Boulez and Expression
A Deleuzoguattarian Approach

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Abstract

This study considers Boulez's music in terms of both structure and expression. In order to do so, it reorients and retheorises the problematic concept of "expression", freeing it from unhelpful previous usage. The post-structuralist theory of expression of the philosophers Deleuze and Guattari is explored in order to provide a means whereby musical structure and expression can be reconciled within one account. For Deleuze and Guattari, expression is a rhizomatic, connective affair in which a musical composition may be viewed as an "assemblage", as the product of flows from a number of media, which provide levels of expression and content for one another through their interconnectivity. While Boulez rejects a particular Romantic notion of expression, he clearly accepts the existence of a level of expression within music albeit as something which he has not fully theorised for himself.

Having articulated a theory of expression, the greater part of the thesis is taken up with the consideration of three main concepts which may be said to be "expressive" within Boulez's music, in terms of the theory. These are *difference* as variation, musical *spatiality* and musical *temporality*. Difference is considered at the levels of athematicism (the virtual theme), open form (virtual form), accumulative development and heterophony (the virtual line). Spatiality is considered in terms of Boulez's "diagonal" pitch dimension, smooth and striated pitch-space, the use of register, the articulation of a composition around significant polar pitches, timbral space and the use of the external auditorium space. Time and temporality are considered in the contrast of smooth and striated time.

Difference and repetition, spatiality and temporality are each discussed from a historical perspective as they occur within the writings and compositions of Schoenberg, Webern, Debussy, Stravinsky, Varèse and Messiaen. They are considered as they appear in Boulez's writings and in a number of his compositions. Reference is also made to similar tendencies in the work of Stockhausen, Cage and Birtwistle. Connections around these three central concepts are made with the work of Klee, Mallarmé, Proust, Char and Artaud. Finally, a connection is made linking Boulez's music of difference and his contrasting musical spaces and temporalities with the new, philosophical "image of thought" theorised by Deleuze and Guattari.

It is argued, in conclusion, that Boulez's music is expressive in the sense that many of its aspects connect with aspects from works of literature, visual art and philosophy. This does not lead to the equation of one artistic medium with another or the reduction of Boulez's music to literature, art, philosophy or, indeed, to previous music. It rather recognises that this music is expressive insofar as it makes difference and alternative conceptions of space and understandings of time, audible in a way which is not usually the case within music. These ideas are recognised to be not uniquely Boulezian. Nevertheless, Boulez is seen as one of the most important post-war composers to have allowed these basic materials to become, not only components within the structural apparatus of his music, but also a content which the music may be said to express.

Contents

Introduction 1

1. Boulez as Composer: A Critical Survey 5
- Descriptive Analyses 10
- Reconstructive Analyses 11
- Ecriture and Perception 16
- More Specific Studies 20
- Musical Modernism: Creative Connections 23
- Orientations 27

2. Boulez and Expression 33
- Topic Theory and Mythic Semes 35
- Musical Modernism and Expression 39
- Boulez and Expression 43
- Musical Content and Expression 52
- Content and Expression: A Deleuzoguattarian Perspective 57
- A New Image of Thought 63
- Boulez: A Rhizomatic Approach 71

3. Boulez and Musical Difference

- Introduction 77
- Deleuzian Difference 79
- Twentieth Century Music, Difference and Repetition 88
- Athematicism: The Virtual Theme 98
- The Open Work: Virtual Form 122
- Difference as "Accumulative Development" 136
- Heterophony: The Virtual Line 141
- Boulezian Heterophony and the Deleuzian Fold 147
- Difference and Repetition: Loose Ends 149
- Summary and Conclusion 152

4. Boulez and Musical Spatiality

Introduction 158
What is Musical Pitch-Space? 160
Interior Pitch-Space and the Diagonal 166
Smooth and Striated Space 179
Registral Space 188
Polar Notes 216
Exterior Spatiality 226
Timbre Space 239
Summary and Conclusion 252

5. Boulez, Time and Temporality

Introduction 255
Music, Time and Temporality 257
Modernism, Time and Temporality - Bergson and Proust 262
Time and Temporality within Twentieth Century Music 268
Boulez, Tempo and Duration 276
Two Temporalities: Smooth and Striated Time - In Theory 280
Smooth and Striated Time - In Practice 286
Static Temporality within Post-War Music 306
A Deleuzoguattarian View 309
Summary and Conclusion 316

Conclusion 321

Bibliography 328

Introduction

"Boulez and Expression: A Deleuzoguattarian Approach". This rather curious title is intended to draw immediate attention to the three main ingredients within the study, namely the music of Pierre Boulez, the philosophy of Gilles Deleuze and Felix Guattari and the question of musical expression.[1]

The difficulties involved in the analysis of post-war music, and of Boulez's music in particular, are well known. Many of them will be reprised in the Chapter One overview of the literature which identifies some of the most significant currents within Boulez studies. The starting point for the present study is the conviction that many of the difficulties encountered within some studies of post-war music result from an absence of explicit analytical criteria or the application of unsympathetic theoretical approaches. Kerman, for example, highlighted the failure of much musical analysis "to open access between the artist and his audience" or "to confront the work of art in its proper aesthetic terms" (1994 p.13).[2] Musicology and musical analysis have clearly opened out in recent years and alongside the proliferation of theoretical approaches which has ensued, there is a recognition that there is no one

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[1] The appellation "Deleuzoguattarian" is taken from Ronald Bogue (1989) who employs it to refer to the "collaboratively developed ideas" of Deleuze and Guattari. While we will frequently refer to this joint body of work, we will also draw liberally upon Deleuze's independent writing and much less so upon Guattari's solo work.

[2] Kerman is critical of the reduction of music analysis to the consideration of form alone and the consequent presumption that musical content is "equivalent" to form. He articulates, what he takes to be, the hidden ideological assumptions within much analysis and, while acknowledging its strength, namely its "precise and systematic vocabulary" [Cavell], he also recognises limitations such as its far from straightforward scientific pretensions, its failure to consider many other significant contributory factors within the creation of a piece of music and the reduction of analysis to a nineteenth century organicist ideal. Robert Morgan's notion of a more extensive analysis is offered as a preferred option. This model is one in which the analysis of new music may include consideration of a "composer's intentions", "the compositional system", "older music", "present-day music" and "perceptual properties and problems". For Morgan "there is really no end to the possibilities that could enable this list to be extended" and he suggests that "a pressing responsibility of present-day analysis is to indicate how new music reflects present-day actuality" (quoted in Kerman 1994, pp.30-31).

"correct" way to study music since every music may suggest its own analytical and musicological criteria.

It is no different with the music of Pierre Boulez. The present study forms a musicology based on the theory of expression developed by Deleuze and Guattari. This theory, in turn, enables us to consider Boulez's music in terms of three principal concepts, namely *difference*, *spatiality* and *temporality*. It would be a mistake, however, to imagine that the result is simply the application of Deleuzoguattarian theory to Boulezian music - the actuality is much more labyrinthine or *rhizomatic*, as Deleuze and Guattari would say. The relation between the work of Boulez and that of Deleuze and Guattari is complex and irreducible to simple summary. Nevertheless, it may be said that it has its origins within an exchange of concepts across the spheres of Modernist art, literature, music and philosophy. These are the primary sources from which Boulez and Deleuze and Guattari conceptualise their creative universes. At times they independently articulate musical and philosophical concepts from their common interest in the same artistic sources. Alternatively, Deleuze and Guattari acknowledge direct borrowings from Boulez's work while, less frequently, Boulez recognises a connection with the concepts of Deleuze and Guattari.

While it is obviously not necessary to study Boulez's music through the philosophical concepts of Deleuze and Guattari, the present study has been conducted in the conviction that their philosophy provides an entirely appropriate way of handling some of the most important elements within his music. Their philosophy is a conceptual one - they create concepts which they think of as practical tools to be used for particular purposes. If more traditional musicology has not always been successful in dealing with Boulez's music it may be that it has lacked the necessary tools, the right concepts for the job. While many of the aspects of Boulez's music which are considered within this study are also discussed elsewhere in the literature, there is a certain sense in which their inclusion within a Deleuzoguattarian framework allows them to be viewed afresh within a rich network of connections.

There are far too many students of Modern philosophy, far too many readers of Modernist literature and far too many viewers of Modernist art who are unfortunately not also listeners to (or performers of) a contemporary music consistent with the sophistication of their artistic and philosophical tastes. Their musical inclinations often seem strangely out of step with their philosophical, literary and artistic preferences. Boulez has drawn attention, for example, to the seeming anomaly in Joyce's partiality for simple Irish folk songs and his lack of engagement with the challenging Modernist music of his time. It is an example which has been raised to a principle.

One way of opening out Modernist music such as that of Boulez to this potential audience may be to show how the music connects multifariously with aspects of philosophy, literature and of art. This is not to justify the creation of spurious connections or the inappropriate extraction of aspects of artistic and literary preference from the composer's biography. The *lines of flight* which are drawn must clearly connect with the music itself and be mutually illuminating or mutually expressive.[3] It is exactly this which the philosophy of Deleuze and Guattari can offer. Their theory of expression, the conceptual cross-referencing which links their work with that of Boulez and the Modernist artistic legacy which they share provide us with genuine concepts or tools with which to explore Boulez's music and writings and a way of showing its expressive power through its relation to philosophy, literature and art.

The result should be neither a crude juxtaposition of media nor a simplistic reduction of media. It is possible to respect the distinctiveness of music, philosophy, literature and art while recognising that we should not view them in a *molar* way but rather in their *molecularity*.[4] This means simply that when considering the expressive value of a work of art it is possible to view it in terms of the *lines of flight* which constitute it and to recognise that these *lines of flight* emanate from a multiplicity of sources. So it is that the *lines of flight* which form a musical composition are not necessarily musical in their origins. The composition may well be the product of *lines of flight* which have found their way from works of philosophy, literature, art, or indeed, countless other sources including other musics. They come together uniquely in the formation of any innovative musical composition.

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[3] The Deleuzoguattarian concepts of the *rhizome* and the *line of flight* are explained in Chapter Two pp.31-34.

[4] Deleuze and Guattari contrast the concepts of the *molar* and the *molecular*. The *molar* is characterised as a fixed block of significations which remain rigidly structured. The *molecular* indicates fluidity and movement.

It is the task of the present study to discuss this theory of expression in relation to Boulez's music and writings and then to show how the concepts of *difference*, *spatiality* and *temporality* may be understood as the result of a significant number of *rhizomatic* connections, of *lines of flight* linking Boulez's music expressively with a variety of philosophical ideas and works of art.

Chapter 1

Boulez as Composer

A Critical Survey

In embarking upon a study of a composer's work, it is traditional to begin by surveying the existing research in the field, in the context of which the present study can then be placed. It must be acknowledged, from the outset, that while no up to date, comprehensive bibliography of Boulez studies is presently available, the number of books, articles and reviews which deal with his work is considerable, given that we are speaking of a living composer. It hardly needs to be said that since it is neither possible nor desirable to discuss all of the literature, this survey is, of necessity, selective and partial in its consideration. Its goal is not to summarise or to comment upon every contribution, but rather, to direct the reader through the literature, identifying general trends and tendencies within the writing. Many of the studies referred to within this survey will be called upon again in later chapters. Where this is the case, their consideration within the present chapter has been kept to a minimum. Furthermore, the categorisation of studies which has been adopted is at times ambiguous since certain studies clearly qualify for inclusion within more than one section.

Boulez has been nothing if not controversial throughout his career and he evokes violently contrasting responses from many quarters. He is credited by several writers as having an evolutionary musical perspective and is said, by some, to have faithfully maintained his original musical project throughout his compositional career. This notion is glimpsed in Golea's polemical and rather historicist account in which the writer tells us that it is his role "to note the irresistible progress of [Boulez's] evolution" (1982 p.53). Daniel Charles terms Boulez "the master of the evolutionary mode of thinking" (1965 p.146) and Nattiez says that "there is absolutely no doubt that Boulez has a latent, secret wish to round off the history of music at the same time as carrying it forward and giving it a further impetus" (1986 p.20). Griffiths tells us that "right from the first he has been guided by the need to lay new foundations for the musical 'language'" and that his early efforts were a perhaps naive attempt to "fix the [musical] language ... for a long time to come" (1978 p.7). Jameux, however, records that this "Utopian ideal of a unified language" prevailed for two years at most (1991 p.55), and Calum MacDonald suggests that, while it lasted, the "deeply authoritarian Paris-Darmstadt axis led by Boulez and Stockhausen" may have caused many of the problems in contemporary music (1990 p.51). Goehr is certainly not alone in celebrating the end of integral serialism and the "return to subjective preference" and emphasises that it was Boulez himself who rejected integral serialism as "impracticable" (1960 p.65). Nattiez and others record that the post-serial crisis in musical language (1949-52) and "the lack of technical means for adapting the actual sound material (whether electro-acoustic or instrumental)" (1986 pp.15-16), were the primary problems responsible for Boulez's consequent compositional difficulties and unfinished works.

As for the result of his supposed "evolution", Clive Bennett wrote in 1979 that had Boulez, "like Mozart, died at 36, as a composer his standing and influence would be no different from what it is today" (1979 p.33). Reinhard Kapp further dismissed Boulez as having "long been relegated to the unending line of historical cases" while the serial movement has resulted in total collapse (1988 p.2). Ann K. McNamee, writing in 1992, would seem to disagree with this judgement since she suggests that "the earthshaking early music of Boulez ... finds itself ripe for historical study" and that "after more than a decade of benign neglect ...[it] could quietly move into the mainstream" (1992 p.289; p.283).

There is a degree of recognition that while Boulez may have held to many of his most cherished principles, his musical style has clearly softened over the decades. Williams criticises *Répons* for its "lack of bite" and the "saccharine tendencies" of its instrumentation (1994 p.209), while Nattiez acknowledges that it "does not have the asperity of *Eclat* or of the *Second Sonata*" and that Boulez's literary style "is no longer scathing, polemical and provocative as it was thirty years ago" (1989b p.13). Williams detects a "loosening of structural rigour" but nevertheless, following Nattiez, believes that Boulez has achieved "a mode of musical thought ... capable of embracing the diversity and contradictions of advanced industrial society on a level as insightful as any cultural-theoretical practice" (1994 p.210). For Nattiez, *Répons* signals the completion of earlier unfinished or problematic works and may turn out to be Boulez's "masterpiece, and probably also one of the major works of the century" (1986 p.22; p.12).

Robert Craft noted in 1958 that all discussion of Boulez's work, with which he was familiar, was concerned with "ideas and techniques", paying very little attention to the music itself (1958 p.57). This impression was confirmed in 1962 by Nicholas Maw who wrote of a "studied evasiveness" in the consideration of Boulez's music among British musicologists (1962 p.162). Robert Piencikowski is critical of the dependence upon Boulez's writings which is found in many studies since he does not believe that Boulez's statements are as revelatory as is frequently assumed. Such work, he maintains, often merely confirms Boulez's own examples (1991a p.xxiii), while Rockwell surmises that "Boulez's explanations of a given piece sometimes fall uncomfortably between quasi-technical rigour and a well-meant vacuousness for the ... masses" (quoted in Jameux 1991, p.162).

It is well known that Boulez intends his pieces to be labyrinths and he has often said that they are not capable of analysis. Many commentators and analysts take this idea very seriously in their studies. Griffiths correctly observed in 1978 that *Le Marteau sans maître* "resists any kind of conventional serial analysis" (1978 p.37) while Deliège, in his study of *Improvisation I* from *Pli selon pli*, maintained that he did not want to probe too deeply because "the historical ground we are dealing with here hardly belongs to us yet" (1986 p.105). Susan Bradshaw suggests that "it remains for future generations of performers, less in awe of the present difficulties of style and idea (and instrumental technique), to uncover the emotional substance behind the often forbidding surface of the music." Bradshaw submits that "even the composer/conductor himself, too recently involved in its technical organisation, is at present unable to reveal much more than its surface structure, or even - dare it be said? - to understand the full expressive potential of his own creativity" (1986 p.127). Jameux is even more extreme in the conviction that there is "a level of analysis more properly left to the composer" (1991 p.250).

For Douglas Jarman "there seems to be something about Boulez's music that encourages commentators to lapse into vague generalisations and half-truths or into technical gobbledygook, as if the sheer complexity of the technical procedures involved in the music had to be either over-simplified or mirrored in the verbal complexity of the author's prose" (1987 p.282). LeFanu concurs, predicating the need for "a de-mystification book, one that brings us directly to the music by cutting through the overgrowth of technical jargon and self-justifying aesthetics with which", she maintains, "Boulez has protected it" (1988 p.47).

In terms of general studies, Golea's *Rencontres avec Pierre Boulez* (1958) considers most of the works from the *Flute Sonatine* to *Improvisations I* and *II* from *Pli selon pli* and identifies a significant number of elements within Boulez's practice. While it is a highly polemical study, it has the merit of being very close in time to the compositions and events which it describes and, while not dealing with any particular work in detail, it nevertheless provides an invaluable early account from the perspective of a Boulez supporter. Peyser's 1976 book and Heyworth's 1973 article, *The First Fifty Years,* provide valuable accounts of Boulez's career up to the mid-seventies, but are more concerned with biography than with musical analysis, while Griffiths' 1978 study, which is exclusively concerned with Boulez's compositions, provides many musical examples but only brief moments of analysis. Jameux's 1984 book views Boulez's career comprehensively from its beginnings to the mid-1980's, systematically chronicling Boulez's musical and literary production. He additionally provides twelve short "analytical introductions" to compositions ranging from the *Flute Sonatine* to *Répons* which provide many interesting insights into individual compositions.

The individual essays within Glock's 1986 *Symposium* each focus on a particular aspect of Boulez's output but together provide the most comprehensive account of his work up to the mid-1980's that is available. Gerald Bennett, for example, contributes a fascinating overview of Boulez's earliest compositions which is generously illustrated with musical examples and analytical extracts. He considers all of Boulez's compositions from the early songs with piano accompaniment and the *Berceuse* for violin and piano (1942 & 1943) to *Piano Sonata No. 2* (1948) which, he tells us, "represents the end of a first period of development in Boulez's work" (1986 p.77). Bennett believes that later versions of certain works reveal the paradox that as Boulez sought to gain ever-greater mastery over pitch and rhythm, the result was, in fact, a certain diminution of control. Bennett traces the interim developments in Boulez's style as he progressively experimented with whole-tone scales, pentatonic scales, polytonality, twelve-note rows and motivic development and he notes the variable influence of Messiaen and Webern within Boulez's emerging style.[1]

Charles Rosen focuses on some of the key theoretical and technical innovations within *The Piano Music* (1986 pp.85-97) considering these compositions variably in terms of their exploitation of pitch-space, their manipulation of serial and motivic writing, their form and their concept of musical time. Susan Bradshaw, in what is easily the most extensive section of the book, examines all of Boulez's instrumental and vocal works (except the piano works) beginning each commentary with a concise statement of the main innovations and goals of each piece. Her study is prefaced with a "brief survey of the aims, formation and expressive purpose" of, what was then, an "entirely new linguistic usage" (1986 pp.139-140) in which she considers "Rhythm and serial duration", "Pitch and duration groups", "Tempo, dynamics and timbre", "Musical space, pitch and time", "Form" and "Texture". Her discussions of compositions are generally focused upon the principal innovations which she identifies within each piece and the significance which each discovery may be said to have within Boulez's overall development. Her remarks, which are unconcerned with systematic description or analysis, are often of a general nature and result in a narrative plotting of Boulez's development. Bradshaw's essay is comprehensive in its coverage, contains numerous insights into the workings of individual pieces and is perhaps the first published study to give an account of Boulez's compositions with any degree of real analysis.

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[1] Bennett tells us that "in the *Onze Notations* the influence of Webern co-exists ... with that of Messiaen" while, in the *Sonatine for Flute and Piano* "much of Webern's influence has superceded that of Messiaen" (p.57). We are told that this "is the last work in which he makes use of clearly thematic writing" (p.61).

Descriptive Analyses

A small number of studies provide musical analysis of individual pieces in which the unfolding of a composition is described section by section. This is sometimes the result of the study of a score or, alternatively, the transmission of the aural experience of a particular performer or listener. While such commentary is often restricted to the consideration of particular sections of a work, the method is occasionally used for an entire work. Anthony Cross, for example, makes the point that to demonstrate how "a motive or harmony is derived from a twelve note series does not explain its formal or expressive significance" (1975 p.215). Since he is concerned only with those aspects of the work which are "*directly* perceptible by the listener", he consequently adopts the path of descriptive commentary in his short study of *Don* (1962) from *Pli selon pli,* an approach which becomes rather tedious when systematically applied to such a lengthy composition.

Michael Chanan is similarly interested in how we hear or "listen to" *Eclat/Multiples* (1970/71 p.30) and how we perceive shapes in the music, "in the continuous flux of sound." Chanan considers the possibility of different readings of the same passages, concluding that "it is a matter of chance which alternative reading strikes one first. But it is not arbitrary that the one leads (or rather shifts) to the other" (p.32). Like Cross, Chanan does not provide a detailed description or analysis of the work, but rather highlights the ambiguities within perception which he illustrates with examples.

It would seem that descriptive commentary works best when it is brief and when it is applied to works which have the most obviously audible or visible forms. The short descriptive analyses produced by Jameux (1991), for example, provide overviews of works which can help to direct the listener. It is a procedure which he uses to good effect in his account of the *Sonatine* (1946) and *Répons* (1981-84). Lawrence Morton (1985) similarly provides a useful verbal description of *cummings ist der dichter* which again succeeds through its brevity.

Reconstructive Analyses

A second category of study refers to what may be termed reconstructive analyses. These are projects which attempt to discover the composer's working materials (pitch, rhythm, dynamics, timbre and so on) with a view to retracing the processes of the piece from first principles. A large number of studies, which use very different methodologies from one another, may be viewed within this category.

In an analysis of the pitch organisation within Boulez's *Sonatine for Flute and Piano,* Carol K. Baron (1975) begins with the series from which the pitch material is developed and identifies some important devices within the piece, including tonal pivots and key motives. She names the row segments according to Forte's pitch-class sets and analyses bs 1-29 in terms of the series, deeming further analysis to be "unnecessary, since the same principles are followed throughout the piece" (1975 p.91). She convincingly demonstrates the 12-tone building blocks of the piece and the main principles of construction which, as she tells us, operate on two levels: (1) "individual sections, which make up the large form, with short interruptions recalling material from other sections" and (2) the recurrence of the minor third C-E flat (pp.92-93). In doing so, Baron seems to have covered some of the most important basic mechanisms within the piece, revealing important points of articulation and clarifying Boulez's early compositional practice.

Franck Jedrzejewski (1987) has similarly studied the place of dodecaphony in Boulez's *First Piano Sonata,* in which he explores the use of the series and the characteristic motives which Boulez derives from it. In a study of sonata form in the first movement of the *Second Piano Sonata*, Peter McCallum conceptualises his analytical role as that of the archaeologist who must unearth what Boulez has concealed beneath the surface of the work (1992 pp.63-64). He details Boulez's methods for splitting-up significant motives into their constituent intervals and the "piling-on" of detail to the point of complexity where they are no longer recognisable. He examines Boulez's application of serial thinking and the survival of certain aspects of "the old tonal form" (p.64).

