen, the transformation of the syllable "LISS" to birdsong attempts to set up, according to Wishart, a contextual environment in which the sound image bird takes on the metaphor of flight and freedom of imagination. The birdsong is transformed in this way from a "sign" (the immediate reference) to a "symbol" (a deeper, emotionally based
reference beyond the immediate one), within the context of this work. The image "bird" has innate potential (as far as humans are concerned) to symbolise flight and freedom: release from our earthbound state and the ability to extend into a state of extreme "openness" and the unknown (the sky). This is expressed graphically in Diagram 9, and although - as Wishart points out - birdsong on its own (as a "sign") need not ensure such symbolism, when manipulated into the kind of context established in Red Bird, the symbolic potential may be unleashed. In this way, sounds are being used in a comparative way, birdsong is conceptually more open than "listen to reason", and is in this way (through a specifically engineered context) is able to be interpreted symbolically.

Diagram 9: Birdsong as Sign or Symbol.

<table>
<thead>
<tr>
<th>SIGN</th>
<th>SYMBOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bird (the actual bird)</td>
<td>Bird (universal bird or &quot;bird image&quot;)</td>
</tr>
<tr>
<td>Bird sings</td>
<td>Potential for the bird to do things beyond humans i.e. flight</td>
</tr>
<tr>
<td>Bird song (evidence of bird)</td>
<td>Freedom, imagination, as symbolised by the concept of bird.</td>
</tr>
</tbody>
</table>

Birdsong is used almost exclusively by Wishart as the referent for bird imagery and symbolism; only at one point (in the middle of what Wishart defines as the "central area"
of Red Bird)\(^{61}\) has the sound of beating wings been used as a "bird" referent, being in this case a transformation out of the sound of book pages-being-turned (as a reference to the "philosopher's book of knowledge"). The wing-flapping sounds in this case are not supported by a strong spatial movement suggesting flight. Rather, the sound moves forward in the stereo space, creating the sensation of a bird in flight in close proximity. The notion of symbolism is closely linked with that of sound metaphors (metaphorical relationships suggested between sounds) and this is further discussed below.

3.7 (h) Ambiguity

In comparing the transformation of sound objects through this process of transfiguration with the possibility of transforming visual objects (such as in film) Wishart makes the following points.

Visual transformation and aural transformation take place in different dimensions. Not only this, they have quite different qualities. We normally have little difficulty in recognising a visual object, even at a glance. Rapid transformations between clearly recognisable objects are therefore quite simple to achieve in visual animation. The whole process has a very "concrete" feel, a certain definiteness. Aural images, however, almost always remain a little ambiguous. We can never be sure that we have made a correct recognition, especially where the transformation of sound objects denies us the normal contextual cues.\(^{62}\)

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\(^{61}\) See ibid., p. 5.

We can see from this that it is the "ambiguity of aural space" which lends a plasticity to sound and allows the kind of transfigurations outlined by Wishart. The potential for uncertainty in the recognition of sources of sound objects allows for the drift of acoustical information into the more ambiguous area of sound transformation and for the emergence of a new image. The result is the "dreamlike" quality of sound-image manipulation as opposed to the more concrete feel of visual image manipulation.

Much of this is, of course, to do with the relative importance in the definition of space that we ascribe to visual and aural phenomena. In dealing with the recognition of sound sources we are working at a level which, because of the weighting of our perception towards the visual, is at a slight remove from our normal bias towards the physicality of objects. With visual cues, the link to an object is often much more direct.

While this ambiguity of aural space involves the potential for difficulty in the source recognition of sounds it is also capable of enabling particular kinds of expression, as epitomised by Wishart's transformational processes. This is a characteristic of any type of musical form which might be regarded as the "intangible" quality of sound and sonic art. With electroacoustic media this is enhanced by the expressivity inherent in the disembodiment of sounds from their sources and the potential for manipulation of source reference "images" as well as purely morphological phenomena. In Red Bird transfiguration of materials not only suggests metaphorical relationships between the individual sound images themselves, but also the associated perception of wider contexts. For example, at one point (towards the end) of Red Bird, there is an extended section of transformation in which an attack/resonance morphology which links closely to the sounds
Source Recognition of Natural Sounds in Electroacoustic Music

of doors slamming\textsuperscript{63} (positioned in a mid-distance perspective, with considerable reverberation) gradually transform into the closely microphoned sound of a clock ticking in a dry acoustic space. Tied to the sensation of the transformation of implied sound-images is the sense of spatial transformation, or the transformation of a spatial context. The attack/resonance sounds imply a vast spatial context - especially through long reverberation time - while the clock sound implies a close up perspective of the sounding object in a confined space. The nature of these indications of space stems directly from the normal perception and observation of objects: long reverberation time implies large space, while the sound of a clock is relatively quiet and one is required to be in close proximity with the object in order to hear the sound as it is presented in \textit{Red Bird}. As an adjunct to this, in metaphorical terms, one might conceivably interpret the juxtaposition of these images not just as symbols of the passing of time, but also in terms of their relative spatial implications - that the claustrophobic sensation of the clock ticking suggests the alienation that lies behind the prison door.

3.7 (i) \textbf{Metaphorical use of Sonic Landscapes}

What would happen if we were to establish a whole system of relationships between sound-images, each having strong metaphorical implications. By articulating the relationships between the sound-images we could develop not only sonic structures . . . but a whole area of metaphorical discourse.\textsuperscript{64}

\textsuperscript{63} Wishart has indicated that the actual source of this sound is vocally produced (the syllable "rea") though this sound does not effectively relate to such vocal origin. See ibid., p. 95 and facing page, for Wishart's description.

\textsuperscript{64} Ibid., p. 89.
This is Wishart's basic premise for the metaphorical use and manipulation of sound objects in landscape sonic art, which can be broken down into the following elements, as are listed below. For the first time in this discussion, we can see the basic outline of a unified "language" of landscape composition.

(1) Sound objects which we relate directly to the source of the sound (through intrinsic recognisability or contextualisation).

(2) (i) Transformation between two "poles" of recognisable sound objects involving a "transfiguration" from one sound object to another;

(ii) the creation of composite sound images through the mixing of sounds according to a predetermined morphological or sound-image archetype (for example, the "word machine" in Red bird - discussed below).

(3) The establishment of sonic landscapes in which there may be:

(i) Real-objects/Real-space;

(ii) Unreal-objects/Real-space (substitution of objects within the space);

(iii) Real-objects/Unreal space (altered natural unifying spatial properties or variations in perspective);
(iv) Real-objects/Real-space/Relationships between objects impossible

(surrealist landscape);

Wishart qualifies the idea of sound objects as metaphors in a discussion of Stockhausen’s *Gesang der Jünglinge*. As we will be looking later at *Gesang der Jünglinge* in a special context relating to New Zealand electroacoustic music, Stockhausen’s comments on the piece are useful here:

My work on the electronic composition *Gesang der Jünglinge* (1955/56) proceeded from the idea of bringing together into a single sound both sung notes and electronically produced ones: their speed, length, loudness, softness, density and complexity, the width and narrowness of pitch intervals and differentiations of timbre could all be made audible exactly as I imagined them, independent of the physical limitations of any singer. The electronic sounds that had to be composed were therefore much more variegated than hitherto, since the acoustical structure of sung words is probably more complex than any other - containing as it does a wide range of vowels (sounds) and consonants (noises) - so that a fusion of all the timbres used into a single family of sound only becomes palpable when sung sounds can appear like electronic sounds, and when electronic sounds can appear like sung sounds. At certain points in the composition the sung sounds become comprehensible words, at other times they remain pure sound values, and between these extremes there are different degrees of verbal comprehensibility. Single syllables and words are taken from the *Song of the Youths in the Burning Fiery Furnace* (Book of Daniel, Chapter 3). Thus wherever the music’s audible signals momentarily become human speech, it is always in the praise of God.65

Wishart comments on the mediation in *Gesang der Jünglinge* between the pure "utterance" of the boy’s voice (which exists in a number of different apparent acoustic

spaces - the singer’s voice being allowed to "float in a strange and unreal space") and the otherwise purely "abstract" electronically produced sounds. Wishart states that the "varying degrees of vocal recognisability or electronic abstractness in between" is possibly one of the first uses of metaphor in sonic landscape composition.

The mediation between these two sound types suggests some kind of mediation between individual human expression and something much more abstract and distant from human expression, a sonic metaphor for Stockhausen’s continuing religious preoccupation.

And also:

It is the mediation between the sound of a voice and the electronic sound which gives rise to a metaphorical interpretation which would not arise if no mediation were established between the two.

In addition to these considerations of the actual sound content of Gesang der Jünglinge we must also realise the importance of spatial manipulation in this piece. Originally the work was realised for five groups of loudspeakers enabling enormous flexibility of spatial motion for the composer. In Stockhausen’s words:

... here for the first time the direction and movement of sounds in space was shaped by the composer and made available as a new dimension in musical experience. Gesang der Jünglinge is in fact composed for five loudspeaker groups,
to be distributed in such a way as to surround the listener in space. Sound may issue from any side, from any number of loudspeakers at once, may move clockwise or anticlockwise, may be partly fixed and partly mobile: all these aspects of the spatial distribution of sounds and sound groups are of importance in this work.69

The control of spatial movement in this way (which in Gesang der Jünglinge is nowhere near fully conveyed in the stereo recorded version on commercial release) shows the manipulation of sounds in a landscape sense. The use of space allows the metaphor in these materials to have full impact, enabling a more tangible realisation of the metaphorical mediation between the sound polarities. The boy's voice, for example, is at times in very "close" apparent proximity (closely microphoned and in a dry acoustic setting) and at times very "distant" (with a good deal of reverberation and lower amplitude). The exact nature of the definition of space in this piece is critical as demonstrated in Stockhausen's meticulous attention to details of balance and loudspeaker placement in the multi-channel performance of Gesang der Jünglinge.

Wishart applies this concept of mediation to the sound transfigurations used in Red Bird as a means of building metaphorical structures. As an example of this he reviews the earlier example of the transformation of the syllable "LISS" into birdsong. Hence, Wishart suggests that the aural image "bird" (which has been used in Red Bird as an aural metaphor of flight and through that metaphor as a symbol of freedom of thought or imagination - given the juxtaposition of such a sound image with others of imprisonment,

persecution and interrogation) need not have such symbolic connotations on its own. However, by making the birdsong "fly" out of the syllable "liss" which links contextually to the inquisitorial "listen to reason" previously established in the work, in Wishart's words, "the metaphorical link with the concept 'imagination' is suggested."

Strong metaphorical implications exist in other sound transformations in Red Bird. For example, the transformation of the book slams into door slams might induce a metaphor of dogma or laws (the book) in a link with imprisonment or restriction of freedom (the doors). The book image alone has a strong potential as a metaphor for ideas, while the slam morphology suggests authoritarianism - or, in an overall sense, the application of ideas (or dogma) for the enforcement of authority. This must also be interpreted in relation to the book slams as a series of attempts to swat a fly which, in this juxtaposition with the image of the book, might be thought of as a symbol for a more "natural" world than that of the "reason" of the philosopher and book. The door is a strong cultural image for opening and closing and links closely to the constructed confinement of space (indoors) by humans - which in this case might be interpreted as an imprisonment metaphor. In this way the two sound polarities link conceptually with each other for the creation of a metaphor in a composite way. At the same time, of course, the sounds can also be heard as purely acoustical values: textures and gestures. The way in which the sounds mediate - as sonic gestures - has a narrative quality which allows very much for this type of listening.

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70 An interpretation which is also supported by the work's subtitle: A Political Prisoner's Dream.

71 Ibid., p. 91.
Another example is the transformation of the syllable "Rea" (from "Reason") into the sound image of a barking dog and (earlier on) into gunfire, these metaphors have a highly aggressive feeling - the shift from a human utterance to an animal utterance being especially potent, as well as the transfiguration of vocal sound into a machine sound (the gun).

Some of the other metaphors induced by sound transformation in Red Bird are less specific in their message. For example, the transfiguration of a voice ("reasonable") into the sound-image of bubbling water does not result in a clear metaphorical meaning, but tends to remain at the acoustical level, functioning more as a manipulation of the vocal sound rather than achieving a strong resultant metaphor. Another dimension opens here, that of enigma, where an exact metaphorical function is obscure or open, with a variety of possibilities. In this sense there are less describable kinds of referential links (as metaphors) but are still perfectly valid as expressive and compositional areas. The enigma that has been suggested in the above transformation may derive from the fact that the "water" referent is not extensively used by Wishart in Red Bird (except as the "fluid" element as part of the "body-machine" image). As such, the reference is more open-ended in terms of a metaphorical impact that those which are used in a variety of contexts and in a variety of transformations - such as verbal material, birdsong, the fly, doors and animal sounds.

In particular, one powerfully enigmatic piece of landscape construction in Red Bird occurs towards the end of the first part, at the conclusion of the "garden" landscape (an extended naturalistic setting of a wide-open space filled with the sounds of animal and bird life). Animalistic vocal utterances have emerged within the garden landscape and
appear to be evolving (transforming) towards some coherent verbal utterance, but are instead compressed into a regularised rhythmic pattern (interacting with the birdsong from the garden landscape) when the whole image is suddenly "destroyed" by the onset of a huge (glass-like) shattering sound which devolves into the sounds of "pieces" rattling on a "floor". This is followed by what Wishart terms the "Empty" section in which long stretches of silence are punctuated mostly with vocal fragments (especially from the phrase "listen to reason"). The sensation of the juxtaposition of the "shatter" sound with the end of the extended "garden" section is that the previous landscape has been destroyed - physically - which is supported by the sudden bleakness of the following section. This is, then, an illusory and - in terms of reality - impossible event, as the aural sensation of a natural landscape has been, in effect, broken like a fragile physical object. The result for the listener is enigmatic: was the garden landscape merely an illusion? Have we entered some other reality? The image of the landscape being smashed is convincingly achieved at this point in the piece, but in a way which suggests - metaphorically - that the extended garden landscape into which the listener has been drawn over a long period could have been an illusion.

Wishart also comments on the duality of function of sounds in composition with sound metaphors in a landscape context:

In putting together a sonic architecture which uses sound-images as metaphors, we are faced with a dual problem. We must use sound-transformations and formal structures with both sonic impact and metaphorical import. We must be both sonically and metaphorically articulate. Using concrete metaphors (rather than text) we are not "telling a story" in the usual sense, but unfolding structures and relationships in time - ideally we should not think of the two aspects of the sound-landscape (the sonic and the metaphorical) as different
things but as complementary aspects of the unfolding structure.\textsuperscript{72}

And qualifies this:

The listener may of course deny or blank out the metaphorical implications, but this is possible with all other art forms which use metaphor.\textsuperscript{73}

Such sonic metaphors rely heavily on the overall context established within the landscape of the work (including aspects such as \textit{titles} and subtitles which, in the case of \textit{Red Bird}, is an important means of defining the overall context) and the innate potential for metaphor within the sound objects themselves. Integral to this is their degree of recognisability as \textit{references}, or sounds which define the object (the physical source) and of the sound-image as \textit{symbols} in which the cultural relevance of the object has the potential for a deeper meaning, not necessarily related to the actual function of the object. The manipulation of metaphors from sound objects in Wishart's way (through transformation) attempts to unleash such deeper expressive resources from recognisable sounds.

Metaphorical relationships between juxtaposed sounds in different spatial settings of imaginary landscape constructions is also evident in \textit{Red Bird}. For instance, in part one, when the philosopher's voice reads "here in our book of knowledge . . ." (along with the contextual sound of pages-being-turned, in a dry acoustic setting) a mix of voices

\textsuperscript{72} Ibid., p. 91.

\textsuperscript{73} Ibid., p. 91.
whispering "listen to reason" (in a slightly reverberant acoustic setting) is cut off twice in succession with the sound of a book being snapped shut. The suggestion here (with the book closing and the voices stopping simultaneously) links these "voices of reason" to the image of the book; that the voices might be thought of as representing ideas in the book. Similarly, at the beginning of part two, there is a related kind of montage. From underneath a bird-like chirping sound emerges a superimposition of the sound of pages-being-turned (in close proximity, in a dry acoustic setting), voices whispering "listen to reason" (in a slightly reverberant setting), and the "machine" sound (in a reverberant setting) - this scenario eventually being cadenced by the "slams" which attempt to swat a fly. The sounds in this landscape are separated for the listener by the sensation of their varying apparent presence. As such, they might be interpreted with the turning-of-pages sound apparently in the "real" space, with the other sounds as supporting, "imaginative" sound-images which relate as indicators; suggesting the underlying "reason" of the book.

Central to the success in Red Bird of cross-situational use of the same referent in different juxtapositions and scenarios is the limiting of the sound referents to a few crucial identities. In this way Wishart has, on the whole, attempted to use sounds which are characteristic enough to be recognised in new landscape contexts and flexible enough to be capable of a variety of transformational and metaphorical possibilities. The referents must therefore be "rich" enough in cultural association of concrete meanings to be, on repetition, used in another context and capable of contributing some new insight into the overall narrative of metaphor and image.

Wishart’s concern for being "both sonically and metaphorically articulate" shows the need for the individually recognisable sound objects to be quite specific in their intended
function. The sounds must not only be direct in their function as recognisable sound-images, but also specific in their function as recognisable sounds in the context of the work. For this reason Wishart defines what he has termed "Metaphorical Primitives".

3.7 (j) Metaphorical Primitives

In establishing a sound-image structure which involves a complex network of metaphors (such as in Red Bird) Wishart initially establishes a set of metaphorical primitives "which the listener might reasonably be expected to recognise and relate to".74

In Red Bird the basic sound types into which the metaphorical primitives fall are:

(1) Words
(2) Birds
(3) Animal/Body
(4) Machines

The metaphoric primitives chosen for Red Bird may seem crassly obvious. However, these are only the basis upon which the metaphoric structure is to be built. The use of intrinsically esoteric referents (a la T.S. Eliot) would not be appropriate in this context, apart from any other objections we might raise to it. The four basic sound types used in "Red Bird" are . . . Words (especially "listen to reason"), Birds, Animal/Body and Machines. Although in certain cases these categories are quite clearly distinguishable, ambiguities may arise (and are used intentionally). For example, non-linguistic vocal utterances (from human or animal voice) may approach linguistic forms and vice versa. A repeated high-frequency glissando may be taken to be of ornithological or mechanical

74 Ibid., p. 93.
origin. Articulated mid-range pitched material may be both bird-like and animal-like. Each symbolic type is chosen because it either has a conventional symbolic interpretation (birds - flight, freedom, imagination: machine - factory, industrial society, mechanism) or such an interpretation can be easily established (the phrase “Listen to Reason” points to itself).  

The notion of metaphorical primitives such as this is central to the ability of metaphorical relationships made between objects to have meaning, in other words; to be interpreted as a new, resultant image or concept. Metaphorical primitives, as Wishart has applied them, are a means by which specific areas within a field of reference can be set up to provide a "context" through which the juxtaposition of certain images can be interpreted and their potency discerned. Furthermore, in Red Bird, there are two broad landscape settings in which sounds are perceived: the Garden and the Reason landscapes. The former involving apparent freedom in the combinations of sound objects and the latter tending towards stricter control of sounds in more regularised groupings.

It could be argued, however, that the adoption of metaphorical primitives in order to ensure the communication of a particular image involves assumptions about the nature of those listening to such a work. Many images in Red Bird are culturally or experientially related. The bird image may be relatively universal, but many are not, such as the book and door sounds. The sound of the dog barking likewise need not be a universal image. The use of the English language is especially non-universal especially when, as in Red Bird, the words must be understood for the full impact of the metaphor to be felt. Although, in this piece there are a range of non-semantic vocal sounds which

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through their inflection suggest, in a more universal way, particular emotional states such as pain and ecstasy. Nevertheless it is - from a composer's point of view at least - by articulating reference sounds which have potent cultural meaning and associations into new, metaphorical meanings that a powerfully direct message is offered, via manipulation and presentation of sonic landscapes that relate to objects, issues and experiences which concern a particular cultural grouping. Therein lies much of the strength of source recognition as an organising basis in sonic art.

A sound type created by Wishart in Red Bird on the basis of metaphorical primitives is that of the machine, existing in this work as a "word-machine" and "body-machine". This is based on the sound-primitive of a "mechanical machine which repeats the same process over and over"\textsuperscript{76} as the basis for the construction of the image. The machine images in Red Bird involve the mixing of a variety of sources - vocal syllables and gestures, movement of "body" fluids, animal and bird sounds, and metallic sounds and reverberant factory-like acoustic setting which help to establish the "mechanical" imagery - all set into a regularised, repetitious rhythmic framework.\textsuperscript{77}

Regularisation of morphologies and the imposition of a "machine" context is a notable general feature of the landscape transformations in Red Bird. A "mechanised" landscape type acts as a natural polarity to the freedom suggested by sound-images such as "birdsong" or the large-scale "garden" setting. For an example of the way a tendency towards a "mechanised" landscape can be perceived in Red Bird, we can return to the


\textsuperscript{77} See Ibid., p. 91 and pp. 95-96, for Wishart's descriptions of the articulation of machine imagery through sound.
earlier description of the sound transformation from "book slam" to "door slam" and in doing so suggest further possible symbolic interpretations of the way this transformation evolves in time. The initial slams themselves are prompted by the presence of the fly which (buzzing freely in the stereo space) is subjected to attempts at being swatted. As the attempts to swat the fly prove to be unsuccessful the book "slams" have grafted onto them a regularised, machine-like "squeak" (rather like an industrial guillotine), so that further attempts to swat the fly can be seen to take on a symbolic meaning; part of the natural process of decay (the fly) being attacked by a regimented, automated power. In this view of these sound-images in Red Bird the important consideration is that the "slam" sounds are interpreted in relation to the persistence of the fly (supported by the spatial movement of the slams which track the movement of the fly) and the overall context of "natural" and "mechanised" polarities. As the transformation process continues, it becomes clearer that the machine-like "squeaks" might be those of door-handle latch mechanisms, as more of the metallic latch sound is gradually revealed, appearing alternately on each side of the stereo space. This is then confirmed when a door sound (in stereo centre) "opens" onto the outdoor acoustic setting of a "garden" landscape, in which the sound of the fly reappears, only to be encircled by a multitude of door sounds once again, which "close" on the garden landscape with the fly continuing to move around the space (perhaps through the door). When these door sounds subsequently subside, the fly disappears into a reverberant spatial setting followed by a single, massive, reverberant door sound. In this way the image of brutality towards the fly (the slam) takes on an unexpected twist, as eventually being the vehicle for the fly’s "escape". This kind of process in Red Bird (that is, sounds moving towards regularisation and mechanisation), sets up strong polarities of "natural" and "regularised" sound-images.
A further, more abstractly defined, category into which sounds of different sources are grouped is described by Wishart as "sharp" category: short, loud sounds with hard attack. This grouping of sounds allows different sources to be unified by the nature of the perceived morphology, so that sounds such as; vocal syllables (especially "rea") and non-verbal vocal utterances (grunts, screams), slam sounds (doors and books), gunfire, dog barks, slaps and punches (in the beat-up sequences at the start and end of the work), are all able to contribute as transient sounds in a texture and also convey reference to a source or image.

Wishart states that at the deepest level Red Bird is "about" opposition between open and closed conceptions of the world - knowledge, politics, language, philosophy and society. This basic expression of polarities can be seen at many levels in the work and stems directly from source recognition and the symbols and metaphors engendered by the transformations from one sound object to another, and especially to the re-ordering and re-grouping of referents in different virtual landscape settings and situations.

Wishart's overall landscape groupings of metaphorical primitives in Red Bird contributes, therefore, to the establishment of two generally perceived acoustic spaces which demonstrate the opposition of open and closed controls of texture. These are the garden landscape, characterised by a sense of openness and random "co-existence" of individual sound images in space/time, and the reason landscape which is characterised by space/time "regimentation" and strict rhythmic regularity. As the form of the work involves the construction of landscapes, the groupings of the elements within the landscape

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78 See Ibid., pp. 92-93.
assumes great importance for the coherence of the work as a self-contained object, so that the listener can tangibly discern movement from one landscape type to another, and the way in which individual sound referents are contributing to that landscape - through transformations, or the establishment of a particular "scenario".

Wishart states that one of the most basic concerns in the form of Red Bird is:

... about the difficult-to-verbalise opposition "open/closed". People's reactions to it, however, are usually expressed in a political, linguistic or other frame of reference. Furthermore, in the long run, "Red Bird", like any other myth or work of art, means what people take it to mean, regardless of what I have to say on the matter.79

Wishart has commented also on the notions of a duality between "musical" structuring and "landscape" structuring in Red Bird.

One interesting feature of this approach was that when I began the piece there was a clear distinction in my mind between organising something as Music and organising something as Landscape. In the actual studio construction of the piece, however, this distinction ceased to have any significance.80

In the broadest terms, Wishart describes the compositional processes and relationships between material in Red Bird of having a unity derived through "myth" structure, that the concept of myth embodies particular underlying processes or structures

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79 Ibid., p. 93.

80 Ibid., p. 94.
of thought. A work such as Red Bird relies heavily on the way in which a range of meanings and influences in the perception of concrete sound objects can be structured towards metaphorical and symbolic messages.