McCallum shows how the untransposed version of the motif acts as a kind of pillar in structurally important places and he catalogues significant motivic appearances within the movement. While he finds some passages to be "relatively transparent", others are judged to be "difficult and perhaps futile to trace without access to sketch material" (p.70). Despite being able to present a clear outline of the movement's form with subjects, tempos, textures and bar numbers, McCallum tells us that "the vast majority of the motivic argument only exists at the analytical level and can only enter our perceptual experience in a very general way", a factor which he believes forms the "aesthetic paradox" of the work (pp.72-73).

In a study of *Structures Ia* Lynden DeYoung tells us that "Ligeti [in his analysis]... could find no direct relationship between each pitch set and its note values" and that he therefore concluded that "the choice of durations, though in itself logical ... is all the same arbitrary" [Ligeti's words]. DeYoung, however, finds a relationship between pitch class and duration set derived from the second movement of Webern's *Piano Variations*. This movement, he tells us, "displays a set of dyads formed by vertical combinations of P and I [prime and inversion]. The basic set comprises a chromatic progression outward from a unison to an octave a tritone away". DeYoung says that "these same dyads provide a basis for a relationship between pitch order and duration in *Structures Ia*" (1978 pp.28-29).

Le Marteau sans maître has received more serious analytical attention than any other of Boulez's works. Piencikowski describes his extended study of the piece as a "sketch" and he limits his enquiry to "the already plentiful information supplied by the score" (1980 p.194). He discusses and analyses the extracts from Char's poetry which are set by Boulez, noting some of the different readings which are afforded by Char's idiosyncratic syntax. Piencikowski considers a number of aspects of the music including its form and structure, instrumentation, compositional techniques and the "conjunction" of music and text, and his intention is to sketch and illustrate the basic elements and procedures of the piece from a variety of angles rather than to account for every moment of the work. Lev Koblyakov*'s* 1990 study, in contrast, provides a much more detailed analysis of *Le Marteau* but purely from a poietic point of view since his goal is to recover the basic materials and techniques with which Boulez composed the piece. Boulez seems to have been impressed by Koblyakov's work, but Steve Sweeney-Turner identifies Boulez's influence throughout the text and feels that Koblyakov's "Sherlock Holmes" approach to analysis "relegate[s] the consideration of the affective qualities of the music itself to mere periphery; as if the analysis of a piece of music should always lead us back, behind the piece, to the Composer" (1991 p.40). Griffiths similarly wonders "how the process confers or determines the work's meaning and value" (1995 p.82).

Koblyakov's analysis of the first cycle is impressive in its logical exposition, especially since, as he tells us, it is mostly due to "*musical intuition*" (1990 p.2). Beginning with the general series, which never actually appears within the first cycle, Koblyakov shows how Boulez has divided it in accordance with the proportion row 24213 in order to form five derived series, each with five groups. Boulez is then shown to have transposed the pitches of four of the five derived series and multiplied each group, by the other four in its series, to form five harmonic fields. There are now five domains, each containing five harmonic fields and each with five multiplied groups (pp.3-5; p.137).

Koblyakov provides domain charts of the type featured by Boulez in *Boulez on Music Today* and the article *Eventuellement*. He shows how Boulez produces the pitches of the first cycle by following vertical, horizontal and diagonal paths through the domains. The analysis is very thorough, tracing almost every note to its group, field and domain. While Koblyakov maintains that "the movement from group to group is to have a certain meaningful direction", he does not, however, clarify what this entails (p.17). He notes that the semiquaver is the duration base of the whole of *Le Marteau* and he produces dynamic grids, analogous to the pitch domains, to demonstrate Boulez's organisation of dynamics. He shows that the durations and attacks are also arranged through the agency of "the multiplication technique" and that all of the movements within the first cycle develop formally "from the initial division of the general series into five parts" (p.31).

The second cycle is shown to be based on "the same general series" which Boulez used in the first cycle and Koblyakov details how Boulez "deduces 11 derived series" from this general series, "the variation of which forms the whole second cycle" (p.35). He explores Boulez's use of defectivisation, in which "the various parameters of a series ... are used only partially, i.e. they do not have all the 12 gradations" (p.37). In all, the second cycle is seen to be composed of eleven sections within which the gradual freeing of series "from defectivisation" is "the main feature of development" (p.40). Koblyakov highlights Section XI from the sixth movement as significant since it features Boulez's first free development of material in his works dating from the fifties (p.63). Overall, the harmony within the second cycle is said to be the result of either "the simultaneous presentation of several series, or ... the compressed presentation of one series" (p.71).

Of the third cycle, Koblyakov surmises that Boulez may have employed "the same general series as in the first and second cycles of *marteau*, though in a different way" (p.79). He does not seem to have fathomed the harmonic workings of the third cycle to the same degree as with the first two, although he tells us that the harmony of the fifth movement "is based on twelve-tone vertical rows" (p.83) and that the ninth movement is made up of "three large sections", the first of which features quotations from the central movements, but presented in reverse order (p.85).

Stephen D. Winick (1986) analyses only the sixth movement of *Le Marteau* which, as Koblyakov has shown, is the point at which Boulez reintroduces the greatest amount of freedom into the music (Koblyakov's section XI from the second cycle). Again, it is an analysis of compositional practice, focusing on the basic pitch-duration associations with which Boulez began and not on the piece as it is heard. He dissects the movement into twelve pitch-duration associations (PDA's) and examines their pitch order. This results in the discovery of a variety of ordered pitch arrangements within the PDA's including many palindromes and symmetries. Winick (1) follows each of the PDA's through individually; (2) considers the twelve PDA's simultaneously (within the music) and finds that some pitches from a variety of PDA's "synthesize or cluster to form new, symmetrical relationships on a 'macro-level'", identifying twelve such clusters; (3) displays the symmetrical structure of PDA clusters; and (4) presents further characteristic examples of symmetry within *Le Marteau*.

Building upon this work, Wayne C. Wentzel finds that "the dynamic-attack association ... conforms completely with Winick's theory" and that "over 80% of the pitches in this movement ... [agree] ... in pitch, duration, dynamic, and attack" (1991 p.148). Wentzel is interested in the other 20% and tries to find musical reasons to explain Boulez's changes to the values in his system, noting, however, that the dynamic-attack associations are mostly concordant with the symmetrical relationships created by the distribution of the PDA's (p.160).

Despite their complexity, none of the studies so far considered has benefited from consideration of Boulez's sketch material. Allen Edwards has written a very interesting article on the Boulez archive at The *Paul Sacher Stiftung* which houses the sketches and scores for nearly all of Boulez's works "including the more-than-50-percent share that currently remains unpublished and otherwise inaccessible". We are told that "the archive contains not only the final manuscript scores of published and unpublished works, but a vast body of sketch material revealing the gestation process of the often multiple versions of each, from original tone-row to finished (or unfinished) composition" (1989 p.4). As Bradshaw notes, "*Messagesquisse*, *Dérive* and *Memoriale* .... the Sonatine, the first two piano Sonatas, *Le marteau sans maître* and Improvisation II from *Pli selon pli* ... remain the only works in his entire output that have not been submitted to some degree of revision" (1989 p.170). Edwards' article is an overview, "a chronological discussion of certain unpublished works, or unpublished sections or versions of works". It provides important information concerning aspects of the *Third Piano Sonata, Figures Doubles Prismes, Poésie pour pouvoir, Pli selon pli, Eclat-Multiples, cummings ist der dichter, Domaines, Rituel, Livre pour quatuor* and *Répons*.

Studies which draw upon the sketches contained in the *Sacher Stiftung* include Edwards' own "preliminary study" of *Doubles* and *Figures Doubles Prismes* (1993), several essays by Robert Piencikowski, including a study of *Eclat* (1993) and some short studies by Raphael Brunner on *Improvisation III* from *Pli selon pli* (1996); Peter O'Hagan on *Trope* from the *Third Piano Sonata* (1998); Werner Strinz on *Polyphonie X* (1999) and Sangtae Chang on Boulez's "Discursive Twelve-Tone Practice" (1999). Piencikowski's study of *Eclat* is particularly interesting since it traces the gestation of the material within *Eclat* from its initial appearance within Boulez's lost score for *L'Orestie* (1955) to its successive manifestations within the solo flute piece *Strophes* (1957) and the original *Don* for soprano and piano (1960), both of which are unpublished.

Ecriture and Perception

While the reconstructive analyses are impressive in their capacity to show how particular pieces were generated, it would seem that they have difficulty in contributing to our perception of music. According to Nattiez, "there is no point in trying to reconstitute the private, labyrinthine workings of the composer's mind, that 'indestructible kernel of darkness' ... that permits neither knowledge nor analysis. All that is necessary is to understand the work's own dialectic and, before all else, to be able to draw conclusions from it for the future" (1986 pp.19-20).

For Fred Lerdahl, Koblyakov's analysis of *Le Marteau* has not changed the way we hear it since, prior to its analysis, "listeners made what sense they could of the piece in ways unrelated to its construction" (1992 p.97). Lerdahl uses the perceptual difficulties provoked by *Le Marteau* to argue that perception depends upon seventeen distinct "constraints" which, for him, demonstrate "why serial organizations are inaccessible to mental representation" (p.115).

In discussion with Boulez, Foucault attributed difficulties of perception to the way in which contemporary music tries to make each element within a piece "a unique event" (Boulez/Foucault 1985, p.10). Boulez, however, ascribes such difficulties to the "laziness" and "inertia" of listeners who do not persevere with repeated hearings of works, from which understanding comes gradually. He does allow that "beyond a certain complexity perception finds itself disoriented in a hopelessly entangled chaos" (p.12) and admits elsewhere to using "the brevity of a sound object or its length to orient or disorient the perception of timbre" (Boulez 1987, p.168). Providing an example from *Eclat,* he tells us that he, at times, purposely suppresses analysis and deliberately confuses perception. McCallum provides two possible ways of making sense of such non-perceptible structures. The first, drawn from William James, suggests that since such works have real structures, it may be that we can intuit them in some inexplicable way, even though we cannot perceive them precisely. The second explanation, from Alexander Goehr, tells us that "technical procedures which remain largely imperceptible to the listener" may still play an important subconscious role in increasing "the intensity of expression in a work" (McCallum 1992, pp.72-73).

The cataloguing of analyses into poietic reconstructive analyses and into more esthesic descriptive analyses corresponds well with Nattiez's semiological division of post-war composition in terms of a "discrepancy between poietic and esthesic" approaches (1993b p.173). Nattiez distinguishes the "poietic-centred tendency of Boulez and the neo-serials who emphasise *écriture* and compositional structures" from the "esthesic-centred tendency of the acousmaticians and the American repetitive school for whom the sound conceived must correspond as far as possible to the perceived sound" (p.180).[2] Integral serialism is charged with emphasising the poietic aspect of musical production to the neglect of the esthesic, since its "poietic-centred obsession" made it "'forget' perception". Nattiez maintains that, with *Répons*, Boulez is one of the first composers to have reestablished the connection between poietic and esthesic levels within composition, without rejecting the principles and complexity of his early works (p.204). He wonders whether *Répons* marks a renewed "balance between the poietic and the esthesic" perhaps produced in response to electroacoustic music, to Cage's perspective and to the crisis within atonality (pp.180-189).

Nattiez's study considers Boulez's use of envelopes and signals, in which "the trajectory becomes more important than each of its moments" and the important "structural changes in the unfolding of the work" are underlined (1993b p.191). Nattiez provides several examples from *Répons* in which Boulez integrates "knowledge of esthesic processes with poietic strategies" (p.191). These include the clear articulation of subsections within the work through a variety of means, such as the use of characteristic tempi, distinctive orchestration and the alternation of aleatoric and fixed sections. Signals are provided for the listener through the employment of polar notes and the strategic placing of particular notes, chords or silences which assume structural significance and help guide the listener through the work (p.195). Perception is said to operate on two levels with envelopes and signals providing an initial path through the work, to be followed by a more detailed reading. Nattiez nevertheless notes a certain irony in Boulez's adoption of devices such as the *envelope*, the *signal* and the *aura* in their resemblance to Schaeffer's concepts of the *allure*, the *accident* or *impulsion* and the *resonance* (p.204), a particularly interesting observation given the uneasy relationship between the two men.

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[2] Nattiez explains that "the distinction between 'poietic' and 'esthesic'" is found in Paul Valéry's inaugural lecture for the *Collège de France* in 1945. Valéry, however, did not in fact use the term "poietic". Nattiez's understanding of the word is taken from Gilson via Molino. Nattiez also tells us that "the word 'esthesic' was Valéry's neologism". The poietic is said to include "(1) deliberations on what must be done to produce the object; (2) operations upon external materials; [and] (3) the production of the work." The esthesic is said to include "enjoying, contemplating or reading a work, musical performance, as well as scientific and analytical approaches to music" (Nattiez 1990, pp.10-13).

Nattiez discusses the significance of the five chord matrix which forms the basis of *Répons*. He tells us that it: (1) prepares "the base material" of the piece producing "scales, networks of intervals, durational relations and the potential for proliferation among which the composer makes his choice"; (2) "protects the composer from returning to archaism of écriture"; (3) "gives birth to a work organised, *grosso modo*, at two levels", the level of the macrostructure organised through envelopes which "defines the curve of the work and its larger form" and the microstructural level of local detail (1993b pp.201-202).

Like Nattiez, Deliège (1988) acknowledges the much greater attention given to the perceptibility of *écriture* within Boulez's works from the time of *Structures* book II and, more especially, *Eclat* onwards (1988 p.199). Deliège's study of the orchestral introduction to *Répons* again discusses the dominance of the five basic chords underlying *Répons* and their relationships and derivations. Deliège looks to characteristic figures in *Répons* such as the trill, repeated notes and harmonic/timbral complexes (1988 p.188) He further considers the piece from the point of view of counterpoint, transposition, imitation, polar notes, distinctive chords, appoggiaturas and the contrast of pulsed and unpulsed rhythms.

Ecriture and Perception by Antoine Bonnet (1987), is an excellent example of an analysis which attempts to deal with compositional materials on the one hand and the piece, as it is heard, on the other. With regard to *écriture,* he shows that "*Messagesquisse* is entirely organised on ... a series of six notes ... able to lend itself to various manipulations" (1987 p.196). He tells us that sections 4, 3 and 6 are retrogrades of sections 1, 2 and 5 and that there are "three levels of perception: sections 1-4, 2-3 and 5-6" (p.201). Bonnet provides examples of the techniques which Boulez used to generate the pitches and rhythms, analyses a little of each section, demonstrates the main techniques which are employed and then leaves the reader to complete the task, if desired. At the level of perception, he reinforces the division of the work into three parts 1&4, 2&3, 5&6 through their similarities of figuration (p.202). He tells us that while sections 1, 3 and 4 are readily perceptible, "sections 2 and 5-6 do not offer enough elements for the process to be understood.

No audible logic can embrace them, if not that of rupture" (pp.205-206). Bonnet then conceptualises Boulez's compositional procedure as one which is fundamentally based upon *écriture*, forming a compositional grammar from neutral material and creating "a certain number of trajectories for perception" (p.207). Bonnet is interested "in the 'written' something that cannot be heard" and "in the 'heard' something that cannot be written", telling us that *Messagesquisse* reveals "the limits of this divergence" (p.208).

More Specific Studies

In addition to the descriptive analyses, reconstructive analyses and studies which attempt to combine attention to both poietic and esthesic dimensions, a fourth category of study examines compositions purely in terms of one or several specific aspects. Many of the descriptive analyses and reconstructive analyses which have been discussed already could just as easily have been considered at this point. The series of studies produced by Ivanka Stoïanova in the 1970's all focus on particular aspects of Boulez's works. Her lengthy analysis of the five movements of *Pli selon pli,* divides *Improvisation I* into eight sections, categorised by tempo, vocal or instrumental ensemble and particular instrumentation. She writes of correspondences, timbral relationships and organisational principles, telling us that "the relationships of the material, of the sound colours, the music-text relationship [and] the distinctiveness within the temporal organisation engender the original form of the second improvisation" (1973 p.85). Stoïanova discusses some of the possible choices open to conductor and performer within *Improvisation III,* examines some of their consequences, traces the correspondences between *Don* and the improvisations and describes the development of *Tombeau.*

Of the 1970 version of *cummings ist der dichter*, Stoïanova says that it is an example of Boulez's practice of repeating the same characteristics differently over distance (1974b p.82). She tells us that this procedure is familiar from *Le Marteau sans maître*, from the *Antiphonie* and *Constellation - Constellation-Miroir* formants of

Piano Sonata no. 3 and "is transformed in *cummings ist der dichter* in a more complex, more flexible and less evident way". Stoïanova enumerates the compositional devices of the piece in some detail and we are told that it is based on three working procedures: (a) "the successive opposition at a distance" of the same contrasting characteristics; (b) the simultaneous superposition of contrasting components which do not interact and (c) "the polymorphous fusion resulting from the interaction and interpenetration of the divergent characteristics" (pp.83-85). Although the processes of the piece are described, they are not identified within the score or illustrated with examples. Stoïanova (1976) describes *Rituel* in terms of the concepts of narrativism, teleology and invariance; the binary oppositions of vertical/horizontal textures and Modéré/Très Lent sections; the tritone relation; the E flat pitch axis; the number 7; the importance of transformation and multiple routes for reading and hearing the work. She provides a very good sense of the compositional materials and processes which are employed, but again does not examine the piece as it actually unfolds.

Piencikowski has examined the role of pitch transformation which he believes to have a singular place in many of Boulez's compositions. He suggests that the pitch parallelism which he finds in *Structures Ia* may be the "prototype of Boulez's future transformations" (1985 p.69) and he tries to follow through the consequences of the mechanisms of the first livre of *Structures* in later works, to show how "the structural properties of the intervals" set things up (p.72). In *Rituel,* Piencikowski shows how Boulez derives a series of transpositions from a "mother cell", arranging them in such a way that the pitch of E flat, which is pivotal in *Rituel*, forms a diagonal across the seven transpositions (pp.67-68). This is a similar procedure to that shown in Bonnet's analysis of *Messagesquisse*. Piencikowski similarly detects axial transformation in the ninth piece of *Le Marteau*, both *chapitres* of *Structures II* and *Eclat* and he interprets these as "multiple facets of an evolving musical reality" (p.79). His rationale for providing only "a brief survey" is his concern not to reduce Boulez's practice to a "dull historicism" (p.76).

Further studies which focus on one particular aspect or another of Boulez's compositions include the work of Béatrice Ramaut (1992), who has analysed his use of citations in *Dialogue de l'ombre double*, Francis Bayer (1981), who considers the phenomenon of musical spatiality within his music, and David Gable (1990), who has produced a very interesting overview of Boulez's output in terms of its articulation of dynamics, treatment of time, harmonic language and tonal space.

A small number of studies consider Boulez's relationship with technology. Jameux tells us that Boulez has drawn on the attitudes of the compositional community along with certain personal "differences in process" (1984 p.11). He says that Boulez came to tape music with the specific goal of integral serialism in mind and that his "compositional preoccupations ... predated the encounter" (p.13). Boulez, we are told, learned two lessons: (a) "the subordination of the ... [machine] to the compositional project itself" and (b) that while the machine can achieve things beyond the capability of any performer, this does not "imply any devaluation of the role of the interpreter." It is not a performing machine. Its role is rather to bring about "the reintegration of certain freedoms into performance" (p.14).

Tod Machover reveals something of the researches into computer music and general programming undertaken by Boulez before he composed *Répons,* especially "the systematic transformation of live instruments by real-time computer, and the use of LISP-type programs to produce compositional structures". Machover tells us that "Boulez's interest in computer-automated processes, in transformational echoes and acoustic resonances, had a direct effect on the compositional method and style of writing of the work, as much for the orchestral instruments as for the electronic treatment" (1984 p.3).

Andrew Gerzso, who was Boulez's musical assistant on *Répons*, demonstrates the link between Boulez's technical and musical thought through exploration of part of *Répons*. He describes the transformation processes which are employed and discusses the music at rehearsal number 21, focusing particularly upon pitch relationships. He examines the first of the soloists' answers in some detail to clarify the relationship between traditional and electronic writing, describing "the latter ... [as] merely an extension of the former" since "the electronic transformations answer the traditional writing and ... a chain of answers crosses over from the domain of traditional writing to that of electronic writing" (1984 p.34). Gerzso (1988) further describes the workings of the technology employed within *Répons,* its processes of spatialisation, and the derivation of the material from the five base chords through Boulez's pitch multiplication techniques.

Musical Modernism: Creative Connections

Several studies consider Boulez in relation to the other arts. Stacey's *Boulez and The Modern Concept* contextualises him among "the painters, poets and musicians who were influential in the formation of his language and style", in the conviction that music is too often studied purely on its own terms without reference to other art forms. He tells us that Boulez "can be understood in terms of these extramusical disciplines and appreciation of his music can be heightened by the adoption of this perspective" (1987 p.viii).

While Kandinsky, Klee, Mondrian, Schoenberg, Berg, Webern, Debussy, Stravinsky, Messiaen, Artaud, Genet and Beckett are all discussed, Stacey focuses particularly upon Boulez's relationship with the work of the poets, Char, Michaux, Mallarmé and Cummings. He considers the poetic texts set by Boulez and those works which, although not poetic settings, are profoundly influenced by poetry. Stacey collates valuable information about Boulez's use of vocal techniques, the background and meaning of the poetry, treatment of text, poetic and musical form. He notes Boulez's sensitive wordsetting and a noticeable shift in emphasis "observed in *Le visage nuptial* and *Le marteau,* from a preoccupation with vocal emission to an interest in formal qualities" (p.76). He traces the development of the relationship between music and text in Boulez's works from a close imitative relationship with the text, through various stages to the superimposition of musical and poetic form in the Mallarmé and Cummings settings. Finally Stacey considers Boulez's vocal settings and techniques in relation to other post-war composers.

Griffiths tells us that "the problems of [Stacey's] cross-disciplinary comparison ... proved recalcitrant" (1988 p.136) and Le Fanu complains that his title "implies a much broader range of disciplines than the book covers" (1988 p.47). Bradshaw casts some doubt upon the presumption that the young Boulez was quite as widely read as Stacey takes him to have been, especially since many of his remarks on music, in relation to the other arts, were apparently made retrospectively (1988 pp.58-59). While LeFanu claims that Stacey is "too much under Boulez's spell to attempt to demystify" (1988 p.47), McNamee believes that, despite its flaws, Stacey's study "leads the listener to the beauty and the audible structure of the piece at hand" (1992 p.287).

Like Stacey, Georgina Born (1995), believes that "the evolution of musical modernism must ... be understood within the context of broader cultural-historical forces" (1995 p.40). Although her study is primarily an ethnographical one, focusing principally upon the institution of IRCAM, she provides a very interesting account of some of the most important and distinctive features of musical Modernism, relating them, where appropriate, to Boulez. Modernism is, first of all, identified as "a reaction ... against the prior aesthetic and philosophical forms of romanticism and classicism" (1995 p.40), which Born interprets dialectically as a manifestation of the "negative aesthetic" or negation of the previous aesthetic (p.41). Born tells us that "Boulez, like Adorno, conceived of the mid-century serialist aesthetic as negational" (p.48), a position which she believes Boulez to have later rejected. Alastair Williams who, like Born, draws upon the Boulez/Adorno connection, interprets *Répons* against the background of "Boulez's continual search for an advanced musical material capable of circumnavigating the aporias of high modernism" (1994 p.197).

Several studies concentrate, in particular, on the Boulez/Mallarmé conjunction. Mary Breatnach has produced a significant study of the "poetic influence" linking Boulez and Mallarmé and "the relationship between poetry and music" which resulted in Boulez's *Pli selon pli*. Her purpose is to determine their "shared and definable vision of art and of artistic purpose" and to discover where "the common ground between the poetry and music lies" (Breatnach p.ix). Deliège suggests that Boulez has been guided by "an obsession with the Mallarméan model" (1986 p.101) and a shared "obsession with the perfect work" (p.105). He offers a "reading" of *Improvisation I* which focuses on "major convergences" in the poem and music and tries "to show how the Mallarméan project of rhythm and of movement of the verse is amplified by the music" (p.105). In *Form and Expression in Boulez's Don,* Anthony Cross examines chiefly "those aspects of the music which can be related to Mallarmé's poem" (1975 p.215), while Jameux provides an interesting extra-musical commentary on Boulez's choice of poetry in *Pli selon pli* (1985 pp.99-109).

Ivanka Stoïanova attempts "to elucidate the real relationship between the Mallarméan project of the Livre and Boulez's structural principles" (1974a p.9). In considering Mallarmé's writings, Stoïanova communicates a sense of the novelty and excitement of the ideas followed by a study of the *Third Sonata* which does not, however, provide a detailed working out of pitch/rhythm relationships since, as Stoïanova acknowledges, only Boulez knows the permutational laws of the piece.

In addition to the Mallarmé connection, Worton (1981) considers *The importance of the poetry of René Char for the music of Pierre Boulez*, while Nattiez (1993b) seeks to proliferate connections in the works and working methods of Wagner, Proust and Boulez. Claude Samuel's *Eclat/Boulez* (1986) features articles covering numerous aspects of Boulez's work including his connections with the work of Mallarmé, Proust, Joyce, Kafka, Klee, Eastern music and a variety of Western composers. Aguila (1992) has produced a very interesting study of Boulez and *Le Domaine Musical* which, while chronicling the music-making of the period, also provides much valuable information on the shifting aesthetic currents among the post-war avant-garde.

Much of Boulez's own writing on the work of other composers gives the impression that he is in fact talking about his own compositions. His writings far outnumber the few studies by other writers which consider his relationships with other composers. Arnold Whittall, for example, examines Boulez's sometime prejudices against Schoenberg and Berg and his championing of Debussy and Webern. He contends that "if he exaggerates the effect of Schoenberg's traditionalism he fails to make enough of Webern's" and that his "writings on Schoenberg are among the most fascinating examples of articulate prejudice available to the musician" (1967 pp.135-136). Debussy's legacy to Boulez is examined by G.W. Hopkins, who finds "recognizably Debussian gestures ... in virtually all of Boulez's music" (1968 p.710). Golea chronicles the early troubles with Messaien in the fifties and Craft reconstructs, with the aid of Stravinsky's letters, the composer's dispute with Boulez. It would be interesting to see Boulez's letters to Stravinsky. Nattiez finds in the Boulez/Cage correspondence the recreation of "the musical climate of the times" (1993 p.6) and notes the "surprising and significant status" the letters have achieved in retrospect (p.3). He acknowledges that "in aesthetic terms, the ... encounter could not have been anything other than a misunderstanding" (p.15) and how "on Boulez's side, the worm was in the bud right from the beginning" (p.8). Nattiez tells us that Boulez derived from Cage the proof that "it is possible to create non-tempered sound-spaces, even using existing instruments" (Boulez, cited in Nattiez p.8), a kind of alternative organisation using charts subject to rational control, whole numbers to build pieces and a way of conceiving rhythmic construction based on real time. In return, Boulez gave Cage the idea of aggregates and the concept of mobility. We relive, with Nattiez, Boulez's abhorrence of the free role given to chance in Cage's music and Cage's response to Boulez's adoption of chance, but on his own terms.

Reinhard Kapp has produced an interesting study of the dispute between Leibowitz and Boulez over music theory. Kapp's objective is to achieve "a just appreciation" of Leibowitz as a musician, not to chronicle "the history of their personal relations" (1988 p.3; p.6). He identifies the role assigned to rhythm as the problem between them and tells us that Leibowitz believed that rhythm should not be considered as an element "for its own sake" but rather as one "which is produced spontaneously by horizontal and vertical sound-forms" (p.6). Boulez wanted "to isolate rhythm and subject it as far as possible to scientific criteria" since he believed that what had been achieved in the pitch domain needed to be completed also in the area of rhythm (p.11). For Kapp, Leibowitz "refused to follow an avant-garde which seemed to him to set all hitherto valid criteria aside and represented itself as totally unpredictable and absurdly wrong-headed" (p.15).

Orientations

Having surveyed what would seem to be the most significant English and French language studies on Boulez, it transpires that analytical approaches sometimes take the form of language-based descriptive studies, on the one hand, and technical reconstructive analyses, on the other. Each approach undoubtedly has its particular strengths. While one has the merit of accessibility and the other of technical rigour, neither may be said to be completely satisfactory. Purely descriptive studies often provide no more than the enumeration of surface features of the music, while more technical analyses, in contrast, can leave the reader enmeshed within a web of confusing detail.

It may be that an approach which can combine consideration of the creative principles within a composition, while maintaining contact with the surface of the completed work, may provide an account of Boulez's music which is satisfying from both poietic and esthesic points of view. The division of musicological studies into poietic and esthesic categories stems from Nattiez's semiology, in which he utilises Molino's tripartitional analysis of phenomena in terms of (a) a *poietic* dimension, (b) an *esthesic* dimension and (c) a *trace* or so-called 'neutral level.' While the adoption of Molino/Nattiez's poietic/esthesic distinction has proved useful in categorising the literature within this critical survey, its current role is limited to just that. It is not the methodological approach favoured within the present study, in which Boulez's music is not considered from *poietic* and *esthesic* perspectives, but rather in terms of the concepts of *content* and *expression* as understood by the French post-structuralist philosophers, Deleuze and Guattari.

The decision to explore Boulez's music in terms of Deleuzoguattarian philosophy may seem to be an unusual one, since philosophers and thinkers such as Adorno[3], Levi-Strauss[4] and Foucault[5] have more commonly been associated with Boulez. It is true that each of these theorists could provide the basis for a study of Boulez's music which would be interesting in its own right. We could consider Boulez's aesthetic in the light of Adorno's *negative dialectic* and the many other points of contact between them. Alternatively, we could adopt a *structuralist* perspective as theorised by Levi-Strauss and modified by Eco, or attempt to mark out a Foucauldian *episteme*.[6] The present study does not explore these alternatives, preferring to follow a Deleuzoguattarian *rhizomatic* approach which eschews the establishment of fixed structures in favour of fluid connections, where meaning is no longer theorised as an epiphenomenon but rather as the interface of any two surfaces. The detail of this Deleuzoguattarian theory of expression will be considered in Chapter Two.

Since the Boulez/Deleuze connection has not received much attention in the literature, it may be important to say something about it here. Boulez's nephew attended Deleuze's seminar at Vincennes and it was this association which led to their meeting, after Boulez's return to Paris in 1977, at the time when Deleuze and Guattari were working on *A Thousand Plateaus*. Boulez recalls how Deleuze approached him with a view to participating in a seminar which Boulez was organising at IRCAM in 1978. Deleuze delivered a position paper entitled *Rendre audibles des forces non-audibles par elle-memes* (Patton 1996, p.286)[7], which suggests that it prefigured the kind of thinking which he and Guattari were to later publish in *What is Philosophy?* (1994), where they distinguish philosophical *concepts* from the *percepts* and *affects* produced within the arts.[8]

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[3] Adorno was really the philosopher of the first-wave of the avant-garde and the Second Viennese School in particular. Despite his interest, his sympathies did not lie with the music of Boulez's generation. Perhaps he simply failed to understand it, as Stockhausen once suggested to him in Darmstadt. Boulez remembers the severe doubts which Adorno harboured in relation to the music of the post-war generation of composers. Boulez recalls that he met Adorno "fleetingly around 1954 and was in close contact with him later in Darmstadt. In the '60s he came to Baden-Baden regularly, but my relationship with him was primarily intellectual" (Peyser 1976, p.241). Pereira de Tugny reports that the correspondence between Boulez and Adorno between 1965-1969 is held at the *Paul Sacher Stiftung* (Pereira de Tugny 1998, p.106).

[4] Lachenmann refers to 1950's avant-garde music as a "classical structuralism" and "serial structuralism" (1995 pp.95-96). Piencikowski recalls that two of Boulez's texts were published in the structuralist literary review, *Tel quel* (1991a p.xxvi). Levi-Strauss (1970) and Eco (1971) both explicitly address the relationship between structuralism and serialism.

[5] Despite having first met Foucault in 1951, Boulez says that they "intersected rather than met" (Eribon 1991, p.65). They had no real connection with one another until the late 1970's and had not seen each other for twenty years when Foucault approached Boulez to propose his nomination and election to the *Collège de France* in 1975.

[6] Boulez's interest in structures does not necessarily justify some kind of structuralist method of analysis as the most relevant means of approaching his music. By his own admission, his music is marked by its proliferation of materials and its labyrinthine qualities. It may be that a study of this music should likewise respect this labyrinthine quality without attempting to reduce it to some simple structure.

For Boulez, Deleuze's contribution to the seminar was "a fantastic development".[9] Recalling their subsequent relationship he says:

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[7] Boulez says that the text was discovered among Deleuze's papers after his death and subsequently published (Interview 28.8.98). Despite this, I have been unable to locate a copy of the text.

[8] The terms *concept* and *percept* will be used throughout this study. Deleuze and Guattari tell us that philosophy deals in concepts while art deals in percepts and affects. It may be said that music theory, like philosophy, produces *concepts* while music, as it is heard, produces *percepts*. Percepts are defined as a making perceptible of "the imperceptible forces that populate the world, affect us, and make us become" (1994 p.182). They theorise that the affects produced by music and the other arts "surpass ordinary affections and perceptions, just as concepts go beyond everyday opinions" (p.65). Furthermore, art and philosophy are said to "crosscut the chaos and confront it" on their respective planes. Nevertheless, the "plane of composition of art and the plane of immanence of philosophy can slip into each other to the degree that parts of one may be occupied by entities of the other" (p.66).

[9] The colloquium organised by Boulez at IRCAM in February 1978 was part of a five evening event entitled *Le Temps musical*. In addition to the performance of music by Ligeti, Messiaen, Stockhausen, Carter and Boulez himself, there were workshops and a debate in which Roland Barthes, Gilles Deleuze and Michel Foucault were all invited to participate. Macey tells us that while the small group sessions were successful, the massed gathering of over two thousand people which assembled on the final evening to participate in a discussion chaired by Boulez was bound to fail. According to Macey:

> Barthes read 'a Taoist story' about a butcher whose intellectual concentration on the cow he was butchering meant that, ultimately, he saw before him simply 'the principle of dissection', whereas Foucault effectively refused to participate and contented himself with answering questions. Only Deleuze entered into the public debate with any enthusiasm (1993 pp.398-399).

Working from Boulez's "published account" of the proceedings, Macey tells us that Foucault "concentrated on a brief analysis of the musical culture of the Parisian intelligentsia, noting with some surprise that few of his colleagues or students took any serious interest in contemporary music and commenting on the anomaly between their philosophical and musical tastes: people who were passionately interested in Heidegger and Nietzsche followed the fortunes of mediocre rock groups rather than the experiments of IRCAM" (1993 p.399).

> Later on, there was really a connection. He listened to music. He came to concerts ... and I know that, towards the end, his last years were really terrible [with] sickness ... He survived in a very difficult condition. The only thing, when he could not even write or read, he listened to music. That's the last thing which remained in his life (Interview 28.8.98).

Apart from the personal relationship between Boulez and Deleuze, they are linked through several references in their writings. Boulez refers to Deleuze's *Difference and Repetition* in *Jalons* (1989a p.120), in the text of a lecture delivered at the *Collège de France* in 1980. In a published interview with Pierre Michel Menger, Boulez draws attention to Deleuze's interest in his article on Wagner, *Time Re-explored*, which, for Deleuze, became the starting point for a philosophical reflection (Menger 1990, p.9). These are the only explicit references to Deleuze (Guattari is entirely absent) which I have been able to find in Boulez's writings and interviews.

References to Boulez's ideas in the writings of Deleuze and Guattari are more frequent. Deleuze refers to several concepts used by Boulez in *Dialogues* (1987 p.94); *The Fold, Leibniz and the Baroque* (1993 p.33; p.82; pp.163-164 n.37), *Foucault* (1988b p.22) and *Negotiations* (1995 p.155; p.163; p.202 n.7a). Deleuze and Guattari draw upon Boulez in *What is Philosophy?* (1994 p.195), but most significantly in *A Thousand Plateaus*, the second volume of their monumental *Capitalism and Schizophrenia* (1987 p.262; p.267; p.269; p.518 n.22; p.519 n.8; p.527 n.39; p.541 n.36; p.548 n.14; pp.553-554 n.20; pp.477-478).

Boulez is by no means the only composer to be cited by Deleuze and Guattari.[10] Nevertheless, the breadth of musical awareness and of critical comment, which is apparent in *A Thousand Plateaus*, should not obscure the special relationship which,

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[10] It should not be imagined that Boulez alone has been singled out by Deleuze and Guattari. Deleuze's earlier solo writings treated the work of a whole line of philosophers such as Nietzsche, Spinoza, Leibniz, Bergson and others, whom he considered to form almost a counter-tradition within Western philosophy. This overtly philosophical approach changes in his work with Guattari, where the style is less traditionally "academic" and the references to figures from the history of philosophy are replaced by the invocation of a wealth of sources from a variety of artistic and scientific backgrounds. *A Thousand Plateaus*, in particular, features an astonishing array of sources including a large number of composers. Deleuze acknowledged the importance of music as a theme running through *A Thousand Plateaus* and, with humility, credited Guattari, rather than himself, with philosophical brilliance in matters musical (1995 p.26; p.29).

I believe, exists between the work of Deleuze and Guattari and that of Boulez. I believe the cross-referencing, already cited, to be an indication of certain sympathetic links connecting their work. Deleuze and Guattari create a philosophy which draws on the creative efforts of artists, musicians and thinkers including Mallarmé, Joyce, Proust, Klee, Messiaen and others, who just happen to be the selfsame figures whose work has significantly influenced the production of Boulez's own thought.

In the following chapters of this study, it will be shown that the philosophical writings of Deleuze and Guattari can: (1) furnish interesting and novel perspectives on several of Boulez's concepts and ideas; (2) provide a theory of *content* and *expression* applicable to Boulez's music and capable of bringing together many of the multifarious strands which combine within Boulez's concepts and (3) result in the kind of analysis which forgoes all attempts at organic wholeness but which succeeds in uniting the realms of *content* and *expression*.

The study which follows draws on a variety of approaches. In addition to the important place given to the writings of Deleuze and Guattari, it is indebted to the work of many others, whose labours are acknowledged throughout the text. It has involved analysis from scores, a brief period of study of Boulez's sketches at the *Paul Sacher Stiftung* in Basel and, at an advanced stage in the process, an interview with Boulez himself.

Opinions differ over the value to be given to a composer's own writings since they are sometimes perceived to be self-justificatory, while the musicologist, who draws upon them, may be judged to be guilty of accepting them uncritically and of failing to challenge them. Boulez's writings have been criticised by Menger, among others, as being "an *a posteriori,* justificatory" enterprise or a "legitimation" (Nattiez's words 1993b p.169) For Nattiez, Boulez has "*constructed* his own *plot* of musical history" (1986 p.21) and he agrees to an extent with Menger that Boulez rewrites history on many points, for example, in fabricating a Webern "in his own best interests." Despite this, Nattiez still believes Boulez's writings to have a fundamental validity (p.170). Griffiths similarly questions Boulez's "chronicle" of recent music history and he poses questions such as: "Was the *Livre pour quatuor* (1949-50) planned from the first as a work of Mallarméan mobility? Was Boulez truly convinced of the 'absurdity' of total serial organization even while he was working on the purest manifestation of it, *Structures Ia*?" In Griffiths' view, Boulez "is still engaged in covering his traces" (Griffiths 1977, p.821).

The present study draws liberally upon Boulez's writings but not in an uncritical manner. An important factor which perhaps necessitates such generous reference to Boulez's writings is the fact that his *Collège de France* lectures, as published in *Jalons*, are still unavailable in English and have received little attention in English language publications. This point is also valid for much of the best French writing on Boulez, which is mostly untranslated and therefore not in wide circulation.

This study finds itself, of necessity, "between" approaches. While considerable attention is given to Boulez's theoretical writings, it is not primarily a theoretical study. Similarly, while many compositions are discussed, both in reference to the work of others and from original study of sketches and scores, it does not provide in-depth analysis of any particular score. It is to be hoped that the strength of the study will be found within its concentration upon three key areas, namely (a) musical variation or *difference*, (b) *musical space* and (c) *musical time and temporality*. Through the exploration of these concepts within music, philosophy and the other arts and in their meeting within Boulez's compositions, it is intended that the study should draw attention to the technical construction of the works, while providing concepts which can assist understanding and perception of the works, through knowledge of the expressive principles at work within their unfolding. Before considering these areas, we must first clarify what is to be understood by the terms *content* and *expression,* for the purposes of this study, and it is to this question we now turn.

Chapter 2

Boulez and Expression

The question of meaning or of expression within Modernist music is one which has not received a great deal of attention within the literature. Indeed, many accounts give the distinct impression that the music of composers such as Boulez exists purely on the technical level of musical structure, the product of quasi-scientific experimentation with pitch, duration, timbre and dynamics. It is no accident that Modernist music is most often critiqued in positivist terms since the positivist analytical discourse and the Modernist musical tradition may be said to be intimately related. The impulse which led composers to dismantle and variably reconstruct the materials of music in the formation of new musical languages is closely connected to that which resulted in the kind of positivist analysis which often resembles the act of composition in reverse. The work of analysis, in this view, becomes the corollary of composition and often serves as its legitimation.

The present study is based on the counter-premiss that, contrary to the positivist tendencies within a great deal of analytical writing on post-war music, elements of structure and expression are inextricably linked within Boulez's works. While such a proposition may seem to be nothing more than the banal statement of the obvious, when we bear in mind the tendency to describe this music in purely positivist terms, the need to re-assert the normally obvious finds its justification. The explicit linking of structure and expression in the context of Boulez's music immediately discounts the possibility of employing any kind of positivist analytical approach since positivism generally finds no place for ideas of musical expression. An appropriate analytical methodology will consequently be one which is capable of integrating both aspects of the work's reality, its technical structure and its expressive significance, its content and expression, within a unified account.[1]

Several more recent studies evidence the re-emergence of expression as a legitimate element within musical criticism and analysis. The interest of Ratner, Agawu and others in *topic theory* and of Tarasti and others in *mythic semes,* provide examples of analyses which value the expressive and the meaningful alongside the structural and the technical. While these studies do not deal with post-war Modernist music, such as that of Boulez, they nevertheless provide fascinating analytical models, which illustrate something of the shifting relationship between *content* and *expression* in music history and theory.

The content/expression approach found within these studies can be said to form the methodological starting point for the present one. We will, consequently, summarise their most important features. Having considered the work of Ratner, Agawu and Tarasti, we will next review Boulez's ambivalent relationship with musical expression, before presenting the theory of *content* and *expression* produced by Deleuze and Guattari. It will be seen that the Deleuzoguattarian theory of expression is, to some extent, related to the studies of Agawu, Tarasti and others through the work of Hjelmslev. We will consequently review something of the response which Hjelmslev's work has provoked in its musical applications. Where Agawu and Tarasti are involved in structuralist and semiotic (semiological) enterprises, which entail the identification of signs and of underlying codes, the work of Deleuze and Guattari is post-structuralist. This means that, for Deleuze and Guattari, there is no attempt to discover underlying codes within works, as structuralism entails, while the concept of the *sign* is no longer thought of as a quasi-linguistic phenomenon, as it is within semiotics (semiology). Instead, Deleuze and Guattari theorise Hjelmslev's opposition of *content* and *expression* in a much more fluid way through the concept of the captured force.

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[1] Tarasti tells us that "many music theoreticians deny that there can be any correspondence between music and external reality" and that "only the inner musical structure (which they consider a distinctive feature of a good musical work) deserves study." Tarasti does not accept this since he believes that "the inner network ... does not suffice, but needs outer references as well" (1994a p.56).

The Deleuzoguattarian theory of expression has a crucial place within the present study. However, in order to understand it properly, it is necessary that it be viewed within the context of the new *image of thought* theorised by Deleuze and Guattari, which is arguably the central theme within their work. We will consider this new *image of thought* through the concepts of the *plane of immanence* (consistency), the *rhizome*, the *body without organs* and the related concepts of the *assemblage, deterritorialisation,* the *diagonal* and the *refrain*. Having done so, we will then identify some of the capturing and captured forces within Boulez's music which enable it to operate on levels of both *content* and *expression,* as understood by Deleuze and Guattari. The consideration of these concepts, these forces, will form the basis for the remainder of the study.

Topic Theory and Mythic Semes

Leonard Ratner's study *Classic Music* (1980) acknowledges the pervasive presence of expression as a vital concern within eighteenth century music. In so doing, it invokes the concept of the *topic*. This concept was originally borrowed, by musical writers of the time, from Classical rhetoric and was, apparently, a normal component part of critical writing on music in the eighteenth century (Agawu 1991, p.33). In musical terms, topoi took the form of a collection of characteristic musical figures which were associated with "worship, poetry, drama, entertainment, dance, ceremony, the military, the hunt, and the life of the lower classes" (Ratner 1980, p.9). Ratner provides a substantial list of topoi, the expressive value of which was common currency at the time and which could be adopted and integrated within a composition as desired. In expounding this new topic theory, Ratner attempts to show that particular expressive ideas were conventionally accepted as connecting with diverse aspects of non-musical culture.

Ratner's idea has since been taken up by Kofi Agawu (1991) who has collated a list of topoi from a variety of sources [primarily Ratner] in order to undertake a semiological analysis of the music of Haydn, Mozart and Beethoven. The resulting topical analysis constitutes a fascinating attempt to uncover the basic elements which enable *meaning* within music of the Classical era (Agawu 1991, p.5). Agawu integrates both "expression (extroversive semiosis)" and "structure (introversive semiosis)" within one analytical account of a composition (pp.23-24), presenting a "semiotic framework" constructed from the twenty-seven topoi, the extroversive referential signs which he has assembled. Agawu identifies these same topoi within particular pieces and believes them to be implicated in a "play of signs" with the introversive, structural aspects of the music which he attempts to reveal through Schenkerian analysis.