In listening to a musicmontage tape, the theatre of manually-operated machines, which constitutes the visual environment of the concert, is bypassed and we are cast adrift in an entirely aural world, where only the dynamic presence of sound-events themselves can define an environment... sounds may again take on some of the "magical" power they must have had for pre-literate (aural-culture) peoples. In this way, if we permit ourselves, we may reenter the state of perception in which Myths have their power, where the environment is vibrant with Significant Sounds, and mythic definitions of reality may be articulated through the meaningful intertransformation of such sounds/symbols.

Instead of the permanence of "objects" with defined boundaries in visual space, we have a drama of Process and Transformation, in which one "object" may become another, and information is thus conveyed in the process itself. Only by thus temporarily stepping outside the consciousness defined by detached visual literacy, which we normally do only in our dreams, can we begin to evaluate that consciousness itself in a wider context.81

And adds:

Red Bird as a myth deals with complex ideas, and is not a simple piece. However, the structure as heard is not complicated, Motifs have not been developed in some elaborate way for their own sakes. The piece aims to distil the essence of several related sets of complex ideas, and articulate the "deep-structure" of these ideas in the most archetypal way possible, in a Mythic form. The aim is thus condensation of the complex, and NOT elaboration of the complicated.82


82 Ibid., p. 4.
A unity, in this sense, is achieved through an approach based on working with the structuring of sounds so that literal meaning (as source reference) can embrace symbolic meaning through metaphorical relationships between sound objects, and the setting up of a field of metaphorical primitives (words, birds, animal/body and machines) which move through Red Bird in a variety of landscape scenarios. This is a form of unity in sonic art which is based on the wider reference meaning of sounds supported by the way their particular morphological characteristics are exploited in processes of transformation. In this way, the elemental concept of "open and closed" forms an underlying reference point to which the sounds in Red Bird can be related as symbols; especially as indicators of freedom/oppression or imagination/dogma. Landscape "groupings" of reason (especially as regularised sound structures such as the machine, or the philosopher and the "voices of reason") and the garden (free co-existence of elements - birds and animals) also point to these kind of basic distinctions in the piece - through specific reference sounds and the ways in which they are combined. The listener is led through the work with a feeling for whether particular juxtapositions of sounds will expand towards seemingly "random" kinds of textural associations or compress towards controlled, regularised patternings. Furthermore, the listener's imagination can be fired so that symbolic meaning can be ascribed to any sound in the piece, depending on how it appears to fit within these basic criteria that have been established.

3.8 Summary to Wishart's Sonic Landscapes

Wishart's use of transfiguration of recognisable sound images for the purpose of establishing metaphors can be seen as a way of achieving a unity of discourse between the "literal" and "abstract" acoustical aspects of natural sounds, and forms a model of the
continuum between these polarities. The recognition of the sound source is achieved or attempted through either the intrinsic recognisability of the sound or the establishment of contextual cues to aid the listener in the disposition of the sound to its source. The abstract aspects are unleashed through the transformations of one sound into another. This area of transfiguration draws attention (through its manipulative nature) to the purely acoustical properties of the sounds - as the spectral and morphological characteristics are melded or juxtaposed. The metaphor functions through the recognition of the sounds and the correct identification of the physical source - the mediations between them link the aural images symbolically.

The transformations from one sound to another then exist in the broader context of the work allowing them, through the multiple articulation of such metaphors, to extend to wider allegorical meanings within the universal "topic" (in the case of Red Bird, strongly aided by the subtitle). In this way the literal and abstract function independently in that we are aware of them at different points, but they impinge upon each other to the extent that they rely on each other for the full function of the metaphor. As metaphor, the transformation ensures the perception of the sound objects in a composite way, rather than just as two sound objects existing in the same perceived acoustic space where they may or may not achieve the same metaphorical impact. This is a basic difference between the juxtaposition and transformation of sound objects for a metaphorical expression or a purely acoustical "musical" expression. Of course if, in a sound structure which attempts these kinds of metaphorical manipulations and constructions, we ignore or fail to grasp the metaphorical links or even the recognition of the sources of the sound objects, we are still able to perceive processes such as the transformation from one initial sound object to another.
The role of contextualisation also requires special mention. It would appear that there are different kinds of contextualisation, concerning the function of the contextual sounds in relation to the sound object which is transformed. To discuss this we will return to the previous example of the door slam and book slam in Red Bird. The contextual sounds for each function in a different way relative to each sound object. The success of the recognition of the book slam for example, depends entirely on our ability firstly to interpret the page turning sounds as book sounds. The mechanics of this particular contextualisation is open to question. Spatially, the page sounds do move "across" the stereo space in a way which we might more intrinsically relate to the turning of book pages (left to right) which is in itself a spatial contextualisation of that sound. However, the composer relies heavily on a narrative link being established by carrying the image of the pages sound onto the book slam sound. In terms of the reality of the object, these two sounds are not necessarily related at all, despite the fact that they are both "book" image sounds. In other words, they represent different and temporally/contextually unrelated sound-images of the physical source "book" - the turning of pages of a book and the slamming of a book on a surface are not related actions.

However, with the door slam example we can see a much more integrated contextualisation. The sound of door handles and latches in conjunction with the slam of a door is an action-related morphology in its own right. In narrative terms, we are familiar with the sounds of door handles-and-latches and the door slam in a recognisable rhythmic interplay. A door does not slam without its metal latches being made to sound also. In this case there is a natural "cause and effect" link present which is being exploited. With the book and pages example, Wishart is attempting a more "cinematic"
synthesis of image - the sounds are both book sounds - but they are not sounds that in life we associate with one another temporally.

An important dimension in the use of source reference, symbol and metaphor in landscape composition is the ability of such referents and their manipulations in a sound-image structure to carry meanings which can be grasped as expressive phenomena, but not necessarily easily or fully described verbally or rationally. That sound objects can be felt and manipulated at levels beyond immediate reference into symbol and metaphor need not result in completely describable or literally tangible links. For, as Wishart has pointed out, the underlying attitude which allows a work such as Red Bird to function as a unified entity is the "mythological" approach to its materials, and that: "myths are not ultimately about what can easily be said, otherwise we would just say it." Ultimately, therefore, while attempts to enunciate "meanings" of some of the sound symbols and metaphors in Red Bird have been attempted here, these can most usefully be regarded as pointers to the full impact and depth of sound-image articulation in such a piece.

3.9 Conclusion

The writings of Wishart and Emmerson discussed above outline ways in which the source recognition of recorded natural sounds in electroacoustic music can be considered as a strong basis for a language in this medium.

83 Ibid., p. 92.
Emmerson attempts to define the sound-image potential of recorded environmental sound with the notion of "mimesis" - the imitation of nature in art. In this way, he builds his consideration of natural sounds in electroacoustic music into an argument which integrates such materials into the wider sphere of "abstract" and "abstracted" syntax - methods of organisation imposed upon or derived from the perceived nature of the materials themselves - within the framework of an overall discourse which may be "mimetic" (using source reference) or "aural" (avoiding the sensations of reference). This line of thought does not, however, seek to differentiate clearly between mimesis as imitation through an intermediate sounding medium and the use of recording technology to capture, store and replay actual sound materials.

Wishart begins from a more lateral view: that of the actual process of source recognition in the mind of the listener. In this way, the acousmatic phenomenon of sound recording is regarded as a means by which the desire of the listener to discern the physical source of a sound can be intensified, due to that aspect of perception which seeks to ascribe a concrete referential meaning to sounds. As a basis for the composition of electroacoustic music, landscape perception raises the recognition of sound sources to the level of assuming a role in the process of forming a work.

Wishart’s conception of sonic landscapes (the source from which one imagines sound to come) as a compositional language, builds on this in a positive and practical way. The idea of "contextualisation" takes into account the fact that some sounds have intrinsic source recognisability, while others are apt to be more ambiguous in reference - depending on the degree to which sound is ordinarily used in defining a particular object. The process of contextualisation holds that certain groupings of two or more sound
Source Recognition of Natural Sounds in Electroacoustic Music

referents together can provide the proper information for recognition of potentially non-specific sound sources.

Wishart's view of landscape composition also embraces the actual morphological characteristics of sounds as an area of compositional concern through the process of "transformation". This process, used extensively in Red Bird (1978) by Wishart, involves the melding of the morphology of one sound object into that of another, so that between two recognisable sound objects is an area of transformed sound. This involves sound objects with their own individual source reference which have similar morphological characteristics, enabling the process to create a sense of "transfiguration" from one image to another, and allowing in this way a metaphorical interpretation to be made through the linking of distinct sound-image identities. Transformation of this kind demonstrates a way of working with reference sounds so that both morphological and referential criteria contribute to the establishment of meaning in a work. However, this kind of transformation is always approached with the references as the pre-eminent consideration. The transformations are not effected for the sake of simply extending morphologies into abstraction (non-recognition); instead, they allow for the directly mediated interaction of the sound objects, so that the reference meanings can be linked in metaphorical meanings. The references are the carriers of meaning, the morphologies the agents by which meanings are fused.

Essentially, the most significant point to be made here is that source recognition of sounds forms a natural and important part of the perception of sounds in the overall environmental field and as such is an essential factor in the creative process where composition with such materials (drawn from the environment) is attempted. The potential
for meaning lies in the natural perception of such materials in terms of their environmental reference and how these are integrated into the form of a work. The existence of this mode of perception (source recognition) deems that it be a genuine and viable source of meaning in electroacoustic music.
4.1 Introduction

While the previous chapters in this part of the study have outlined historical background to the direct use of environmentally based sound sources in composition, methods of classifying natural sounds, and approaches to the use of source recognition in making work with environmental sounds, this chapter will concentrate on the making of field-recordings and their use in sonic artworks where structures are made on the basis of source recognition. Field-recording is considered here as a process of documenting the sounds of real-world events and objects, a way of capturing and preserving listening experiences. As such, source recognition is considered a primary criterion on which evaluation of the formal and structural potentials of these materials can be based.

Source reference is dealt with here in terms of field-recordings as signs and symbols; where signs are sounds which impart a direct reference to the source objects, situations or locations from which they spring, and where symbols are signs that have been used or articulated by the composer in such a way as to encourage some kind of metaphorical interpretation of the reference. In drawing on examples of existing works which incorporate field-recordings, this chapter will examine ways in which literal field-recordings have been used so that there are emotional and expressive repercussions extending from the composer’s handling of the sign reference and symbolic potential of
the materials.

4.2 The Nature of Content

In an essay entitled "What is Content?"¹, Douglas Davis has discussed the role in visual and performance art of what he terms content: "Symbols and meanings that point towards the outside world"², and the importance he accords the integration of such elements into art.

Davis draws attention to the fact that the use of specifics in content involves a type of material with formal possibilities not, at the time of writing (1973), dealt with in late twentieth century art - saying of content:

... we have been led to believe that it [content] is a corrupting agent in aesthetic structures that are irreducibly visual and experiential, directed at the eye rather than the intellect. We have been trained not to seek a meaning in art beyond its corporeal components. I believe that we are about to leave that indoctrination behind, that it is time to begin thinking about content again. Not in the traditional way, not in the rhetorical terms left over from narrative painting of Social Realism, but in new ways, grounded in our present condition.³

The point is that we have no skills for dealing with content, after decades of avoiding it. The results - when an


² Ibid., p. 44.

³ Ibid., p. 44.
artist weaned on experiential doctrines turns to content - are always bathetic, particularly so when he is prompted by chance, for this or that political issue. When modernist art attempts to deal with the real world it cannot do so on grounds beneath its visual sophistication.4

Davis argues that the use of specific content, which draws meaning into work through material which is directly referential to "life" experience, has been a formal desire embodied in work such as the early conceptual and "found" art of Marcel Duchamp. He also speaks in praise of artists who in their work have "dared" to employ content which is referential, explicit in environmental or semantic and syntactical material (speech and conversation) or related directly to the experiential - where the material fulfils formal function through its direct, literal or specific meaning. A work mentioned positively by Davis in this sense, for the frank handling of "content as content", is Malcolm Morely's Gulfstream (1971) which consists of a large red "X" painted over a landscape of Johannesburg - a protest against South African politics.5

A work which receives negative criticism from Davis, from the point of view of

4 Ibid., p. 47.
5 A similar work by Morely is Race Track (1969-70) in which a realistic painting of a Durban racecourse is also "defaced" with a large red painted "X". The image appears as a large colour print with a white border all around. Painted underneath (to resemble printing) is the caption "SOUTH AFRICA Greyville Race Course - Durban, South Africa." Several layers of specific meaning are engendered, combining techniques of photo-realism with metaphorical statement. The realism of the basic image (which itself parodies the "art" of a print or poster) interfaces with the abstract (but nevertheless specific in meaning) graffiti-like red "X", this itself is highly emotional - while the words, in indicating the place (and the attendant political overtones) clarify the images and their meaning as an anti Apartheid statement. In the racetrack image and caption, metaphor and pun are also highly potent elements.
the handling of content and the failure to fully and overtly embrace content in a potentially suitable context, is the sound/sculpture work *Hearing* (1972) by the New York sculptor Robert Morris (b. 1931).

There it stood, a copper chair, a sheet-metal table, and a lead-plated bed, all burnished, primary structures. But Morris could not stop there, working as he was in post-formal American time. First, the structures were mounted rather dramatically, on a raised platform, and thus elevated above the plane of the specific object. Second, the viewer was warned not to touch any part of the tableau, lest he suffer electrical shock. And last, a tape-recorded dialogue between many voices filled the space. The quality of the recording - and the "actors" - was below the level of the visual installation . . .

The dialogue in Morris's *Hearing* could hardly be grasped by the ear at the installation. I heard it clearly much later, by listening to the tape played on a recorder, close up. Morris's dialogue pits an interrogator and a series of witnesses against a lone defendant. They debate a long series of aesthetic and metaphysical points. At one point a speaker says: "Talk is cheap"; his adversary replies: "Objects are not." Morris himself obviously concurs; for he chose deliberately not to raise the audio level of his dialogue so that viewers could hear the content of the debate he had written and recorded. He preferred to let the sound perform abstractly, below the level of audibility.6

Here, Davis, because of his equation of content with meaning (or potential for meaning), bemoans Morris' failure in this case to give full significance to the nature of the content of the sound materials7 - in that the sound was presented as abstract rather

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7 In another sound/sculpture work, *Box with Sound of Its Own Making* (1961), Morris dealt with a more direct link between sound content and sculptural installation. The sculpture consisted of a small wooden cube containing a tape (continued...
than **abstracted** or relocated material and that an opportunity for a formal significance to be gained from the content of the sound materials was lost to the work. That the sculptural installation in *Hearing* involved such explicit primary structures and that the sound element avoided the revelation of its content does not, according to Davis' view of the use and power of content, allow for a meaningful juxtaposition to emerge.

Davis' comments on the nature of language as content are relevant to several electroacoustic works which will be discussed later in this chapter:

The use of language leads inevitably toward content because language is an instrument forged by necessity - by man's [sic] need to describe and deal with the outside world. No matter how reductively it is used or how repeatedly hung upon the wall, language inexorably engages the mind through meaning, and the structure of grammar itself. The prevalent art-world bias against meaning is only that, a bias. Morphological rules and propositions are hardly the chance occurrences that many artists have taken them to be. The more we learn about languages, the more we discover how universal are their structures. Each has a grammar which includes a lexicon, a phonology, a syntax, and distinctions between elements that deal in time, space, and number. The proposition that a sentence makes is structurally irrevocable. Language is governed by deep laws; it is also open-ended in terms of its flexibility since it can re-form itself to state new concepts, it defies determinism. No linguistic proposition can be a tautology, since language does probe beyond itself, into the outside world, which it exists to describe.\(^8\)

\(^7\)(...continued)
recorder playing a tape loop of sawing and hammering involved in the construction of the installation. The content is specific here, but relates back into the abstraction of the art object itself as a self-contained formal construction - any metaphor is implied rather than directly manipulated.

Davis suggests reasons for the avoidance of content as he sees it:

We are all caught in the tautology that art counts only as art when it is about art. The essential step is to break out of this restrictive trap, which requires a willingness to integrate the complex self (with its feelings about the outside world) and the work of art. The use of content does not require a simplification of the self. The difficulty inherent in art is a condition of its existence. So is its source in the intellect.9

If content is ruled out as a significant area of form and expression in art such that a definition of "art" exists prior to the execution of works, the nature of the work may be restricted by the definition. Davis argues that if specific real-world references are intended by the artist, the use of content which springs directly from environmental sources - so that the references are imparted directly - should not be ruled out as working material.

Content, then, is seen by Davis as:

(1) an important, natural aspect of the way in which real, actual objects are perceived in life - and that this aspect can be carried into valid art works;

(2) an element which can be integrated and dealt with in artworks, so that actual meanings (of references) can contribute to the expressive qualities of a work.

... there can be no natural place for the mind in art without meaning. Content is the expression of mind; it is also

9 Ibid., p. 54.
the link between the work of art and the outside world.\textsuperscript{10}

Davis's polemic is extremely valuable in laying the groundwork to the argument for the use of recorded environmental sounds in electroacoustic music as natural references—that the content of such sounds (the reference of the sounds to the world outside of the artwork itself) has a valuable role to play in form and structuring processes.

With such a view of content we will examine the use of field-recordings as material drawn from the natural sound environment, the use of this material on the basis of its potential for source reference and the use and manipulation of meaning derived from that aspect. As such, "content" embodies the notion of source recognition. This is discussed further in this chapter, regarding environmental sounds as signs - references to the objects or situations that give rise to them.

4.3 Field-Recording: Definition

It is necessary to define \underline{field-recording}, as this forms the starting point of the argument to follow, which addresses the use of the (portable) sound recording medium in the making of permanent documentary records of the sounds of situations, objects, events or locations which are of significance to the composer. Furthermore, the concern here is to emphasise the properties which are intrinsic to the materials, and ways in which these can be put to use in composition. A two-level approach will be adopted in this definition, allowing a relatively broad base from which to work. Recording "in-the-field" involves:

\textsuperscript{10} Ibid., p. 54.
(1) the capture of natural sounds as they occur in a given environment. This embraces the idea of "found" sounds - those which exist naturally in the environment, outside of the volition or invention of the composer;

(2) the focus on and capture of sounds of some specific action or event from a certain environmental context.

In this way, field-recording can be considered a process by which individual sounds or an overall ambience is recorded. Field-recording can be seen as a way for the composer to: explore the "real-world" soundscapes of particular locations; use a location for its intrinsic acoustical qualities or ambience; or approach sounds in the environment which are produced "candidly", without being manufactured for particular contrived aesthetic effects.

With a view to its relevance in composition, field-recording offers the composer the potential to:

(1) capture and scrutinise juxtapositions and combinations of sounds as they occur in the field of a real-world environment;

(2) capture specific sounds from an environmental context, so that these can be used in juxtapositions and combinations determined by the composer.

Therefore, in terms of the compositional process, field-recording can be seen as embodying a fundamentally receptive approach to the sounds of the environment - in that
field-recording can be considered as an activity in which the composer is able to preserve sounds of objects and situations that are of significance to the artist - from "found" or already extant sources. The recording process is a means for the composer to document aspects of the way sounds of a given environment are experienced or perceived. As such, it is the primary concern of this study to base consideration of the compositional use of field-recordings on criteria which extend from that fundamental aspect of the way environmental sounds are ordinarily perceived and interpreted: source recognition. The use of source recognition in field-recordings is further discussed in this chapter in terms of environmental sounds as signs - that is, references to the objects or situations that give rise to them.

The present consideration of field-recording as a documentary approach to a given environment should also be placed in relation to certain aspects of the landscape concepts of Trevor Wishart\(^\text{11}\). Landscape composition, as Wishart defines it, is built on the observance of the way objects and their sounds behave in the environmental acoustic space and the subsequent manipulation of recorded natural sound objects (which may have been gleaned through field-recording) on the basis of such perceived properties. That is, the construction of the illusion of natural soundscapes and the manipulation of a perceived "reality" on that basis (the way the perceived acoustic space and the recognisable sound objects in that space combine towards a sense of the real or the surreal). Wishart's landscape composition involves the assemblage of sound objects into larger groupings, united by the way in which the objects are perceived in terms of the total space - their proximity, motion, contextual consistency (or physical possibility), as well as shifts in

\(^{11}\) See Chapter three above for specific discussion of this.
virtual acoustic space (for example from interior to exterior).

This conception of landscape composition holds that the "... minimum number of cues compatible with a convincing landscape illusion"\textsuperscript{12} is to be aimed at in the assemblage of sound objects in an aural landscape. This is an observation which points to the fact that, in a form determined by source recognition, the way references are combined to indicate the "real" or "surreal" is a basic informing principle. Therefore, in considering field-recording as a means of documenting real sound events, evaluation of how a recording will impart references is of crucial importance to the composer. It is necessary to consider, as part of the recording process, whether in a given location there are sound referents which interfere with or enhance the intended sign reference that is desired from the recording. Sounds of motor vehicles and aircraft, for instance, can frequently be "spoilers" of on-location recording where it is desired that a specific sound be captured alone as a "pure" referent. In such cases, "extraneous" sounds such as these act as references which may detract from the central focus of attention - references which, although they do not escape the microphone, can often be ignored or not noticed by the ear in real-time, due to the way mental attention is concentrated. As such, distinction can be made in field-recording between signs that function as "desired signal" and "unwanted noise". However, the ambient sounds of a recording location are also capable of providing a wider sense of the overall reference. For instance, sounds of traffic heard from the domestic interior, birdsong heard by a stream that runs through bush or seagulls near surf, all involve referents which indicate a spatial context outside or around a main area of

reference.

From this point in the study, then, consideration will be given to how the process of recording in the environment functions as part of the creative process, and ways in which the characteristics of field-recording as a medium of sound documentation can be taken up as catalysts for structural criteria in the making of work.

4.4 Recording as Documentation

4.4 (a) Introduction

A view of field-recording as a documentary tool sees the recording medium as a means of capturing the sounds of objects and events in the environment, which are felt by the composer to be of significance as signs. Sounds focused on can therefore be permanently stored as "documents"; as artifacts in their own right. As such, field-recordings are able to reproduce a particular perspective of the sounds of a given environment (depending on microphone placement and usage), retaining the virtual timescale over which the sounds originally occur.

The disembodiment of sounds from their sources through recording may allow the process of source recognition to be extended from an important real-time perceptual element into a carrier of meaning with expressive potency. Because recording enables the separation of sounds from the visual perception in real-time of "cause and effect" (which
in normal experience is weighted approximately eighty percent towards the visual), the mental "filling-in" of non-aural perceptual cues and associations can lead to an intensified aural experience; a phenomenon of intrinsic relevance to field-recordings as documented real-world signs. Furthermore, in the context of tape montage, the composer can put forward complexes of scenarios and references which can deepen or guide the imaginative and emotional response of the listener. For the moment, however, we are concerned with the role of recording for the composer and its place in the creative process.

4.4 (b) The Role of Recording

In terms of the capture of the sounds of real environmental events in a documentary sense, the act of making field-recordings itself assumes a significance for the composer. The act of recording involves a listening attitude carried through into an action - the making of the document (the recording) and its subsequent incorporation into a work. For the creative artist using the electroacoustic medium, this action arises from the stimulus provided by some aspect of the environment, causing a demand within the individual for its documentation in sound. As such, it forms part of the creative process itself. In this way we can view the recording process as a way of gaining greater insight into ordinary experiences and environmental sounds, in that field-recording can be considered as a kind of extension of the objective and subjective faculties - for in using the recording process to document particular sounds of the environment, those listening experiences can be overtly displayed any number of times.

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Here, some explanation of the creative process is required. New Zealand composer John Cousins has written:

> The creative process in people occurs when they attempt a codification of their most deeply felt, intuitive insights regarding themselves and the world in which they live; using whatever medium they wish to employ, or find at their disposal.

> Its value lies not only in the production of work which gives a real and honest sense of these insights, but also in the growing and changing that results from attempts at such production.¹⁴

Cousins then identifies with this definition of the creative process three related areas of function:

**Motive:** why the individual is involved in creative work, stemming from an intrinsic need for self-expression and self-validation.

**Idea:** what is actually being framed from within the internal resource of the individual.

**Technique:** how the idea is realised in terms of the final object.

These areas are at all times related and interactive within the creative process.