Agawu's topics are listed as follows (Agawu 1991, p.30):

alla breve
alla zoppa
amoroso
aria
bourrée
brilliant style
cadenza
sensibility
fanfare
fantasy
French overture
gavotte
hunt style
learned style
Mannheim rocket
march
minuet
musette
ombra
opera buffa
pastoral
recitative
sarabande
sigh motif
singing style
Sturm und Drang
Turkish music

Agawu believes that topoi supply a framework within which various levels of meaning within eighteenth century music can be considered (p.19). He values the opportunity they provide to cross boundaries between music and "other semiotic systems, societal structures and specific historical events" (p.130). Agawu uses topoi to provide a reading of the expressive surface of a composition but relies on the play of these expressive topical signs with the structural data revealed by Schenkerian analysis to provide meaning (pp.17-18). Each musical piece is segmented by topical signs in the hope that the interaction of topoi will enable the analyst to fashion *a plot* for each piece which Agawu describes as "a secret agenda, a coherent verbal narrative" (p.130). According to Ratner, "Mozart was the greatest master at mixing and coordinating topics, often in the shortest space and with startling contrast" (1980 p.27). While Ratner clearly acknowledges that there is much in Classical music which is not explained by topical means, he is convinced that "the recognition of these expressive qualities, explicit or implicit, is illuminating, often providing a clue to a striking aspect of structure" (p.30).

In contrast with the fairly rapid passage of topoi identified in music from the Classical period, Ratner and Agawu agree that compositions from the Baroque era tend to rely upon one topic alone, for example a dance movement. Baroque pieces are thus often marked with a greater sense of unity and consistency than Classical compositions (Ratner 1980, p.26). Romantic compositions, in contrast, are thought by some writers to shift from the commonly accepted topical signs of Classical music towards more personal and individual "private codes". Agawu, however, believes this situation to be highly ambiguous (1991 pp.135-137). According to Eero Tarasti, the Romantic period developed its own topoi and is no less rich a source of topoi than the Classical era. Marta Grabocz (1986), for example, has analysed the entire piano works of Franz Liszt in terms of seven topics which she terms *isotopies*. They are: (1) macabre interrogation, the *lugubre* search, the Faustian question, the 'why'; (2) the pastorale; (3) the heroic; (4) the macabre or tempestuous, demoniac fight; (5) sorrow; (6) the religious and (7) the pantheist (Tarasti 1996, p.10).

Tarasti maintains that "every composer develops his own characteristic isotopies according to his musical education, background, environment and general aesthetico-social context" (p.10). He tells us that Romantic composers share a communal store of topoi among which are the mythical topoi (or semes) which he explored in an earlier study and which we will consider shortly. Wagner's *Ring*, for example, is found to be a topical treasure trove in which Wagner uses many of the topoi already found in Classical music while adding many more of his own. While composers and listeners of the Romantic period are said to have related music to a "poetic idea", Tarasti maintains that their neo-classicist successors "heard music ... as a simple play of tonal figures incapable of expressing anything". Accordingly, poetic programmes became redundant since musical meaning no longer existed as it had for the Romantics (Tarasti p.140). Agawu is silent on the fate of topicality in music beyond the Romantic era.

Analogous with the topic theory of Ratner and Agawu, there is the notion of the *mythic seme* developed by Tarasti. Following Levi-Strauss, who described the musical work as "a myth coded in sounds instead of words" (quoted in Monelle 1992, p.30), Tarasti identifies seventeen mythical semes in Wagner's *Ring*, Sibelius' *Kullervo Symphony* and Stravinsky's *Oedipus Rex*. These are: nature-mythical, hero-mythical, magical, fabulous, balladic, legendary, sacred, demonic, fantastic, mystic, exotic, primitivistic, national-musical, pastoral, gestural, sublime and tragic (1979, pp.86-129). Like Agawu, Tarasti's approach is a *structuralist* and *semiotic* one since he is principally concerned with music as a sign system. His interest lies in "the structure, message and implicit codes of a work" (p.12) and he sets out to discover the equivalent musical expression which corresponds to myth. For Tarasti, when "certain musical idioms are filled with mythical connotations of a certain culture", recognisable cultural units are formed (Tarasti 1979, p.15). While music retains its own conventions and rules, its alliance with the world of myth gives it "a new function" which involves supporting "the mythical meaning and content" (p.27).

Tarasti invokes the concept of the *mytheme* which refers to the distinct elements with which myths are composed. These, he tells us, can be combined in a variety of ways, following certain rules, to "create mythical stories and utterances" (p.44). Tarasti adapts Greimas's linguistic semeanalysis for his own musical purpose. For Greimas, who believed that "aesthetic symbols in principle do not function differently from these units of linguistic communication", semes are "minimal semantic units, [from which] the signification of whole texts and groups of texts is ultimately inferred" (p.72). So it is that Tarasti defines musical semes as "those relatively few dimensions with which we articulate the musical universe. Hence, semes are such categories as size, length, speed, intensity, density, continuity, tension etc." Semes, in turn, are to be found in lexemes, which in Tarasti's musical terms can be "a short motif, the main theme of a composition ... a phrase or even the whole composition" (p.73). Tarasti believes the "polymorphism of mythical reality" to be most readily found in the late Romantic music of Liszt, Wagner, Sibelius, Stravinsky and Slavic music (p.82), and after exploring the provenance of each mythic seme, he provides numerous illustrations from the works of his chosen composers.

Musical Modernism and Expression

Agawu's topoi and Tarasti's mythic semes presume music's openness to a multivalent *outside* of itself which is said to result in the production of some kind of *meaning*. One of the greatest difficulties with the public reception of Modernist music, such as that of Boulez, has been the widespread perception that this music is without expression and that it has no real meaning beyond the level of technique and structure. Indeed, some of Boulez's own statements on musical expression have seemed to support this view (Boulez 1986, p.32; pp.81-82).

This view of music is by no means a new one. In the nineteenth century the celebrated critic, Hanslick, proclaimed that "the beauty of a musical work is *specific to music*, that is to say that it resides in the relations of the sounds, unrelated to ... strange extra-musical ideas" (Quoted in Brelet 1949, p.55). According to Gisèle Brelet:

> The common fault of diverse philosophies of music was of being only 'fantastic fairy tales' grafted onto the music without benefiting it; it was of being *transcendent metaphysics*, exterior to the music which only provided its pretext. It is right to oppose these transcendental metaphysics and to prefer the idea of an autonomous aesthetic explaining the music through itself, without exterior help (1949 p.56).

This proposes the *nature* of expression within music as problematic. The Classical and Romantic repertoires, which interest Ratner, Agawu and Tarasti, can obviously be considered purely in terms of musical parameters such as pitch and duration and their higher level structures. Hanslick, among others, has written clearly and illuminatingly about music in these terms. Nevertheless, a strong case has been made that there is also a sense in which these musics provide palpable openings to meanings already established by previous music or meanings shared with other non-musical sign systems. So it is that Classical music can draw on socially familiar dance forms such as the *gavotte*, the *minuet* or the *march*; on simple social-musical gestures such as *hunt style* and *fanfare*; on characteristic stylistic practices such as *French Overture* and *Mannheim rocket*, easily recognisable as the signature of a particular musical group; on sounds suggesting emotional gestures such as a *sigh*, *singing style*, *amoroso* and the rage of *Sturm und drang*. Tarasti's mythic semes are similarly based on the potential of musical sounds to express socially recognisable states such as the *sacred*, the *magical* or the *demonic*. In general terms, while Baroque, Classical and Romantic music have shown themselves to be capable of interpretation in terms of topoi and mythic semes related to objects, conditions and emotions outside of music, Modernist music has, in contrast, seemed to stand in a rather self-enclosed way, operating perhaps as a "pure" sign system, set apart from the cultural practice of intertextuality; a radical reaction to the social meaning-systems of the bourgeois period of European art.

Arnold Whittall has produced a rare analysis of Webern's Op.30 *Variations* which considers its meaning as well as its musical structure (1996, p.268). In Robert S. Hatten's work on *Musical Meaning in Beethoven*[2], Whittall finds an example of a musicology in which "music and any associated text" become "joint participants in a heterogeneous discourse" (p.269). Hatten identifies the topoi of the *tragic* and the *pastoral* in the first movement of Beethoven's Sonata Op.101 which suggests, to Whittall, an alternative approach to the Webern piece (p.272; p.266). Whittall is interested in the convergence of "structure and semantics" in the work and he wonders whether it may "be interpreted in the light of ... [Webern's]'search for the highest', and 'the deep, unfathomable meaning in everything'" (p.266). He suggests that "post-tonal music lacks that relatively stable topical vocabulary available to analysts of baroque, classical and romantic music" (p.294), and consequently that a topical analysis of a Webern piece is a problematic task. He nevertheless analyses the piece in terms of the expressive topoi of *vulnerability* and *assertiveness* which he refers to as "the work's principal emotional poles" (p.292). He suggests that Op.30 reveals "the elements of a spiritual conflict between vulnerability (seeking serenity) and assertiveness (a tendency to violence)" more directly than any other work by Webern (p.297).

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[2] Robert S. Hatten, *Musical Meaning in Beethoven. Markedness, Correlation, and Interpretation* (Bloomington and Indianapolis: Indiana University Press, 1994).

This suggests that the seemingly self-enclosed nature of Modernist music may in fact be susceptible to the sort of expressive exegesis practiced on earlier styles by Ratner, Agawu and others. Indeed, it is a central thesis of the present study that Boulez's music can indeed be understood as operating at an expressive level. However, as indicated above, the *nature* of this expressive level needs to be defined. It is important to note that this study conducts a post-structuralist critique of Boulez's music which does not involve a quest for codes or topical signs such as are found in the semiotic and structuralist analyses of Agawu and Tarasti. Where a structuralist approach generally seeks to analyse a phenomenon in terms of underlying codes and signs, the post-structuralism of Deleuze and Guattari, which will be explored here, is unconcerned with such meta-languages and eschews the reduction of a phenomenon to an essential core, seeking instead to map its surface forces.

Modernist music, such as that of Boulez, is clearly unconcerned with the expression of elements such as the eighteenth and nineteenth century social mores glimpsed in the dances of the Classical era, nor is it occupied in expressing the mythic content of Tarasti's Romanticism. Boulez's music will be shown to express, in the sense of *making sonorous through music*, concepts or *topoi* which are at the very heart of the entire Modernist enterprise. The major part of this study is devoted to the consideration of three concepts which, it will be argued, are central to Boulez's music. These are: (1) *difference in itself*; (2) the rendering audible of alternative conceptions of musical *spatiality* and (3) the rendering audible of alternative concepts of musical time as *smooth time* and *striated time*. It will be shown how each of these concepts is made sonorous within Boulez's music and how they open the music to its outside through a rich series of creative connections with art, literature and philosophy. These concepts will be explored in turn as we proceed. It is enough to acknowledge them at this point.

Concepts such as *difference*, contrasting musical *spaces*, and contrasting *temporalities* may not immediately strike the reader as obvious in their expressive functioning. While they are referred to throughout the literature, it cannot really be said that they are generally thought of as expressive concepts. Umberto Eco's division of communication systems into, what he terms, *ratio facilis* and *ratio difficilis* provides one way of conceptualising the process whereby novel elements within musical works are progressively recognised as being expressive (Eco 1976, p.183ff.; pp.217-260). *Ratio facilis* refers to the conventional codes which enable an expressive element to be associated with a corresponding content element. *Ratio difficilis* refers to the contrary case where there is no accepted code, as yet, or recognised correspondence between the levels of *content* and *expression*. According to Eco, music, like all communication systems, follows a pattern whereby there is constant movement from *ratio difficilis* towards *ratio facilis* (pp.239-240). While Monelle (forthcoming) points out that "much music is understood by ratio facilis right from the start", much music is not. This perhaps reinforces Boulez's much-repeated position that the difficulties faced by listeners of post-war avant-garde music are not historically unique. We are not the first generations to struggle with making aural sense of new music and the concepts or *topoi* with which it engages. Boulez, following Adorno, perhaps following Berg on Schoenberg, says that this very difficulty is a positive feature of worthwhile music. Boulez encourages bewildered listeners simply to listen often and more carefully in the hope that repeated listening will deliver the sought-after moment of insight when all will become clear. Certainly the traditional acknowledgement of a *ratio difficilis* moving towards a *ratio facilis* provides a framework for the listener of Modernist music.

The concept of *ratio difficilis* suggests that what is perceived to be the readily digestible *expression* and *content* of Classical and Romantic music has not always been so easily interpreted by listeners or musicologists. Patterns of listening and reception have developed with repeated listenings, sometimes over generations. Cultural connections outwith music have been made and remade to the extent that, as a community of listeners, we are the recipients of a wealth of musical and cultural codes, broken down for us into *ratio facilis*. When we are faced with music which has no clear reception patterns as yet, no cultural connections already provided for us, giving us clues and contexts for the comprehension of the sounds, in other words when we are confronted with raw music which has not yet been domesticated into neat and manageable codes, we are more than a little lost. We fail to find any meaning, to make any connection of *content* and *expression* and are strongly tempted to infer that since we cannot make connections with the music, and since no-one has provided them for us, they therefore do not exist. Post-structuralism, however, is unconcerned with the establishment of codes and prefers to view artworks more for the new creative connections which they are capable of making rather than for their affirmation of accessible, already codified connections.

In pursuing expression within Boulez's music, we will now look to Boulez's statements on musical expression, including those problematic utterances which suggest that Modernist music is non-expressive. In doing so, the impression should not be given that a composer is the only or even the most valid commentator on his/her own work. On the contrary, it should be recognised that it would be perfectly possible to understand Boulez's music expressively, with or without his approval. This is not necessary, however, since, it will be argued, his well-known and oft-quoted statements on expression must be understood within a very specific context which alters their meaning considerably.

Boulez and Expression

The anti-expression stance which is frequently attributed to Boulez[3] is often traced back to the influence of Stravinsky, whose statements on this question are well known. A brief consideration of Boulez's writings, however, will be enough to dispel this popular misconception. In his 1951 article, *Bach's Moment*, Boulez examines Stravinsky's well-publicised aesthetic of "pure music". Stravinsky writes:

> 'I consider that music is, by its very nature, essentially powerless to express anything at all, whether a feeling, an attitude of mind, a psychological mood, a phenomenon of nature, etc. ... *Expression* has never been an inherent property of music;' and again: 'The phenomenon of music is given to us with the sole purpose of establishing an order in things ... To be put into practice, its

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[3] Nattiez, for example, writes: "let Boulez be the leading man in the neo-serialist school, and we are ready to acknowledge that 'music is a non-signifying art'" (Nattiez 1990, p.111).

> indispensable and single requirement is construction. Construction once completed, this order has been attained, and there is nothing more to be said. It would be futile to look for, or expect anything else from it' (Stravinsky - quoted in Boulez 1991, pp.1-2).

Boulez counters Stravinsky's claims for "pure music" with the observation that "nearly all Stravinsky's works - at any rate the major ones - up to his neo-classical period, relate to a stage action or at least to a literary text." Looking in particular to "the muddle of tendencies which emerges through *Petrushkha*, *The Rite*, *The Nightingale*, *The Wedding* [and] *The Soldier's Tale*", Boulez says that to describe such compositions as examples of "pure music" is an "illusion" (pp.4-5). According to Boulez:

> The continual statements about music's inability to express, this urge to refer constantly to the abstract, to construction *in se*, to the play of forms: surely these are simply a spiteful reaction to a series of works which could do nothing but 'express', and in the most extreme fashion? (1991 p.5).

Furthermore, Boulez reproaches Stravinsky's invocation of J.S. Bach in order to provide a paradigmatic model for pure music. Boulez recalls the Bach *Passions* and the testimony of Bach's contemporaries who paint a very different picture from the one provided by Stravinsky. Far from avoiding expression, Bach is here "reproached ... for the violence of his sentiments" and "the extravagance of his 'Gothic' genius." Again, Boulez quotes Johann Gotthilf Ziegler who, in a passage written in 1746, tells us that Bach taught him "not to play the chorales simply as they are, but according to the feeling indicated by the words" (1991 p.5).

We should not be surprised that Boulez does not subscribe to Stravinsky's doctrine of pure music since Stravinsky himself later explained his earlier statements in a way which was perfectly in line with Boulez's interpretation. In his conversations with Robert Craft, recorded in *Expositions and Developments* (1959-1962), Stravinsky maintained that "that over-publicized bit about expression (or non-expression) was simply a way of saying that music is ... beyond verbal meanings and verbal descriptions" (p.101). He now tells us that these statements were intended to counter the drawing of inadequate correlations between "a composer's feelings and his notation." Stravinsky says that his earlier statements were:

> offhand and annoyingly incomplete, but even the stupider critics could have seen that it did not deny musical expressivity, but only the validity of a type of verbal statement about musical expressivity .... A composer's work *is* the embodiment of his feelings and, of course, it may be considered as expressing or symbolizing them - though consciousness of this step does not concern the composer (1962 p.101).

Furthermore, Stravinsky says that:

> composers ... are not conceptual thinkers .... The composer works through a perceptual, not a conceptual process. He perceives, he selects, he combines, and he is not in the least aware at what point meanings of a different sort and significance grow into his work. All he knows or cares about is his apprehension of the contour of the form, for the form is everything. He can say nothing whatever about meanings (1962 pp.102-103).

Whatever the vicissitudes of Stravinsky's relation to expression, it seems clear that Boulez did not subscribe to his idea of "pure music" or the impossibility of musical expression. Boulez's statements were published in 1951, at precisely the moment when integral serialism, the expressive nadir or *degree zero* of Western art music, was in the air. Boulez was no neutral commentator upon events. Despite distancing himself in his writings from what he considered to be an academic dodecaphony, he was clearly a prime exponent, for a time, of integral serialism. He was also polemically opposed to the neo-classicism of those composers who, after the First World War, turned back to older musical forms and styles. For Boulez, the neo-classicists were guilty of artistic capitulation, of unhelpful reactionary impulses and a rejection of progress. The neo-classical camp, on the other hand, attacked Boulez and his fellow dodecaphonists for, what they perceived to be, a soulless intellectualism.

In *Possibly* (1952), Boulez defended himself, his musical theory and technique against the reproach that he was an arid "intellectual". He writes:

> why should I be ashamed of my technique? On the contrary, I retaliate by saying that this allegation of intellectualism is ill-founded since it starts from a

> false conception - when it is not tainted by sheer bad faith - of the interlocking roles of sensibility and intelligence in all creative work. Do not forget that, in music, expression is intrinsically bound up with language, even with the technique of language. Music is perhaps the least dissociable of all expressive media, in the sense that it is its actual morphology, before all else, which expresses the emotional development of the artist (1991 pp.138-139).

He continues:

> In a dying echo of romanticism, theoretical research is still, as we have seen, regarded as a closed circle having no common ground with creative work in the true sense. Let us have done with this outdated legend: we must indeed do so, or die of asphyxia. A consciously organising logic is not something independent of the work, it contributes to its making, it is connected to it in a two-way circuit; for it is the need to pin down what one wants to express that directs the evolution of technique; this technique reinforces the imagination, which can then project itself towards the previously unperceived; and in this way, in an endless play of mirrors, creativity pursues its course ... (1991 p.139).

We perhaps draw closer to the original source of ambiguity and what Boulez genuinely finds to be objectionable in ideas of expression in the article *Tendencies in Recent Music* (1953/1957). Boulez commends Varèse's "flat rejection of anything that could be called expressive nuance, in the pejorative sense (a constraint inherited from certain aspects of *fin-de-siècle* romanticism)" (1991 p.174).[4] The historical background to Boulez's distaste for this kind of expression is provided by Aguila in his study of the *Domaine Musical*. Aguila explains how French music between 1950-1960 was generally controlled by those musicians who were born between 1880 and 1910 and who had made their reputations "between 1920 and after the war .... [those who] were later called 'les musiciens français d'expression harmonique'" (1992 p.89). In a clear conflict between generations of musicians, Aguila reports how "the traditional notions of 'feeling', 'expression', 'states of mind', 'lyricism' and 'heart' were ferociously thrashed in derision by the post-Webernians" and that it was "conversely ... on the absence of 'expression' that conservative composers based their most numerous reproaches to serial composers" (pp.101-102). Serial composers were accused of a "sterile academicism" and were blamed for "the loss of a collective sense of transcendence which had underpinned the work of art in other epochs." According to Aguila, this polemical situation receded in the mid-1960's (p.105).

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[4] Boulez says that the musical expression of feeling is "inexplicable" since a composer may not know what she/he wants to convey and may be unable to articulate it verbally. For Boulez, feeling within music is the result of six centuries of "culture" and "conditioning" and "two centuries of severe conditioning" which cannot be avoided and which undoubtedly influences perception (Samuel 1986, p.22). Boulez admires the way in which Klee "does not seek to explain himself; he says how he makes it, why he makes it. He does not confess and does not reveal the 'mystery' of what he has made" (Boulez 1989b, p.9).

It is against this background of generational aesthetic conflict and the opposition of two very different conceptions of expression that problematic passages within Boulez's writings must be understood. There are passages where, on the face of it, Boulez would appear to be discounting any understanding of musical expression (Boulez 1986, p.32; pp.81-82). In *Putting the Phantoms to Flight* (1960/1964), for example, Boulez writes of "the inability of music to express anything but itself" (1986 p.82), saying that:

> The specific strength of the composer lies in the 'non-significance' of music, its lack of 'meaning', and we ourselves must not lose sight of the fact that it is the phenomenon of sound that is of primary importance ... (p.81).

He continues:

> There is always a temptation, not for the musician himself but for those who discuss his work, to express what we may call 'outside' opinions; and whether the alibi is a poetic, a philosophical or even a political one will depend on circumstances and on individual cases. It always appears as though the majority of these 'outside' commentators were embarrassed by music's lack of 'meaning' and felt obliged to give it some definite aim, without which it would have no social purpose and would in fact deserve to be called no more than an 'ornamental' art, as has often been done. We can only repeat that music cannot undertake the task of expounding rational ideas; it supports none of these or, alternatively, supports them all indiscriminately; but it goes against its own nature if it attempts concepts that are totally alien to it. It can, on the other hand, undertake the qualification of our ideas, their emotional character and their ethical content. This is particularly true when there is a generally accepted system of conventions, so that certain musical situations automatically evoke certain mental situations by means of associative reflexes.

> If this system of conventions disappears or the meaning of the conventions is for some reason lost, we are unable to decipher that particular code of ideas to which the music specifically refers (1986 p.81).

As Aguila has shown, such passages cannot be properly understood without taking their historical context into account, recognising the perceived need among avant-garde composers to distance themselves from Romantic notions of expression and the antagonism which consequently divided the two camps within French music. If we try to unite both sets of Boulez's statements, we are left with the following set of ideas: (1) that the notion of "pure music", as originally outlined by Stravinsky, is an illusion to which Boulez does not subscribe; (2) that for Boulez, expression is an integral guiding element within all music; (3) that he believes his own music to be expressive; (4) that he has not rejected expression in itself, but rather what he perceives to be its Romantic caricatures; (5) that Modernist expression does not involve the type of expressive associations recognisable within certain older musics.

This said, we must probe further to discover what expression actually is for Boulez and what its limits may be. In *Aesthetics and the Fetishists* (1961/1962), Boulez writes:

> We are now aware of the fundamental mistake of concealing beneath the word 'style' a dichotomy between form and content, technique and expression. This distinction which was a favourite with aestheticians of the old school, has been proved to be groundless and furthermore quite inapplicable to the actual facts of musical language (1986 p.32).