Motivation stems from the individual innately requiring the expressive outlet of making work; genuine ideas motivate creative action; and with the force of this motivation the idea can reach—through the artist’s technical capabilities and compositional solutions—a state of "realisation" (in a work). This stresses the nature of motivation and ideas as intrinsic and elemental factors in the creative process, stemming from the artist’s subjective resource—and also that the place of technique itself is as a factor which serves those two basic aspects. As Cousins puts it:

For the work to exist, there must be skill—technique. For technique to exist, there must be ideas pressing to be realised. For ideas to exist, there must be a genuine initiative to express...to "say something"...which is in itself the secret of being human.\textsuperscript{15}

The process of making a recording shares characteristics of each of the three above related areas. In other words, documentary field-recording can be seen to model the essence of the creative process, involving motivation into action on the basis of ideas. The recording can be regarded as an object in relation to the environmental continuum from which it is captured: recording transforms the now (the moment) of reality into a disembodied, finite, self-contained document in sound—the "field" being the resource of ordinary experience for the artist and the "medium" being the way of allowing a focused listening attitude or expression to be made extant. In this sense, emphasis is at this point within the creative process not solely on the process of invention or synthesis of materials, but on scrutiny and focus directed towards naturally existing phenomena. A key factor in initiating creative action is the stimulation of the subjective preferences of the artist. That

\textsuperscript{15} Ibid., p. 41.
materials are moving to the artist stems from the recognition of an affinity (however unconsciously realised this might be) between the materials and the subjective preference of the person. This is a catalyst for creative motivation and activity. In this sense, the manifestation of "the idea" is not as "synthesised" motives or gestalts (as are associated with conventional instrumentally realised forms) but the use of given materials in such a way as to highlight or articulate the composer's emotional response and relationship with the materials. The idea is realised, therefore, in the way the artist attempts to mould the materials into a structural unity. It is important to point out that though stemming from a receptive approach to the sounds of the environment, the use of given materials such as field-recordings in the ways suggested here involves, in composition, the active functioning of the artist's sensibility in the achieving of a meaningful articulation of the materials. In turn, unity is perceived by a listener only if the materials are heard as contributing towards a meaningful object, tangibly based on some aspect of the materials to which the listener feels an affinity - rather than simply hearing a "succession of sounds".

From here, the question remains for the composer as to whether the recording itself, as a documentation of reality capable of allowing experiences through sound to be re-contextualised or relocated in new spaces, is necessarily replete in itself, or whether some other articulation of the sounds is required for the material to effectively convey the expressive intentions of the artist. That is, how far does the recording itself go in embodying the significance accorded it by the composer?

Recording as documentation of real-world sounds can be broken down into the following areas which demonstrate the properties of field-recording as an act of expressive
potential.

(1) The aural experience of the now (real-time) is captured from a given perspective, analogous to the experience of an individual. Recording itself results in a shift away from the now into the area of artifact and the realm of potential art object. Furthermore, sounds are not permanent and are linked to particular actions. When an action which produces a sound ceases, the sound can no longer be perceived. Recorded documents preserve sounds independent of the actions which produce them.

(2) Unlike the real-time experience of the now, recording results in a finite document, which can be reviewed and manipulated. This potential for review of facets of human experience is itself of expressive importance.

Documentary is highly suited to the nature of the tape medium through the fixity of the final product (the tape format producing the same result each time in performance). The documentation of events which are real demands this fixity and goes without saying in terms of a general fidelity to the original event. For documented sounds to be fixed in their content is not just a convenience for the composer (as it may be in studio produced abstract works) but shows a unity between the nature of the actual content and the recording medium itself. Field-recording captures the virtual timescale of environmental sounds - offering, in reproduction, temporal fidelity to the original source.

Duration and temporal evolution of the documentary is determined through the action which produces the sound referents. The progress of time is directly related to the
duration of the event and is directly analogous to the experience of real-time, but disembodied from it.

(3) The document can be projected into any acoustic space by means of loudspeakers. This embodies a powerful concept of alteration of context or re-contextualisation. This not only involves the sounds themselves but brings into the form and expression of sonic art the role of context itself - that the sensation of a location where sounds happen is capable of being manipulated in a meaningful way. The documentation process of recording allows sounds to be transferred from their original context to new ones, or the purely temporal transformation of capture and replay of sounds back into their own original space.

(4) If we acknowledge the field-recording as document we acknowledge its existence as an object which offers a "frozen" view of the real-time actuality from which it is taken - allowing us to regard this as a temporal transformation. Contrary to the imposition of a "reduced listening" attitude (seeing the disembodiment of the sound from the object as a lever to the raising of sounds to a level at which they become "musical objects") using field-recording to document real sound events retains, through source recognition, a "literal" or concrete reference to the source. Because assigning sounds to their physical sources is such a fundamental aspect of ordinary environmental listening, field-recording can involve reference to the source as signs. However, the disembodiment of the sound and the source through recording and playback through loudspeakers may result in a slight sense of "mystery" around the sign - in that concrete, physical evidence of the source is not present.
(5) Recording characterises a **listening attitude**. The separating of sounds from their sources embodied in this kind of listening attitude represents an **intensification** of normal perception of sounds because all perceptual cues are being invested in sounds. The "loss" factors (through the removal of other sensual facets) can be seen as a way of increasing expressiveness, which can lead to the possibility of achieving insights into ordinary experiences by bringing "reality" under direct and intense observance. That the sounds of the environment carry actual meaning through the assigning of sounds to their sources is central to the notion that field-recording is capable of intensifying the perception of the natural sound environment. This, in terms of natural sounds as signs, is the value of the acousmatic phenomenon.

(6) Through the fixity of the tape medium, the listening attitude can be made extant outside of the individual. While in real life, specific listening experience is achieved through focusing the attention on aural perception, documentation of sounds through the tape medium enables a listening experience to be concretised outside of the individual. Field-recording enables environmental sounds to be made available as documentary artifacts. Recording makes it possible - in one process - for a listening attitude to be both documented and displayed to other listeners.

Temporal transformation (the abstraction of sounds from their existence in real-time) and re-contextualisation (change of space or location of sounds), while retaining as signs their fundamental link with the source via the process of documentation, are important factors in the use of field-recording in electroacoustic music towards an expressive, unified result in a work. When sound sources can be recognised, field-
recordings retain a fundamental link with the reality from which they sprang, offering the composer a powerful base of "real-world" reference meaning from which to work.

4.4 (c) Listening Experience and Recorded Document

The use of sound recording to document natural acoustic events and environments raises the question of the relationship between the individual’s experience of listening in real-time, and the nature of the recording process as one which results in an extant artifact outside of the individual. Environmental listening in real-time is essentially a personal experience and linked strongly to individual motivation and the kinds of information we actually want to perceive - in this, attention plays a vital role. Studies in cognitive psychology have shown that much of the sensory information which is available to us is actually lost from cognitive memory if it is not attended to - that is, processed according to our ability to understand or respond to the particular information\(^{16}\). In a short article entitled "It(’)s Time"\(^{17}\) Roger Reynolds has stated that "the brain can ignore or suppress information to which it is not willing to attend, but it can [also] actually prevent associated impulses from being transmitted."\(^{18}\)

Under normal circumstances we have senses of sight, hearing, touch, taste and smell, each of which is capable of contributing information towards our definition and


\(^{18}\) Ibid., p. 16.
understanding of the surroundings. As we are concerned with the use of sound-recording to capture "field" information and wish to align this with a view toward how recorded sounds can capture and carry sign references in sonic art, we must consider that, relative to actual experience, the aural sense forms part of what is really multi-media perception. In real-time we can rely on four other senses, especially sight, in order to give context or reference to a sound, should there be (in terms of aural perception alone) ambiguity as to the reference. In recording, therefore, it is possible for there to be a loss of degrees of context in the isolation of aural information alone where the listener is not necessarily able to assign the source of actual reference to a sound.

As we have seen in the previous chapter, Trevor Wishart has recognised that certain sounds have greater intrinsic source recognisability than others and that in composition and where source recognition is desired as a formal and structural element, consideration can be given to the placement of sounds together through montage or juxtaposition which possess mutual contextual relevance.19

At the same time we need to acknowledge that sound has certain properties which enable auditory perception to be focused and capable of precise discernment of subtleties of sign reference. For example, because sounds can be perceived across considerable distances or be transmitted through solid objects while remaining signally recognisable (for example an approaching train, a conversation heard from another room), sound is of considerable importance to us in the recognition of objects and events.20 Furthermore,


20 See Ibid., p. 70-71.
environmental sounds which occur distances apart but perceived from the same vantage point are able to be summarily or individually attended to in the gaining of a sense of a particular locality or the focus on particularly critical information, in this latter case as Roger Reynolds has suggested:

... some forms of attentiveness require no conscious effort, and when motivation is high, one can perform remarkable feats of perception. Talking at a party, in the midst of a dozen other conversations of varying speeds and intensities, the noises of dishes, background music, traffic, and so on, one can catch the sound of his own name from across the room.21

Consideration of the way aural perception is used in real-time is useful in relation to the process of sound recording and playback, which involves the making of finite documentations of particular experiences of sounds. From this basis, the aim here is to suggest that the possibility exists - through field-recording - for an intensified, articulated capture or review of the sounds drawn from natural environments. Pauline Oliveros has expressed her experience of this attribute of sound recording:

It was about the end of the fifties that I got into working with tape and I’ve said many times that one of the most important things that happened to me was putting the microphone in the window and recording the environment - uncritical - and to listen back and to discover that I had not heard everything that was on the tape. From that point, I began to listen really carefully and I told myself I had to listen all the time. Any time I discover I’m not listening, I

remind myself and listen all the time. It's an interesting project.\textsuperscript{22}

In relation to the statement from Pauline Oliveros quoted above, it is relevant to affirm that a great deal of the value of recording as documentation lies in the fact that we do not listen all of the time, and that the potential for this kind of scrutiny of the soundscape is limited to the "specialness" of concentrated listening experiences. We will proceed from the point of view that recording itself has a valuable and potentially expressive role in the making of sonic artworks; providing the opportunity for a means of documenting sounds of a given environment, individually or in juxtapositions and combinations in which they naturally occur, as well as for re-contextualisation of sounds in terms of replay location or temporal context, and in juxtapositions with sounds from other implicit contexts.

The opportunity exists for composers/artists to articulate aspects of their environment through the intrinsic potentials of the recording medium in ways which allow emotional insights to be displayed. Through a view of the innate relationship between sign sounds and reality, signs offer an important role in the creation of formal and structural relationships. Signs are an aspect of direct \textit{meaning}, which stems from the cultural, human or ecological role or significance of the subject of a recording. In this chapter, with description and analysis of works (largely by New Zealand composers of electroacoustic music) we will seek to identify ways in which a level of meaning can be discerned within the pool of contexts and referential qualities of sound signs. In this

approach, the way in which environmental references are linked to particular culturally defined meanings is not, of course, a new or negative phenomenon. All forms of expression, even those highly abstract, are linked to social and cultural frameworks. As Trevor Wishart has written:

\[\ldots\text{Musics are material and social phenomena, and not the idealist constructions of abstract intelligences. Musics are created and perceived by particular people in a particular socio-historical context, and this has a great deal to do with the music's significance. There is no Universal Truth, and no Universal musical language. The structure of any particular music reflects the assumptions, conscious or unconscious, of its maker. Musical form carries social meaning.}\]

While cultural relevance in the case of sign sounds is linked to the specifics of the reference context, this is to be seen, for the present at least, as a natural consequence of the differing set of values, expectations and materials relevant to varying cultures and localities which, as Wishart has described, are pertinent to any form of musical expression.

A work which uses literal field-recordings as the basis of a form which arises from the articulation of elements that comprise the recordings is Musik Dari Jalan (1976) by Jack Body. In this piece, the basic materials are field-recordings of Indonesian city streets, which comprise several constituent sign elements; traffic, pedestrians and conversation, but especially sounds of street musicians and the cries used by street-sellers to attract customers. The piece consists of sections of "literal field-recordings presenting the "street scenario", and "abstract" sections in which instrumental and vocal sounds

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(street-sellers' vocal and instrumental mottos and closely microphoned sounds of the kinds of instruments played by street musicians) are mixed in a neutral acoustic setting without contextual or ambient sounds. In this way, details which comprise the literal street ambience are made more directly available to the listener, so that elements which contribute to the intrinsic aural vibrancy and richness of the Javanese streets (which has captured the composer's interest) can be made extant. Especially notable in the way this is achieved is in the way the "abstract" and "literal" sections in the piece meld. For example, at one point the sound of a single instrument (a guiro) apparently "in" the ambience of the street scenario grows louder and louder until the street ambience fades and the guiro sound is heard on its own - closely microphoned - at which point the sounds of other instruments are added in the now "abstract" context. Earlier in the work there can be heard the cry of a street seller (in an "abstract' spatial setting) which is suddenly placed into the ambience of the street, and continues as part of that scenario. Through such processes, the listener is encouraged to be aware, in Musik Dari Jalan, of certain street sounds both in terms of their originating context and in a way which allows the sounds to be appreciated for their gestural and resonating properties in their own right - as elements which appear abstracted from the literal field-recordings.

With regard to the cultural significance of the materials, the street cries are of particular interest, since their primary function (in real-life) is as verbal signals - advertising wares. To a non-Indonesian speaking listener, however, they function as motivic sign references (more like in a conventional "musical" context). Nevertheless, the form of the work is successful in imparting the sensation of the sounds being heard "in" and "out" of context, so that components of the street soundscape can be appreciated.
4.4 (d) **Documentary Photography: An established form**

It was from the realisation of the significance of recording images on film and the potential for expressive scrutiny and commentary on realistic subject matter that the photographic documentary grew as an art form. Documentary content has its deepest basis in photography and it was in this medium that the term was first used when in the economic depression of the 1930's a group of American photographers began to reveal, through the candid nature of their work, the sufferings and poverty of millions of the American people.

One of the first basic realisations made about the use of the camera as a documentary tool was that "it provides a clear representation of what the retina of the human eye sees, but does not always notice". Gradually the notion that the photographer could introduce commentary on the subject was realised: that the instant at which the image is recorded is of critical importance in capturing the right moment of movement, as are the technical characteristics of the medium (slow or fast shutter speeds to blur or freeze motion, depth of the field of clear focus, careful use of exposure to create different sensations of the fall of light) which can result in different kinds of expression or comment. Also, that the arrangement of objects in the space of the frame ("composition") involves formal and structural relationships between objects. In documentary, these elements - which centre on the capabilities and characteristics of the storage medium in relation to the scenario or event which is being captured - are of critical importance, as they define the ways in which the nature of the documentary medium allows the actions

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under scrutiny to be captured and articulated by the artist.

In the area of documentary photography, of particular relevance to the approach being outlined for documentary use of field-recordings is the example of the work of American photographers Christian Sunde, Tom Zimmerman and Arthur Freed. These photographers emerged in the 1960's and became very concerned with the making of personal documents - turning the camera towards their own lives and experiences for content - with the following aim:

... to find elemental truths in themselves and their own private moments. They documented their personal experiences, events that were judged not in relationship to life around them, but only in their effect on the photographer himself.

... few in the field had consciously chosen to delve so deeply into themselves or been so ruthlessly honest and unflinching about displaying their private lives and emotions in public in their effort to communicate some aspect of reality to their audience.25

In Freed's work, for example, a series of photographs which document a personal relationship while on an extended journey by car show a range of emotional and interactional states: togetherness, reflection and hostility.26 These photographs are remarkable for their compositional skill, and clarity and depth of expression, the photographs being taken in absolute candour. For instance, in one of these works, photographed by Freed while driving, an argument while travelling (presumably over which

25 Ibid., p. 214.

26 See Ibid., pp. 230-236.
direction to take) is powerfully conveyed: a map appears to be angrily pushed aside by
the photographer’s companion, hand and arm in sharp focus outstretched dynamically
across the frame while Freed’s angry eyes and forehead can be seen reflected in the rear­
vision mirror of the car. 27

This kind of work in visual documentary involves the selection of appropriate and
potent sign images for the embodiment of meaning in the document itself - that is, the
emotion, sensation or moment in time that the artist wishes to capture and convey out of
the scenario. This is a significant factor in the expressive potential of signs drawn from
mundane contexts. When recognisable, the cultural niche or function of the sign has an
actual meaning, but is capable of being placed in a new context which allows for
emotional reaction.

4.4 (e) From Field-recording to Sign

With the use of recording to document real sound events it follows that of great
significance to the sound as sign is how the recording is made as well as what is
recorded. We have already seen that field-recording can be regarded as a factor in the
creative process itself, even from the level of creative motivation and action. But
naturally, further to this, the way recording is carried out is relevant to the iconography of
sign sounds, and can yield valuable areas of compositional consideration.

It is important in the use of field-recording on the basis of sign reference to

27 See Ibid., p. 234.
consider the **focus** and **scale** of the reference which is sought. Some examples are suggested below, in diagram 10.

Diagram 10: Focus and Scale of Sign Reference.

**focus**: the relationship between transducers and sound source, especially relevant in terms of the way sounds are perceived in **space**, for example;

- proximity of transducers to the source
- characteristics of transducers (directionality)
- when moving or stationary transducers are used, number of transducers employed, complexity of the vantage point for recording.

**scale**: the nature of the sign with regard to a natural pool of references, for example;

- individual/crowd
- contextually congruous signs/contextually incongruous signs
- human sounds/natural environmental sounds

In further compositional terms such matters of **focus** and **scale** of content might be seen to hold the possibility for the establishment of overall **levels** of reference towards the creation of meaningful and articulate soundworks - levels which have meaning relative to the pool of cultural and human factors and contexts from which they spring.

Since field-recording offers the listener a particular perspective or set of perspectives of the sound event that is captured, the way in which sounds are recorded (depending on microphone placement) can impart the sensation of a particular way of experiencing the sounds of an object or situation. That is: close proximity or distance
from a source; a changing perspective, through the movement of the source or the microphone; or a continuous "tracking" of a moving sound source. The close microphoning of a sound, for instance, equates with the experience of the source object from close proximity. If the sound is naturally of low amplitude - such as a cat's purr - a very close microphone can impart the sensation of one's ear being held directly against the source, since that is normally the only means by which the sound can be experienced in that way.

In the iconography of sign sounds it is necessary to realise that signs function in two different ways with respect to time. Essentially, we might divide this area into signs of narrative and static evolution of reference. Narrative sign sounds comprise a set of smaller reference units which are revealed and relate in the graphing of an icon. Static signs tend not to progress but arise from continuously functioning reference elements. For example, a single (beach) wave envelope could be considered as a static sign in which each stage in the evolution of the event contributes to the unfolding of the sign (the buildup and dissipation of acoustic energy in the wave morphology), while a succession of wave sounds might also function overall as a static icon, in that the succession of similarly generated individual signs all refer to the same physical process. Naturally though, in purely morphological terms, no two wave sounds are exactly alike, and the breaking of waves on the shore over long periods might be considered to have great interest as a sound object.

However, the point is to suggest here that signs are not constituted by simple

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28 These distinctions are further discussed later in this chapter.
"blanket" references but are capable of being regarded in terms of the way the reference evolves temporally and morphologically, with different sign meanings as a result. For example, a relatively straightforward sign sound such as footsteps may involve a number of factors which give different meaning to the basic reference itself. Firstly, we might consider the way in which the sound itself is monitored. This might be; moving (with transducer/s attached to the sound source) so that the footsteps are monitored continually in the same way; or stationary (with the source moving relative to a fixed transducer) so that the footsteps "progress" through the acoustic space. These two basic approaches summarise divergent ways of capturing the sign, with different emphasis of meaning. In the first case (moving transducer) the sign sound is constant - such that the perspective gained is linked to the person walking, or a "first person" experience is documented. In the second case (stationary transducer) the sign sound evolves such that a "second person" experience is documented.

From this kind of basis we can consider the way such a simple sound object can be the signal to a group of variant references. For example, the following kinds of referential criteria could be applied to such a sign as the sound of footsteps, each giving rise to a different icon with diverging aspects of contextual inference:

(1) Are the footsteps: coming? going? passing? going upstairs?

(2) Is there one person or more?
(3) What kind of surface is being walked on:
- gravel?
- concrete?
- carpet?
- leaves?
- snow?

(4) What footwear is being worn:
- bare feet?
- sneakers?
- stiletto heels?

(5) Do the sounds denote:
- walking?
- running?
- pacing up and down?

In each case one of the most significant features of this particular reference is the physical basis of the evolution of the sound - walking characterised by the heel striking the ground followed by the forward "rolling" of the front part of the foot towards the toes (in walking backwards this action is reversed). Acoustically, this results in a morphological scheme which consists of a relatively sharp attack transient (of the heel) followed by a second, smoother onset (the front part of the sole). Among different people the variations in acoustic morphology of a simple phenomenon such as walking, resulting from corresponding variations in movement such as the initial dragging of the heel on the ground, can make it possible for individuals to be recognised by the sound of their walk. The way sign references are perceived and interpreted are linked inextricably to the morphological details which constitute the sign.

Essentially, we are concerned here with the way in which the signs and combinations of them can project an image or images to a listener. In the context of field-recording as a process of documenting real objects and events, references can be considered either as discrete signs (single objects) or composite signs (where several signs
combine to produce a broader reference). This, in turn, leads to a phenomenon of important potential in composition with field-recordings on the basis of sign reference: expectation - how signs evolve in time and the ways that signs integrate temporally to impart a scenario. With signs, central to the function of expectation for a listener is the sensation of a contextual scenario that the sounds are generating. Consider the following sign sounds:

(1) footsteps (walking), with no contextual "ambient" sounds - continuing indefinitely;

(2) footsteps, punctuated by the sounds of doors opening and closing - continuing indefinitely;

(3) three isolated footsteps - with long periods of silence before and after the sound.

In these examples, the "image" that the listener forms will be shaped by the available information. In the first example, the kind of surface being walked on; in the second, a person passing through doors as they open and close, as well as an apparent locational setting (say, reverberant corridor or domestic interior). However, in terms of such signs as real-world referents (such as "person walking through a corridor") there will be an area in time at which expectations that derive from everyday experience determine that there should be some kind of change in the sign - a destination or "purpose" reached. Beyond this, continuation of the sign may reach the point at which a more metaphorical
meaning is implied, such as a journey through a corridor which never ends so that the notion of "no end" or destination is inferred. Within a finite temporal context such imagery could also be supported by the slow "fading" of the footsteps into the distance or "oblivion". Furthermore, a sign such as the door sound may function as a "tension" element, such as - "will the next door be the point at which some change is initiated, or not? Will there, in fact, be another door? Will the footsteps simply stop?"

Such a use of time may be interpreted as "enigmatic" in terms of the expectations engendered by the obvious abstraction of the sounds from an originating "reality".

The third example could, as a sign, also be interpreted as being enigmatic but rather, because the sounds do not continue long enough for a sense of expectation of change to be carried by the continuation of the sign, how the sign might be subsequently elucidated as contributing towards some larger context. This could be regarded as a more "abstract" use of the sign with respect to time; for while the footsteps continue in the first and second examples, they generate and carry an implied context (as a journey of some kind), even though it may extend beyond the realms of what might be normally expected in terms of everyday experience. Alternatively, suppose that the sound of footsteps is a consistent element in a scenario in which there is a narrative of innately linked contextual changes, such as a person entering different kinds of spatial settings - up stairways, going through doors and moving inside and outside. The scenario relates more clearly to ordinary patterns of experience, since an evolving narrative is actually present with the new kinds of contextual information as they appear, with a wider set of references contributing to the scenario.
In general, these considerations point to the notion that the tape medium allows recognisable sounds to be captured and presented with their sign reference always remaining intact, but so that they continue beyond the temporal scope of what can reasonably be equated with reality, or conversely, that the sparsest indication of a sign, without wider temporal or situational context is also possible. This relates basically to the nature of the signs themselves, and the kinds of durational expectations that could be associated with them in a real-time context. The sounds of a river or the sea, for example, are natural sounds of enormously long durational expectancy - the continuity of the sounds (including cycles of change within them, such as waves) being part of the intrinsic nature of the way the sign is perceived.

4.4 (f) Montage

Considering focus and scale of reference of sign sounds leads to the area of combination and juxtaposition of these elements within a composition. This is an area which has not received a great deal of attention from writers on electroacoustic music, but a parallel with cinematic montage has been drawn by Simon Emmerson - for "ordering, re-ordering, altering and manipulating the succession of images in time"\(^{29}\) - citing certain principles of montage put forward by Russian film maker Sergei Eisenstein.\(^{30}\) Eisenstein's approach to montage was effectively put to use in many films, including "silent" films

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\(^{30}\) In The Film Sense. Translated by Jay Leyda. Faber and Faber, London, 1943.
with musical soundtrack,\textsuperscript{31} and provides us in this study with some further points with respect to composition with sign sounds in electroacoustic music.

\textbf{Montage} - the splicing together of sequences of images on film (tape) - emerges essentially from the idea that two or more elements when placed together form a new image or idea:

\begin{quote}
... two film pieces of any kind, placed together, inevitably combine into a new concept, a new quality, arising out of that juxtaposition.\textsuperscript{32}
\end{quote}

Eisenstein affirms this as a property relevant not only to cinema, but in the juxtaposition of any kinds of information or objects\textsuperscript{33}. In his films, however, Eisenstein was concerned very much with the presentation of stories (narrative) and utilised montage in the putting forward of "not only a narrative that is logically connected, but one that contains a maximum of emotion and stimulating power".\textsuperscript{34} Montage can involve, then, different perspectives of the same situation or object so as to reveal the situation according to the sensibility of the artist, or the creation of completely new concepts or images

\textsuperscript{31} For example, \textit{Battleship Potemkin} (1925). The shooting script for this film can be found in \textit{Eisenstein: Three Films}. Edited by Jay Leyda, translated by Diana Matias. Icon Editions, Harper and Row, New York, 1974, pp. 11ff.