Annulling the form/content, technique/expression distinctions of traditional aesthetics, Boulez's *Collège de France* lectures often concentrate on music from the point of view of the musical *idea*. In the article *Idée, Réalisation, Métier* (1978), which looks at various approaches to musical analysis, Boulez tells us that musical ideas do not exist in themselves. They are, rather, a response to the culture which surrounds us. A composer can never be certain of having grasped an idea fully anyway, and in the process which leads from the composer's first glimpse of the idea to its final manifestation within a completed piece of music, the initial idea disappears and with it, presumably, whatever original meaning it may have had. Boulez believes that the initial desire can never be recovered and that any poietic attempt to retrace the steps taken from final composition back to embryonic idea will inevitably fail, since the impulse, at its root, is lost forever (Boulez 1989a, p.33). As for attempting to "recover [the] meaning" or sense of musical ideas as they appear in completed pieces, while Boulez acknowledges the possibility of symbolic meaning within music, he stresses that unless the composer has drawn attention to this meaning her/himself or if it relates to familiar codes, there are difficulties in deciphering it with any degree of accuracy (1989a pp.35-36).

The absoluteness of Boulez's previously quoted statements on the non-signifying nature of music is qualified considerably when Boulez tells us that if music is non-signifying, then this is true purely from the point of view of the difficulties of interpreting musical symbolism and from that point of view alone (1989a p.36). When he says that "music ... is not a ... superior alphabet" we come closer to understanding that Boulez, certainly by 1978, is not opposed to the idea of musical meaning or expression but rather rejects any crude or facile attempt to transliterate musical meaning as if it were a universally accepted language which could be read off simply without ambiguity, or indeed as if it were any kind of language at all.

Boulez is vehement in his opposition to music which allows political, philosophical, psychological, scientific, mystical or any other connections to assume greater importance than a purely musical structural rationale (1989a p.56; p.84; p.125). He is critical of the modern development of an electro-acoustic sound world which has produced a variety of commonly-made associations and in which connotation is given primary importance. In Boulez's view, "all properly structural, musical thought has disappeared" from this music (1989a p.56). He is equally dismissive of music which, he believes, confuses emotion with expression and which can consequently seem to be no more than a "psychological oscillogram" (1989a p.125).

In *La Composition et ses différents gestes* (1980), Boulez writes that:

> Our expressive gestures are perhaps limited, or if they are not, they are strongly conditioned by our cultural atavism. How can the plunge into technique be liberating and make us discover expressive gestures for which we were not prepared? (1989a p.128).

Boulez questions the extent to which expressive means are consciously employed and suggests that even where there is an expressive intention, there may be unforeseen expressive consequences. To an extent, the technical problems thrown up by the processes of composition can result in new expressive experiences (1989a p.129).

For Boulez, extra-musical elements are "exterior vectors" which can influence music directly or indirectly. With "indirect influence", the exterior vector, be it poetry, drama, art, science, philosophy or whatever, is not "integrated literally into the work", whereas with "direct influence", the exterior vector is deliberately and autonomously combined with the music (1989a p.131). Where indirect influence is concerned, Boulez believes that it would be extremely unlikely that we would be able to recognise the connection without prompting from the composer. For Boulez, exterior vectors should not be directly transcribed into music. The elements should rather be adapted in line with music's specific character. He is convinced that to fail to do so will result only in disappointment and the highlighting of "false equivalences" which will fail, structurally and idiomatically, to acknowledge the specific laws pertaining to each domain. As an alternative, Boulez outlines "three types of relationship ... between extrinsic vectors", which he terms: (1) "concomitance and parallelism", where one reflects the other; (2) "subordination and domination", where "one is the envelope of the other" and (3) "confrontation and concurrence", where "there is conflict and antiphony between the vectors" (1989a p.134).

According to Boulez, "every age obeys certain general lines of force". These are intellectual, though not necessarily musical, tendencies which are found across many areas of endeavour (1986 p.121). An example, provided elsewhere by Boulez, is that of Debussy. A study of musical Modernism in Debussy, he says, would need to look to painters and poets such as Manet, Whistler, Verlaine and others, who were significant influences upon Debussy in his youth (1991 p.24). Boulez recalls the parallels which have been drawn between a common period in the creative outputs of Webern and Mondrian, who tend "to *reduce* material, to simplify timbre [and]colour, to organise form [geometrically and] to express themselves aphoristically." Boulez, however, does not believe this to be the result of direct contact or even awareness of the other's experience and development. For him, it can be explained as an indirect relation in which both artists have drawn upon similar expressive means (1989a p.131). He offers a similar explanation for the common tendency towards "reduction" and "concentration" of means found in both Debussy and Cézanne. Once again he believes it to be unlikely that changes made by Debussy to his musical language were prompted through direct contact with Cézanne's late works which manifest similar characteristics. He suggests instead that there are "typologies ... families of temperaments" which connect artists from various disciplines and he illustrates this point by listing an impressive litany of twentieth century typologies such as "a Webern-Mondrian typology, a Léger-Varèse typology, a Schönberg-Kandinsky typology, a Stravinsky-Picasso typology, a Matisse-Ravel typology" and so on (pp.131-132). Despite positing the existence of such "vectors", Boulez believes them to be limited in their application (p.132). Nevertheless, having established the notion of the typology, he considers it also in his own case, acknowledging certain special influences in Klee and Mallarmé, who, he tells us, have independently "confirmed" him in his own "preoccupations" and even helped him to "discover them" (p.133).

In the *vector*, the *typology* and the *line of force*, Boulez provides a series of concepts which may be perceived to be highly expressive from a Deleuzoguattarian point of view, since they involve the opening of music to its outside and permit the theorising of artworks in terms of connections. Before exploring the Deleuzoguattarian account of expression further, we must first, however, consider the concepts of *expression* and *content* as they have been more generally understood in recent writing.

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Musical Content and Expression

This chapter has considered Boulez's ideas on musical expression at some length. It has been important to do so in order to challenge the commonly asserted view that Boulez's music is essentially anti-expressive. That Boulez envisages music to be expressive is clear from his comments on Stravinsky and Bach and his rebuttal of those who pejoratively categorise him as a technical, academic composer. While he is at times circumspect in discussing expression, this is most likely the result of a desire to dissociate himself from views of expression which he perceives to be false or undesirable. Having successfully distanced himself from traditional understandings of expression, it was once again possible for Boulez to propose expression as an essential component within his own music.

Having established the existence of expressive readings of Classical and Romantic music, and having shown that Boulez favours an expressive understanding of music, we must now clarify what is meant by expression within this study, since Boulez does not elaborate his own theory of musical expression. It is beyond the scope of the present study to consider the spectrum of available theories of expression, but it is nevertheless appropriate that some general observations should be made before considering the theory of expression propounded by Deleuze and Guattari within the context of their new *image of thought*.

Scruton, for example, tells us that "it is impossible to assume any common understanding" of expression since "each philosopher who has discussed ... [the term] has used ... [it] in his own way, and for his own theoretical purposes" (1997 p.119). Scruton, nevertheless, distinguishes expression from the related concepts of inspiration, imitation, evocation, suggestion, and representation (p.134). He agrees with Nelson Goodman who "argues that works of art can express any property (or 'predicate')." In Goodman's view, "a work of art expresses P by 'metaphorically exemplifying' the predicate 'P'" (quoted in Scruton 1997, p.141). In agreement with Goodman, Scruton adds that the "expressive power" of music can be experienced "in its ability to compel ... metaphors from us, and to persuade us that they fit exactly" (p.141). Dismissing several alternative theories of musical expression, Scruton advances the thesis that to say "a piece of music has 'expression'" is to say "that it invites us into its orbit" (p.148).

Deleuze and Guattari base their theory of expression on the distinction of *content* and *expression* theorised in Hjelmslev's *Prolegomena to a Theory of Language* (1943).[5] They are not the first to do so, since Hjelmslev's opposition has been taken up by a number of writers. Nattiez tells us that Hjelmslev's opposition is a "reinterpretation of Saussure" in which "the signified becomes the 'content' and the signifier becomes the 'expression'" (1990 p.4). For Eco, "Hjelmslev's definition, which assumes the sign-function as a mutual correlation between two functives (expression-plane and content-plane), can be taken as a more rigorous development of the Saussurean concept" (Eco 1984, p.14). Hjelmslev, according to Eco, tells us that it is "'more appropriate to use the word sign as the name for the unit consisting of content-form and the expression-form and established by the solidarity that we have called the sign-function' (1943:58). A sign-function is realized when two *functives* (expression and content) enter into a mutual correlation" (Eco 1976, p.49).

For Hjelmslev, "'the decisive point for the question of whether or not a sign is present is' ... whether there are *two* planes and these planes are not *conformal.*" In Hjelmslev's words, "Two functives are said to be conformal if any particular derivate of the one functive without exception enters the same functions as a particular derivative of the other functive, and vice-versa." Eco adds that "in the case of 'pure games', as well as of music, formal logic and algebra, 'if the two planes are tentatively posited the functional net will be entirely the same in both'. Therefore these structures are not called 'semiotic' for they are interpretable but not biplanar (while languages are biplanar and not conformal)" (Eco 1976, p.89).

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[5] The reader should note that two quite distinct uses of the term *expression* are employed within this chapter. The earlier part of the chapter is concerned with a Romantic view of expression as feeling, the rejection of which is often associated with the nineteenth century critic, Eduard Hanslick. This view of expression is discussed only in order to avoid misunderstanding. The second part of the chapter deals with expression as theorised by Hjelmslev in his study of language and sign-functioning. It is this second type of expression which Deleuze and Guattari explore in their work and which forms a key concept within the present study.

Monelle demonstrates the content/expression opposition with reference to the particular segmentations of perception produced by individual languages, and how "the boundaries of content-forms are differently situated in different languages". In the Welsh language, for example, we are told that the word "*glas*, meaning 'blue', covers also certain shades of green and grey, while Welsh *llwyd* means 'grey' as well as 'brown'." This implies that an expression has "no real meaning" and that "both content and expression are parts of the sign function". Indeed they are said to exist purely because of this sign function (Monelle 1992, p.44). Monelle confirms that Hjelmslev has a problem "envisaging sign-systems very different from language" since, in Hjelmslev's terms, "the semiotic character of music remains provisional, for no analysis of the content plane can ever be undertaken to prove that it is non-conformal with the expression plane." Monelle, however, questions the validity or sensitivity of Hjemslev's criterion in the first place, suggesting that "it is only of certain kinds of language that a formal content-plane can be proposed, notably that called referential by Jakobson" (p.46). Monelle looks to Greimas and Courtes who tell us "that it is often hard to find a dividing line between the content-plane and the expression-plane" and that "this distinction, vital to Hjelmslev and traditional linguistics, begins to dissolve." Monelle, in turn, speculates that music may demonstrate "the coalescence of expression-plane and content-plane to an even greater degree" (p.238).

For Eco, "to deny the nature of sign to conformal systems means to disregard a large portion of semiotic phenomena". He says that "it is possible to consider as signs even the units coming from the *conformal but not monoplanar* systems in which the expression form coincides at some extent with the content form" (1976 p.89). Eco elucidates this point with reference to the game of chess in which:

> a given formal relationship between two different pieces on the board *does not* simply correspond to an equivalent relationship on the content plane: ... [it conveys] ... a series of optional moves, a set of possible responses, a chain of foreseeable (or unforeseeable) solutions and therefore a series of new interrelational positions of the entire set of pieces .... Therefore the possible content of a single piece is independent of the piece taken as expression. A

> chess game is a semiotic system with *two* planes and its pieces act as functives of a sign-function (1976 pp.89-90).

Music is likewise said to provide "another example of a semiotic system in which each situation could be differently *interpreted*" since "every situation in a musical piece may (or may not) announce a foreseeable but unpredicted musical solution" (p.90).

Hjelmslev's opposition of *content* and *expression* has clearly not been accepted uncritically into musicology. Considering whether or not music should be thought of as a language, Baroni suggests that a positive answer to this question would stem from being able to establish a relationship between a musical "plane of expression" defined as "audible structure" and a "plane of content" defined as "semantic structure". The plane of expression and the plane of content are said to be related in that "one 'stands for' the other [and] ... acts as a sign for the other and refers back to it (that is, so that sounds acquire meaning)" in ways which are accepted and recognised through social and cultural conventions or codes (1983 p.181). Baroni, writing in 1981, is cautious since he believes the study of the potential workings of such codes to be significantly incomplete, and because of what he perceives to be the lack of an "adequate understanding of the planes of expression and content." For Baroni, there are problems of psychology, anthropology and epistemology concerning the plane of content while the plane of expression is equally beset with textual, formal and perceptual problems (pp.181-182).[6] Overall, Baroni is unsure of the value of using Hjelmslev's opposition of *content* and *expression* within music theory since he is concerned that it is related to "the traditional aesthetic problem of the antithesis of form and content" (pp.198-199).

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[6] Baroni identifies three types of problem which research has revealed in relation to the plane of content. These are: (1) "*Problems of psychology*" which question the types of reality to which "the significant structures of musical language refer" and the "levels of consciousness and relationship with the world outside" they may entail; (2) *Anthropological problems* which concern "the function of music in various historical, social, and cultural traditions" and (3) *Epistemological problems* concerned with "the conditions for verifying the interpretations of meaning in a musical text." Baroni similarly identifies "three general concerns" relating to the plane of expression. These are: (1) "*Textual problems*" arising from the nature of music which demands "continual reinterpretation"; (2) "*Formal problems*" which involve the "identification and definition of formal characteristics and the relationships that connect them on different hierarchical levels (the field *par excellence* of musical analysis)" and (3) "*Perceptual problems*" caused by the volume of "musical activity" in a particular musical parameter, since musical expression is finitely limited by the constraints of "human perception and memory" (Baroni 1983, p.182).

Tarasti (1996), in contrast with Baroni, is convinced that a level of *expression* and a level of *content* are minimum prerequisites for any musical semiotic. For Tarasti, the level of *expression* refers to "the concrete physical-aural stimulus", the technical work of composition, while the level of *content* deals with all "emotions, associations, values and meanings joined to music", in other words, the aesthetic response of the listener. These two levels are said to be:

> inseparably united with each other - precisely as Saussure presumed that every sign has two aspects: signifier and signified, which are like two sides of the same sheet of paper. Therefore the semiotical analysis of music requires that one pay simultaneous attention to both expression and content (Tarasti 1996, p.9).

In an earlier study (1979), Tarasti goes even further and considers *expression* and *content* in terms of *form* and *substance*. With this model, the *substance of expression* involves the basic cultural materials of music such as scales, rhythms, dynamics, timbres and so on, and the *form of expression* refers to the form which is set upon the musical materials. The *substance of content* refers to "the associative responses aroused by the composition in a listener", while the *form of content* refers to the way in which "a culture determines the patterns and symbols which permit a listener to interpret his responses to a musical work" (1979 p.31). According to this idea, a composer is not in any way privileged in terms of interpreting the content of her/his own composition. The composer becomes one listener among many others, each with their own responses, since "the content level in art music remains an open, empty place for the shaping of various meanings" (p.32; p.54).

According to Tarasti (1994a), the musical relationship between expression and content "differs essentially from that in verbal language." He tells us that where a verbal sign has an "arbitrary relation between the signifier and signified" in music, "expression and content are inseparably connected with each other" and "the slightest change on the level of expression produces a change of content as well"

(1994a p.11). Tarasti discusses the problem of "how to connect the level of content to that of expression, how to join musical concepts and meanings to syntactical features of music. In order to assert that music is a semiotical process and that musical semiotics is possible, we have to believe that it has at least those two levels of signification" (p.29). He tells us that musical models which operate with "only one level of signification, such as Hanslick's theory and Schopenhauer's philosophy, are not semiotical." Despite this, he believes that:

> even in extreme cases of formalist music analysis we catch glimpses of both these levels; hence such analysis is at least momentarily semiotical, when uniting the levels of content and expression. Few formal analyses of music are so formal that they could do without any references to the level of content, i.e., to that which is usually hinted in discourse about the aesthetics of a composition (Tarasti 1994a, p.30).

It can be seen clearly, therefore, that Hjemlsev's opposition of *expression* and *content* has been explored by a variety of writers seeking to provide an expressive account of musical composition. Having acknowledged some points of difficulty concerning the appropriateness of Hjelmslev's opposition as tools for a structuralist analysis of musical compositions, we now consider the post-structuralist approach which is found in the work of Deleuze and Guattari.

Content and Expression: A Deleuzoguattarian Perspective

One of the key themes, perhaps even the most important one, within Deleuze's writings, with and without Guattari, is the discovery of what he calls a new *image of thought*. While this concept will be elaborated later within this chapter, it is enough for the moment to acknowledge that this new *image of thought* operates in terms of connections. In contrast with the semiotic approaches of writers such as Eco, Tarasti, Agawu and Monelle, Deleuze and Guattari are not interested in correspondences between words and things, and therefore, by extension, in any isomorphism between musical sounds and things (p.22). While they retain the idea of a thought which is made up of signs, they replace the signifier-signified relationship of traditional semiotics with *asignifying signs* which rather turn away from signifieds, referring instead to other signs (Deleuze and Guattari 1987, pp.67-68). An important consequence of this position is that *expression* and *content* now become "relative terms" (p.44).

As already acknowledged, the application of the terms *content* and *expression,* which we find in Deleuze and Guattari, is based on Hjelmslev's work in the field of linguistics in which Saussure's key concepts of the *signifier* and the *signified* are replaced by the terms *expression* and *content.*[7] According to Hjelmslev:

> The terms *expression plane* and *content plane* and, for that matter, *expression* and *content* are chosen in conformity with established notions and are quite arbitrary. Their functional definition provides no justification for calling one, and not the other, of these entities *expression*, or one, and not the other, *content.* They are defined only by their mutual solidarity, and neither of them can be identified otherwise. They are each defined only oppositively, as mutually opposed functives of one and the same function (Hjelmslev, quoted in Genosko 1996, p.145).

Expression and content give rise to a *plane of expression* and a *plane of content*. Deleuze and Guattari follow Hjelmslev in the conviction that the *content plane* and *expression plane* are purely arbitrary and functional in status. There is, according to this view, no absolute justification for designating one element of a sign as *expression* and the other as *content,* or vice-versa. It is their "mutual solidarity" which defines them and identifies them and they can only be recognised relatively in opposition to one another "as mutually opposed functives of one and the same function" (Hjelmslev, quoted in Deleuze and Guattari 1987, p.45).

Hjelmslev's theory is attractive to Deleuze and Guattari because it bypasses "the traditional opposition of form and content" and recognises the arbitrary nature of simple designations of elements as either of *expression* or of *content*. It concentrates instead on the stage prior to the formation and constitution of elements as expressions or contents. Hjelmslev's theory allows the supposition of what Bogue terms "a material substrate which precedes the formation of the planes of expression and content" (Bogue 1989, pp.126-127). Deleuze and Guattari identify this substrate as the *plane of consistency* or *body without organs*, that is, "the unformed, unorganized, nonstratified, or destratified body" (Deleuze and Guattari 1987, p.43). This so-called *plane of consistency* is one designation for the new *image of thought* theorised by Deleuze and Guattari. At this stage, it may be enough to think of the *plane of consistency* simply as a plane on which "all fixed categories, values, intentions, presuppositions and structures are dissolved" or decomposed only to form ever-new formations of heterogeneous elements (Goodchild 1996b, p.67).

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[7] According to Genosko, "French linguists and semioticians" were introduced to Hjelmslev's writings through André Martinet's 1946 study of Hjelmslev's *Prolegomena to a Theory of Language*. The *Prolegomena* itself, however, was unavailable in French until 1967 and it was Roland Barthes "who popularised Hjelmslevian terminology by developing a connotative semiotic". Genosko places Deleuze and Guattari within the "widespread critique of the signifier and the prevailing anti-Saussureanism of the period but with one important exception" since Deleuze and Guattari "combined a critique of a linguistics of the signifier with praise for Hjelmslev" (Genosko 1998, pp.175-176) .

To introduce concepts such as the *plane of consistency* or the *body without organs* is to enter into very specialised Deleuzoguattarian territory and to invoke an idiosyncratic set of concepts which will be explained later in this chapter, since their appreciation is essential within the present reading of Boulez's music and theory. Let it suffice for now to say that the *level of content* and the *level of expression* are formed from this *plane of consistency*, and that "between content and expression, there is neither a correspondence nor a cause-effect relation nor a signified-signifier relation: there is real distinction, reciprocal presupposition, and only isomorphy" (Deleuze and Guattari 1987, pp.502-503). Deleuze and Guattari depart from the already discussed structuralist readings of Hjelmslev's work and consider Hjelmslev's opponents to be wrong in designating the content/expression pairing as a reactionary return to "the discredited notions of the signified and the signifier", since they believe content and expression to be irreducible to either ideas of the signified-signifier or the distinction base-superstructure (Deleuze and Guattari 1987, p.43; p.68). As they say, "a form of content is not a signified any more than a form of expression is a signifier" (p.66).[8]

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[8] For Guattari "it is regrettable that the Hjelmslevian expression-content pair coincides in fact with the Saussurian signifier-signified couple". This, he tells us, "has in effect made the totality of semiotics fall back upon a dependency on linguistics" (quoted in Genosko 1996, p.145). Guattari believes that "linguists have too hastily equated Hjelmslev's distinction between expression and content with that of Saussure's between signifier and signified" (p.148).

Deleuze and Guattari disagree with any attempt to equate a word with a signifier where a thing becomes a signified in correspondence with that word. They cite Foucault's example of the "prison" where as "a form of content on a stratum" it "is related to other forms of content" such as the "school, barracks, hospital, factory" and so on. The *form of content*, "prison", "does not refer back to the word 'prison' but to entirely different words and concepts, such as 'delinquent' and 'delinquency,'" and so on. This is the *form of expression* which stands "in reciprocal presupposition with the form of content 'prison.'" Following this route, a "form of expression is reducible not to words but to a set of statements arising in a social field considered as a stratum (that is what a regime of signs is). The form of content is reducible not to a thing but to a complex state of things as a formation of power (architecture, regimentation, etc.)" (pp.66-67).

In *Nietzsche and philosophy* (1962), Deleuze approaches the relationship of *expression* and *content* from the perspective of *force*. Slightly modifying Deleuze's own words, Brian Massumi writes that "a thing has as many meanings as there are forces capable of seizing it" (Massumi 1992, p.10). Meaning is consequently said to be "more a meeting between forces than simply the forces behind the signs." Meaning becomes "the encounter of lines of force, each of which is actually a complex of other forces" which resist neat, logical unification (p.11). The *plane of consistency*, according to this view, can now be a place inhabited by forces, some of which take possession of one another.[9]

Value now becomes a question of "the hierarchy of forces" manifest within the complexity of a phenomenon (Deleuze 1983, p.8). Although we can still distinguish *content value* and *expression value*, this distinction is purely functional since both *expression* and *content* can be recognised as either the overpowering force or the overpowered force. The sign no longer refers to *content* and is neither a referent nor a signified, but rather refers to "a whole world of forces" which are enveloped within the sign (Massumi 1992, p.12). In addition to being functional, the distinction of *content* and *expression* is likewise "relative and reversible." The *content* in one place can be the *expression* in another to the extent that "the same thing can be both at different times or simultaneously, depending on which encounter is in question and from what angle" (p.12). Nevertheless this reversibility and relativity does not reduce the sign to the whim of subjectivity since "the 'perspective' according to which one becomes the other is not fundamentally the point of view of an outside observer. It is the angle of application of an actual force. Content and expression are reversible only in action. A power relation determines which is which" (pp.12-13). In their reversibility, *content* and *expression* relate to one another in a state of "reciprocal presupposition." As Massumi says, "one does not exist without the other. They are mutually determining. And although they are always mixed in fact, they are distinct in nature" (p.13).

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[9] For Goodchild, Deleuze's theory of "force" is "a radical innovation" since "one no longer looks to the essence of a thing or a proposition, but to who makes use of it and what function it has for them." He tells us that "Deleuze describes the pluralist idea that a thing can have many senses as 'philosophy's greatest achievement' (Goodchild 1996b, p.22).

In Deleuzoguattarian terms, meaning is "an interface between at least two force fields, or more specifically, between a form of content ... and a form of expression" (p.15). The Hjelmslevian terms of *form of expression* and *form of content* are illustrated by Massumi with the help of an example taken from the carpenter's workshop, namely the process of the making of a table. The "formal organization of functions" (what a completed table is and is for) is the *form of expression,* while the order and organisation which lead to the end product, in other words "the qualities of the wood as raw material, the states they pass through as they become a table" are the *form of content* (p.13). The distinction of form of expression and form of content facilitates the isolation of the "dynamic aspect of both formations at their determining point of impact." Instead of two independent and "irreducible formations", we have the two aspects of an interface (pp.13-14).

The interface between the *form of expression* and the *form of content* presents "a set of abstract relations between abstract points, the 'diagram' of a vectorial field." This is an encounter in which *form of expression* and *form of content* become fused. The encounter is dynamic in nature rather than static and is "composed of a number of interacting vectors." It consists of the "interaction between a multiplicity of terms, an interrelation of relations, an integration of disparate elements. It is a diagram of a process of becoming .... that enables a real 'translation' to take place" (p.14).

Again, using the image of the table, Massumi illustrates how "the interrelation of relations crosses from one substance (the thingness of tools and wood) to another (the ideality of thought)." The dynamic element of the process within materials is repeated, this time in thought, as "thought repeats the interrelation in its own substance ... mimics the encounter" and establishes "a parallel network of vectors, but between different points (concepts instead of tools and wood)" (p.14).

For Deleuze and Guattari, meaning consists in such translational processes. The process first enacted with wood can be repeated in the realm of thought and what was enacted in thought can be translated into "written or spoken words" (p.14). The original set of dynamic relations can therefore exist in "things (tools to wood)" but also in ideas "(concept to concept)" (p.16). Massumi acknowledges that Deleuze and Guattari do not use the word 'translation' in the general sense in which he applies it (p.147). We are told that "if meaning is a process of translation from one substance to another of a different order and back again, what it moves across is an unbridgeable abyss of fracturing. If meaning is the in-between of content and expression, it is nothing more (nor less) than the being of their 'non-relation'" (pp.15-16).

The translation which results "is repetition with a difference. If meaning is becoming, it is a becoming-other. It is the alienation of the same in the different, and the sameness of the different in its alienation from itself" (p.16). So it is that "the interrelation of relations between the wood and the tool bears no resemblance to that between concepts, which bears no relation to that between phonemes or letters: 'no conformity or common form, nor even correspondence'" (pp.16-17). Once again, pursuit of the content-expression relationship, from a quite different angle, has led us to the point of falling into the specialised and perhaps unfamiliar terminology of Deleuze and Guattari. As before with the concepts of the *plane of immanence* and the *body without organs*, the concepts of *difference* and *repetition* are central to this study and will receive close attention in Chapter Three.

Massumi, in summary, concludes that:

> CONTENT is what is overpowered, EXPRESSION what overpowers. Both content and expression are substance-form complexes. Content considered outside its encounter with expression, therefore as having neither form nor substance, is MATTER OF CONTENT (the overpowered thing as a bundle of potential affects, in other words, abilities to affect or be affected). Expression considered outside its encounter with content as having therefore neither substance nor form, is MATTER OF EXPRESSION (the overpowering thing as a bundle of potential functions) (p.152).

Massumi cautions, however, that "if we try to pinpoint the encounter [of content and expression], it slips from our grasp" (p.15).

In Deleuzoguattarian post-structuralism, *expression* and *content* arise out of a new *image of thought* which is designated as "an unformed plane of consistency" comprising a multiplicity of forces. In order to understand this new alignment of the *content - expression* relationship we will need to examine the new *image of thought* proposed by Deleuze and Guattari much more closely.

A New Image of Thought

A fixed system of thought is not to be found within the work of Deleuze and Guattari. Their collaborative studies continually introduce the reader to a variety of new concepts as they strive to articulate and re-articulate a new *image of thought*. It is not intended that these concepts should necessarily be combined into one perfectly coherent super-system. The need to have more than one conceptual means of referring to this new *image of thought,* and the impossibility of linking words and things in simple morphologies is integral to Deleuzoguattarian philosophy. The new *image of thought* is expressed in three main concepts - as a *plane of immanence (or consistency)*, as a *rhizome* and as a *body without organs,* three concepts which will now be considered briefly along with a series of associated concepts.

Deleuze and Guattari (1994) define the two mutually dependent aspects of philosophy as the development of a perspective through "the creation of concepts" and the tracing of, what they call, an abstract *plane of immanence* or a *plane of consistency*. Each concept, which is alternatively referred to as a *concrete assemblage,* is said to be comprised of indivisible component parts (1994 p.36). A Deleuzoguattarian concept is non-representational, self-referential and is defined by the unity of its parts, termed *consistency*, as well as by the intersections it makes with other concepts, both on its own and on neighbouring planes (pp.22-23; May 1994, p.35). Each *plane of immanence* is described as "a table, a plateau, or a slice" on which concepts form points. However, the plane itself is not to be equated with the concepts which have traced it (Deleuze and Guattari 1994, p.35). Fluid, not static, existing points meet and new points are introduced as the plane is modified, crosses other planes, or is fashioned anew from scratch. (May 1994, p.36). Such *planes of immanence* are drawn by *lines of flight* through processes termed *territorialisation*, *deterritorialisation* and *reterritorialisation,* which describe the movement of points as they form new planes or move from one plane to another (Deleuze and Guattari 1987, p.270).

The clearest contrast of this new *image of thought* with the dominant image of traditional Western thought is perhaps to be found in the distinction of the new *plane of immanence* from the *plane of organisation*. The *plane of organisation* is said to be structural and deals in "the development of forms and the formation of subjects." This plane, in addition to its component parts, contains an extra, concealed, transcendent dimension which is not openly perceived in itself, but which is "inferred" from the organisation itself, hence the name *plane of transcendence*. The *plane of immanence* differs from the *plane of organisation* since it has no concealed, inferred transcendent dimension. Deleuze describes this new plane in terms of "relations of movement and rest, of speed and slowness, between unformed, or relatively unformed, elements, molecules or particles borne away by fluxes" (Deleuze and Parnet 1987, pp.91-92).

According to Deleuze and Guattari, the *plane of organisation* seeks to restore fixed entities and labours endlessly to block all *lines of flight* or *deterritorialisations* on the *plane of immanence*. The *plane of immanence* is likewise said to be employed in escaping from the *plane of organisation* as it attempts to dissolve its fixed functions and is constructed ever differently from new combinations of concepts or *assemblages* (Deleuze and Guattari 1987, p.270; Deleuze and Parnet 1987, p.99). For Deleuze and Guattari, "one continually passes from one [plane] to the other", from the *plane of immanence* to the *plane of organisation*, "by unnoticeable degrees and without being aware of it" (Deleuze and Guattari 1987, p.269). The *plane of immanence* or consistency is not, however, chaotic. Consequently, Deleuze and Guattari believe that to avoid the situation where the *plane of consistency* becomes completely "undifferentiated", it is "necessary to retain a minimum of strata, a minimum of forms and functions, a minimal subject from which to extract materials, affects and assemblages" (p.270).

This *plane of immanence* is one way of conceptualising the new Deleuzoguattarian *image of thought* (Deleuze and Guattari 1994, p.37). Deleuze and Guattari posit the existence of many such planes, each of which constructs *immanence* in its own way, and it is suggested that "every great philosopher" forms a new *image of thought* by tracing her/his own *plane of immanence* (pp.50-51). All creative innovation, in fact, is said to involve processes of *deterritorialisation* in which concepts break down and are uprooted from their context only to reassemble with other heterogeneous elements to form new assemblages, perhaps on a different plane altogether (*reterritorialisation*). The Deleuzoguattarian project consists precisely in "the study of these lines", the study of the *deterritorialisations* and consequent *reterritorialisations* by which the elements of an assemblage, which has broken down, come to form new *assemblages* (Deleuze and Parnet 1987, p.125). Concepts or *assemblages* are said to be primarily defined by their points of *deterritorialisation* and *reterritorialisation* in a dynamic system which is in constant variation (Deleuze and Guattari 1987, pp.93-94). For Deleuze and Guattari, we can trace the lines of *deterritorialisation* as they fragment an *assemblage* only to reassemble themselves in ever-new configurations in the process of *reterritorialisation*, thus forming new, and equally transient, *assemblages*.

For Deleuze and Guattari, historical developments in musical expression have likewise depended upon such *deterritorialisations,* as *lines of flight* escape from their musical *assemblages* only to form new ones. Deleuze and Guattari think of *deterritorialisation* in terms of Boulez's concept of the *diagonal*, which conceptualises the contribution of an original creator as a quasi-diagonal line which passes between previously accepted horizontal and vertical coordinates. For Deleuze and Guattari, the creative artist or philosopher takes her or his place on an already existing plane, composed of many such lines. The originality of their creative effort is thought of as the drawing of a new diagonal line which is not formed simply through the connection of points on already existing lines, in other words, through an eclectic amalgamation of aspects from the work of others. Instead it forms itself between already existing points and lines and doing so creates a new line in a new space. This new line, this *diagonal* or *transversal*, marks out a philosophical or musical territory of its own, one which has never been known before. For Boulez, every great musician invents a new *diagonal* which is "irreducible to" and passes between previous and current "harmonic vertical and melodic horizontal" coordinates upon the musical plane. Each *diagonal* or *transversal* introduces new techniques and "is really a line of deterritorialisation" which traces its own unique coordinates and forms a new *plane of consistency* (Deleuze and Guattari 1987, p.296; 1994 p.191).

Deleuze and Guattari also define the new *image of thought* as a *body without organs,* a concept which may be equated with the *plane of immanence* (1987 p.72; p.154). Massumi encourages us to think of it as "the body outside any determinate state, poised for any action in its repertory ... the body from the point of view of its potential, or virtuality", "a network of virtual relations" (Massumi 1992, p.70; p.129). The concept can be used of any kind of phenomenon which is viewed in a fluid state of perpetual becoming rather than as an already fully "organized and integrated" object or thing (Grosz 1994, p.203). It directs us to make connections with a work "and its outside", since this new *image of thought* is not concerned with traditional forms of "explanation, interpretation and analysis" (Grosz 1994, p.198).

Indeed, according to Grosz, it rejects:

> the domination of linguistic/literary/semiological models, which all seek some kind of hidden depth underneath a manifest surface. Rather, they are interested precisely in connections and in interrelations that are never hidden, connections, between not a text and its meaning, but, say, a text and other objects, a text and its outside ... (Grosz 1994, p.198).

She continues:

> It is thus no longer appropriate to ask what a text means, what it says, what is the structure of its interiority, how to interpret or decipher it. Instead, one must ask what it does, how it connects with other things (including its reader, its author, its literary and nonliterary context) (p.199).

A third concept used to designate the abstract *image of thought* or the *plane of immanence* is the "vegetal model" of the *rhizome*. Deleuze and Guattari replace the traditional *image of thought*, which is unveiled as an arborescent image of thought, with the concept of the *rhizome* (1987 p.15). In contrast with the hierarchically structured branches found within tree systems, a *rhizome* has lines which allow the connection of any of its points with any other (pp.7-8). While *rhizomes*, such as are found within the natural world, do not in fact allow such free association between their stalks and lines, with the Deleuzoguattarian *rhizome,* "communication runs from any neighbour to any other, the stems or channels do not preexist, and all individuals are interchangeable, defined only by their *state* at a given moment" (p.17). Where arborescent systems have "hierarchical modes of communication and preestablished paths, the rhizome is an acentred, nonhierarchical, nonsignifying system" (p.21). Steve Sweeney-Turner defines the qualities of a Deleuzoguattarian rhizome as:

> a process, and not a structure ... if a rhizome is identified it will be different to all other rhizomes .... [It] has no underlying plan which can be traced. Rather, it has characteristics which can be mapped. There is no specific point at which we *must* enter the structure of the rhizome, there is no beginning as such, no point of origination. Not one root from which all else stems, but a whole system of roots ..., indeed, nothing stems *from* anything else, or is rooted *in* them. Rather, the particles of the system graft themselves onto each other, continually making new connections ... (Sweeney-Turner 1994, pp.348-349).

The concept of the musical *transversal* or *diagonal*, meaning the processes of musical *deterritorialisation* and *reterritorialisation*, is linked by Deleuze and Guattari with that of the *refrain* or *ritornello*, an explicitly musical concept, introduced most comprehensively into Deleuzoguattarian philosophy in *A Thousand Plateaus*. Deleuze and Guattari say that the *refrain* is a "territorial assemblage" (1987 p.312). Just as birds mark out their territory with their songs, musical *refrains* likewise mark out territories. Deleuze and Guattari speak of *refrains,* in a general sense, as comprising "*any aggregate of matters of expression that draws a territory and develops into territorial motifs and landscapes"* (p.323). More specifically, the term refers to the sound component within an *assemblage*. *Assemblages*, in turn, are said to be composed of all "kinds of heterogeneous elements" (p.323) which are drawn from a great variety of different *milieus* which, for Deleuze and Guattari, are the distinctive parameters or dimensions of a phenomenon.

An ethological example, which illustrates the concepts of *milieu* and *assemblage*, is the description of the nesting behaviour of a particular species of male wren found in *A Thousand Plateaus*. This, we are told, consists in "a dance, clicking of the beak, an exhibition of colours, a posture with neck outstretched, cries, smoothing of the feathers, bows, a refrain". The discrete elements of this behaviour are each taken from the separate *milieus* of colour, smell, sound, posture and so on, which all come together to form a territorial *assemblage*. The originally disparate elements from the varied milieus are now held together as a territorial *assemblage* by precisely that quality which Deleuze and Guattari refer to as *consistency* or consolidation (1987 p.323; p.329). As they see it, *consistency* does not operate by traditional tree systems of thought, but rather through the freer association of elements permitted by rhizomatic thinking (p.328). So it is that "heterogeneities", which had previously simply co-existed independently or followed one another sequentially, are now united within the same *assemblage* without surrendering anything of their heterogeneity (pp.329-330). The only necessary condition for this is that "the matters of expression" must be such that they make *consistency* possible (p.329). This *consistency*, which binds the heterogeneous elements together within the assemblage, is further identified as the *transversal*, that component part which had "taken upon itself the specialized vector of deterritorialisation" (p.336).

Deleuze and Guattari refer to the *refrain* as the true *content* of music which, as with other *assemblages*, is composed from diverse milieus. Within a musical *assemblage*, musical sound is only one component among others, since the *assemblage* is equally formed from literary, artistic, philosophical and many other milieus, the elements of which are assembled to form an expressive musical territory or *refrain*. Musical *refrains,* in turn, are continuously being uprooted and *deterritorialised* through the working of *transversals* (p.303).[10]

For Deleuze and Guattari, the tonal system within Western music is a case of an arborescent *image of thought*. The change from an arborescent music to a rhizomatic one is accomplished through what Deleuze and Guattari refer to as a "generalised chromaticism" in which all of the "sound components - durations, intensities, timbre, attacks" are placed "in continuous variation" and through which "music itself becomes a superlinear system, a rhizome instead of a tree" (p.95). According to Sweeney-Turner:

> we have ... moved from the concept of variation as organic development towards variation as heterogeneity; from the unity-within-contrasts of the organicist Romanticist aesthetic, towards the contrasts-within-alleged-unities of a certain (non) aesthetic of Otherness (1994 p.366).

Deleuze and Guattari explicitly introduce post-war composers such as Cage and Boulez into their articulation of this rhizomatic *image of thought*. They find in "certain modern musicians", the positing of an "immanent sound plane" in opposition to "the transcendent plan(e) of organisation, which is said to have dominated all of Western classical music" (1987 p.267). They consider Cage to have been the first to have "most perfectly deployed this fixed sound plane, which affirms a process against all structure and genesis" and to have privileged "experimentation against any kind of interpretation" (p.267; Sweeney-Turner 1994, p.378). Cage's music is consequently said to form a *plane of immanence.* They likewise consider Boulez's music to be rhizomatic because it is like "a seed which you plant in compost, and suddenly it begins to proliferate like a weed" (quoted in Deleuze and Guattari 1987, p.519). They understand Boulez's concepts of the *smooth* and the *striated* as corresponding to the *plane of immanence* and the *plane of organisation*. The concept of the *smooth* is said to function "as a form of BwO" while the concept of the striated operates "as an organizational plan(e)" (Sweeney-Turner 1994, pp.382-383). For Deleuze and Guattari:

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[10] Ronald Bogue has produced a short study (Rhizomusicosmology) in which the Deleuzoguattarian *refrain* is considered in relation to Messiaen's music. He acknowledges that Deleuze and Guattari "offer a means of construing music as an open structure that permeates and is permeated by the world" (Bogue 1991, p.85).

> the striated is that which intertwines fixed and variable elements, produces an order and succession of distinct forms, and organizes horizontal melodic lines and vertical harmonic planes. The smooth is the continuous variation, continuous development of form; it is the fusion of harmony and melody in favour of the production of properly rhythmic values, the pure act of the drawing of a diagonal across the vertical and the horizontal (1987 p.478).

Despite the clear rhizomatic lines which Deleuze and Guattari draw linking their new *image of thought* with the processes found within Boulez's music, Sweeney-Turner is not absolutely convinced. He draws on Wishart who suggests that for Boulez, "pitch and duration seem ... to form the basis of a compositional dialectic, while intensity and timbre belong to secondary categories" (Wishart quoted in Sweeney-Turner 1994, p.384). According to Sweeney-Turner, "Boulez himself has described the compositional relationship between the two axes not as a rhizomatic displacement, but within specifically arborescent lexis".

Sweeney-Turner believes Wishart to have provided "the most intense critique of Boulez' arborescent tendencies" and he offers it in opposition "to the reading" which Deleuze and Guattari make. As a result, we are left with two diametrically opposed readings of Boulez, "the *rhizomatic Boulez* of Deleuze/Guattari's reading, or the *dialectical Boulez* of Wishart's". Sweeney-Turner, in a sense, circumvents this problem by positioning Boulez between Cage and Stockhausen. While Sweeney-Turner agrees with Deleuze and Guattari that Cage's work is rhizomatic, he also believes Stockhausen's work to be basically arborescent, since Stockhausen considers the heterogeneous elements within his music to be "the outcome of a unified world concept" (Stockhausen, quoted in Sweeney-Turner 1994, p.346). Sweeney-Turner suggests that "Boulez could be placed between these two planes" but wonders whether "this middle-ground represent[s] the becoming-BwO of the organism, or the being organized of the body of immanence?" (pp.384-385).

Sweeney-Turner suggests that music may be "the product of some dialectic" between the plane of immanence and the plane of organisation "as Boulez suggests despite Deleuze/Guattari's reading" (p.393). He does not consider this to be a return to a simple dualism between two planes because the *plane of immanence* is different every time. It "is not static - it is a continual flux .... continuous variation, and so the distinction between the two planes is not that between 'two opposed models', but that between static *model* and continual *process*" (pp.394-395).

Boulez: A Rhizomatic Approach

In the course of this chapter, the question of *expression* has been considered in recent musical writing as evidenced in *topic theory* and *mythic semes*. It has also been established that Boulez's writings are open to musical understanding at both technical and expressive levels. Having further considered the rather ambiguous notions of musical *content* and *expression*, I now propose to adopt the relative and fluid Deleuzoguattarian understanding of these concepts which, as has been seen, circumvents the traditional dualism of *form* and *conten*t.

Pursuing, in the most general terms, the expressive lead set by writers such as Ratner, Agawu and Tarasti, we must now consider the place of *content* and *expression* within Boulez's music. The present study is not concerned with the discovery of topical signs or mythic semes such as form the basis of the structuralist analyses of Agawu, Tarasti and others, nor is it involved in unearthing underlying codes within Boulez's work. Products of the second half of the twentieth century, such as Boulez's works, clearly express different concerns from those which are found within the Classical or

Romantic music of these previous studies. In Deleuzoguattarian terms, each successive era within musical history is characterised not by its topical signs and underlying codes but by the *refrains*, the heterogeneous *assemblages* which constitute it and the territories which it articulates.[11]

The primary expressive utterances within Boulez's music refer neither to such social conventions as the dance movements of the Baroque and Classical eras nor to the mythic, nationalistic and individualistic topoi of Romanticism. I believe that they are to be found, as in the visual art of Klee, the poetry of Mallarmé, Artaud's late solo performances, Proust's *la Recherche*, the last two great novels of Joyce and indeed in Deleuzoguattarian philosophy, in a more self-reflective fascination with the materials of art itself. So it is that we find in Boulez the expression of *difference in itself* manifested as non-repetition at various musical levels. Likewise, we find in Boulez and others a more intense interest in musical *spatiality* and in contrasting *temporalities.*[12]

Boulez acknowledges the existence of both technical and expressive aspects within his music and the validity of "typologies" or significant connections linking artists, musicians and writers, which he terms *vectors*. The deliberate drawing of attention to such relationships, especially in his own case, signals an openness to a musicology which can provide more than purely technical study of musical parameters, enabling us to appreciate musical compositions in their inter-connectedness, as they relate to their outside.

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[11] Deleuze and Guattari catalogue a list of refrains which are striking in their similarity to the topoi and semes discussed at the outset of this chapter. Their refrains include "the lullaby, the drinking song, hunting song, work song, military song ... the Polish, Auvergnat, German, Magyar, or Romanian, but also the Pathetic, Panicked, Vengeful, etc." (Deleuze and Guattari 1987, p.347).

[12] Klee went so far as to say that within expressionist art, construction becomes a source of expression (Klee 1961, p.22). Klee's artistic experience connects powerfully with that of Boulez's generation of composers who likewise felt the need to concentrate on the fundamentals of construction for new ways of composing music. When it came to articulating the new electronic sound universe alongside its older acoustic relation, Boulez summed up the experience in words from Klee saying that he was "at the edge of fertile land" (Boulez 1991, p.172). According to Maconie, "technology extends human perceptions, and to communicate the idea of extended perception is frequently as important, and sometimes more important, than the representation of a recognizable object in the field of vision. As Klee said, art does not render the visible, rather it makes visible .... Instead of holding up a mirror to nature, the new art fashions a lens through which nature can be viewed from radically different perspectives" (Maconie 1989, p.174).