\textsuperscript{33} Examples are given throughout the first chapter of \textit{The Film Sense} drawn not only from Eisenstein's own films, but from works of literature in which the sequence and focus of the constituent parts of narrative descriptions are skilfully unfolded in time.

through the juxtaposition of disparate elements - yet these images are able to assume for each person their own individual significance relative to individual experiences. Eisenstein sees this as an integral part of the creative process, that montage allows articulation of images in a way which may provide communication of the particular viewpoint of the artist to others:

Montage has a realistic significance when the separate pieces produce, in juxtaposition, the generality, the synthesis of one’s theme . . . the task . . . is to transform this image into a few basic partial representations which, in their combination and juxtaposition, shall evoke in the consciousness and feelings of the spectator, reader, or auditor, that same general image which originally hovered before the creative artist. 35

In essence the montage principle, as Eisenstein outlines it, is a means by which a particular theme or situation can be overtly presented in a way which codifies the living experience of time into the revelation of moments of intense emotional focus. For this reason Eisenstein considered montage to be a necessary step away from a simple "affidavit-exposition" in which a single perspective of view is constantly maintained. 36 In general terms, the concept of the theme is a potential binding force for the montage of signs towards a structural unity.

The material and unifying resource in the montage of signs is "life", and the forming of an artwork through the characterisation of varying states and levels of human

36 See Ibid., pp. 36-37.
Composing with Field-Recordings: Sign and Symbol

perception.

[The] "mechanics" of the formation of an image interest us because the mechanics of its formation in life turn out to be the prototype of the method of creating images in art. 37

The technique of creation recreates a life process, conditioned only by those special circumstances required by art. 38

Montage can thus be regarded as a means of achieving a temporal articulation of literal field-recordings. The composer can edit out portions of a continuous recording, combine into a "continuity" different spatial perspectives of the same sign, or create a "composite" narrative with a range of differing or related materials. Naturally, this is a way of working which stems directly from the characteristics of the recording process as a means of capturing and combining any environmental sound events.

4.4 (g) Articulation of objects and natural forms: Christo

Outside of the world of sonic art, an example of intensification of the perception of objects through their sign meaning and in the direct reality of the object (though not "documentary") can be found in the "wrapped object" and environmental art of the Bulgarian-born sculptor Christo (born Gabrovo, 1935), who began producing "packaged" sculptures in 1958, the year of his arrival in Paris. All kinds of objects have been

37 Ibid., pp. 21-22.
38 Ibid., p. 43.
Packaged by Christo, using materials such as plastic, canvas and polypropylene tied down with twine, ropes or synthetic cords. The scale varies enormously, beginning in 1958 with the small scale Packed Bottles and Cans, to the temporary packaging of landforms, monuments and buildings and other structures demarking or articulating aspects of the natural or urban landscape, such as Running Fence. A selection of Christo's packaged work below shows the diversity of his work and indicates the enormous potential for the varied application of such an elemental idea, as well as the enormous sustenance offered the artist in this area.

Packed Motorcycle: 1962, in plastic and rope.


Packed Road Signs: 1963, in jute and rope.

Packed Volkswagen: 1963, in rubberised tarpaulin and rope.

Packed Supermarket Cart: 1963, in plastic and rope.

Packed Telephone: 1964, in plastic and twine.

Packed Magazines: various from 1964-68, usually in plastic and twine.

Packed Armchair: 1964-65, in plastic and rope.

Packed Tree: 1966, (white birch) in jute, plastic and rope, 10 metres long, also 1968, (oak) in rubberised canvas, plastic and rope, 17.7 metres long.

Wrapped Paintings: various, especially 1968, using canvas and twine or rope.

Packed Fountain: 1968, Festival of Two Worlds, Spoleto, 14 metres high.

Wrapped Kunsthalle: (Bern, Switzerland), 1968. This Swiss art museum was wrapped with 2508 square metres of reinforced polythene and rope.


Wrapped Floor: Museum of Contemporary Art, Chicago, 1969, 260 square metres of
drape cloth and rope - included the wrapping of stairways, pedestals and other gallery equipment.

The floors and stairways were also wrapped in 1969 at the Wide White Space Gallery in Antwerp, (same materials).

**Wrapped Coast:** Little Bay, Australia (near Sydney), 1969. The shore packaged was lined with cliffs and was approximately 1.6 kilometres long, 45.7 to 244 metres in width and on average 15.2 metres high. The wrapping took three weeks to complete and remained in place for ten weeks. The materials used were erosion control mesh (a synthetic woven fibre manufactured for agricultural use) and polypropylene rope.

**Packed Monument to Vittorio Emmanuele:** Piazza Del Duomo, Milan, 1970, in woven synthetic fabric and rope. Also wrapped was the monument to Leonardo da Vinci, Piazza Scala, Milan.

**The Wall - Wrapped Roman Wall:** Rome, (Via Veneto), 1974, in woven polypropylene (6820 square metres) and dacron rope.

**Wrapped Walkways:** Loose Memorial Park, Kansas City, Missouri, 1978, orange nylon (13285 square metres) spread over 1022 square metres of paths and walkways in the park.

**The Pont-Neuf Wrapped:** Paris, 1985. This bridge was wrapped with woven polyamide fabric, with rope and steel chains. After completion, the project remained in place for sixteen days.

Other works by Christo which involve the articulation of natural forms and spaces in the environment include:

Stacked oil drums, creating huge structural masses from these, notably **Wall of Oil Drums** in Rue Visconti, Paris, June 1962, where an obstructing wall was created across this street with oil drums stacked on their sides.

**Running Fence,** Sonoma and Marin counties, California (1976) a fence of white nylon fabric, hung from steel cable strung between steel poles, was 5.5 metres high on 39.4 kilometres (24.5 miles) long crossing the properties of fifty nine ranchers, crossing roads and passing through a town (Valley Ford) ending submerged in the Pacific Ocean at Bodoga Bay. The **Running Fence** was removed fourteen days after its installation and all materials given to ranchers.

**Surrounded Islands,** Biscayne Bay, Greater Miami, Florida (1983). Eleven of the islands in the bay were surrounded by pink polypropylene fabric floating on the surface of the water, extending 200 metres from the island into the bay.
The act of packaging in these works by Christo effects a transformation of the objects. The masking of the actual object with material and cords does not destroy the actual identity of the objects. They are wrapped so that they remain recognisable, the material and the tying of the cords following the contours of the form, sometimes with part of the object left tantalisingly exposed. This facilitates a new, altered awareness of the form. The packaging prevents the objects from being functional in their normal sense, while still remaining themselves. The idea of function is at the core of the cultural or social relevance of the objects, and their removal from use prevents them from being taken for granted and demands that the object be re-evaluated in terms of their form. The idea and act of packaging is in itself an act of expression, with a sense of intimacy and mystery deriving from the wrapping of the objects.

The larger works, such as the wrapping of monuments, buildings or sections of the coastline assume a significance and impact due to their scale. Because they remain in the direct context of their existence (their surroundings and social use or, in the case of the coast, its interface with the sea), the alteration of context through the way the object is perceived in its own space is significant. With all the wrapped objects, attention is drawn to their functional context through the introduction of an objectivity induced by the packaging - concealment and a sense of mystery. That the objects remain in their environmental situation, in their own sphere of reality, also allows the sense of reality itself to be manipulated - the reality of the objects in the direct context of their relationship with their surroundings.

The identity of the internal, supporting objects was withheld rather than obliterated, because Christo, like other artists of his generation, wanted to combine, in a double
focus, an untransformed object with a new object, the work of art. The tendency of figurative art has been to synthesize signs for objects with properties internal to the work of art, to produce a sign-cluster readable both as referent and as formal structure. The work of art is in the middle, in a complex state of mediation. In Christo’s packages, however, we are faced with an original object, a core he has not made, and a skin that he has. We are presented, therefore, with a double-layered rather than a unified image, consisting of two objects. It is a way to combine the literal (in terms of solidity and thereness) with the making of a new structure (the entertainment of the artist). 39

This kind of process may result in new ways in which the creative process operates in the manipulation of materials:

As art becomes more literal, control passes from, say, the act of drawing to the act of contextualization. 40

David Bourdon also writes on the nature of contextualisation:

Christo, however, does seem to conceive of wrapping as an act that falls just short of transformation. On one hand, the packages are exactly like actual objects: they occupy their normal space, in contrast to the ideal, virtual space occupied by any figurative sculpture that is not the same size as it is in real life and that, in addition, may occupy a niche or be otherwise "distanced". On the other hand, Christo does aesthetically "distance" his objects by wrapping them and making them seem more remote and inaccessible. By obscuring their identity, he effects a partial transformation in which mundane materials retain the same identity while assuming a new meaning. . . . In obscuring the object’s substance and denying its function, Christo makes his packages self-contradictions, caught between the literal and the


40 Ibid., p. 8.
metamorphic. Encased in a chrysalis, the objects are metaphysically in transit.\textsuperscript{41}

These works involve signs, objects retaining their identity and cultural meaning but the displaced from "normality" by the act of packaging - so that another view of their meaning as both forms and practical or physical objects is offered, while retaining a basic sense of their reality. In this way, observation, scrutiny, situational context and the question of reality itself are held as meaningful values which, when they involve apparently mundane cultural objects, structures or natural forms, are articulated into a new significance. This allows an enhanced appreciation of the objects which are part of everyday existence.

The intention with this example is not to draw a direct parallel between Christo's sculpture and the use of sign elements derived from field-recordings but to show how in another art form properties such as the sense of reality and an awareness of change in context have been embodied in particular ways of treating and dealing with objects. For our discussion concerning the documentary usage of field-recordings the valuable notion arises that, in the forming of a work, re-contextualisation of environmental materials involves a revision of the nature of creative control. A process directed away from synthesis (as Alloway suggests with regard to drawing in the quote above) towards a process which, through manipulations of context, can lead to an enhanced appreciation of sounds of natural objects and phenomena through the composer's introduction of changes in the normal perceptual functions, the most basic being dislocating sound and source through the recording process.

\textsuperscript{41} Bourdon, David. \textit{Christo}. Harry N. Abrams, New York, 1972, p. 11.
4.4 (h) Further Possibilities of Context

At this stage we must consider the nature of the playback space in relation to recorded sounds. In electroacoustic music which involves the literal presentation of field recordings the nature of the space into which sounds are replayed is of crucial importance in the realisation of form and the broadening of the potential for contextual manipulation of field-recordings. This is because in considering the environment as an active functioning aspect of field-recording, the role played by the actual environment subsequent to recording is a possible area of concern to the composer. If the context from which sounds are taken is of residual value, the real-time context from which they are taken may remain an area of ongoing value, and polarities may be established between the presence of real-time environmental sound and the documenting of recorded sound.

"Concert" or "gallery" spaces for the performance of musical works, while nevertheless social manifestations, are generally conceived as being environmentally neutral - so that a focus on the processes of the artwork in itself may be achieved. In terms of literally presented field-recordings in a work of electroacoustic music, this offers the possibility of the projection of a captured acoustic perspective from a given "field" environment in a neutral space. Such an environment is usually intended to be passive, and a clear line is drawn between the art object and the external sounds of the performance space - sounds which are not intended to be co-opted into the form of a
Composing with Field-Recordings: Sign and Symbol

However, the possibility exists to extend the potential for expressive manipulation of field-recordings by taking into account the overall relationship between the locality of the sound source as an actual (real-time) frame of reference and the playback via tape of previously recorded sounds within that locality.

To do this we need to distinguish whether the intention is for active or passive function of the listening environment and whether the listening environment is the same or different to the recording environment - that is, if there is physical re-contextualisation of the sounds.

Before going on to describe potential use of the changing of context through recording, the possibilities might be put forward illustratively thus:

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42 Unless, in a work such as John Cage's 4'33" where ambient sound is specifically co-opted into the piece, or, in the case of a work such as I am Sitting in a Room (1969) by Alvin Lucier, in which a spoken phrase is recorded, replayed and recorded again by an air microphone via the loudspeaker playback over and over so that the verbal element is gradually rendered unintelligible as a result of natural acoustic feedback. In this way the purely qualitative aspects of location (the acoustical characteristics of the room) have been assigned a role within the form and have been made active - this role is intentionally composed into the work. See Lucier, Alvin and Simon, Douglas. Chambers. Wesleyan University Press, Middletown, Connecticut, 1980, pp. 30-31 for the performance instructions for this work.
Diagram 11: Contextual Possibilities with Sign Sounds.

**TEMPORAL**

| Use of documented sounds on tape to be played back in new time context in same environment |

**CONTEXT**

| consistent content or locality of playback same as recording | active sounds occurring in real-time desired to enter piece | altered new locality or context |

**LOCATIONAL**

| passive conventional "concert" situation |

(Amplification - that is, microphone pickup and projection of sound through loudspeakers - can involve changes in scale or location of sound but always in real-time).

The replay of a field-recording from a particular environment through loudspeakers back into the real-time of that environment concentrates on the **temporal** transformation of that sound. The **context** (the original locality) has remained the same but the evolution and existence in time of a particular aspect or aspects of its acoustical makeup has been manipulated. An example would be the sound of a bird singing recorded in the bush and then replayed from the same place after the bird has flown away. This amounts to a
temporal manipulation of the acoustic information of a particular segment of time for that locality. The relationship between the objects or events which are the sources of the sounds and the sounds themselves (on tape) has been manipulated. There are two levels at work, real-time and recording but the two are linked through the relevance of the sound as sign.

That in one instance the sign happens in reality and in the other instance in documented form holds expressive potential. Extended kinds of temporal articulation might also be relevant through manipulation of the normal temporal evolution of a sound by, say, extending a brief sound through looping or contracting a continuous sound through editing. Further meaning may be possible in the domain of specific temporal context - where moments in time are relevant to specific sound events. For example, the replay of nocturnal bird sounds during the daytime, a recording of a crowd at a football match replayed into an empty stadium, or the sound of trees being felled in a forest when trees are not actually being felled.

Taking this a step further yields the possibility of making spatial reorientations as well as temporal manipulation. The birdsong, for instance, might be replayed from the bush floor or under dense foliage. Spatial reorientation such as this need not involve the temporal transformation of recording - relocation of sounds in real-time from any locality is a possibility through the microphoning, amplification and loudspeakers. In this way sounds might be resituated as they actually occurred. Again, in relation to sounds which function as signs we might move towards an expressive result - such that the orientation of spatial relationships as we expect them to occur may be altered in a kind of literal surrealism.
with, say, the sound of a river being placed at the top of a tree.

Expressive potential also exists in the manipulation of the scale of sounds, either recorded or amplified in real-time. For example, the increase or decrease of the normal amplitude of a sound such that the morphological details are exaggerated or diminished could, given the continued recognition of the sound as a sign, achieve a surreal effect.

The above kinds of considerations show ways in which relatively simple manipulations of signs can be expressive, by evaluating the role of the playback environment and its potential as an originating context for sign sounds. Ultimately, we might see this as a way of differentiating between an acute, active listening experience (real-time), in which a significant awareness of environmental sounds may take place entirely within the sensibility of the individual, and a means of articulating aspects of the natural sound world so as to enable an expression to be made extant outside of the individual in a concrete form. The process of recording is itself a step towards the externalisation of an individual response.

Whether these kinds of manipulations result in spatial exploitation or "surreal" manipulations of meaning, depends on the relevance of the source to its originating location and the replay location. A bird, for example, can sing from any tree in the bush (without going beyond the bounds of expectation based on reality) but it cannot be as loud as a jet aircraft or be in ten places at once without electroacoustic manipulation. Such alterations and articulations of environmental contexts and the expectations which form within the human consciousness might be the basis of a blueprint for an approach to expression based
on intervention and scrutiny of natural processes and relationships.

The use of the actual environment as a replay context for field-recordings remains a relatively "fringe" area within the mainstream of electroacoustic music and has tended to be linked more with an overtly sculptural or theatrical approach, although English composer Trevor Wishart has made several works which involve recorded materials replayed into the environment, such as *Forest Singularity* (1977) and *Beach Singularity* (1977). The term "singularity" in these works is borrowed from a mathematical concept defining "an exceptional point in an otherwise unexceptional field." The *Forest Singularity* (the performance starting at twilight) involved the physical transformation of a tree by wrapping and decorating it with white and reflective materials, including candles. Performers were involved, carrying portable cassette machines which played recordings of animals and birds - these were transformed in simple ways but preserved their "naturalistic" characteristics. Loudspeakers were also positioned in the tree, from which there came "quiet, eerie sounds." At the end of the piece there was sudden total darkness, leaving the audience to find their way out of the forest. Wishart's work of this kind involves not only manipulation of the sound environment but also a theatrical and sculptural presentation. The decoration of the tree in *Forest Singularity*, for example, amounts to a physical

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43 See Kirby, Wayne J. *Electroacoustically Transmitted Sound as a Sculptural Medium*. D.A. Thesis, New York University, 1981, for descriptions of some works which approach this.


46 Ibid., p. 15.
articulation of the environment - a focus on that environment in terms of a "concrete" object.

A work which uses real-time amplification of natural sound materials in live performance is Spirit Catchers (1974) by Annea Lockwood. In this piece four people each bring a familiar object which is for them capable of evoking special or strong reminiscences or associations with particular times, events, feelings or people in their lives. In the performance they are seated with their objects, and speak aloud the memories and associations which are prompted by the contemplation of the objects (or "spirit catchers"). This is done in their own time, following the natural rhythm of their stream of thought, and without thinking about what the other performers are saying. Each of the four people is microphoned and amplified through four separate loudspeakers, which are distributed throughout the performance space. A fifth performer operates a mixer and fades the amplification of the other performers slowly in and out in a kind of "eavesdropping" process, enabling the audience to hear portions of the reminiscences. The work ends when each of the four speaking performers has exhausted their flow of memories.

The amplification and redisposition of the sounds into different parts of the performance space, through the distribution of loudspeakers, articulates the sensation of hearing the memories. The listener hears portions of each person's memories juxtaposed and cross-faded with those of the other performers, amplified and disembodied from the actual people themselves. However, their spontaneously realised material and "live" presence is axiomatic to the work: Spirit Catchers is realised through the bringing together of four people and their individual memories which are unique in both content and the
rhythmic flow of associations that spring from each person.

To summarise, field-recording is a process by which sounds of everyday life and real environments that are of significance to the composer can be made available as working material. Exactly how the expressive significance of the materials - as they are felt by the composer - is subsequently made extant (in the context of a work) lies in the compositional processes attempted. One of the first steps in this, however, is the making of the recordings themselves, as this is the means by which the composer's materials are abstracted from their real-world contexts. As such, a basic "grammar" of possibilities with field-recording can stem from its role as a sound-documenting tool within the environment; and also, the ordinary ways in which human aural perception functions in the environment - with a strong disposition towards source recognition.

The recognition of sound sources (as signs) and their attendant meanings, and the manipulation of sound contexts as it is enabled through the temporal transformation implicit to sound recording, are fundamentals in the combining and mixing of real-world sounds in the perceived acoustic space of loudspeakers. At this stage, attention will be focused on how such criteria can function in working with field-recordings in the structuring of sonic artworks.
4.5 Approaches to Compositional Language

4.5 (a) Environmental sound as sign and symbol

As a means of obtaining material for the composition of electroacoustic music, the recording of natural sounds is a process used not only by composers working with sound documentation and source recognition, but also those whose language is based on an abstract (non-referential) use of sounds.

This last mentioned approach has been influenced to a large extent by "reduced listening" and "sound object" ideas on musique concrète of Pierre Schaeffer, holding to the view that the experience of sound as "music" is most appropriately felt through abstract sonic art. Natural sounds tend to be regarded for their general suitability as raw material for spectral and morphological transformations and manipulations - capitalising on the intrinsic harmonic, rhythmic or envelope characteristics of the sound. In this sense, field-recording offers the possibility for the composer to capture any sound in any location, which might offer rich possibilities for morphological treatment and to broaden the resource of available sounds.

Denis Smalley, a composer greatly influenced by the reduced listening and sound object philosophies of Pierre Schaeffer, expresses this view towards field-recording:

Ours is . . . the unique historical period of second order and remote musical surrogacies which have shifted the burden of listening away from direct physicality. Ironically, though, it is also the period of increasing importance for physically-based sources since through field recording composers have
Composing with Field-Recordings: Sign and Symbol

direct access to sounding activities not previously accessible as musical materials.47

Such an attitude is based deeply in a tendency towards the use of all sounds primarily for their spectral and morphological qualities and the structuring of compositions on the basis of perceived and manipulated acoustical values as abstractly functioning entities.

The approach taken here, however, attempts to outline possibilities inherent in, and suggested by, the role of recording as a means of documenting the sounds of real events and the possibilities of structuring works from sounds which retain their literal reference to the sound source. Because the recognition of sound sources is a fundamental dimension of the way environmental sounds are interpreted and ascribed meaning, ways in which this part of sound perception can be transferred to structural criteria for the making of work can be regarded as a factor of considerable potential in the use of field-recordings in sonic art. Essential to this is an appreciation of field-recordings as sign and symbol.

Sounds have meaning as signs when their source object or situation is discernable, that is; the sound can be heard as a directly documented reference to the source. In field-recordings this may involve individual signs (a dog barking or a tap running) or an overall sonic scenario (such as a fairground or beach) in which there may be a number of constituent sign references.

Individual listeners may have their own particular responses to aural signs, depending on their own experiences, in that particular objects, localities or events can have a huge variety of significances and meanings for different people. This is certainly a factor in the use of sign sounds in sonic art, as they are capable of articulating a personal and cultural awareness and significance of the objects and situations with which we are familiar.

For sign sounds to become symbols requires the presentation of the sign in such a way that ideas are expressed beyond the objects to which the sounds themselves refer. This may involve the harnessing of sounds which have a naturally explicit symbolism (through cultural conditioning) or the construction of symbols (within the context of a specific work) which may involve the extraction of a latent symbolism from a sign sound.

In discussing sign and symbol when using field-recordings in composition, it is useful to summarise these terms with basic definitions outlined by Carl Gustav Jung:48

**Signs;** are sounds which denote the objects to which they are attached. For a sign sound to be functional as such, it must be recognisable.49

**Symbols;** are sounds which, although they may be familiar in daily life, are able to

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49 R. Murray Schafer has reserved the term *signal* for sounds which are specific in what they represent, but because of the correlation of this term with the overt performed action intended for the transmission of specific communication, its use here will be as "of sign".
be invested with meanings or connotations in addition to the direct and obvious meaning (as sign).

A symbol implies something more than its obvious and direct meaning. It has a wider unconscious aspect that is never precisely defined or fully explained. Nor can one hope to explain it. As the mind explores the symbol, it is led to ideas beyond the grasp of reason.\(^5\)

4.5 (b) **Signs and meaning**

At this point consideration will be given to what might form a compositional groundwork through which meaningful expression can be created in works using field-recordings; as aural signs and symbols. In other words, how these materials can be manipulated or integrated into forms of expressive potency. First of all, however, it is useful to consider an "established" argument for the achievement of unity and meaning in sonic art which involves (and requires) the exclusion of recognisable sounds (indeed, the whole conception of source reference) from the composer's materials.

The classic refutation of the possibility of real-world environmental references as the basis of a discourse in sonic art has been made by Pierre Boulez:

Any sound which has too evident an affinity with the noises of everyday life (for instance, the most typical: machines and motors - an unexpected piece of luck for those so shrewd as to confuse "modernism" in musical thought with the "automation" of contemporary civilisation), any sound of this kind, with its anecdotal connotations, becomes completely

isolated from its context; it could never be integrated, since the hierarchy of composition demands materials supple enough to be bent to its own ends, and neutral enough for the appearance of their characteristics to be adapted to each new function which organises them. Any allusive element breaks up the dialectic of form and morphology and its unyielding incompatibility makes the relating of partial to global structures a problematical task.  

This statement is rooted in a presupposed belief in the necessity for the abstract nature of "music", an immovable prerequisite used as a yardstick from which to measure the aesthetic basis of all sonic art. This relies upon the idea of the formation of hierarchies of abstract sound materials for composition, and is a view still held by Boulez. He regards any allusive or possibly referential element in music as "dangerous" - including attempts to base structures on overtly theatrical elements. In a recent seminar held in Wellington, New Zealand, Boulez gave an example of his attitude towards allusive sounds in electroacoustic music by suggesting that the sound of a "cork being pulled out of a bottle" would not be a sound malleable enough for integration into the kind of discourse he deems necessary for music, as its reference would - for Boulez - preclude its suitability for integration into a discourse based purely on the manipulation of abstract hierarchical relationships. The implication in this case being that "references" could be felt as a distraction to the perception of the pure order-relationships of materials. This assumes that formal unity in sonic art should extend from the establishment of hierarchies of abstract materials which, through the absence of reference, allow the composer to mould them to

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52 Seminar held at Michael Fowler Centre, 25 March 1988, organised by Composers Association of New Zealand.
virtually any structural model or application.

The suggestion in such an attitude is that in order to deal with meanings of an elemental but emotionally powerful nature - or, as Boulez puts it, "... to choose a certain number of basic concepts having a direct relationship with the phenomenon of sound, and then to state postulates which must appear as simple logical relationships between these concepts, independent of the meaning attributed to them"\textsuperscript{53} - that only materials which stand apart from the everyday recognition of sources are of use as implements of an expressive language. Put another way, this reinforces the "conventional" notion that musical meaning functions only as a self-contained system of hierarchies and relationships.

In that the Boulezian credo of non-reference regards source (sign) recognition as being a criterion by which sounds are deemed antithetical to a structure concerned with morphology, the handling of sign content is considered not relevant as a compositional procedure. But, in composing with field-recordings as sign sounds, no matter how explicit the reference, the sounds can obviously always be heard in terms of morphological criteria. In other words, morphology can be regarded as an available compositional factor. Thus, notions of structural and gestural organisation based only on the morphology of sounds relates to only part of the perceived properties of recognisable sign sounds.