In conceptualising this dynamic movement of forces between artworks, the Deleuzoguattarian concept of *deterritorialised lines of flight* offers significant possibilities in enabling us to view a work from the point of view of the expressive links which connect it with certain aspects of other works from different media. A Deleuzoguattarian approach enables us to consider a musical work as a unique assemblage on which *lines of flight* from other musical works meet *deterritorialised lines of flight* from literature, art and drama in the creation of a new artwork, which can be understood as the meeting point of the forces which form it. This is not to reduce an artwork to a list of previous artworks or to play a game in which we merely spot influences within a work. This would not do justice to the originality of the artist or the artwork. The concept of the *diagonal/transversal* is the mark of originality and uniqueness within each new work, in that while the work connects aspects of previous works, these are assembled on a new plane through a new connective principle. Boulez's works, when viewed as Boulezian *assemblages*, are not reduced to aspects of Webern, Messiaen, Char, Mallarmé, Joyce, Klee and others. They remain distinctively Boulezian. When we say that many of the forces which we find within a Boulez score are reterritorialised *lines of flight* which can be seen differently within Mallarmé, Klee and others, we do not reduce Boulez's work. We simply acknowledge that some of its forces now speak within music as they also speak within visual art, poetry or philosophy.[13]

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[13] According to Williams, Adorno "finds support from Pierre Boulez for his contention that the reflective capacity of aesthetics has become inseparable from the techniques of art" (Williams 1997, p.11). For Williams, "philosophy and art enter into a symbiotic relationship where each is able to articulate an area of thought inaccessible to its partner: art depends on philosophy to judge its truth content, but can follow the inner life of particular impulses in a way prohibited to discursive logic in its present form" (p.12). Lyotard says that "philosophy slips into activities which, until the present, were considered as non-philosophical." The preoccupation with time within avant-garde music is an important case in point. Lyotard is "struck in seeing that each time that philosophers have embarked upon work on time, they have taken their examples from music." Conversely, contemporary works of art "struggle to discover other spaces and other times" (Samuel 1986, pp.16-17). Lyotard recognises that "since the end of the 19th century ... the work realised in the arts and, probably, most of all, by musicians, must be taken into account by philosophy." For Lyotard:

> philosophy tries ... to dramatise the questions posed by the artist .... For me, it is evident in *Répons* or in *...explosante-fixe...* or, even if it does not please Boulez, in certain works by Cage .... creators pose questions which are as fundamental as those of which philosophers speak, without composing essays, without including their reflection in a sort of meta-language (Samuel 1986, p.17).

Some of Boulez's own statements can be understood in a way which is generally supportive of the Deleuzoguattarian reading which is proposed. On his relationship with Joyce's work and on the question of analysing works of art, Boulez writes of extracting "a new element from a model, to examine the possibilities of the model and to transform it" (Samuel 1986, p.107). Speaking of Klee's use of musical terms such as "rhythm, polyphony, harmony, sonority (Klang), intensity, dynamic, variations" and so on, Boulez says that it is not "a simple 'translation'" but rather "a tentative application of the riches of music to another mode of expression, to study and transpose its structures" (Boulez 1989b, p.36).

It is essential to acknowledge that there is nothing of eclecticism within this approach. Boulez dissociates himself entirely from any "heterogeneous syntheses of elements" which amounts to a "superficial" linking of disparate materials. This is emphatically not Boulez's way. Instead, for Boulez:

> Each important work ... not only a specific work, but the output of a composer - is a new assemblage [agrégation] where a unique intention has resulted in a previously unknown synthesis ... where a certain number of elements have been left aside (1989a p.39).

In speaking of the genesis of the musical idea, Boulez says that "it can only be the product of a certain combination of circumstances: .... It is the sudden synthesis of a certain number of scattered and ... *presupposed* givens" (1989a p.112).

In Boulezian terms, we may designate the technical materials taken by Boulez from figures such as Webern, Messiaen, Char, Mallarmé, Klee, Proust, Joyce, Artaud, and others, as forming the captured force or the *content* of a piece. The resulting music becomes the dominant force or the musical *expression* of many of these ideas. Again, this identical second expressive level, the musical composition, can simultaneously be seen as the *content* level of a new expressive level in which *difference in itself*, varying conceptions of musical *spaces* and the alternative temporalities of *smooth* and *striated time* are expressed.

Boulez is not alone among musicians in exploring ideas such as *difference in itself* and various conceptions of *spatiality* and *temporality*. As composers shifted their focus from the traditional characteristics of Western music such as melody and harmony, interest developed instead in ideas of *difference*, manifested as non-repetition, notions of musical *spatiality* (pitch space and auditorium space) and alternative *temporalities* (experiences of time). All music may be said to exist within a sound space (pitch space) and in time (tempo and rhythm). Likewise all music plays on the presence or absence of repetition. With the Modernist era, however, there is a significant change in perspective. *Difference* as non-repetition, the movement of sound masses in pitch-space and the play of alternative temporalities, in their various manifestations and modes, now become the expressive capturing forces which connect music to its outside and provide its correlation and meaning.

Many composers of the post-war avant-garde formed idiolects utilising, in the process, concepts taken from creative thinkers working in diverse areas of endeavour. This suggests that Modernist music may, to some degree after all, have the commonality necessary for expressive communication. Connections among artists across the arts have not always been explicitly acknowledged. Modernist art and literature have often fared better than music and have long commanded greater general recognition, a fate which has singularly eluded avant-garde music. There is a need to perceive Modernist music within a broader perspective including Modernist art, architecture, literature and certain elements within contemporary philosophy. Given time, it may even be possible to compile a set of expressive concepts/percepts for post-war music linking Boulez with many of his fellow composers from the avant-garde. It may be that future generations will see a commonality of expression in post-war avant-garde music missing from contemporary accounts.

While Deleuze and Guattari do not have a musical or musicological background, they develop philosophy from artistic ideas including Boulez's ideas and the ideas of those same figures whose names arise constantly in Boulez's own discourse. When we examine *difference* as variation, *smooth* and *striated space* and *smooth* and *striated time*, the three identified areas of expression which form the basis of this study, we will do so with the assistance of some of the primary insights of Deleuzoguattarian philosophy. It is not proposed, however, that we in any way equate Boulez's music with Deleuzoguattarian philosophy. Nevertheless, in drawing a philosophy of *difference*, a philosophy of *smooth and striated spaces* and of *pulsed and amorphous times*, it will be argued that the work of Deleuze and Guattari is of great value to the present study precisely because it is often formed from some of the same materials with which Boulez formulated his theory and composed his music. It is my conviction that close consideration of the work of these two writers yields a fresh and fruitful approach towards thinking the music and theory of Boulez.

Chapter 3

Boulez and Musical Difference

Introduction

In Chapter Two of this study I tried to show that an understanding of Boulez's music and thought can be enhanced through consideration of a certain number of concepts which, within the context of the theory of expression already discussed there, can be said to be expressive. These are concepts which have more than purely musical resonances. They are concepts in relation to which Boulez has consciously positioned himself in the course of his development. This chapter will examine the first of these concepts, the concept of *difference*. This concept is one which it is easier to define and clarify in relation to the corresponding concepts of *identity* and *repetition*. These are ideas which have come to be seen as defining features within the broader picture of twentieth century philosophy, art, literature, science and music and which, I believe, find important expression in a variety of ways within Boulez's music and thought.

This chapter will look to the particular philosophy of *difference* developed by Gilles Deleuze. It is this philosophy which, I believe, will eventually enable us to perceive the concept of *difference* as a central one within Boulez's music. Having considered the concept of *difference* from a Deleuzoguattarian point of view, we will then seek to trace the gestation of Boulez's thinking of *difference* and *repetition* through his reflections on the ideas and practices of his musical forebears. Ideas of variation and non-repetition were absolutely central, for example, to the musical conception of composers such as Schoenberg and Webern at a particular stage of their development. We will likewise briefly survey the place of non-repetition within the work of some of Boulez's musical contemporaries.

Although it appears in many guises, Boulez has made *difference* (as variation) a central concept within his music. This, it will be suggested, has happened in four major stages which are, to some extent, chronological in sequence. The first phase in Boulez's treatment of *difference* is concerned with *difference* through *athematicism* and can be summarised in the notion of the *virtual theme*. This involves the efforts made by Boulez in the compositions from the *Sonatine for flute and piano* (1946) onwards, to create a music based not upon the return of thematic identities but one based upon athematic differences. A *virtual theme* has no essential form, only its many instances, each of which has equal validity. This movement has its culmination in the completely athematic *Structures Book 1* of 1951-52. From this zero point of complete athematicism, Boulez gradually reintroduces more easily perceptible elements into his compositions, but nevertheless retains an inherent athematicism and an attachment to the idea of the *virtual theme* which is maintained right up to his most recent pieces.

This reading of Boulez's musical development in terms of the concept of *difference* next informs the interest in *open works* and *aleatoricism* which Boulez reveals in the article *Alea* (1957) and in works such as the *Third Piano Sonata* (1957-) and *Don* from *Pli selon pli* (1957-62). This can be interpreted as a second phase in his treatment of *difference*. At this point, concern shifts from the thematic level to the formal level and we encounter *difference* and variation as *aleatoricism* within *open form*. Form is no longer to be defined as a fixed unfolding of the musical moments within a piece. In open form the many possible versions of a composition are to be understood as equally valid. This can be termed *virtual form* since each possible version of the composition is only one manifestation of the *virtual form* which cannot be perceived in its entirety in any one performance. Boulez's interest in *virtual form*, at the primary structural level, has proved to be less enduring in comparison with *virtual thematicism*, and the aleatoricism which remains in the most recent pieces is generally employed in secondary areas.

The third phase in his handling of *difference* refers to what Boulez calls *accumulative development.* This is to be found within a series of pieces dating from the 1970's up to the present, in which blocks of composed material recur in varied ways several times within a composition, creating Stravinskyan sectional forms. The final stage in Boulez's treatment of *difference,* which will be examined here, involves a renewed principle of *heterophony*. Here it is possible to have several simultaneous versions of a musical line, none of which is to be thought of as primary and all of which are said to be equally valid manifestations of the line. We will term this final stage the *virtual line*. While Boulez theorised the concept of heterophony in *Boulez on Music Today* (1963), it features more prominently in works from the 1970's such as *Rituel* (1974-75) to the definitive versions of the movements from *...explosante-fixe...* completed in the early 1990's.

For the purposes of this study, each of these stages in Boulez's treatment of *difference* will be viewed as constituting, in Deleuzoguattarian terms, *an assemblage of deterritorialised lines of flight*. This simply means that, as we consider these four stages, we will be looking to the ways in which his work connects with the work of other important figures such as Schoenberg, Webern, Stravinsky, Klee, Mallarmé, Char, Joyce and Artaud. The philosophy of Deleuze and Guattari enables us to describe Boulezian concepts in terms of *lines of flight*. These are only the creative forces and ideas which emanate from the *difference*, multiplicity and openness which are to be found in the works and theories of other creative artists and which become part of Boulez's own project.

Deleuzian Difference

The Deleuzoguattarian philosophical project, as we saw in Chapter Two (pp.63-71), centres around the thinking of a new abstract *image of thought*. It is important to understand that an *image of thought* is more than the "method" by which we actually think. It is a "more or less implicit, tacit or presupposed image of thought which determines our goals when we try to think" (Deleuze 1994, p.xvi). It is more than the background against which our thinking happens since it is the very plane on which thinking occurs. Deleuze's new *image of thought*, in contrast with the traditional representational and identity-based thought which is said to account for most Western thinking, is to be based upon the concept of *difference* within a thinking which no longer reduces all differences to identities.[1] Before considering the nature of Deleuzian *difference*, we look first to the origins of the concept within Deleuze's work.

While Deleuze received a traditionally rationalist, philosophical education, his own early studies are largely the exploration of the work of a series of anti-rationalist philosophers including Lucretius, Spinoza, Hume, Nietzsche and Bergson. Of these thinkers, Nietzsche's work is undoubtedly the most important for Deleuze because of the alternative it offered to the Hegelian philosophy which had dominated French thought in the 1940's and 1950's (Bogue p.2). For Deleuze:

> the Hegelian dialectic ... was based ultimately on a logic of identity, within which the non-rational 'other' could only be conceived of as the shadow of the rational 'same'. What was needed, according to Deleuze and others, was a philosophy of difference *as* difference, irreducible to the concepts of identity and representation. Deleuze found the inspiration for such a philosophy in Nietzsche (Bogue 1989, pp.2-3).

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[1] *Difference* is a concept better known from Derridean deconstruction than from the work of Deleuze. Bruce Baugh (1996) summarises the distinctions separating Derridean and Deleuzian *difference,* telling us that while Déscombes' *Modern French Philosophy* links them together generally through 'difference', those features which separate them "are considerable and should not be ignored." In Baugh's words:

> Derrida's difference combines semiological difference (the difference between signifier and signified, language as a system of difference without positive terms) with a theory of temporal difference or deferral (derived from Heidegger and from Koyré's reading of Hegel). Deleuze's difference on the other hand, stems from a line of thought that insists on the difference between thought and being, between difference and the concept of difference, between difference and conceptual difference. From Deleuze's standpoint, Derrida's attempt to reduce all differences to differences of essentially the same type is a reduction of difference to the same and erects a 'tyranny of the signifier'. What Derrida's difference does not capture are all the multifarious forms of difference that elude or go beyond signification and which cannot be understood on the model of the linguistic sign. The 'differentials of force' described by Nietzsche, Spinoza, Leibniz and modern physics and the concomitant theory of the body Deleuze draws out from this, would be one example of a difference beyond differance (Baugh 1996).

In the course of the 1960's, beginning with *Nietzsche and Philosophy* (1962), Deleuze formulated his own philosophy of *difference*, a project which is most fully expounded in *Difference and Repetition* (1968) and the *Logic of Sense* (1969). While Deleuze's philosophy of *difference* contains elements from the work of Plato, Duns Scotus, Kant, Spinoza and Bergson, its starting point is clearly the philosophy of Nietzsche.

Nietzsche's critique of enlightenment reason pinpoints Kant's failure to include the realm of values within his critical analysis, since his simple assumption of "the value of Truth, Goodness and Beauty", renders "his critique ... wholly subservient to these unexamined values." Nietzsche, alternatively, introduces "the question of value into thought" and installs its critique at the centre of his own "genealogical philosophy." His chosen method for conducting this evaluation of values is to trace "their lineage to their origin." What he discovers "at the origin of values", according to Deleuze, is *difference*, and "two distinct ways of making differences, one affirmative and one negative" (Bogue 1989, p.16).

Nietzsche's aim is ultimately "to enunciate an affirmative and active thought" in order to oppose "the negative and reactive thought" which, he believes, has dominated Western philosophy from its beginnings. For Deleuze, "the ultimate result of Nietzsche's completion of the Kantian critique is the creation of a new image of thought" which will replace the existing dominant one (p.18). Deleuze draws upon certain currents within Nietzsche's work in order to identify Platonism as the origin of this "dominant tradition" which "is defined by its suppression or exclusion of difference in favour of a logic based upon identity, resemblance and similitude" (Patton 1994, p.145).

It is important to note that Deleuze is a Nietzschean philosopher but not merely a "disciple of Nietzsche". He uses aspects of Nietzsche's thought in order to formulate his own philosophy more cogently. It is a "selective and creative" reading, "as much a development of certain possibilities in Nietzsche as an exposition of a philosophical system" (Bogue 1989, p.33). Nevertheless, the theme of the overturning of Platonism is not a Deleuzian fabrication. In a note to his *Nachlass*, Nietzsche refers "to his own philosophy as an 'inverted' or 'reversed' Platonism..." and in the preface to *Beyond Good and Evil*, he dismisses Platonism as the "dogmatist's error" (cited in Patton 1994, pp.143-144). Furthermore, opposition to the Platonic concepts of "the One, the Same, and the Whole" are to be found throughout Nietzsche's works (Bogue 1989, p.28). While the anti-Platonic theme is clearly present within Nietzsche's writings, Patton nevertheless cautions that several modern philosophers have set out to overturn Platonism but that "it is not always the same Platonism that is envisaged, nor does rejection always take the same form in each case" (Patton 1994, p.141). Consequently, while Nietzsche is presented in *Nietzsche and Philosophy* "as an anti-Platonic philosopher who tries to overturn Platonism by completing the Kantian project of a critical philosophy", Deleuze embarks on this project in his own name in *Difference and repetition* (Bogue 1989, p.56).

Deleuze has argued persuasively against the supremacy of representational thought which, to his mind, has dominated artistic and philosophical perceptions since Plato and Aristotle and which, he believes, with its emphasis on identity (1994 pp.68-69), fails to account adequately for *difference* (pp.55-56). Most philosophers:

> had subordinated difference to identity or to the Same, to the Similar, to the Opposed or to the Analogous: they had introduced difference into the identity of the concept, they had put difference in the concept itself, thereby reaching a conceptual difference, but not a concept of difference (Deleuze 1994, p.xv).

For Plato, the authenticity of anything was determined by the degree of identity it shared as a copy with its original, hence the seeming inadequacy of simulacra which were judged to be imperfect copies of ideals which existed only in Plato's perfect world of forms. Plato, according to Deleuze, feared the lack of determination and identity within simulacra and was consequently anxious to distinguish and separate good and bad copies of the perfect form. Deleuze, in contradiction, rejects Plato's philosophy of identity and instead seeks to overturn it through a philosophy of *difference*, a *difference* which cannot be explained in terms of representation and identity. Accordingly, Deleuze denies "the primacy of original over copy, of model over image", and elevates simulacra in an approach where *difference* is prized above sameness. For Deleuze, everything is a simulacrum since, for him, there are no absolute foundations or identities (Deleuze 1994, p.66; p.128).[2]

Michel Foucault has stressed the importance of understanding that *difference*, in the Deleuzian sense, does not mean "a difference *from* or *within* something; behind difference, beyond it." Traditional thought has tended to view *difference* from the standpoint of sameness and unity. Deleuzian *difference*, on the contrary, conceives "difference differentially, instead of searching out the common elements underlying difference" (Foucault 1977, pp.181-182). Within the framework of traditional identity-based thinking, perception looks for "global resemblances" among phenomena which are then "decomposed into differences and partial identities ... at the root of what we call diversity" (p.183). What results from this process of thought is a range of likenesses and resemblances which can be classified in terms of their degree of identity or *difference* from any initial idea. Deleuze's task is to reveal the way in which, for the traditional system of thought, "difference is held fast within an oppositional, negative, and contradictory system" such as that of dialectics (Foucault 1977, p.184). Where dialectics recaptures every *difference* in a future synthesis, Deleuze desires to free it through "divergence". This liberation of *difference* can only be achieved "through the invention of an acategorical thought" (p.186). Such a mode of thought would no longer provide primordial unities within which differences and multiplicities can be categorised. Non-categorical (or univocal) being is now permitted "to function as that which is repetitively expressed as difference" (p.187). It is this single expression of all being which prevents categorisation of phenomena and enables "difference to escape the domination of identity" (p.192).

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[2] Deleuze says that in the *Sophist*, "Plato discovers ... that the simulacrum is not simply a false copy, but that it places in question the very notions of copy and model" (Deleuze 1990, p.256). Nickolas Pappas refers to Deleuze's *Plato and the Simulacrum* (Deleuze 1990, pp.253-266), as "an unorthodox treatment" of Book X of *The Republic* (Pappas 1995, p.186). According to Nicholas P. White, many of the best recent studies of Plato have focused on Plato's *Sophist* (1993 p.vii). White does not address Deleuze's reading of the *Sophist* but does draw attention to Plato's consideration of terms such as the "same" and the "different" (p.viii). For White, Plato does not really "explain the relation" between these terms and White, therefore, concludes that "one need not insist that a particular one of the two must be defined in terms of the other" (p.xxxiii).

In aesthetic modernity, especially Modernist art, literature and music, Deleuze finds a world which he believes to be defined in terms of *difference* and simulacra (Deleuze 1990, p.265; Patton 1994, p.154). He writes of the "permutating series" and "circular structures" of modern art which he perceives to be directing philosophy away from representation. With representation, every unique viewpoint must have a corresponding "autonomous work with its own self-sufficient sense". Deleuze looks instead to works such as Mallarmé's *Livre* or Joyce's *Finnegan's Wake* which challenge and invert the notion of a model or pre-eminent position as "the identity of the object read really dissolves into divergent series defined by esoteric words, just as the identity of the reading subject is dissolved into the decentred circles of possible multiple readings" (Deleuze 1994, pp.68-69). In this Nietzschean world of *difference*, *becoming* replaces *being*, which has perhaps been the central concept within Western metaphysics since the time of Plato. The constancy of *being* is undermined as reality, the world, the cosmos, or whatever, is no longer perceived to be composed of fixed entities but rather of a perpetual flux of forces which connect and disconnect in constantly ever-new ways.

Deleuze connects the concept of *difference* with that of repetition which he also believes to have been subject to thinking in terms of "the identical, the similar, the equal or the opposed" (Deleuze 1994, p.xv). Instead, Deleuze posits a repetition, no longer subject to identity and sameness, but rather to *difference* and variation. Deleuze interprets this philosophy of *difference* and repetition in terms of Nietzsche's much misunderstood doctrine of the *eternal return*. This is not to be seen as the return of the same, in the sense of history repeating itself, the same thing occurring again and again in the same way, nor is it to be understood in its moral sense as an affirmation of life. It is, rather, the return of the same which is always different with each recurrence. According to this view, each return is a unique manifestation of a *virtual* which is inexhaustible in its possibility. Massumi suggests that the concept of the *virtual* may be the most crucial, yet "least understood", concept employed by Deleuze and Guattari. He defines it as "the difference between something actually in existence and a potential for existence" and explains it with the help of Quantum physics.[3] Whatever means a scientist may use to measure a "subatomic phenomenon" will always affect and change it. The processes necessary for perception of a subatomic particle will result in the "'collapse' of its 'wave-packet'". In other words, until perceived, the subatomic particle has no individual existence. The virtual particle or wave packet is given determinate position and existence simply through the intervention of the scientist (Massumi 1992, pp.34-35; pp.52-53).

In Deleuzian terms, the *virtual* passes into the actual. The *virtual* is therefore the total cloud in which all possibilities coexist. It is from this principle of the *virtual* that the eternal return operates, designating return, "not of being and the same, but of becoming and difference." The "flux and multiplicity" involved in such an eternal return results, therefore, in a world of chance and chaos in which innumerable permutations of forces may result (Bogue 1989, pp.28-29). Beginning from Nietzsche's concepts, Deleuze affirms *difference*, chaos and multiplicity as the *becoming* which continually recreates the world. In terms of the present study, it may be that Deleuze's reading of Nietzsche, as it has been unfolded here, gives philosophic expression to something which, in its own way, informs the literary efforts of Mallarmé and Joyce, as well as the geometry of Klee, and which is taken up, to some extent, in the music of Boulez. It would certainly seem, at least to me, that this is the view taken by Deleuze and later shared by Guattari.