In electroacoustic music, the morphological properties of sounds can also be used as a level of information through which references can be linked or fused. For example,

works which in different ways have exploited this in conjunction with sign references are
Trevor Wishart's *Red Bird* (1978), in which the transformation from one sign sound to
another by means of morphological manipulation results in a transfiguration from one sign
into another and *Tiger Balm* (1970) by Annea Lockwood which involves no
transformation of morphologies of sign sounds but, through careful montage and attention
to the proximity of the sound sources in the recording of each element, allows the listener
to perceive the natural morphological similarities of the materials.

This note from a "sound journal" by Pauline Oliveros shows the kinds of problems
and considerations encountered in relating the actuality of life experiences to aesthetic
experiences, which in this case hinge on a particular awareness of sounds for both their
reference content and context as well as morphologies in order for relationships to be
discerned.

Oct. 8: Walking along the sidewalk at Cal State
University, L.A. recently, I heard a rustling. I saw some
leaves whirled by the wind against the sidewalk. The sound
continued as my ears and eyes travelled to a rustling fountain,
the ultimate destination of the sound of the rustling leaves.
Wind merged with water.

Unity through variety - variety through unity.

Elements: similarity of the sounds (unity), the transient
swirling of the leaves, the static nature of the fountain
(variety), the direction of the moving sound (variety). How
can unity dominate without destroying variety and *vice versa*? How
can the two principles illuminate each other? (Like two

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54 See chapter three above for more detailed discussion of this.

55 This work is discussed more fully later in this chapter.
mirrors held opposite, reflecting each other.\textsuperscript{56}

The phenomena described here clearly divide into sign reference and the morphology of sound. Through acoustics (a morphological link, similarity or complementation) sign elements are linked; "wind merged with water". The two are informing each other - the sense of meaning in the two sounds is interpreted through the fact that one is caused by the wind, the other by water. Within that essential framework of meaning, the sounds also possess subtle morphological differences "the transient swirling of the leaves, the static nature of the fountain." A figurative link (implying a metaphorical relationship between signs) has been extracted from the morphological properties of two sounds.

One very valuable aspect of the use of sign content in composition with field-recordings is that it involves references with which a broad base of listeners can identify - within the relevant cultural context. In other words, the materials have the potential for a fundamental intelligibility, by virtue of their nature as documents of the aural experience of the real world, as "given" rather than synthesised elements. If we then consider that a language for the use of recorded environmental sounds might involve "what the sounds are" (as signs) and "what is done with them" (the processes or articulations carried out in the form of a work), we have a very basic context from which to begin to identify and appraise what might be thought of as meaningful structures. Furthermore, we will focus on ways in which field-recordings (as referential materials) can be considered in a structure such that the signs engender a unifying, elemental and overall meaning.

To this end, we need to outline ways in which the referential meaning of signs can function. Signs can be considered as having meaning in three essential ways.

(1) The reference itself, such as: "door".

(2) The wider implications or associations which extend from that reference, such as: "door" - the definition or articulation of space, enabling or preventing movement from one space to another, or an interface between interior and exterior.

(3) The combination of signs so that secondary associations and meanings (such as the above) can be made more clearly extant - so that the "door" sign might function for, say, "transition" from one acoustic setting to another, or from "objective" to "subjective" experience (or vice versa). Meanings of this kind rely on the implicit references of the materials, and the way in which they are combined in a structure.

Therefore, at the most basic level, the referential meaning of a sign is fixed (as "bird", "door", "car" or "aeroplane") so that, in a form based on source recognition, the references can be readily discerned by listeners (within an appropriate cultural context). Furthermore, the way the materials are manipulated by the composer (such as particular juxtapositions, or morphological transformations) can be perceived in terms of the listener's appreciation of the fundamental reference implications of the signs. Such a conception of the way meaningful forms can be created with referential sounds relates directly to the earlier consideration of field-recording as being a process of documenting - as "found" materials - sign sounds which have expressive connotations for the composer.
Trevor Wishart has called for the basing of musical discourse on aspects of perception which do involve references outside of the art object itself, such that musical language can reflect more closely social and personal reality, and this view is put forward succinctly in the following statement.

...we must build our musical-philosophical discourse on accessible audible roots. But we must elaborate, on this basis of public accessibility, a sophisticated language capable of complex and subtle musical discourse. For the moment I wish only to suggest some possible socio-musical "givens" that might be acceptable as the basic roots of any musical language. These are:

1. Rhythm in the sense of felt, danced, human movement, speech rhythm, but not the psychologically arbitrary arrangement of "duration-structures".

2. Melody in the commonly accepted sense of recognisable tune-like gestalts (I have yet to hear someone whistle Schoenberg’s tunes as he predicted).

3. Language, and all human utterances, and all extensions of these, and the articulations and timbral patterns arising from them.

4. Landscape, in the sense of recognisable real-world sounds and sound-environments and sound-constructs deriving from these in various ways.

5. Music-Theatre ... combination of musical-organisation with theatrical gesture and situation, visual props and effects ... preferably pointing outside the confined world of professional musical performance itself, and its idiosyncrasies.

More generally musical structure might be related to the mythic structures pervading our own "Everyday reality" - and in a critical way.57

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Clearly, such a matter can be reduced to polarised approaches. On the one hand, whether a composer should proceed from a "definition of music" based on parameters which see neutral, non-referential elements as axiomatic values - which derive essentially from the nature of previous musical practice. This kind of approach may involve the exclusion or adaptation of material towards a suitable resource for that purpose - for example, through extensive transformations of recorded natural sounds, so that the original is not discernable. On the other hand, whether a composer should proceed from a more pragmatic basis, and deal with the capture, manipulation and presentation of natural reference elements (sign sounds) with a view towards externalising, in a work, the expressive qualities and attributes of the materials themselves as they trigger creative action from within the artist.

Utilisation of materials which are appropriate for the artist as an individual, attempting a discourse which enriches the material in a way appropriate to the expressive aims of that individual, is always the most valid basis from which art forms can spring. That is to say that structural and formal processes which stem from the kinds of meanings and identification with the materials that have the most significance for the composer can be the only relevant way of working for any artist.

The notion of unity will still be important if the artist seeks to manipulate the material on the basis of a particular idea but the way it is achieved will need to be realised in a way relevant to the nature of those materials - in the case of recognisable environmental sounds: as signs.
Ironically enough, the words of the initiator of serial methodology, Arnold Schoenberg, are appropriate:

One must not forget that - theory or no theory - a composer's only yardstick is his sense of balance and his belief in the infallibility of the logic of his musical thinking.  

While the guiding conception of how formal unity is to be achieved lies with the composer, the goal of unity itself is an essential part of the fabric of meaning - wherein a structure is perceived not just as an assemblage or succession of signs and/or morphologies, but as an integrated object. This depends on the composer successfully articulating, within a form, lower or more fundamental levels of meaning which embrace the immediate sign references, as a unity in the context of a topic to which the references relate, either directly or metaphorically. One of the main values in this is for the listener to perceive the way compositional processes, as they relate to the materials themselves, function as expressive devices. Sign sounds possess a foundation of referential meaning that can allow compositional processes and articulations to be powerfully and tangibly grasped - rather than the form and materials of a work being shaped by artificial, systematic relationships or sequences which are abstractly or obscurely conceived and carried out. The following section demonstrates ways in which signs can be used to underline or give rise to elemental ideas, by virtue of a basic unity between the materials.

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4.5 (c) **Environmental references in electroacoustic music: Three examples**

The question remains, how can sign references, as carriers of meaning, be embedded in a structure such that they convey concepts and meanings that go beyond the references themselves? In order to elaborate this point further, we will consider three works by New Zealand-born composers which show divergent approaches to the adoption of the same environmental phenomenon - the sea (and especially waves) - for expressive purposes.

**Seaswell** (1979) by John Rimmer is an abstract musical work in which the very general extrapolation of a gestural pattern from the wave-break morphological archetype is used to generate musical gestures. **Tides** (1984) by Denis Smalley integrates the use of general "sea" sign elements with abstract textures derived from them in a work otherwise structured on the basis of an abstract discourse, while **Tense Test** (1985) by John Cousins incorporates a postlude with a beach setting which derives structural function from its sign content and subtle symbolism relative to the overall form of the work.

John Rimmer’s **Seaswell** for trumpet and tape (electronic sounds) is a work possessing gestures modelled on the motion of the sea - motion here in the sense of the evolution of gestures both morphologically and spectrally - with abstract electroacoustic music on tape comprising gestures and textures that build up and break down in complexity as an analogy to the sound of surf. This is especially noticeable in patterns of morphological iteration which appear to dissipate their initiating energy, with an overall downwards pitch curve, but with widening range of spectral makeup and gradual slowing of the iteration of the component attacks in a gesture - "disintegrating" as do waves. As
well, a solo instrumental (trumpet) part engages in a dramatic interplay with the convolutions of the electronic sounds. In this basic idea behind the work, the composer was inspired by a particularly impressive piece of coastline in Northland, New Zealand, where there are especially large and powerful waves.

*Seaswell* is a work in which an environmental phenomenon has been used as a model for the making of an abstract work. The sea reference is, however, only made explicit through the title - the buildup/breakdown analogy of the sea itself is not in the final event extant in the work - there are no clear sign elements (sounds of the sea) which might relate the work from within itself, to the sea. Furthermore, buildup/breakdown as a model for a work could conceivably be utilised as just that, a concept capable of informing the narrative of gestural evolution in a sound-work and need not be, for the purposes of an abstract work such as *Seaswell*, actually related to the sea. The musical discourse in *Seaswell*, at an abstract level, is akin to conventional instrumental music but with the extended and enhanced timbral and rhythmic possibilities offered by the electroacoustic medium. The idea of generation and dissipation of energy has been extrapolated by the composer from the experience of the sea and used as an informing aspect of the creative process. The sea image has served initially as an inspirational source for the composer towards such a model and lastly, in the use of an allusional title, to allow the listener to relate the work back to the kind of experience which prompted the composer towards the use of the model. In between is a piece of music which might in fact be interpreted in a number of other ways (save for the title) given the general nature of the application of the model.
This example shows environmental influence of a very general kind, seeking to pattern the gestural componentry of a work on the morphological and spectral shaping of a natural phenomenon. However, the question remains with Seaswell as to the ultimate efficacy of the sea model. Such a work extends from the mimetic and manipulative basis of more conventional programmatic music realised through what are essentially abstract (non-referential) values of pitch organisation, duration and timbre. The extramusical allusion creates the suggestion of a level of discourse which does not necessarily enhance or positively underline the nature of the musical (that is, morphological and gestural) discourse, because it is suggestional and not actively functioning.

Tides by Denis Smalley is a work in which the manipulation of sounds on the basis of their spectro-morphological properties is of prime concern - and includes much studio-transformation of natural sounds so that the intrinsic spectral and morphological properties of the materials can be expanded in their own right - but does also involve the use of sound materials which retain their reference to the sound of the sea. Source-material for the work included a field-recording of the sea itself. In the composer's own words:

Tides is . . . based on analogies between water and sound. It is concerned very much with textures and the internal movement and colour of textures. Images of turbulence and strength, and also tranquillity. One might think of the play of colour and light, for example, and particularly important are the contrasts between magnified details and the wide open spaces, particularly of the sea motion in the second movement.59

59 Smalley, Denis. Talk given for Radio New Zealand before a broadcast of Tides.
Tides is a "hybrid" work in which natural and synthesised sounds are melded as the composer combines and manipulates spectra and morphologies of both kinds of sounds. For example, in the first movement, Pools and Currents, particularly evident are the "bubbling" morphologies of water, recorded and slowed down, to reveal greater internal detail of motion, and then imprinted by computer processes with the spectral makeup and motion of synthesised textures possessing rich harmonic content. In the second movement, Sea Flight, dramatic use has been made of a sea sound which approaches white noise with the projection of wave-like sounds in huge parabolas within the stereo space.

While the reference to the sea in Tides is quite general, the nature of the sounds used reveals enough sign meaning to embody in the work itself the sea image. A particularly strong sign element is a single wave sound which pans across the stereo space near the end of the first movement, which not only reveals the sea as the sound source of the work but acts as a structural transition to the final movement which concerns itself largely with broad wave-like envelopes and motion.

At another level, Tides can be considered an abstract work because the structuring processes within the composition are essentially based around spectro-morphological "sound object" criteria but, through the retention of recognisable water and wave sounds, has within it, references which act as clues to its environmental basis, at the same time involving transformation and manipulation of sounds such that the material is made available for an abstractly musical discourse. In Tides, gestures such as the "parabolic" spatial notion of hybrid wave-water morphologies reflects a process of modelling, into a stylised abstract gesture, the implied movement of waves in the sea. Smalley sums up his approach thus:
For me, the most important and exciting factor in
electroacoustic and computer music composition is the
possibility of creating and hearing sounds previously unheard.
It is an experimental, interactive process where the potential of
an already existing or a newly created sound is explored and
expanded. I make all decisions, reject some, keep some and
finally have the terrible problem of finding a context in the
work.⁶⁰

Tense Test by John Cousins is a work which deals with a particular issue and very
clear, specific content. The basis for the work springs from an interview made with the
artist in which questions of the male role in society, and the experience of that role for
men, were addressed. The central question, answer, question which has informed the basic
substance of the work is this:

L.[ita] B[arrie]: Those sorts of divisions, and emphasis and
concentration, that's a very . . . . MALE thing, isn’t it? . . . .
I mean, sort of intellectual divorced and separated off and not
integrating with internal . . . . .

J.[ohn] C.[ousins]: It is, it is, because the thing that you do as
a man often is separate from your living experience . . . . and
. . . um . . . I think that is one of the enormous [sort of]
tragedies of being a man . . . . really . . . . .

L.B: What are those tragedies as you see them . . . . . or
the vulnerabilities of being male? ⁶¹

The work falls into two sections, the first consisting of a multilayered verbal
examination and re-examination of the content and intent of this part of the interview.

⁶⁰ Ibid.

⁶¹ Cousins, John. From programme note to Tense Test. For performance at School
of Music, University of Canterbury, Thursday 17 April, 1986.
Layers of persona are built up as the impression is created that a number of separate lines of argument are being followed by a number of people, even though all the voices are of the same person (Cousins himself). In this section a context is generated, in an apparent effort to more fully reveal the implications of what is said in the original interview, through which the question and answer process is applied many times over to the original interview and to comments made on the interview. This continues until a state is (deliberately) reached in which there are so many conflicting contentions that the simple and genuine nature of the original comment becomes obscured. The second section involves a variety of candidly recorded "situational" field-recordings in which the composer "thinks out aloud" while involved in a domestic task (such as mowing the lawns), again re-examining the question and answer, telephone calls in which questions and answers are disembodied from each other, sections of the original tape recorded interview, as well as morphological transformations of material which allows the content of the different scenarios to be linked and engenders an enormous sense of turmoil, tension and conflict.

It is from an attitude towards unity based around content and sign reference of an explicit nature that the postlude section must be seen as an integrated and meaningful part of the work. This postlude (at the end of the second section) consists of a beach setting of a family interaction. The content and its handling is open and direct - children expressing excitement, wonder, and simple, natural feelings at their surroundings - with parental understanding and encouragement. The spoken content in itself relates to the beach location, the observations made, for example, of certain marine life illustrate this. As well, a gently undulating, slightly "muted" wave sound underpins the overall graphing of the locality. The water sound also contributes greatly to the expressive quality of this
section - embracing a subtle symbolism of expansiveness but of positiveness and renewal.

In this way, Tense Test is a work which demonstrates that the conception and execution of a work at the exclusively morphological level is not axiomatic to sonic art where unity and meaning are desired goals, and that a variety of specific sign references can be integrated into a meaningful form. If the overall sense of formal unity and structural meaning projects the work towards what might more usually be regarded as "theatrical" elements, it is not that this work is a piece of theatre, but that such structural possibilities of direct referential content have been greatly exploited within that medium.

The field-recordings in Tense Test provide a documentary starting point around which the form of the second section is constructed, revealing fragments of real-life situations in which the question and answer process (centred on the "male role in society") is being continued. In this way the work has definite and specific subject matter which is put forward in a direct way - through sign reference - rather than dealing with abstract morphologies whose patternings can be taken as analogies for environmental reference. Likewise, all the sound transformations in Tense Test extend from and remain related to sign sounds heard in the piece, so that these suggest a sensation of expanded and enriched reality, rather than analogies between "real" and "synthetic" sources.

A work such as Seaswell is conceived from a fundamentally different basis, even though grounded in direct environmental sound-influence. Sonic art is seen in this case as being by necessity abstract, and to that end the qualitative and quantitative aspects of natural sound which are translatable into abstract "instrumental" terms are extrapolated into
the composition - again highlighting the dichotomy between influence and use of environmental sound.

**Tides**, in attempting to overtly mediate between literal sounds sources and spectro-morphological transformations of these sounds, also works from a basis that abstractly based expression is the primary aim of sonic art, in that textural and morphological details and relationships form the main discursive elements in the piece. At the same time, the technique of surrogacy allows different degrees of transformation to be used, from relatively "literal" water sounds to analogous textural and gestural motion of synthetic sounds. As such, the sea reference remains very general.

While *Seaswell* and *Tides* are works which revolve completely around the influence and analogy of the sea, in *Tense Test* the beach locality constitutes only one area or section within the piece. This in itself can be seen to set *Tense Test* apart from the other two works as having a fundamentally different approach towards the attainment of formal unity. Because *Seaswell* and *Tides* involve discourse in the nature of abstract morphological and spectral manipulations, the material is broadly unified by an overall single "image" relationship - the sea. This does not depart from the idea of a "topic" as in a conventional piece of programme music. As far as discourse is concerned, this approach also embraces the area of repetition and extension of motivic device towards unity and comprehension (analogous to conventional ideals of unity in composition with non-referential materials). But in *Tense Test*, because sign content is being used so explicitly as a catalyst for the structure of the work, more psychological concepts underpin the discourse of the work: the question and answer, and how intensive examination of that
whole process can reveal how difficult it can be to verbally convey the simple integrity of feelings. The sea element is not one which has significance in a motivic way throughout the work, rather it provides another situation from which to interpret the work's overall content, especially through its uniqueness in the work in relation to all the other sign elements and processes within the piece.

The comparison of Seaswell and Tense Test, in particular, reveals two quite different ways in which environmental sound informs the discourse of a work. In Seaswell the broad frame of reference is a natural "model": the sound of the sea. This is acted upon in the work through the use and manipulation of electronically and instrumentally generated sounds which behave as analogies for morphological patterns that can be associated with the model. In Tense Test, the broad frame of reference is a social phenomenon: the male role in society; a topic which is epitomised in the piece by the portion of interview (quoted above) which, through the "question and answer", has engendered the form of the piece. The question and answer process is a catalyst for commentary on the content and intent in the original interview to be examined over and over again. As such, this centres on a topic which is not a concrete ("object") model, but an issue which is revealed and expounded through literal materials.

While the mimetic process which functions in Seaswell is actioned through morphological analogies (a literal real-world phenomenon alluded to by imitative spectral and morphological motion - supported by a directly specific title), the basic topic in Tense Test is set out via direct sign content and, in particular, verbal content that always relates to the central issue. This is so consistent throughout the piece that the beach scenario at
the end (a relaxed interaction in which there is no discussion of "the topic") can still be interpreted in relation to the male role in society idea: as an optimistic polarity to the tension generated by the continual consideration of the "tragedies of being a man". Sound transformations in Tense Test serve to extend the emotional content of the signs, as the morphological manipulations always appear as an expansion of the perceived "realities". These also allow morphological similarities between some of the sign sounds to be emphasised (such as between a telephone dial, lawnmower and tape recorder transport).

Essentially, then, in Seaswell we can see the use of what are fundamentally non-reference (synthetic) sounds being shaped as gestural patterns that stem from a model which is literal; while in Tense Test sounds of literal origin are used to convey a message which, through the presentation of a range of sign references, is expanded as a kind of "allegory". As such, in Tense Test, literal materials are used with their reference meanings intact, but so that they contribute to a discourse at a more fundamental, emotionally based level: directly allusive sounds (signs) are combined and manipulated in the exposition of a basic topic.

4.6 Spoken Language as a Sign Element

4.6 (a) Introduction

Words and phrases, because of their function as sounds which carry actual meaning (semantics) offer very powerful possibilities in the communication of specific ideas or images and can be considered a specialised form of aural signs. Words are able to be
very precise in their sign meaning, and as references, constitute a special human level of sign representations. The sound of a door and the word "door" have their own particular cultural connections (the relevance of the sound of the door to a person from a culture in which those objects do not appear, or the necessary knowledge of English to understand the word "door") but these points aside, clearly words denoting objects and the sounds of the objects themselves constitute different levels of sign reference - one a direct reference, the other a coded reference. As signs, vocally produced sound can, broadly speaking, be divided into two areas:

(1) **phonetics** - specialised utterances which are the building blocks of defined verbal languages;

(2) **purely physiological utterance** - derived from manipulation or responses of the vocal and oral mechanism which are not specifically phonetic.

Physiological sounds, in terms of communication, may reflect consciously or involuntarily the internal state of a person (a sigh, a cough, a giggle) and may approach phonetic archetypes in the form of phonetically analogous utterances (the questioning "hmmm? . . .", the indignant "ha!", the negative "uh, uh"). Often such quasi phonetic utterances may be reinforced in their sign meaning by a bodily gesture, such as a shaking or nodding head, or hand and arm movements. Emphasis, expressive intent or emotional state may also result in variations in the envelopes of phonetic sounds (in semantic context) such that the broadly expressive nature of physiological utterance "shades" the semantic or syntactical meaning of the signal - such as in different levels of vocal amplitude
(whispering of shouting), "breathy" voice or singing, projecting the voice through the nose or deliberate oscillation of the tongue or "s" sounds to produce a lisp or "raspberry" effect.

These two aspects of vocal sound, then, can diverge in the way they are able to convey meaning - phonetic sounds towards semantics (the coded meanings of words) and the syntax of phrases and sentences, while physiological utterance can function at a more "expressive" level as vocal emphasis or general indications of an internal state, as paralanguage. All may be seen to have relevance in terms of the establishing of signs and show the human vocal mechanism as capable of producing a vastly flexible range of sound gestures which (within the sphere of the human sensibility and particular developed modes of expression and communication) range from the production of a vast range of non-verbal morphologies to the cultural conventions of literal language.62

Of great importance to the communication of specific signs through language is the intelligibility of the language to any given listener. Where a language is not understood by a listener, a less specific response is to be expected - that the presence of a voice indicates a person or personalities in a general way, say, a conversation between two people or a crowd of people talking. Other indicators, such as inflection or intonation, may become the only way that a specific meaning can be extracted from the content, that is, how the language is articulated rather than what is being said.

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4.6 (b) **Abstract and Poetic Use of the Voice: examples**

Vocal material of many kinds has an enormous background of use in electroacoustic music, from purely semantic material to works which concentrate on amplification and magnification of physiological or phonetic utterances. For instance, in \textit{U\textsubscript{47}} (1960) by Jeanne Baronnet and François Dufrêne, Dufrêne’s voice has been used as a "frequency generator of special flexibility," and deliberately projects an acutely tangible sense of the internal, bodily nature of the sounds - with minimal transformation of the morphologies so that they would not be "deprived . . . of a natural vigour" - resulting at the end of the work in the gruffly spoken statement of the title, suggesting that the whole piece has, to that point, been an extended microscopic view of the mechanism of that phrase.

Conversely, in \textit{Don’t Hesitate, Do It} by Sten Hanson, actual words are used and maintained. A single (urgently) spoken phrase - "don’t hesitate, do it, do it right now!" - is repeated continuously throughout the work (which lasts barely three minutes). Repetitions of the phrase are gradually layered over each other, with slightly increased tape playback speeds so that the quality of the voice is transformed and a web of out-of-phase repetitions of the phrase is constructed, subsiding at the end of the piece to the original lone voice, heard at its original speed and pitch.


\footnote{64}{Sleeve notes to \textit{U\textsubscript{47}}, Panorama Des Musique Experimentales. Philips Modern Music series, 835 485/86 AY.}

\footnote{65}{Ibid.}
In the area of New Zealand electroacoustic music, notable examples exist in both of these polarised approaches to the use of vocal sounds. In *Wouldn’t You Say* (1978) by John Cousins, vocal morphologies were used to control (via a microphone input) two voltage controlled synthesizers. The resulting four-channel work bears no overtly vocal timbral quality. Rather, the flexibility of vocal gesture has allowed the composer to realise the intention of creating a work comprised of electronically generated timbres but without obvious mechanical periodicity of the machine, and allowing for the spontaneous invention possible through vocal improvisation. *Vocalise* (1985) by Ross Harris uses digital sampling technology made possible with the Emulator 2. In this work there are many quite clearly recognisably vocal elements in the form of closely microphoned sounds of the oral mechanism and whistling. The natural sensation of vocal morphology is therefore more directly imparted than in *Wouldn’t You Say*, at the same time enlarging and extending the innate "living" qualities of the sounds into more abstract gestures.

In *Song Cycle* (1975) (electroacoustic version) by Jack Body, the composer has used recordings of five of a set of seven love poems by Bill Manhire. Two voices are used, one male, one female, and these are the only sound sources. The poetic material has been used to create a work which, on the one hand, allows considerable portions of the poetic material to be presented intact and, on the other hand, attempts a kind of temporal exploration of the poetic material through isolation and repetition of single words and phrases (which function as recurrent "motifs") as well as the layering of words over and over so that semantic meaning is lost and only the general acoustic quality of the voice remains tangible. The content of the intact elements of the original love poems as they appear in *Song Cycle* sets up a context from which the isolation of particular words and
Composing with Field-Recordings: Sign and Symbol

phrases can be seen as an attempt to explore more fully (through repetition and juxtaposition) the expressive qualities of the original materials.

*Solstice* (1983) by Bronwyn Officer also uses entirely vocal material and stems from a poetic basis, although two distinctly different elements have been used: a recording of the poem *Solstice* spoken and intoned by its author, Cilla McQueen, and recordings of vocal textures generated through "play" on phonetic sounds (drawn from the poem) by a group of school children. In this piece, these two sources function as polarised elements of vocal sound - actual speech as verbal signs (in the form of a single voice) and textures generated by phonetic utterance (in the form of a mass of voices). The work concerns itself very much with manipulation of the speech element, in the breaking up of the syntax of words and phrases and the layering of the poetic elements towards abstract textures, through which process the entire poem is revealed and links between the poetic and phonetic elements are explored.

In *Poem in Time of War* (1967) by Douglas Lilburn, the composer has placed a complete oriental poem (which is sung) within a structure of electronically transformed natural acoustic sounds. The work was realised essentially as a reaction to the American-Vietnamese war of the 1960's. The poem, which is about a woman waiting for her soldier husband to return from war, emerges from a brief introduction of "electronic" material and is presented very directly and clearly. Another section follows in which the woman's voice seems to resurface in fragments with small pitch and envelope distortions dissolved into the electronic texture, which begins to grow and evolve in mass. The electronic sounds take over in the coda of the work, bell-like envelopes and electronic sounds with a
hard "metallic" quality seem to mirror some of the melodic inflections of the original poem - especially in the interval of a minor third. This sense of growth and increase in energy in the work has been commented on by Lilburn as "innocent prologue and . . . desolate black cloud of coda". The resulting work retains the integrity and simplicity of the original poem within a continuously evolving abstract soundscape.

In the context of a New Zealand audience, the presentation of verbal material such as an oriental language raises the question of language intelligibility in the communication of sign. If the actual words cannot be understood, the poem becomes a more generalised sound object which might suggest its oriental origin - but within the work as a human element embedded in an abstract soundscape - the title providing a clue to metaphorical significance of this juxtaposition.

4.6 (c) The Persona: Berio's "Visage"

Luciano Berio's Visage (1961) is a classic "utterance" work in which a recorded female voice (that of Cathy Berberian) enunciates a stream of vocal gestures which carry meaning not through semantics - although at one point a single word is clearly articulated; "parole" ("words") - but through the nature of the inflection of the gestures with, as Berio has described, their accompanying "shadow of meanings and their associative tendencies". The vocal material in Visage does present the kinds of onomatopoeic, inflectional and other

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non-verbal expressive elements such as laughter, crying, moaning and shout-like gestures which are normally embraced as important informational and characterising elements within the area of vocal communication. It does not, however, present a consistent pattern of actual speech. In this way Berio has described \textit{Visage} as a piece concerning the "metaphor of vocal behaviour [which] does not present meaningful speech but the semblance of it".\footnote{Ibid.}

That these vocal morphologies continue to function within \textit{Visage} as signs (that is, they characterise specific kinds of emotional state) is a direct embodiment of Berio's contention that:

\begin{quote}
... language is not made of words on one side and concepts on the other but is rather a system of arbitrary symbols through which we give a certain form to our way of being in the world ...\footnote{Ibid.}
\end{quote}

In \textit{Visage}, the voice itself is surrounded by a soundscape of electronically generated sounds acting as a gestural and musical foil to the vocal material. The voice shifts in and out of states of interaction and co-existence with the electronic material - as well as receding into and moving forward in the space with the use of reverberation and shifts in amplitude. Morphological similarities between voice and the soundscape are made at certain points - for example, filtered white noise linking to the unvoiced exhalation of air, and a key structural point in the work occurs when a guttural semi-voiced inhaling gesture in the voice is streamed off into the soundscape. Towards the end of \textit{Visage} the vocal

\footnote{Ibid.}
material moves into sung phrases, suggesting a link between "musical" elements and the previous attempts at verbal communication. In the final section, a continuous texture comprising a variety of resonances, while abstract, appears to have voices embedded in it, forming an enigmatic kind of coda to the work. The strongly "human" quality engendered by the voice in Visage is achieved through the variety and directness of the utterances which co-exist with the electronic sounds in a kind of illusionary electroacoustic environment. The fact that the obvious transformations of characterisation from one morphology to another (for example, laughter to sobbing) are done by the same voice gives a strong sense of what is an important possibility in the use of vocal material: that of persona. This is a very theatrical type of notion but one which is carried out clearly in Visage. Not only is it obviously the same voice and identity (persona) throughout the work going through the suggestion of a variety of emotional states, but this is underlined by the variety of morphological and gestural manipulations of the electronic sounds with which the persona co-exists. This idea of a theatrical tendency has been supported by Berio in his statement that:

Visage is purely a radio-program [sic] work: a soundtrack for a "drama" that was never written. Consequently its destination is not really for the concert hall but rather any conceivable medium for the reproduction of words.70

This gives us the further realisation, in terms of persona, that non semantic but recognisably vocal morphologies can, in a general way, infer or indicate human presence.

70 Ibid.
4.6 (d) **Spoken language in field-recordings**

In terms of field-recording, spoken language is able to give a real and tangible sense of people and personalities. In natural, everyday situations a great deal may be revealed about humans, their makeup as social beings and the way they experience the world around them. In terms of content, language elements in field-recording are valuable not only for the specific nature of words as signs, but also in the informal way in which word signs are articulated and the overall role that may be taken on by verbal material in relation to other sign sounds. In purely sonic terms, verbal communication (words and their inflection - what is said and how) gives the strongest indication of the nature of interaction between people because speech is an important personal and social phenomenon. In addition, the actual meaning of words may allow a situational recording to be clearly and graphically articulated. A recording of two people planting a tree, for example, might conceivably be made completely explicit by the role of language if they discuss the task in hand - sounds of digging and shifting earth which might alone be ambiguous or open to a very *general* sign meaning could be given explicit meaning.

In field-recordings of people in situations, language may also possess a level of meaning which is separate from the actual task or event. It is very common for people to communicate in casual conversation about matters which do not relate directly to their activity, especially where activities are mundane or repetitive. In this type of case, because the sign meaning of language and the sign meaning of ambient sounds do not actually coincide, a potent "tension" may result through the interface of the sign elements. Because language and sign meaning of ambient sounds are structured at different levels it is
possible for them to co-exist in a way which may engender an expressive result.

For example, in this author's own work *You Must Remember This* (1984) literal recordings were used of a middle-aged couple in conversation while doing the dishes. The verbal interactions which take place can be perceived as signs, as can the sounds of the domestic task itself (water and dishes in the sink and sounds of cutlery and crockery). The conversation itself seldom centres on the task in hand but largely concerns time - the sensation of time passing (especially in relation to contact with other people) and particularly the feeling that time passes very quickly. This kind of verbal/interactional content (which is loaded with personal as well as universal meaning - the passing of time concerns everyone) in the context of a mundane domestic ritual (which as a task is repeated every day) is in itself a demarcation of the passage of time. This results in two levels of meaning, which are unified as a documented reality, but separate as "activity" (task in hand) and "conversation" (of genuinely felt observations). The cultural significance implicit to each of these levels allows their co-existence to result in a relationship which is expressively potent.

Spoken material is a hallmark of most of the electroacoustic music of John Cousins. This is inextricably linked to the personal nature of Cousins' work, which almost always involves his own voice even to the point of being explicitly autobiographical. In much of this work, the personal content of the verbal material allows very specific images and situations to be clearly focused.

In *Parade* (1981), for example, the material is centred almost entirely on letter tapes
sent home to New Zealand by Cousins while on a trip to North America in 1972. This material includes personal thoughts and descriptions and commentary on events and places experienced by him. All of this material has, because of the purpose for which it was intended (as letter-tapes), the sensation of someone "thinking out aloud" - thoughts while on board an aeroplane heading for Honolulu (including a description of the purchase of the portable tape recorder used to make the recordings), descriptions of a hotel room, a friend's apartment, eating a hot dog, a description of Ice Hockey, American football and of a football trophy parade (the last mentioned being a strongly recurrent element in this work, and one from which the title is derived). In many of the recordings there are sounds of actual events as they were happening (of the places visited by the composer) which allow the recordings to convey very directly their documentary origin. This is especially the case, for instance, where in the description of the football parade Cousin's voice is raised over the sounds of the event, or, in the description of a football game, a television commentary can be heard in the background.

Each of the letter-tape fragments is self-contained and imbued with not only the richness of the topics themselves being talked about, which are interesting, often humorous and of cultural significance (such as the wonderment expressed by Cousins in relation to American enthusiasm for sports), but they also convey the excitement and feelings experienced by the artist at the time. As examples, take the moving description of a dirty hotel room ("held together with body fat"), the humorous commentary by Cousins getting into a bed with broken springs protruding through the mattress or specifically cultural observations such as the description of sports, Ice Hockey, American football and the Parade ("American football . . . ah . . . is terrific") or the recordings of a Christian campus
preacher who will not listen to his audience.

At the time of making these tapes, Cousins had no intention of using them in a work, and this can certainly be taken into account as a factor in their informal directness and genuineness. This spoken material is central to the whole of Parade, providing a stream of commentary and directly related experience (related from the actual real-time experience of the events) which is interwoven with morphologically transformed material (especially sounds of the parade band). A strong sense of a consistent persona emerges from the overall work, as the artist encounters and experiences a new culture and gives direct responses to these events.

Overall, the work is broken into a series of six vignettes, separated by silence, each of which offers some new information as well as carrying material from earlier sections. This sectionalised nature of the work is underlined by the inclusion of tape recorder switching sounds. These sounds do not consistently cue the start or end of each vignette, but suggest a more complex relationship between the role of the tape recorder as a documentary tool, and the function of this kind of material within the work. At the beginning of the second section, for example, the tape recorder switches "on" revealing a description of American football, and then switches "off". Then at the end of that section the tape recorder switches "on" revealing an anecdotal recording of Cousins sneezing (and making comments on that). Finally, the tape recorder switches "off" again, ending that section. This sets up a very clear suggestion that the material is to be heard as documentation, as sonic reality captured on tape, also relying on the expectation that the tape recorder once switched "on" will switch "off". This provides the sensation that the
material bracketed by the tape recorder sounds exists at a different level to the other material in the work - a level which we are intended to hear as removed from that of the other field-recordings. Subsequently, the tape recorder sounds emerge on only two further occasions and, ultimately, their role as clues to the documentary becomes more ambiguous - this is because the tape recorder switches "on" in the last section but does not switch "off" again. In this way the implied function of the tape recorder as the means by which the messages are sent becomes enigmatic and the work takes on a more dreamlike quality, with the persona of the artist still in the midst of activity and continuing to describe and comment, but disembodied from the context of the "tape recorder".

In terms of the persona idea, this attempt at the suggestion of "layers" of reality might be interpreted as a way of articulating the areas of actual experience (as factual or documentary information) and emotional response (as the morphological manipulation of sound-materials) and the juxtaposition of these elements in a "surreal" sonic environment.

Black and White (1987) by Chris Cree Brown, for orchestra and tape, concerns the Springbok (South African) Rugby football team's tour of New Zealand in 1981. The tape material in Black and White is completely graphic and almost exclusively documentary, including sounds of protests, helicopters, sounds from pubs, two prayers by an anti-tour Anglican bishop and a hymn Jesus Loves the Little Children sung by two different small choirs of children. As such, verbal material fulfils an important role in the work.

The documentary materials (protest marches, police/protester clashes, rugby match commentaries, the All Black "haka" and chants sung by protesters) are literal recordings
made at the time of the actual events in 1981 and these are presented in untreated form\textsuperscript{71}, montaged with orchestral material.\textit{Black and White} is very much a piece about a society - the reactions New Zealanders had to the question of the tour and its eventual reality. In a broad sense this involved matters such as their awareness and sensitivity to the situation of Black people in South Africa and their feelings about this in relation to their perception of the role played by contact between the two nations through a sport such as Rugby.

In \textit{Black and White}, however, the composer seeks not so much to make obvious these basic issues, but rather to deal with the effect that the issue had on New Zealand society. The composer has attempted to bring into the work's content many of the underlying divisions at the core of that society, especially in racial and political attitudes - questions such as "whose business it was that the Springboks come to New Zealand", whether nations should "build bridges" or impose sanctions over the existence of apartheid, the relationship of South African racial issues to New Zealanders' own sense of the bi-cultural and bi-racial nature of their society and how far they were prepared to go to defend and argue their feelings on those issues. Most significantly, however, this issue was a catalyst for the revelation of underlying divisions already present in the society.

Because the intention of the composer in \textit{Black and White}, as a piece about people and their attitudes to a particular socio/political issue, there is considerable variety in the type of material presented. This allows the work to show not only the kinds of events and

\textsuperscript{71} Although in certain areas such as the protest clashes, sounds were multi-layered in order to produce a more dense and convincing texture, the sounds remain untreated in terms of morphology.
localities that were important to the tour (and New Zealand society in general) such as the rugby matches (and commentaries), protester/police clashes and pubs, but also opinions and specific interactions between people at the time. For example, there are comments by pro-tour and anti-tour people, such as a rugby supporter immediately after a match, statements of opinion by prominent New Zealanders such as politicians, rugby administrators and (at the end of the work) the composer himself.

Scales of conflict and interaction are successfully conveyed, from close personal contact such as an argument between two people over the truth of an incident during a protest, to a protest clash of extreme violence through which individual voices can be heard - for example, police megaphones, "You may be hurt", and screams of protesters, "Bastards . . .". The work also effectively conveys the difference in scale of verbal material which was intended to be projected over a large area to many people (such as the speech of a protest leader given through a megaphone after on rugby match) and the intimately spoken opinions of the whole issue recorded by the composer in a pub. In the first instance the spoken material originates from a situation in which the message has been intentionally projected over a large area for many to hear, while in the second instance the message has been put forward at a personal level and subsequently made public via the composition.

These kinds of materials are, in the historical context of the issue, very powerful icons - a sense of the reality of the events from which they are taken is preserved and epitomise the kind of reasoning and views prevalent at the time. The material selected for the tape part of the work is informationally very direct. The composer has included
material which immediately conveys the situation or opinion under scrutiny, the actual semantic material is used as just that: a vehicle for the expression of opinions and feelings.

Verbal messages are central to the whole nature of Black and White as a work which is determined to be specific and uncompromising in its projection of the sensation and polemic of the 1981 Springbok Tour of New Zealand, and relies heavily on the intelligibility of the verbal sign elements. As a documentary work it provides a social record of the way in which divisions manifested themselves between factions of society and as a result, the kinds of situations in which people were prepared to put themselves, making strong comment on the whole nature of that tour as a part of New Zealand history which revealed some of the basic divisions in the society.

4.7 Articulation of Sign Sounds

4.7 (a) Two Examples: "Signs in the Vicinity of Memories" and "Tiger Balm"

Two works which utilise sign sounds in powerful ways are Tiger Balm (1970) (electroacoustic version) by Annea Lockwood and Signs in the Vicinity of Memories (1988) by John Cousins. Both works use recognisable sounds with no morphological transformation of the signs. In Tiger Balm the sound of a jews harp and a collection of gongs have been slowed down, this exception being notable in that they are musical instrument sounds to begin with. Both works also achieve formal unity through a combination of source recognition and the acoustical properties of the sound objects, which
nevertheless remain as intact functioning signs. The two works diverge largely through the presentation of a greater sense of documented time in Cousins' work, whereas the sounds in Lockwood's piece are more static "single object" sounds even though they often continue untransformed for long periods. The solely domestic and very personal content in Cousins' work also gives it a more claustrophobic sense of space, while the Lockwood work, with greater diversity of sign elements and contrasts in apparent acoustic space, involves a wider set of referents and spatial settings.

In Signs in the Vicinity of Memories, field-recordings of domestic activities and objects (such as making a cup of tea, shaving, bathing, opening a window, a toilet flushing, or a handwashing sequence) are presented graphically, with long sections of complete silence between. These are the "signs" referred to in the title. Some of the sign sounds also have verbal monologues superimposed over them in which the artist recalls early memories and experiences. The sign sounds tend towards either narrative signs or static signs.

The narrative signs involve a progression of developing information, with each part of the activity consisting of lower level sign within the overall sign. For example, the "handwashing" can be broken into:

(1) running tap (filling basin)
(2) soaping hands
(3) pulling plug (emptying basin)
Static signs concentrate on one object, in which there is a general sign element and these can be simple or complex. An example in this work of a simple static sign is that of the "tap", which consists entirely of the sound of a leaking tap. There are no lower levels of sign information below the "tap" sign so that, although the sign element is functioning, one is drawn more quickly into the acoustic nature of the event. There is no sign narrative to follow and interpret, only that of the fluctuations of the water morphology. In a simple static sign such as this the reference details are continuous and one is able to be drawn quickly into the spectral and morphological shifts in the acoustic qualities of the sounding object. A complex static sign refers to only one object but there is an intrinsic pattern of morphological change. In Signs in the Vicinity of Memories examples of such signs are that of the toilet flush and the shaving recording (both of which are closely microphoned). The toilet flush is initiated by the transient of the flush mechanism being activated and this is immediately followed by the rapid onset of a noise-like harmonic spectrum which gradually decays, ending with the sound of dripping water. Similarly, the shaving recording is initiated by the sharp click of the electric razor switched on and is followed by the grainy noise-like spectrum of closely microphoned shaving. All the sign sounds have a strongly iconic quality and with all of these sounds the "meaning" embedded in the sign functions beyond the simple recognition of sources themselves.

Cousins has been able to achieve this through detailed consideration of each of the qualities within the sounds; of spectral and morphological makeup, sign reference and symbolic potential. Each of the sign sounds was recorded using a multi-microphone setup with up to ten separate transducers mixed down to stereo - ambience stereo microphone, contact microphones and close air microphones - to capture, enhance and enlarge aspects of
the sounds which would otherwise (through simpler microphoning) not be as fully and clearly etched as has been achieved in these recordings. In this way the acoustic nature of the sounds has been (from the recording point of view) concentrated, allowing the situations to be captured in a unique and intense way. Many of the sounds, especially those with strong transients give, because of the microphone spacing, a slight out-of-phase result which contributes to the slightly "larger-than-life" feeling of the sounds. The sounds are rendered much louder and more detailed than they exist in real life, but without studio spectral or morphological transformations. The morphological qualities of the sounds have been revealed through processes which do not destroy the syntax or recognisability of the signs.

Manipulation and structuring on the basis of sign with these kinds of sounds hinges, in particular, on the recognition of the sign reference, as a kind of cultural scenario becomes embodied in each sign. In this sense, the way the signs themselves are articulated temporally is of critical importance, as this concerns the amount of information which is given towards the overall recognition of a narrative sign sound.

For example, the first sound in Signs in the Vicinity of Memories is that of a casement window opening and closing. The composer has deliberately not included atmosphere or ambient sound before the actual window-opening sound, or after the closing sound. To begin with the sound is fairly ambiguous, the irregular thumping of the casement window being pulled up is in itself a fairly amorphous aural sign. The outside incidental sounds which are revealed by the open window (traffic, leaves blown in the wind) and the dry exterior ambience elucidate the sound as a sign. In this way, the focus
is not on a movement from actual interior to exterior, but in terms of an implied interior - an interior which is, in this scenario, not actually stated. The sound of the window itself implies a physical movement towards the exterior. This kind of treatment of expectation based on the cultural reference of the sign sound illustrates the areas in which sign sounds in themselves can be made highly articulate, and how actual literal meaning can be focused into expression through sensitive temporal treatment. The notion of implied interior/stated exterior of the window sound functions metaphorically throughout the piece with internal, claustrophobic and solitary domestic sounds - which as a stated interior constitute the rest of the sign content of the piece. Incidental traffic sounds which intrude on these other sign sounds are almost always present as a background external referent. In this sense, then, the exterior becomes the implied element: the roles are reversed.

In these ways morphology and evolution of sign are able to function together towards a specific meaning, with the articulation of the field-recordings involving the recognition of signs, and also the nature of their morphological makeup. As conveyors of meaning, the sign sounds are unified by their nature as sounds of the domestic interior, and the continual implication of inside/outside as is described above.

The "memories" are at the same time explicit in their content and allow the sign sounds an even greater symbolic meaning. The memories concern early experiences of adolescent gender-role, sexuality and objects of special significance remembered from childhood. These, interfacing as they do with the intense and "claustrophobic" nature of the sign sounds (which give the sense of only a single individual carrying out the tasks), heighten the feeling of alienation and aloneness which pervades the field-recordings. The
sign sounds are able to move in terms of content from what they actually document in a graphic, literal sense, into a metaphorical underpinning of the subject matter of the memories. This, then, becomes the most important "meaning" of the sign sounds; as a set of graphic scenarios and objects from the domestic environment, unified by the fact that they all involve "images" of aloneness - events and objects presented without human interaction. On the other hand, the "memories" involve one person's recounting of past interactions and experiences - so that these are only heard as "filtered" through the recollections of the person speaking.

Annea Lockwood's work *Tiger Balm* (electroacoustic version) also possesses unity in the handling of form through the elements of sign, symbol and untreated sound morphology. The sounds in *Tiger Balm* are more wide ranging in sign reference than in *Signs in the Vicinity of Memories* and impart a greater sense of variety in the way the sounds have been recorded. For example, the sound of a cat purring which is very closely microphoned and the sound of a propeller driven aeroplane passing overhead which was recorded from a considerable distance. Unlike Cousins' work, sound signs in *Tiger Balm* are superimposed, although there are never more than two heard simultaneously. All of the sounds, with the exception of two streams of musical instrument sounds (gongs and a slowed jews harp sound) are literal human or animal produced sounds. They are presented for long periods in an "overlapping" montage, with never more than two sounds heard simultaneously. Each element is listed below.

(1) Cat purring (close microphone) 5'02".
(2) Gong sounds (medium-close microphone slowed and transposed downwards one octave) - two sections 4'19" and 5'03".

(3) Heartbeat (close microphone) 2'22"

(4) Jews harp (slowed and transposed downwards one octave) 1'58"

(5) Woman (medium-close microphone) - erotic vocal sounds 4'34"

(6) Tiger (medium-close microphone) 3'58"

(7) Aeroplane (distant microphone) 35"

All of the signs function in a static way, the sign sounds do not break down into smaller sign units of successive events or developing images. As such, there are no explicit scenarios presented in Tiger Balm only juxtapositions of individual referents.

In Tiger Balm, expressive meaning and unity is achieved through juxtaposition and superimposition of sounds on the basis of the natural acoustical qualities and similarities of these materials as they exist in the untreated sounds. The morphological aspect is not extrapolated into an area of abstract discourse; the sign element is always preserved, so that literal sign meaning is a strongly tangible aspect of the way the sounds are perceived. The combination in the piece of such a range of environmental sounds and the morphological and spectral similarities that can be discerned between many of them (such
as the low-frequency modulations in the cat-purr, aeroplane, tiger and jews harp sounds) allows variety and unity to be simultaneously functioning.

The extended nature of the sounds such as the cat, the tiger and the woman which continue for long periods of time, while signally static, allows the internal qualities of spectra and morphology to be gradually explored by the listener. Once the sign reference "cat", "tiger" or "woman" has been established a morphologically based listening attitude becomes quite natural, but because the sounds are untreated, not transformed away from their literal nature, the sign element continues to function. "Cat", "tiger" and "woman" are always available to the listener as functioning signs. This extension of recognisable sounds in time is, then, a way of achieving a morphologically orientated mode of listening simultaneously with overt sign content, and is in this case appropriate to the static nature of the sign reference of these sounds. The woman and aeroplane sounds can both be considered types of complex static signs as they possess natural transition and development in their morphology which links to the evolution of the sign reference - the aeroplane sound because its morphology evolves with the natural motion of the aeroplane past a stationary microphone placement, and the woman sound because it evolves through an increasing state of suggested sexual arousal and resolution. The heartbeat, cat and tiger sounds can be regarded as simple static signs as the details of the morphological and spectral makeup of the sounds does not indicate any change in the perceived nature of the reference.

The composer has realised in Tiger Balm a structuring of materials on the basis of both sign and morphology. For example, the superimposition of the woman sound and the
tiger together never stop being "woman" and "tiger" (on the opposite sides of the stereo space), but their combination as signs allows resultant images of power and sensuality to emerge. Each of these sounds has its own implicit sense of sensuality and power which when combined is intensified to the level of symbol - the sounds remain literal in that they are recognisable but tend towards the surreal in the nature of the superimposition - the raw aggressive sound of a wild animal interfaced with the intimate, erotic female vocal gestures creates a relationship which is symbolic of the sensuality that can be perceived in both images. While the sign references do, in fact, coalesce acoustically in a superimposition, the individual sign elements have more of a feeling of juxtaposition as each sound occupies a separate polarity in the stereo space. The virtual sound source of each element appears discrete, giving the sensation of the two signs being placed side by side in a simultaneous juxtaposition as opposed to a temporal juxtaposition, (one sound following another in succession). So while the morphologies superimpose in the acoustic space, the sign references juxtapose in that they remain discrete signs.

Further to this juxtaposition, after one minute eight seconds of the tiger sound, this sound is moved across the stereo space into the centre of the space, in the direction of the woman sound. This results in an enriched sense of the nature of the juxtaposition of signs. The feeling of the proximity of the two sounds as independent functioning signs is intensified. This is a very simple, graphic way of creating a sense of correlation between them as signs towards a symbolic meaning derived from the images of sensuality and power in each sound. The way these two sounds coalesce acoustically also contributes significantly to the success of the juxtaposition of sign and the suggestion of symbol, because the rhythmic sense they engender together is very potent. The sounds breathe and
undulate in a way which suggests that they are almost interactive. Both share a natural sense of rhythm of breathing and utterance and both have a natural sense of climax and resolution in the evolution of the sounds.

4.7 (b) **Balance between sign and morphology**

As we have seen in the discussions of the two works above, the potential sign content of field-recordings can be grouped into two main areas, described below.

(1) **Narrative signs**: which comprise several different sign elements. These act as lower-level reference units which indicate a composite of sign references which contribute to the overall scenario.

(2) **Static signs**: in which there is reference to one particular object or action. These can be of two kinds:

- (i) **Complex**: in which there is a pattern of morphological change associated with the behaviour of the reference object - the change is brought about by the natural motion or function of the object.

- (ii) **Simple**: in which the sign reference is continuous - where there is no overall change in the physical or behavioural state of the sounding object.

Considering sign sounds according to such criteria relates naturally to the idea that
sign content carries information which constitutes reference to a sound source, and that such information may consist of a composite of morphological factors corresponding to the physical nature of the event. However, when the sign content is such that the reference is intrinsically static, the ear is likely to be drawn towards the ongoing nature of the sound's spectra and morphology. This indicates that a natural balance exists between the perception of sign content and spectro-morphological content, and that redundancy of sign information means aural attention can focus more fully on the spectral and morphological content of the sounds in their own right. This may happen when there is an excess of information at one level: when a narrative sign ceases to function as such, or does not hold the attention; when the reference of a static sign is discerned (and does not develop with a narrative of new information) or when sign reference is ambiguous (possibly because it is not sufficiently contextualised). This natural relationship between sign and morphology is directly related to duration - how much new or developing sign content (information) is revealed in relation to time. In this way, static sign sounds or the continual repetition of narrative signs, allow for greater aural focus on spectrum and morphology.

Alternatively, a situation could easily be imagined in which sounds of ambiguous sign reference may continue for some time (allowing the listener the opportunity for focus or spectra and morphology) whereupon the sound is subsequently contextualised by another element, allowing for a "retrospective" realisation of sign reference. This is a key point where sign and morphology meet, because it is the changes and alterations in spectra and morphology which form into sign information. In static signs, there may also be crucial points in which there is a change in morphology or sound spectrum which re-focuses the
ear on sign content. This is clearly a factor in describing the nature of complex static signs, where changes in the behaviour of the same object induce acoustic change.

An example of a static sign in which a small point of change may actively encourage reorientation of listening focus is the "cough" that occurs in the cat-purr sound in Annea Lockwood’s Tiger Balm. The modulation in morphological patterning is sufficient to cause a listener to seek an explanation for the perceived change in the morphological evolution of the sound - a re-affirmation of the sign "cat" by virtue of the "explanation" of: "cat cough". Within this (cat-purr) element of Tiger Balm the cough is crucial because its morphology is heard as a series of short "points" in the overall continuity of the purr morphology and, because the cough is heard several times, it takes on a cyclic character, such that the "cat" sound is heard as a simple rather than complex static sign.

The evolution of sign sounds and their references is capable of engendering a sense of expectation in the perception of the listener: factors such as "how will the narrative sign continue, and what will it reveal?" "Will the sign which is felt to be static prove ultimately to be part of a larger scenario of sign narrative?" Such questions imply sensitivity to the patterns of changing or unchanging information. If a composer can discern points at which sign content reaches redundancy through the static nature of a reference, or when attention to spectral and morphological detail that may result from such redundancy of sign content is a positive element in the structure of a work; forms with which listeners have a strong perceptual, intellectual and emotional affinity may be realised.
Tiger Balm and Signs in the Vicinity of Memories show a similarity of approach to the use of sign in that the literal reference of the sounds is always functioning, and the sounds are never transformed or manipulated towards a purely spectro-morphological "argument". The natural (unmanipulated) morphology of the sounds plays an important role in both works, but is never extrapolated through transformation of the sounds into a separate level of discourse. Both works attempt to use sign meaning towards formal unity.

They diverge in nature in that Signs in the Vicinity of Memories employs sign sounds with distinct narrative information which are more complex in sign content, while Tiger Balm consists of static signs. In Tiger Balm the sounds achieve an expressive articulation through:

(1) the juxtaposition and superimposition of signs which, through their extended durations, allow the listener to be drawn into an acute awareness of the morphological makeup and evolution of the sounds and (through the juxtaposition of signs) new symbolic meaning of the sounds;

(2) the natural similarities of spectra and morphology of a wide variety of juxtaposed sign sounds suggests a unity between a range of environmental phenomena.

In contrast, Signs in the Vicinity of Memories involves:

(1) temporal articulation of individual unified sign "icons" with extended periods of silence between each, and the superimposition of some of these with a different element -
the memories - towards a new symbolic meaning;

(2) enlargement and intensification of the natural morphological structure of the sign sounds through increase in amplitude combined with extensive multi-microphoning of the contributory sound elements.

4.8 Performance Possibilities with Sign Sounds: Four examples

Live performance or physical, sculptural elements offer to the composer of electroacoustic music using field-recordings as signs the possibility of exploring temporal and physical dimensions beyond the fixity of the tape format itself. In relation to signs, the value of this lies in the potential for deepening the significance of the source reference or articulation of a particular structural evolution. In the use of live and recorded sign sounds in the context of an electroacoustic work, a relationship between "live" and "recorded" sound elements may be achieved - especially where the same sign is used.

Very clear examples of this are evident in two works by Chris Cree Brown. In Music for Limbs (1981), one of the principal sound sources is that of air being released from a party balloon so as to create a "squeal" sound, but transposed downwards (through tape recorder speed changes) by up to five octaves. This work was originally realised for a dance performance in which each sound in the work was associated with a dancer or dancers (sounds of machinery from a container port, a voice, a bagpipe band, synthesised bell-like sounds and the balloon sounds). After 13 minutes 23 seconds of the work, the dancer associated with the "balloon" sounds blew into a balloon while stretching the neck
of the balloon apart sideways so as to produce several varied envelopes of a loud, high-pitched, frenetic sound. This lasted for approximately twelve seconds (during which time the tape remained silent), after which the dancer remained completely still until the next tape sound, when the dancer immediately releases the blown-up balloon, allowing it to flutter into the air.

This performance element is required even without the dance performance and necessary with an audience of one! Here, a relationship is made extant between an a non-reference sound, and the physical object from which it is derived. In this way, an expressive link is made not only between "live" and "recorded" dimensions of sounds, but between "real-time source" as a sign (aided usually by the physical presence of the object and the means by which it is sounded) and a "morphological transformation". The point at which the live sound occurs reveals the balloon as a sound source in a way which integrates the actual object and the live production of sound into the rest of the work. In this way, after the transformed sounds are established in their own right, the source of the sound can be regarded as having been "revealed" retrospectively.

In Black and White (1987) for orchestra and tape a more explicit link is made between taped and live "versions" of the same sign sound - in this case a voice - which can be seen as a pivotal element in the piece, as this work involves graphic documentary commentary on the divisions in New Zealand society brought to the surface by the 1981 Springbok Rugby tour of New Zealand. At the end of the introductory section of the work, the orchestral trombone section plays a fragment of the South African National Anthem which is seemingly "cut off" by a taped scream of: "fuck off 'Boks". Just prior
to the coda of the work, this same phrase is screamed in performance by a live voice (a person planted in the audience) and this is similarly cued by an orchestral fragment of the South African National Anthem. In this case, in *Black and White*, the live/taped elements are identical both as verbal sign elements. The formal significance of this in terms of the work lies essentially in the extension of the overall message of the piece (through the theatrical domain) into the real-time event of the performance space. That is, initially as a taped sound the voice appears as "documentary" but its statement "live" by an actual person in the real-time of performance brings the message into the "now". In both *Black and White* and *Music for Limbs* the broader distinction between live and recorded sounds can be regarded as being made extant.

*Edit for Pauline* (1983) by John Cousins is a work which exists in two versions, one is purely electroacoustic on tape, the other involves a performance element. The work is based around a recording of a description by a woman (Pauline - paralysed by multiple sclerosis), of her failed suicide attempt. Throughout the piece the original recording of Pauline's voice is played and edited with new sections of taped material spliced between phrases. In the performance version this editing is done in real-time by a performer seated in front of a tape recorder, with back to the audience. The editing sounds are picked up by contact-microphones and amplified through loudspeakers and therefore induced more overtly into the work. The editing process itself is developed to the point of being a refined ritual. The tape is stopped at certain parts of the monologue and the last phrase written on a contact-microphoned blackboard. Prepared tape material is

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72 In the version for tape alone, the sounds of the performance version are integrated into the piece.
then inserted into the tape of Pauline’s voice and this is followed by a small ritual involving the transfer of water with a straw between small brass bowls, followed by the striking of the bowls with a small beater with the pitch sung in response by the performer - this being evolved from her suicide method, which is described in detail by Pauline in the recording (except in that case the water was transferred, via a straw, from a glass into a jar filled with aspirin).

The material "edited" into the recording of Pauline is also derived from the performance ritual: sounds made by tapping the bowls, the sucking of water into the straw, singing, writing on the blackboard and tape editing sounds. This process continues along with the gradual emergence of a further four-channel prepared tape until the stream of the vocal narrative becomes engulfed in morphologically transformed sounds of the ritual. This gives the key to the function of the ritual as a catalyst for morphological expansion and as an analogy to a shift in "reality" with the voice as a sign being projected through the process of the performance into an "unreal" soundscape. The work builds to a climax in which the voice of Pauline becomes overwhelmed by the textural density of the treated materials, but this subsides suddenly (with the sound of a tape recorder put into fast forward "cue" mode)73 leaving the rest of Pauline’s description of the events that followed her suicide attempt, with the faint transformed sounds of the ritual sparsely underpinning the voice.

In this version of Edit for Pauline, the performance element acts as a very clear indication of the process behind the structural evolution of the work. The real-time editing

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73 Where the magnetic tape is in contact with the replay head of the machine.
of tape is a sign element in itself (its function is very clear) as well as a ritual element and, along with the water ritual, constitutes a performance element which both initiates and provides material for the form of the work.

Rain from the Moon (1984) by Colleen Anstey is a performance installation work which involves electroacoustic, sculptural and cinematic elements with a considerable degree of unity between the various media. The sonic part of the work consists of a tape recording of a fragment from a description by a woman of her relationship as a child with her father, and relates his inability to communicate with her. This fragment was recorded several times in succession onto a length of quarter inch analogue magnetic tape at the speed of 9.5cm per second. During the performance (which takes place in an elongated gallery space) the performer, walking backwards and holding the very end of the tape, pulls the length of tape across the playback head of a Revox A77 tape recorder (with reel motors disengaged). In this part of the work the performer has to move as evenly as possible at the speed of 9.5cm per second in order that the verbal material can be replayed (through loudspeakers mounted in each corner of the space) as intelligibly as possible, because slight fluctuations in movement would cause exaggerated "wow" of the verbal information. The use of bodily motion as a motivator for the sounding of recorded material creates in this case a strong link between a performance process and the electroacoustic medium in the presentation of verbal signs, the movement being necessary for the replay of the information on the tape, and the nature of the recorded material as a sign element (which is required to be understood) regulating the controlled nature of the movement. Cause and effect is embodied in the actual presentation of the material and the means by which that presentation is achieved: movement produces sound and the sound
requires a particular kind of (careful) movement.

Each of these works shows a possibility in the integration of live performance with recorded material involving sign sounds, and in all these works a performance aspect provides a particular way of gaining added dimension in the expressive manipulation of signs. In works such as these, which involve a performance element, the real-time "presence" of the performance involves the other perceptual senses, especially visual. An action in real-time which produces a tangible structural result (such as editing tape) allows processes in a piece to be physically present as well as perceived aurally.

In *Music for Limbs* and *Black and White* this results in the establishing of different levels of reference - as "recorded" (through the tape medium) and "live" (through the performer), including (in *Music for Limbs*) the "revelation" of the sound source of transformed materials in a way which integrates the "sounding" of the physical object with the work itself.

In *Edit for Pauline* the "editing ritual" acts, because of its performance in real-time, as a performed sign and as the initiator of the structural processes within the overall form of the work. The performance and the verbal material (Pauline’s voice - which was edited), are further linked by their integration as sounds, that is, the sounds which are edited into the verbal material are the sounds of the editing procedure and ritual itself.

In *Rain from the Moon*, however, the distinction between the performance and the sounds - even though they are interactive - is maintained. The performance facilitates the
sound material, and the sound material dictates the careful nature of the movement, so that sound and performance remain as separate but "cause and effect" related elements.

As in our earlier discussion on the potentials and possibilities of playback, locality and context, we can see that the use of performance elements in works which involve sign sounds results in an extension of the terms of reference of the signs themselves. Of crucial importance in this is the fundamental difference between "recorded" and "real-time" and the inevitable embracing of all the senses in the real-time experience.

4.9 Symbolism

4.9 (a) Symbolic archetypes

In Chapter twelve of The Tuning of the World\textsuperscript{74}, R. Murray Schafer discusses symbolism of certain aspects of the soundscape.\textsuperscript{75} He describes symbolism in a sound event as that which:

\begin{quote}
Stirs in us emotions or thoughts beyond its mechanical sensation or signalling function, when it has a numinosity or reverberation that rings through the deeper recesses of the psyche.\textsuperscript{76}
\end{quote}


Schafer begins from Jung's theory that there exist certain symbolic archetypes\textsuperscript{77} derived from "archaic remnants": mental forms which appear to be aboriginal or innate shapes within the mind, which cannot necessarily be explored directly in terms of an individual's actual life experiences. These archetypes are not actual mythological images or motifs themselves, which are simply inherited means of representing the archetypes; rather, they are the tendencies towards the forming of concrete motifs. The way in which archetypes are actually represented may vary, while the basic pattern of the archetype remains the same.\textsuperscript{78}

From this kind of basis, Schafer looks towards the identification of very fundamental and archaic sounding phenomena as keys to archetypal symbolic images; although, as this view begins from the symbolic motifs themselves, it explores more the symbolism of primeval objects.

Two natural sound sources classed by Schafer in this way are water, especially the sea, and sounds produced by the wind. Water embodies a rich symbolism of purification and renewal - as a basic element in the sustaining of life. Individual motifs for the symbolism inherent in water involve the differing ways in which water occurs or behaves - rain, streams, fountains, rivers, ice, snow or the sea:

\ldots it is symbolic of eternity: its ceaseless presence.
It is symbolic of change: the tides; the ebb and flow of the waves. Heraclitus said, "You never go down to the same


\textsuperscript{78} This includes archetypes such as the "hero figure" and basic moral judgements of "good and bad". See Ibid., p. 69ff.
water twice." It illustrates the law of the conservation of energy: from the sea, water evaporates, becomes rain, then brooks and rivers, and finally is returned to the sea. It is symbolic of reincarnation: water never dies. Nor does water respect the law of gravity, for it flows downward and evaporates upward.  

The sea symbolizes brute power; the land, safety and comfort. The tension between them is made audible in the crashing of the breakers. No sound unites continuity and discreteness so effectively within its signature.

In terms of sound, the sea elicits not only a natural sense of periodicity and inevitability through waves (as well as implicit tidal motion) but as Schafer suggests, is capable of producing almost complete white noise, yet is changing and evolving - eliciting a sense of power, depth and continual energy.

Because the wind is itself an unseen phenomenon, but one which stirs motion and sound from any potentially resonant object or space, symbolic images associated with the wind have tended towards the spiritual - a manifestation of the intangible and illusory - symbolising all that cannot be directly controlled, trusted or understood, to the "breath" of the universal sense of the spiritual.

Illusory, capricious and destructive, the wind is the natural sound man has traditionally mistrusted and feared the most . . . The trickery of the wind has continued right down to modern times as anyone who has tried to make tape recordings outdoors well knows.  

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80 Ibid., pp. 170-171.

81 Ibid., pp. 172-173.
In the area of artifacts (objects made by humans) Schafer regards bells as significant symbolic sound sources, extending through their traditional functions as holders of either gathering powers or scattering powers, which Schafer refers to as either centripetal or centrifugal forces. Examples from a variety of cultures and times are given, such as: the use of bronze gongs in Ancient Rome to drive away ghosts; the parish bell in Steiermark, Austria to drive away storms; a handbell carried by priests to the homes of people in Medieval England to drive away witches; or ankle bells worn by women in Middle Eastern countries to attract men. The symbolism of church bells in ancient Christianity is also discussed, not only in its use to attract worshippers and to drive away evil, but also more specific images such as the idea of the metal beater symbolising the preacher's tongue causing "both Testaments to resound", or the frame from which a bell is suspended symbolising the crucifix.82

The central idea, however, in Schafer's argument for the bell as a symbolic archetype is in the links made between the bell and the circle or mandala:

... we are left with the fascinating fact that for a significant number of people, many of whom no longer find explicitly Christian associations in the church bell, the sound continues to evoke some deep and mysterious response in the psyche which finds its visual correspondence in the integrity of the circle or mandala. This is clear from tests we conducted in which subjects were asked to draw their impressions of sounds played to them on tape recordings. The sound of church bells frequently stimulated circular drawings.83

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82 See Ibid., pp. 174-175.

83 Ibid., p. 176.
Schafer then refers back to Jung, who pointed to the mandala as an archetypal symbol of wholeness, completeness or perfection — a powerful notion, given the widespread and longstanding use by many societies of bells of all kinds. It is necessary, however, to emphasise here the cultural relevance of symbols, that symbolic motifs grow and change with the emphasis and evolution of societies and the artifacts within them.

Schafer goes on to describe the way notions of acoustic symbolism have been and continue to be modified in time, as the relationship between humanity and the environment is altered through the increase in technology in industrial and social areas. Essentially this is borne out in what we might term the symbol of control: control and manipulation of natural phenomena especially from the increasing tendency to insulate people from natural environmental experience. Consistent with the ideas of Jung, the archetypes remain intact while the symbolistic motif is transformed:

... natural sounds, rich in symbolism, have also undergone transformations. Thus thunder, the original vox dei and Sacred Noise, migrated first to the cathedral, then to the factory and the rock band. And bird-song, having been brought into thematic unity with the medieval garden, where its purpose was to orchestrate love, finally became transformed into the transistor radio, by which the contemporary Tristan and Isolde could groove to the "top fifty" in the backyards and parks of suburbia.

If we follow Schafer's reasoning, machinery is an important aspect of the control

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85 Ibid., p. 179.
symbol - that machinery enables humans to have a sense of surmounting the limitations of the dependency and/or link to basic patterns and forces of the earth.

Traditionally the machine symbolized two things: power and progress.

... Today the hard-edged throb of motors can be heard around us continuously as the keynote of contemporary civilization, and whenever it has sprung into the foreground as figure, it has been glorified as the symbol of power and prosperity.

4.9 (b) Use of symbols

Jan Morthenson has argued that symbols are a medium of communication; he recognises humans as social beings and communication as a social need, agreeing with the American philosopher Nelson Goodman in regarding symbolism as a phenomenon "based on curiosity, the urge to know".  

Symbolization is to be judged fundamentally by how well it serves the cognitive purpose: by the delicacy of its discriminations and the aptness of its allusions; by the way it works in grasping, exploring and informing the world; by how it analyzes, sorts, orders and organizes; by how it participates in the making, manipulation and transformation of knowledge.

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86 Ibid., p. 179.


88 Ibid., p. 2.
This is a view which gives a clear sense of an important aspect of the role of symbolism for humans: a means of attempting to find in the objects and events that surround us, the embodiment of deeply based questions of the relations of the world’s elements and the role of the human sensibility within that framework. That is, to extract from experience and observation a sense of meaning and purpose, which may be able to transform simple events in such a way that they can fulfil emotional responses.

From this kind of basis - that symbolism involves communication and exploration of objects and events towards a greater understanding of the world and our social function as humans - we will now look at some ways in which sign sounds in the context of electroacoustic music which employs field-recordings can be manipulated towards symbolism. This stems from the concept that all objects and phenomena can be construed symbolically:

The history of symbolism shows that everything can assume symbolic significance: natural objects (like stones, plants, animals, men, mountains and valleys, sun and moon, wind, water, and fire), or man-made things (like houses, boats, or cars), or even abstract forms (like numbers, or the triangle, the square, and the circle). In fact, the whole cosmos is a potential symbol.  

If any sign is capable of being articulated towards a symbolic meaning, then the means of unleashing this meaning needs to be found in a way appropriate for each symbolic motif and, furthermore, that the specific properties and potentials of the actual

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symbolic images used are highly relevant. For example, Jung - in the context of discussing the symbolism involved in dreams - acknowledged that different motifs can be used to evoke the same symbols, and that a very significant aspect of the interpretation of these symbols is to discover why certain images are preferred to others which may have similar symbolic potential.\textsuperscript{90}

The awareness of symbols and reference elements as they might be embodied in art works is something which has changed in emphasis according to the prevailing view of cultures and the attitudes of artists - in other words, the kinds of things which are relevant, expected or significant within a particular culture. As Simon Emmerson has remarked:

\begin{quote}
We may have become much less conscious of the religious symbolism in Baroque music while being very conscious of the use of "birdsong" in the music of Messiaen.\textsuperscript{91}
\end{quote}

The potential for sign sounds to move towards symbolism in electroacoustic work depends very much on:

(1) the particular cultural significance or function of the object, situation or locality to which the sign refers;

(2) the role played by the sign sound in the overall form of a work - the relevance


of the sound to other sounds in a work through its meaning as sign.

Furthermore, social use of sound symbols in everyday life often exists as an underlying or unconsciously realised form of communication or message-sending, and some examples might be:

1) the high "revving" of a car engine, especially at intersections, which might symbolise the assertion of a kind of "macho" male sense of power (extending ostensibly from the general power symbol of machinery but through the idea of a car as a personalised piece of machinery);

2) slamming doors as a symbol of exclusion or unwillingness to communicate, relevant to the concept of internal domestic space;

3) jingling keys (the more the better) as a symbol of power, authority or knowledge.

All these, of course, extend from the sign meaning of the sounds but because they are culturally potent; that is, they relate directly to crucial aspects of our cultural existence, they are able to be vested with the depth of meaning of symbolic motifs. The example of the car engine, for instance, is capable of being immediately assertive and links into the strong symbolism implicit in all machinery of control and power. This image is, because of its proliferation, an important and potent one in a cultural sense: over a great deal of the Earth now, automation and machines are closely linked to peoples lives and the way
they live them. The door and key examples are rich in a cultural sense because of their link with space - domestic space or work space - which is basically humanly fabricated but is (in Western cultures at least) an important part of people's sense of their makeup as social beings. The symbolic meaning is communicated in such examples by the way in which the object is used to create sound and the particular social or interactional context of the event. Sound is a phenomenon which can transmit such meanings - it can give the sense of an object being manipulated in a particular way, made to "speak" as it were, and able to impart the sense of a particular underlying intention which is made explicit through sound. The car, door or keys as objects in themselves may be cultural symbols, but the way in which their sound potential is used can be a way of specifying a particular image and thus a symbol. Sound has this characteristic: to embody a sense of gesture out of any sounding object, so that the nature of the evolution of a sound in time may, through the cultural role or significance of the object, be used to evoke a symbol.

Sign elements such as those described above are able to evoke culturally and humanly significant images or meanings in that they embody the use of a particular object in a particular way in order to symbolise those meanings. If such motifs are acutely suited to being conveyed by means of sound, then they may have a strong disposition towards sonic symbolism.

In the context of sonic art, any sign sound may be manipulated structurally into a symbolic meaning. In order to do this the composer must articulate signs in relation to other material such that it gives rise to a new sense of meaning, which allows the sign to reveal, as a metaphor for deeper or more complex ideas and images, a symbol. Trevor
Wishart, speaking of his own work, has put it like this:

How . . . can we use any metaphor with the certainty that it will be understood? The answer, I think, lies in the embedding of the metaphor in a structure of interrelationships and transformations, as in Red Bird such that various oppositions and distinctions are established.  

The matter of transformational methods is peculiar in this instance to Wishart's own technique, but the point to be emphasised here is that the extraction of symbolic meaning from sign sounds is very much to do with how or with what kind of expressive intent one approaches the sound with the view to creating a network of "oppositions and distinctions". Some of these attitudes may be extant cultural ones, such as (in Red Bird for example) the "machine" or "door" images, but others may rely more completely on the nature of the relationships created between materials within a specific work, as may be appropriate within the larger context of a broad "topic".

In Music for Limbs (1981), by Chris Cree Brown, a symbolism through machinery sound is evoked. The sound element most central to the work is that of air being released from an ordinary child's party balloon, with the neck of the balloon stretched apart so that it is caused to vibrate in the characteristic squeal. This sound has been slowed down and lowered in pitch by up to five octaves, so that the sounds take on an extended, gently undulating envelopes. Throughout the work these sounds take on a strong sense of persona for two reasons:

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(1) their morphology is almost vocal in quality, with pitch curves analogous to sighing and small "breathy" sounds sometimes at the end of the envelopes which are similar to the exhalation of air;

(2) the juxtaposition and superimposition of these sounds with a variety of other sign sounds such as a bagpipe band, a human voice and machinery. The consistency of the balloon-derived sound through these "situations" enhances its sense of persona.

Throughout the work, the persona sound encounters and attempts to "converse" with the other sounds, by attempting to emulate them, but it is the persona image which in combination with machinery sounds that can be seen to clinch a symbolic meaning in the work. At one point in Music for Limbs, loud machinery sounds (a field-recording of the container terminal at Wellington Harbour) are superimposed with the "balloon" persona sound, but not the gentle relaxed sense of utterance of the opening. The persona seems to scream in a painful chorus, the pitch is higher than before and the envelopes are short and erratic as if responding to the tortures of the machinery. The "balloon derived" sound is capable of eliciting a sense of this kind of "pain utterance" because of its function as a persona. The juxtaposition of this pain imagery with the machinery sounds evokes a symbolism of change, perhaps through the existence of technological mechanised means at the expense of a natural existence. Automated power and simple personification are directly interfaced, although the fact that the persona image is achieved in a slightly oblique, suggestional way (the balloon sound gives the impression of persona without in a literal sense being one) creates a sense of ambiguity or absurdity in the juxtaposition. This section forms a critical point in the work's structure, as the persona reaches a point where
its initial "natural" state has been transformed into a state of extreme reaction to the machinery sounds, underlining the "change" symbol.

Kryptophones (1973) by Jack Body is a work underlined by an overall symbolic image of world communality and co-existence. The work consists of spatial juxtapositions and combinations of shortwave radio call signs of various nationalities such as "this is the voice of America" and "this is New Zealand calling" as well as musical fragments and crowd sounds.

... I began to think about the theatrical possibilities of short wave radio, and remembered listening to a car radio on a clear, calm night in Greece, when I was able to tune into a world of sound, voices and music, that flooded in from Central Europe, Eastern Europe, the Near East, Middle East and Africa. What an astonishing realization that the air about me was continually oscillating with this fantastic confusion of sounds that my unaided ear was incapable of hearing! What would it be like if I could hear these sounds with my naked ear, or see these electro-magnetic signals with my eyes?93

In Kryptophones an aural environment in which an atmosphere of simultaneous national identities analogous to the composer's radio experience is created. The other elements in the work, crowd sounds, snatches of music and fragments of shortwave-like noise sounds suggest the sensation of a continuum of distance and proximity, which can create for the listener an awareness of space, with the impression of sounds travelling great distances to meet in a central reference point - that of the listener. Jack Body writes:

Kryptophones attempts to create an analogy between short wave radio signals and the type of aural hallucination experienced by some mystics (and madmen) who hear voices "from out there".\footnote{Ibid., p. 13.}

However, a further underlying symbol can be found in this work. Sign content (verbal meaning, the sensation of different languages, crowd sounds) and the sense of space achieved through the shortwave radio analogy symbolises the simultaneity of individual national identity in relation to the potential communality of humanity. Shortwave radio itself may be considered as a phenomenon which symbolises the multiplicity of individual nationalities that are in existence all the time which, although separated by the barrier of physical distance, are brought together in the air all over the planet in a way which is, without radio reception, totally intangible. The signals unite physically in the form of shortwave, but not in a way that unites their messages. In Kryptophones however, they are perceived as being united in an aural montage.

Reference has already been made to the way in which sign sounds have been combined towards symbolic images in Tiger Balm (1970) (electroacoustic version) by Annea Lockwood. The woman and tiger sounds, for example, which are juxtaposed in the piece give rise to symbols of power and sensuality which are implicit to both - the sound of the woman embodies images of erotic power and sensuality, and that of the tiger (as a strong wild animal with many mythological associations) is an image of power and strength. These two sounds are able to fuse towards this symbolism not just because of their sign reference, but because of the nature of their intrinsic morphological similarities.
The naturally cyclic morphologies coalesce in a way which produces a new resultant rhythmic interplay, but without the sounds losing their individuality of morphology or sign reference. While initially the two sounds exist on opposite sides of the stereo space, the movement of the tiger sounds towards that of the woman increases the feeling of the metaphorical relationship between the two signs and can be seen as a drawing together of the two complementary motifs. In this case, two different manifestations of power and sensuality fuse in a new, heightened, *symbolic* image of power and sensuality - that sensuality is a form of power.

Annea Lockwood writes;

*Tiger Balm* was originally created in 1970 as a music theatre piece incorporating live and taped sounds and actions evocative of ancient erotic rituals, traces of which, I believe, still survive in the communal memory, dormant memories which may be evoked by sound . . . I then made the second version for tape alone . . .

Over a period of two years I slowly assembled sounds which were for me, highly sensuous. Rather than consciously working out a structure for them, I let the shape of *Tiger Balm* emerge on a wholly unconscious level, let the sounds arrange themselves as if dreamed, and I found that they moved in a flowing transformation process. Very often a sound merges with its successor, blending together through shared characteristics which are frequently evocative of the tiger's presence.  

The image of sensuality and power embodied in the symbolism of the tiger and woman is evident in a broader sense throughout *Tiger Balm*, largely through the projection

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95 Lockwood, Annea. *Sleeve notes for Tiger Balm*, opus one recording, n.70.
of internal and external sensations of sounds. For example, whether the sounds are magnified through close microphoning (such as the cat purring) or involve a sense of space and distance (such as the aeroplane), or, whether the sound is actually an internal one (such as the heartbeat) or an external animate one (such as the woman and the tiger). The range that is thus established, with polarities of internal and external as well as the variety of signs, contributes to the symbol of sensuality and sensual awareness in the overall conception of the piece, but is essentially crystallised by the juxtaposition of the woman and tiger sounds, which remains the most potent symbolic image. The tiger image, too, assumes a centrality of its own. This centrality is suggested by the title, but functions in the morphological similarities of many of the sounds to that of the tiger. The jews harp and aeroplane sounds, for example, are very similar in quality to the tiger sound, while the cat purring possesses not only morphological similarity but a similarity of sign reference as well. The slowly evolving, hypnotic nature of all the sounds, with a strong sensation of internal periodicity, allows these links to be perceived.

4.9 (c) Symbolism through Enigma

A significant way of achieving symbolic meaning from sign sounds is through the idea of enigma. As we have seen, an important aspect in the property of meaning in sign sounds is that they relate to an existence outside of themselves - that sign sounds involve a cultural context implicit to the reality from which the sound originated.

When the implied contextual "reality" of two or more sign sounds are mutually exclusive as a consistent reality, that is, the signs are not part of the same apparent
scenario (of the kind Trevor Wishart has suggested in his discussion of surreal landscapes)\textsuperscript{96} an enigma may result and a metaphorical or symbolic meaning may be appropriate as a unifying, expressive link.

When a sign sound is juxtaposed or superimposed with other material such as:

(1) sign sounds which are contextually incongruous or together form an ambiguity of context; or

(2) generatively unrelated material (such as "natural" and "electronic");

the combination of materials may be taken as having metaphorical significance. In this way, through enigma, symbolic potential implicit to a sign may be made explicit and a focus on sound for meaning beyond sign reference may be achieved. Successful symbolism will result when a "symbolic" meaning can be perceived as a unifying force, image or idea between different elements.

In Soundscape with Lake and River (1979), Douglas Lilburn has juxtaposed field-recordings of naturally occurring water sounds with sections of abstract electronic music. There are three sections of electronically generated sounds, separated by two natural sound sections - a lake and a river respectively. The water sounds act as pivots, not only by virtue of their structural placement, but because of their reference meaning as signs in relation to sections of abstract electronically generated sound materials. In this sense, their

context in the overall form of the work embodies a strong sense of enigma, as the two sound sources are strongly polarised as "synthetic" and "natural" elements. Furthermore, these are not integrated in any complex way, but are simply juxtaposed in the structure.

Each section possesses its own particular unity. The electronic sections are carefully controlled, although by no means suggestive of meter, with a simple but natural sense of rhythm based around recurrent, delicate timbral identities underpinned by the presence of drone identities. Use of discrete pitch is a significant factor in these sections, especially in relation to the field-recordings. The water sounds, because of their more complex spectra and morphologies, function as an acoustic as well as referential polarity to the electronic sounds, while the natural sense of rhythm in the convolutions of spectra and morphology of the water sounds and the slightly wayward but continuous rhythm of the wave sounds relates to the electronic music in a very general way, and these two types of sounds remain as very distinct elements in the work.

There is deliberately no continuously tangible sense of structural mediation between the natural and electronic sound worlds. The natural and electronic sound worlds in this piece share the characteristics of cycles of repeated identities (for example, the pattern of lake wave morphologies or the repetition of electronic pulse sounds), but the natural sounds undergo no treatment or processing, while the electronic sounds remain as pure pitched material (without mediating towards noise sound). They are, through juxtaposition, together placed into a new context, and the contrast between the two sound worlds of the piece (the presence of the water sounds in relation to the electronic sounds) engenders a strong sense of enigma.
The electronic sections, because of the intrinsically abstract nature (with gestural and motivic correlations) and because they occupy the greater part of the piece's duration, tend to set themselves as the groundwork of the piece, with the sign elements (lake and river) functioning as transitions or pivots. Because of their reference meaning as signs, the outwardly incongruous nature of the water sounds in the work's form allows them to take on a deeper symbolic meaning - their presence is enigmatic, perhaps like a stream of "subconscious" material which rises to the surface, symbolising the continuum of natural processes and phenomena and the innate rhythmic structures of the environment. As such, the juxtaposition of two polarised sound sources can be regarded as symbolising the notion that all sounds are able to be united at the level of rhythmic shape and momentum, and the generic role of "given" environmental sounds in this process.

The two sound worlds in Soundscape with Lake and River function together in a conceptual way. This shows the potential within the medium for symbolic statement through such allegorical means; that is, without being necessarily dynamically interactive as developmental structural units which are subject to manipulative transformations and combined or mediated-between through surrogacies or hierarchies.

The multiple function of sound at levels of morphological evolution, sign and symbol can be seen in the specific example of the use of door sounds in the author's own electroacoustic work You Must Remember This (1984).

This piece is constructed around field-recordings from the domestic interior and concerns matters of time seen, in particular, through the observance of a mundane domestic
ritual: doing the dishes (washing up). Door sounds also fulfil a significant role as a "motif" at various points in the work and we will, through this example, attempt to investigate ways in which a sign sound (the door) can function at more than one level of meaning, involving referential and symbolic implications as they can be discerned from the placement of sounds in the structure, particularly concerning the formal concepts of transition and enigma.

As signs, the door sounds refer strongly to the domestic interior along with other elements in the work, domestic tasks and intimate family conversations and interactions. The door sounds are able to function as signs through their recognisability. This sound, in all its subtle variants has a strong, intrinsically recognisable morphology; the metallic sound of handles and latches, squeaks or groans of hinges and the shift in spectrum and sense of spatial ambience as the door opens or closes and the heavy transient as it closes which resonates in the walls and ceilings. These lower level elements which all, through recognisability, constitute a unity towards the sign contribute to a strongly icon-like sound event.

The morphological nature of the door sound is also of importance in the case of You Must Remember This. There were two different doors recorded, with subtly different acoustical results. One door had a latch which closed easily with a strong "snap", the other had a fault in the latch which prevented the door from being closed easily and created a hollow, less distinct door morphology. Some of the sounds were slowed and transposed down an octave (including spectral emphasis with equalisation) allowing greater attention to the evolution of the morphology, magnifying internal spectral details and
creating a more close-up, intimate communication of the still intact sign reference. In addition, the doors were physically closed in different ways; for example, "matter-of-fact", slammed or very slowly and deliberately. This kind of variation in action alters not only morphological evolution, but has expressive effect on the sign by suggesting the nature of the intent implicit in the sign itself - that is, how or in what state the door is closed - perhaps suggesting sensations of anger or gentleness. In this way, the door as a sign element, because of its strongly recognisable cultural identity, has a number of "inflections" that function through its essential reference.

There are further implications in the door as sign in the area of narrative. A door opens . . . will it close? This notion of reciprocal sign gesture functions through the reference of the sign sound and into the area of expectation. The door as sign, in literal terms, relates to space and change in space; but in the piece is linked to temporal space, formal space or symbolic space. In terms of temporal and formal space this is related strongly to transition, a change of emphasis or a new section within the work. The first door sound in this work, for example, provides a transition from an extended "abstract" section based on metallic timbres, into a literally presented conversation between two people. The door sound can be initiatory or punctuative as a transition element in the overall narrative of the form, and because the morphology is so characteristic, the individual door signs can link across structural units as "parentheses".

Such formal applications are not necessarily the prerogative of sign sounds. Any sounds which are morphologically similar could conceivably be manipulated into such a context. However, the sign and symbolic inference of the door sounds allows layers of
specific cultural meaning to be embraced simultaneously. In this way, the function of the

doors as a transition from a section of one kind of material to another (abstract to

referential) is essentially metaphorical. The door acts as a self-contained reference but

nevertheless carries the implications that extend from the meaning of the door as a sign:

change in space, or movement from one space to another. As such, the door sound can be

regarded as indicating a symbolism in the shift from one kind of material to another,

perhaps as interior/exterior, or subjective/objective.

In the wider context of the work the matter of enigma arises through the role of

signs. What is the relationship between the doors and the people and situations? Are the
doors at the same level of reality as the other situations in the piece? Some of the door
sounds have conversation behind them, the content almost imperceptible - speaking voices
are revealed from behind the doors, but what is happening is not clear. At other times the
doors open into a seemingly empty space creating a more "dreamlike" or abstracted
meaning, as the door sound by itself includes no other literal reference - its sense of reality
is not fused with any other sign element in the same temporal domain. However, always
related to the door sound as a sign is the implied presence of a person opening and closing
the door itself. This kind of enigma - layers of implied reality and implied relationships
through juxtaposition of sounds in such ambiguous but potent ways - forms part of the
narrative of the work, and may be seen to allow the sign meaning of the door sounds to
lead to deeper symbolic implications. Letting in or out, opening or closing may lead to
symbolic equivalents, inclusion and exclusion, revelation and denial. Framed within a
domestic context these can be seen as potent expressive images. The way in which the
door sound is emitted (the implied emotional state behind the action) as has already been
Composing with Field-Recordings: Sign and Symbol

outlined, may also underpin such symbolic inference.

The door sounds in You Must Remember This are unified relative to domestic interior, but enigmatic in their relationships to the other sounds in the work through their temporal placement. How they are perceived in relation to documentary material and situations or emerging out of abstract sound textures enables them to take on a strong identity of transition - as a structural function - while the strongly iconic quality of the door sound allows the sign to be heard in its own right as well as allowing metaphorical and symbolic images to form. Enigma arises out of these because their sign function within the piece is ambiguous (in terms of implied reality and space) yet their own iconography is self-contained.

By way of contrast, Trevor Wishart's use of door sounds in Red Bird involves essentially different images. The door sounds in this piece function very much through the theme of political imprisonment and repression of freedom. Many of Wishart's door sounds are heavy and massive, prison doors with long reverberation time following the closing sound.

The doors of this kind in Red Bird speak as symbols of imprisonment, repression and claustrophobic alienation of political or ideological kind - in this sense they derive much of their meaning directly from the topic of the work. However, acoustic articulation of the sounds also contributes to the metaphorical implications. On occasions, the long reverberation time of door slams implies a sense of empty vastness beyond the door (the door as it symbolises political power). Here there is an implied but very expressive
paradox between the sense of enclosure and the sense of empty space beyond the finality suggested by the door.

As has been described in Chapter three, the transfigurations between disparate sign sounds achieved by Wishart is of great importance to Red Bird both as a spectral/morphological manipulation in itself and as a trigger to metaphorical and symbolic meaning, and we have outlined the process by which Wishart manipulates "door slam" and "book slam" morphologies. Part of Wishart's compositional technique in Red Bird seeks, then, to fuse (through such transfigurations) the morphological and referential aspects of sounds into a single metaphorical "meaning". However, the overall layering and acoustic spacing of the door sounds also contributes towards their metaphorical role. The door sounds often occur in the mid to background space of the sonic landscape of Red Bird - further supporting the symbolic interpretation of the sounds through political statement: the doors represent a constant threat, an ominous presence. The prison door as a symbol of oppression; as a solution to ideological and political divergence forms a powerful image, framed within the theme of Wishart's idea of "open" and "closed" conceptions of the world.

Door sounds in Red Bird are also indicators of an interface between the "garden" and "reason" landscape - especially as an "escape" symbol. This is used particularly near the end of the work, where there is a brief sequence in which a series of doors are opened and closed. In this scenario the panicked panting of the "prisoner" is heard with running footsteps and with doors opening and closing in rapid succession on opposite sides of the stereo space - forming an image of a series of doors in a corridor opened in an attempt to
escape the mechanised "reason" landscape that has existed up to that point. Later in the piece, a single door sound opens onto what appears to be the garden landscape, only to have revealed that the interrogator's voice is there with: "we ask merely that you listen to reason", the door is then closed again and the machine landscape continues.

4.9 (d) Summary to Symbolism

In the examples of works cited in this section, we have considered symbolic meanings in electroacoustic works such as: ubiquity of language via radio (Kryptophones); the elemental and generic nature of environmental sound as a rhythmic force (Soundscape with Lake and River); sensuality (Tiger Balm); change through experience (Music for Limbs); and transition in experiential states (You Must Remember This).

The ways in which signs are combined and the overall context generated within the structure of a work have significant bearing on the ways in which symbols are evoked. In Music for Limbs the "persona" is present throughout the work and is perceived as "encountering" each new material in each successive section, with the machine sound being particularly threatening and powerful. In Kryptophones can be heard the mixing of a range of radio station call signals in one apparent spatial setting, as well as crowd sounds - which impart the sensation of masses of people and an overall feeling of spatial vastness. In Tiger Balm the similarity of gestural morphologies between two sounds in particular (the woman and tiger) allow these referents to be linked symbolically by the juxtaposition of two contrasting images. That is, two different objects shown to be producing complementary sounds allows the attendant images to be fused. In You Must Remember
This the door sounds relate as signs to the other domestic "scenarios", but are separated temporally from these, so that they do not appear as part of the "action", giving them an enigmatic quality. Door sounds also function as transitions between sections. The first door sound, especially, which forms a transition between an extended section of abstract sound and a domestic field-recording, can be regarded as a metaphor for the shift from a purely "non-literal" soundscape to a "concrete" real-world scenario. In Soundscape with Lake and River, the unmediated juxtaposition of two types of sound source which are of different means of generation (natural and electronic) is at the basis of a structure which, in terms of source reference, consists of two sound worlds which are contextually incongruous. Outwardly this forms an enigmatic relationship, but one in which the materials are drawn together by the potential for the listener to discern subtle rhythmic links between the two polarised elements. The sections of natural sound, as graphic environmental referents, can therefore be regarded as a generative rhythmic force.

In this discussion, we have considered that any sign has the potential to be used in a way which evokes a symbol. This can be through either "innate" symbolic potency of particular signs (as they may be commonly used in a given culture) or in the linking of sign in juxtapositions which assume a metaphorical significance - so that symbols can be generated in specifically constructed contexts. Using symbolism allows sonic signs to be invested with a level of meaning that extends from but goes beyond the basic sign reference. As a compositional factor the strength of this lies in the notion that ideas which are not easily or fully expressible in directly stated terms can be evoked. The value of symbolism, therefore, lies in the potential for real-world signs (and their attendant imageries) to form motifs which link powerfully to fundamental aspects of human
emotional response. Symbolism is a level of meaning which is a direct function of sign reference, and the way references are structured in a piece. As such, it is a significant aspect of the way field-recordings can be used in making sonic artworks.
CONCLUSION

The main aim of this part of the study has been to apply the compositional possibilities of source recognition of environmental sounds to the area of field-recording. This has been emphasised in two main ways. Firstly, that field-recording is a process of creating sound artifacts, which have a significance as documentations of the sounds of real situations, places and objects. Secondly, by examining ways in which these materials may be used in composition on the basis of sign reference, and the extension of such references into the area of symbolism.

Sign reference rests on the potential for the listener to assign a sound to its physical source object, event or situation and it is in this sense that the documentary possibilities in field-recording are discussed - as the capture and reproduction of the sounds of a given environmental "field". At one level, this can be seen to emphasise an essentially receptive approach to the sounds of the environment - that sounds are documented for what the artist regards as intrinsically valuable or moving in the situations from which they spring. At a further level, this extends to the idea that the perception of ordinary and everyday objects and situations can be intensified through the listening attitude embodied in the recording process itself, and that the materials documented can be presented to the listener in a way which meaningfully enhances or extends the normal perception of these sounds in a "life" context. In other words, that source reference of sounds - as an aspect of perception by which humans define and orient themselves within the environment - is a springboard to the expressive potency of environmental sounds as signs in composition. As such, documentary use of field-recording represents the first stage in creative action, that the recording process forms an extension of the composer's
perceptions of the environment. Furthermore, the use of sound recording to document real acoustic spaces and events indicates the emphasis in the creative process as being away from "invention", towards processes which stem from the receptive nature of field-recording - the capture of extant sounds which exist outside of the "manufacture" of the composer. The crucial characteristic of field-recording which enables the transference of environmental sounds into the area of potential creative expression is the notion that the recording process involves the temporal transformation of the sounds, allowing them to be replayed and projected into any new acoustic space - any number of times - which further allows for the realisation of alteration of context. Furthermore, disembodiment of sounds from their actual physical sources is in this way to be regarded as an implicitly expressive phenomenon. This is because a listener's imagination is called on to piece together references in the process of source recognition when the sound source is not physically present.

One of the most valuable aspects of sign reference in composition with field-recordings lies in the fact that there is innate potential for listeners to feel a strong affinity with signs, because source recognition of sounds is such an elemental facet of the ordinary perception of the environment. This gives rise to an important point in the composer/listener relationship - that if the structuring processes that are applied by the composer stem from such a fundamental mode of perception, there is potential for a fully discernable unity between the materials of a work and the structural methods or processes involved. Inasmuch as field-recording deals with "found" materials, and that these materials may be regarded as stemming from a given or extant set of relationships in the field of the environment, sign reference functions for the listener through the particular experiential base of the individual. The more universal the experiential phenomena and
The role of sign and symbol outlined in this approach to field-recording demonstrates the importance of context—the sign references and how they are used in composition. In this part of the study, ways have been outlined in which composers have attempted, in the use of sign sounds, to present some meaningful insight into the objects or situations that they have approached and recorded. Processes that enable this, which may be broadly termed as the "articulation" of the materials, include: the juxtaposition and superimposition of sign sounds in montage; use of related or generative performance elements in a way that integrates another medium with the sounds; careful attention to how much of a given scenario is presented and the effect of this on the interpretation of the sign; transformation of the acoustical qualities of the materials (including simple amplitude alterations); and through the evocation of symbols. The potential role of symbolism is important in that sign reference of sounds can be used to suggest metaphors for images or ideas of deeper emotional significance than is necessarily implied by the immediate sign. Central to the ability of metaphors to be constructed and interpreted as such is, again, the perception of these in terms of a particular field or topic, in the context of which the juxtaposition of certain signs is capable of being interpreted symbolically. In general, then, all these processes of articulation are aspects of the creative handling of the materials wherein the sign content or symbolic potential of sounds can be made to produce a deeper emotional impact than might exist if the materials were regarded separately.

At a time when, in the development of all sonic art, aurally tangible relationships between the perceived nature of the materials and the compositional processes or methods
by which they are handled is being called for, a concept such as the source recognition of sounds in field-recordings is significant. Source reference is a fundamental aspect of the perception of environmental sound in life and, as such, forms the basis of an appropriate method of composition with such materials. This can be seen as a way of dealing with "meaning" in sounds which stems directly from the way in which environmental sounds are ordinarily perceived, and the role they occupy in human awareness. This is a property not shared by the application in composition of structural methods derived from models whose fundamental meaning lies outside of the criteria by which sounds are perceived, such as pre-existing numerical and proportional sequences and ratios. Just as these can be seen as contrived attempts to invest in music a concrete or self-justifying unity and meaning, a similar danger looms in the application of technological devices per se to the realisation of electroacoustic music. For there are traps in overemphasis on the technological processes of how sounds are produced and the capabilities of the necessary hardware and software, rather than the function that sounds have or are capable of in a musical structure. What must always remain paramount in the intention of the composer is consideration for how processes and materials integrate tangibly in the realisation of a work.