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[3] The precise meaning of the term *virtual* within contemporary thought is considered by Serge Dentin in the article *Le Virtuel dans Les Sciences* (1992). Dentin is concerned that the term, which has become rather fashionable within contemporary thought, has nevertheless been prone to contradictory definition within the arts, while it has received a variety of applications within the sciences. Like Deleuze, Dentin locates the virtual within the rejection of all ideas of images and reproductions, simulacra and copies (pp.167-168). Dentin sketches three scientific understandings of virtuality. (1) The concept of the *virtual route*, as worked out by Lagrange (1736-1813) through the application of the variational calculus developed by Euler (1707-1783). The virtual route is demonstrated with the example of a ball in motion which is pulled by the force of gravity. If we consider a particular point in space corresponding to a starting time and then a second point in space corresponding to a finishing time, the distance between these two points in space and time can be traversed by an "infinite" number of possible paths which are called "virtual routes". While the ball will only have one actual trajectory, this, according to variational calculus, should be seen as emanating from within a much larger field of possiblities (p.172). (2) Looking to the physics of light, Dentin writes of the *virtual quantum*. While our eyes tell us that a beam of light travels towards us in a straight line, the notion of the virtual quantum provides an alternative explanation, based upon the idea of constructive and destructive interference patterns within light. According to this view, a quantum of light does not simply travel in a straight line through space, but rather passes simultaneously through all possible routes. In all of the spatial points where the interferences are destructive, there is cancellation and nothing is perceived. All that is seen results from the single path which has a constructive interference pattern. (3) Finally drawing upon "the quantum theory of fields" which "describes the material world as an ensemble of real particles in interaction surrounded by a cloud of virtual particles", Dentin writes of the *virtual particle* (p.176). In this understanding of reality, "the identity of a particle can be conceived of as the ensemble of all its possible fluctuations .... it is impossible to speak of a trajectory since the particles literally *occupy* all of the space" (p.177). As Dentin says, when the virtual particle is measured, it is only perceived in one of its many states, yet "the virtual exceeds even the notion of a state since the state is [only] a moment of the virtual, a configuration" (p.177).

For Deleuze and Guattari, artistic and musical expression involve "an enlarging of perception" which they believe "can only be attained if perception breaks with the identity to which memory tethers it" (Deleuze 1986, p.99). Conveniently for us, Deleuze explicitly applies his thinking of *difference* and repetition to Boulez's music and thought in an essay entitled *Boulez, Proust et le Temps* which forms part of the sixtieth birthday tribute produced for Boulez by Claude Samuel. In this essay, Deleuze views Western tonality as a musical system based essentially upon the principle of identity. Boulez's music, in contrast, is perceived as leading to "a generalised refusal of every principle of identity" in its "variations and distributions". Nevertheless, Deleuze acknowledges that music such as this, based upon *difference* and variation rather than identity, can give rise to serious perceptual problems since the listener may be faced with unceasing variation and little in the way of reference points with which to orient the ear. Deleuze recognises that Boulez solves this problem through the introduction of, what Deleuze refers to as, *fixed points* within the score. In Boulezian terms, *fixed points* are generally termed *signals* and *envelopes.* Their function is, in Deleuze's words, to make "the formal structure come to the surface" or to isolate "a group of constitutive elements" in such a way that perception is enriched and memory can operate more successfully.

Deleuze further connects Boulez's music with Proust's *la Recherche* in which *fixed points* are also said to be found (p.99). Deleuze denies that the introduction of *fixed points* into the musical or literary work has in fact simply reinstated a principle of identity. He tells us that the *fixed point* "is not defined through the identity of a repeated element, but through a *quality* which is *common* to the elements which are not repeated without it". Deleuze cites, as an example, the Proustian idea of a savour [*saveur*] which is "common to two moments". This does not reveal identity lurking behind a facade of variation, but rather discloses a variation which is rather "individuation without identity" (pp.99-100). We are told that it is precisely this new type of variation which is the locus of the enlarged perception facilitated by art, since it enables us to perceive difference, no longer tethered to a dominant principle of identity, but purely within itself. Using the example of the village of Combray, which is so prominent throughout *la Recherche* in the memory of the narrator, Deleuze tells us that for Proust, this "savour, as a quality common to two moments, identifies Combray as always different from itself." In other words, while Proust uses the village of Combray as a *fixed point*, as a familiar reference point throughout the work, its aspect is constantly varied with each appearance. Likewise, in music, "the functional game of repetition and difference has replaced the organic game of identity and variation." In this way, "*fixed points* do not imply permanence, ... but rather force us to perceive variation", while Boulezian *envelopes* similarly produce not fixed identities but rather "shifting relations" (p.100).

I suggested to Boulez that Deleuze's concept of *difference,* as found within *Difference and Repetition* and elsewhere throughout Deleuze's work, seemed to be a very apt concept for much of his own work. Boulez agreed and said that he "was very happy to discover that" himself and that when he first came across Deleuzian *difference*, he believed that it expressed his own thoughts exactly. I further suggested that Deleuze's terminology provided a suitable terminology for discussion of Boulez's music, to which Boulez again wholeheartedly agreed, saying that his meeting with Deleuze had been based upon the concepts which they shared (Interview 28.8.98).

If these observations are valid, Deleuzoguattarian philosophy can provide a theoretical focus for one (among many) possible understanding of Boulez's attention to musical *difference* and multiplicity. It is on the basis of this that we continue and look now to the pre-war musical sources of Boulez's treatment of *difference*, in particular the music of Schoenberg and Webern.

Twentieth Century Music, Difference and Repetition

According to Boulez, the entire history of the Western world is caught up in a "dilemma" involving repetition, variation, recognition and unrecognition. Indeed he believes that a profound interest in repetition and *difference* is found, directly or indirectly, in most musicians and certainly in the work of contemporary musicians, since the formal articulation of music is always dependent upon what he calls a "dialectic" relationship involving repetition and *difference* (Boulez 1989a, p.123; p.200). He says:

> All work, but especially all musical work, lives under the double sign of analogy and difference .... All musical form depends absolutely upon the dialectic relationship which supports analogy and difference; it is on these characteristics that formal articulation is based (1989a p.200).

Within his *Collège de France* lectures published as *Jalons*, from which the above quotation is taken, Boulez devotes a considerable amount of space to the discussion of questions of *difference* and repetition within the context of twentieth century thematicism and athematicism. The three chapters gathered together under the title *L'enjeu thématique* form a record of the lecture courses on the subject given by Boulez between 1983 and 1985. A total of 121 pages is spent here in the consideration of thematicism, with many additional references elsewhere throughout the volume. While Boulez's study considers thematicism within the music of Debussy, Stravinsky, Bartok, Varèse and others, the sections which are of most relevance to Boulez's own practice are those which refer to what Schoenberg, Berg, Webern and latterly Stravinsky, did with the notion of the theme.

The importance attributed by Boulez to phenomena of *difference* and repetition within post-war music is therefore primarily rooted within the theoretical and practical innovations of the Second Viennese School. Boulez recognises multiple manifestations of the principles of variation and non-repetition within their work, in "not doubling the components within an object, non-repetition of objects, no literal return of ideas, no literal reprise of formal elements" (1989a p.333). He says: "despite the strongly diversified aesthetics rendering the works more or less complex, more or less difficult to grasp", there lies "a single principle ... one can call it the principle of variation, one can also call it the principle of non-repetition" (p.332).

In the article *New Music: My Music* (c.1930), Schoenberg explained the place of repetition within his music as follows:

> 1. Substantially, I say something only once, i.e. repeat little or nothing.
> 2. With me, variation almost completely takes the place of repetition (there is hardly a single exception to this); by variation I mean a way of altering something given, so as to develop further its component parts as well as the figures built from them, the outcome always being something new, with an apparently low degree of resemblance to its prototype, so that one finds difficulty in identifying the prototypes within the variation (Schoenberg 1975, pp.102-103).

He continues:

> Now, if I recall that I confessed to repeating little or nothing in my music, then you will rightly ask, 'Why? Why make it so hard for the listener; why not make things easier for him, in the way he needs; why say once only things that are hard to perceive and remember even when heard repeatedly, so that one completely loses the thread and doesn't begin to comprehend all the things that come later?' To this I have to say: 'I can do it no other way, and it does not work any other way. Only, I did not choose to write like that, I do not go out of my way to write like that, and it would be a relief to feel I might do it differently' (p.104).

As we will come to see again in Chapter Four on *musical spatiality*, it is not clear at this stage of research to what extent Schoenberg's terminology, for example his use of the word *repetition*, is self-consistent. Compare, for example, the quotations above with the following passage taken from *For a Treatise on Composition* (1931) where he writes:

> the motive - can manifest its presence only through repetition .... even today it is impossible to mould a form with plasticity, and in an easily comprehensible way, unless one uses repetition ... that is to say, since up to the present we have found no other basic principle for giving shape to music - it is a justifiable thesis that repetition is the initial stage in music's formal technique, and variation and development its higher developmental stages (Schoenberg 1975, p.265).

Cage, who was for a time a pupil of Schoenberg's, recalls that for Schoenberg "there was only repetition; he used to say that the principle of variation represented only the repetitions of something identical" (Cage 1976, p.45). Again, Cage remembers that Schoenberg taught him "that a variation was in fact a repetition", indeed "an extreme case of repetition" (p.75; pp.78-79).

Whatever the complexities of Schoenberg's evolving relationship with *repetition*, Charles Rosen recognises that the truly revolutionary step taken by Schoenberg was "the renunciation of thematic form" which was first accomplished with the early monodrama, *Erwartung,* in 1909 (Rosen 1976, p.47). The decisive nature of this move stemmed from the fact that hitherto, the repetition of themes and the intelligible treatment of motifs had provided the clearest means of articulating musical form. Boulez likewise pinpoints *Erwartung* with its almost complete "absence of themes based on the determining *return* of privileged figures" as "the extreme point of thematic atomisation" within Schoenberg's development. *Erwartung* and *Die glückliche Hand* (1910-13), two works from Schoenberg's free atonal period, are together commended by Boulez as being his most enterprising from a thematic viewpoint (Boulez 1989a, p.174). Boulez says that in *Erwartung* "we find, at fever pitch, invention in a perpetual state of becoming" (1991, p.283). Even within Boulez's harshest appraisal of Schoenberg in the article *Schoenberg is dead* (1951), Boulez writes of the "perpetual variation, or non-repetition" of the *Three Piano Pieces* Op.11 and *Pierrot Lunaire* as "remarkable features" (1991 p.210). By the time of the *Collège de France* lectures of the 1980's, Boulez continues to identify "the tendency to variation, to non-literal repetition, to the evolution of forms towards a state of constant mobility" as perhaps the most significant element within Schoenberg's development (1989a p.255).

Even so, writers such as Robert Craft, H.H Stuckenschmidt and Oliver Neighbour have rejected the term *athematic* as properly descriptive of *Erwartung* since they perceive, albeit at a very basic level, some kind of "constant motivic development" within it. Rosen, in contrast, would appear to be in agreement with Boulez's account, stressing that whatever motivic elements can be heard or discovered through analysis no longer possess the "similarity" or "continuity" which informs previous music and which normally enables the listener to appreciate a motif through a principle of identity. Rosen concludes that "*Erwartung* is 'athematic' or 'non-motivic' in the sense that understanding and appreciating it does not require recognising the motifs from one part of the work to another as all music from Bach to Stravinsky demands". Even Craft is said to admit that "the web of motives in *Erwartung* is extremely difficult to disentangle" (Rosen 1976, pp.47-50).

Boulez is primarily interested in those works in which Schoenberg dispensed, for a time, with thematicism. Nevertheless, despite the anti-thematic revolution within Schoenberg's so-called atonal music, Boulez believes that his use of certain contrapuntal techniques, especially that of strict canon, was inconsistent with, and indeed undermined, his desire for variation since it resulted in consequents which were exact copies of antecedents in terms of both pitch and rhythm (Boulez 1991, p.210). Further, with the advent of the twelve-tone system and the traditional forms which Schoenberg duly adopted in order to make musical prolongation once again possible, thematic repetition of a sort reappeared with the restatement of the series. Boulez castigates Schoenberg's use of the twelve-tone system for, what he calls, its "confusion between theme and series", its "ultra-thematicization", which Boulez believes to be an inherent flaw within Schoenberg's system and its inevitable consequence (1991, p.212). The third piece of Schoenberg's Op.23 piano pieces, for example, is cited by Boulez as a case of ultrathematicism in that Schoenberg uses the transpositions and inversions of a single "five note row" to produce all of the harmonic and melodic material within the piece. The fifth piece of the set uses a twelve note row in such a way that the order of the pitches almost never changes throughout the composition (p.290).

Berg, in contrast, never rejected repetition with the radical purpose of Schoenberg's *Erwartung* or some of Webern's early works. This, according to Boulez, is partly the result of an inclination to operate themes simultaneously on dramatic and musical levels, a phenomenon recognised by Boulez in as early a work as the *Altenberglieder* (1912). Berg's themes, for example in *Wozzeck*, act as *aide memoires*, and are allotted to persons, emotions, situations or objects such as the characters of Wozzeck, Marie, the knife and so on. Here, Berg attempts to reconcile the possibly conflicting demands of dramatic expression and formal development through subjecting his themes to the rigours of purely musical forms. Nevertheless, despite his attachment to thematic reference, he succeeds in avoiding repetitive structures and thematic repetition favouring rather, the extensive variation of his themes (Boulez 1989a, p.175).

According to Rosen, of the three main Second Viennese composers, only Webern "made a profound exploration of athematic forms" (Rosen 1976, p.112). Boulez describes how, within Webern's early works, thematicism is intimately related to intervallic structure through the privileging of particular intervals (1989a p.181). This process led to a consequent weakening, if not the outright annihilation, of all distinctions between what had formerly been perceived as "principal figures" and "secondary figures" (p.182). In the Op. 9 *Bagatelles* (1911-13), we are faced with the paradox of a thematicism which, from one point of view, is no longer apparent in any accepted sense of the term while, from a different perspective, it is equally capable of being perceived as thematically all-pervasive. Boulez considers the Op. 9 *Bagatelles* to be Webern's "most radical work in terms of non-repetition" since, for example, in the fifth bagatelle Webern imposes non-repetition strictly and allows nothing to return in exactly the same way (p.182; p.187). For Boulez, at this point of Webern's development, "maximum coherence equals maximum perceptual insecurity", a situation which is perhaps not dissimilar to that later encountered in

Boulez's own *Structures* book 1 (p.182). It was this loss of perceptible coherence caused by strict non-repetition within works such as the *Bagatelles* which persuaded Webern to reintroduce repetition at the centre of his work.

In his two series of lectures, *The Path to Twelve-Note Composition* (1932) and *The Path to the New Music* (1933), Webern provides his own account of these events. He recalls that his works of the free atonal period were informed by the conviction that repetition should be avoided and that music should constantly present something new. He tells of how he came to reject this view, becoming convinced that continual novelty and the avoidance of repetition did not in fact provide a way forward since it rather destroyed comprehensibility and made musical prolongation problematic (Webern 1963, p.55). With the advent of the twelve-tone system, Webern came instead to view "the principle of repetition" as the "easiest way to ensure comprehensibility" through the constant return of the given sequence of twelve notes (p.22). Boulez recognises this return to repetition within Webern's work in the exploitation of intervallic invariance (Boulez 1989a, pp.186-187; p.353; p.355), in the repetition of cells and in the exact repetition produced within his late "strict canonic forms" (p.183).

Webern, in the early 1930's, defines a musical motive, along with Schoenberg, as "the smallest independent particle in a musical idea." Such motives are said to be recognisable simply through their repetition (Webern 1963, pp.25-26). Webern, at this stage of his career, views Western music as the development of repetition with "ever-increasing freedom" so that variation is to be seen as a kind of freer form of repetition (p.31). He believes the twelve-note system, with its practice of not repeating any note until all twelve have sounded, provides a new thematic technique with the advantage of even greater freedom. As he says, "unity is completely ensured by the underlying series. It's always the same; only its manifestations are different" (p.40). Webern bases this fundamental conviction upon his reading of Goethe in whose image of the "primeval plant; the root is in fact no different from the stalk, the stalk no different from the leaf, and the leaf no different from the flower: variations of the same idea." For Webern, Goethe's idea is applicable to everything including music, hence Webern's assessment that variation form is somehow "the primeval form, which is at the bottom of everything. Something that seems quite different is really the same." Just as "an ash-tray, seen from all sides, is always the same, and yet different. So an idea should be presented in the most multifarious way possible" (p.53).

In this return to repetition, Webern does not, however, use literal repetition, but rather seeks to deduce all of his material from "a single Idea" which exists at the precompositional level (Boulez 1989a, p.187). Boulez notes the paradoxical and possibly contradictory nature of this aspect of Webern's aesthetic whereby he aspires to present absolute unity and constant variation simultaneously within his material. It is Webern's attempt to integrate these two seemingly mutually exclusive ideas which results in what Boulez estimates to be Webern's greatest achievement.

Boulez says that "Webern's principal contribution remains ... in having overturned the notion of the theme from the real to the virtual" (p.188). Boulez perceives this *virtual theme* in Webern's Op.27 *Variations for piano* where, according to Boulez, one no longer finds a set of variations beginning, in the traditional way, from a recognisable theme such as Schoenberg provides in his own Op.31 *Variations for Orchestra*. Webern's species of variations is said by Boulez to be based rather on a *virtual theme* (p.187). In the first movement of the Op.27 *Variations*, the "images" which Webern engenders from his materials are not linked uniformly to a primordial idea as traditional variations are related to an original idea. They are rather diverse occurrences of an idea which never becomes perceptible itself and which is only ever perceived in its multifarious manifestations (p.187; pp.358-359).

The Idea is therefore said to be *virtual*, meaning that it preexists all themes and acts as the condition for "the definition of real images and their developments" (p.117). There is here no primordial theme. Instead of the deduction of traditional thematicism, athematicism and virtuality entail the emergence of successive manifestations from an initial virtual idea, as the basic materials which provide the initial field of operations are dismantled, reconstituted and ornamented (p.359).

Webern's athematicism or *virtual theme* implied for Boulez and his generation a renewed variation principle in which thematic elements are separated, given autonomy and recombined in variation. According to this new principle, no particular version of a thematic idea, such as the initial aggregate or the first heard phrase, is favoured over any other. Even so, certain elements may have a "primordial" but not "definitive" place (p.255) as the musical language no longer begins with "standard and recognisable objects" but rather with basic elements which continually recombine to create *objects* related through their similarity and *difference*.

It has been remarked on occasion by a number of writers that Boulez's texts on the work of other composers often read more like commentaries upon his own work. Nattiez acknowledges this criticism specifically in the case of Boulez's reading of Webern. It is sometimes said that "Boulez remakes history" and that "in a sense, he has fabricated a Webern in his own best interests" (1993b p.170). Whatever the substance of this criticism, its satisfactory exploration is well beyond the scope of the present project. Nevertheless, it forces the question upon us; to what degree is the concept of the *virtual theme* a genuinely Webernian one? Is it really the work of

Webern or is it simply Boulez reading Webern in very much his own terms? Our account of repetition and non-repetition in the work of Schoenberg and Webern shows, if anything at all, that this is a far from transparent area. The thinking and practice of both composers was not static and changed considerably in the course of their development. In surveying the entirety of their outputs Boulez makes very definite and limiting choices in what he takes from their work. To this degree it is important to acknowledge that the issue for this study is not so much to establish whether or not Boulez is correct in ascribing the notion of *virtuality* to one aspect of Webern's thematic practice, but rather to trace the *transversal*, the *diagonal* which

Boulez believes exists linking Webern's aesthetic with his own.[4]

Webern's statements in his lectures from the 1930's clearly place him in the *identity* camp since he resolutely gives sameness priority over *difference*. Nattiez believes Boulez's intention and practice to be similarly organicist, a claim which finds support in Boulez's reading of Bach and Webern and their "preoccupation" with "deriving the multiple beginning from the unique" (1993b p.188). Boulez praises Bach's *Art of Fugue* and its "inexhaustible variation of a single theme", and quotes Webern for whom "to develop everything from *one* musical idea ... [provides] the greatest coherence" (quoted in Nattiez 1993b, p.188). Nevertheless, Boulez pinpoints an inherent ambiguity within Webern's espousal of both a central idea informing all of the aspects of a work and the desirability of constant variation. Furthermore, in Webern's Op.27 *Piano Variations* (perhaps within the first and third movements in different ways) Boulez draws attention to an aspect of Webern's practice which

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[4] Bailey tells us that five of Webern's sixteen instrumental twelve-note movements are in variation form. This form fascinated Schoenberg and Webern who used it in several of their compositions. Bailey distinguishes their use of variation form in their differing understanding of "the 'something' that is 'really the same'" since "Schoenberg wrote variations on a theme [and] ... Webern did not." Examining Webern's Op.21/ii; Op.28/i and Op.30, she concludes that "none of the sets of variations has a theme that functions in the usual way." The third movement of Op.27, however, is said to be "the only one of the five in which subsequent 'variations' are not based in any way on material introduced at the beginning. For this reason, this set would seem to be the most abstract, and therefore the most revolutionary of all (though in my opinion neither the most complex nor the most interesting)" (1991 pp.195-197). Bailey concludes that while "Webern was never to write a set of variations on a theme of the conventional type ... he would also never write another set on no theme at all as he had in Op.27/iii" (p.215).

In the course of *Jalons*, Boulez refers to Webern's *Piano Variations* in five separate places, normally in connection with the idea of virtuality (p.117; p.187; p.208; p.358; p.375). Only in pp.358-359 does he explicitly tell us which of the three movements he has in mind, namely the first movement. It is not at all certain that he is thinking only of the first movement in the other passages. Bailey points out that only the third movement of Webern's Op.27 really involves variation in the sense of a set of variations. She blames Leibowitz for providing the first in a series of "exotic" interpretations of the first and second movements which attempt to explain it against the odds in terms of variations (Bailey 1991, p.190). Dohl interprets "each of the fourteen phrases in the [first] movement as a variation of the prime/retrograde idea - each a slightly different manifestation of horizontal symmetry." For Bailey, while Dohl's interpretation "is a valid description of events at the phrase level ... it neglects the overall structure, which is clearly of importance" (p.191). Bailey tells us that the third movement is "unique" for Webern since all of his other genuinely variation form movements have some kind of theme. She says that "only in Op.27/iii does the opening section present nothing that is subsequently varied." Instead, in each of the six sections, a characteristic musical property is featured (p.207). Boulez's attribution of virtual thematicism would seem to correspond well with Dohl's interpretation of the phrase difference within the first movement while Bailey's reading of the third movement seems to describe a virtual theme in all but name. It should be remembered that Boulez acknowledges that the term "variations" must be understood in a rather free way.

Webern himself does not seem to have chronicled. While the main motivic idea of the first movement is fairly pervasive in the first and third sections of the movement, to what exactly can we refer each manifestation of the motive since no one example can be given originary status? Similarly, in the third movement there is no initial thematic utterance to be varied. It is precisely in this lack of an original with which to compare all other versions that we move from the province of identity to that of *difference*. That Webern favoured identity-based musical thinking is clear both in his later compositions and sparse theoretical writings and is not in question. That Boulez found something else as well is what is of present interest, whether it is eventually understood to be an accurate reading of Webern or, in fact, a misprision.

Such ideas of athematicism and the *virtual theme*, which Boulez first found within Webern's scores, have had a profound influence upon Boulez's own writing. Looking back from the mid 1980's, Boulez charted the place which the *virtual theme* has played within his own compositional development. Significant though it is, from the point of view of this study, it is only one manifestation of a much broader interest in *difference* and multiplicity. These are ideas which have featured within Boulez's music in a number of guises through the literal non-repetition, virtuality and athematicism of the earlier works to a concern with *difference* and multiplicity at the level of form, expressed in the aleatoricism of the *open form works* of the 1950's and 1960's. From the 1970's onwards we find *difference* expressed formally within the Stravinskyan *accumulative developments* of works such as *Rituel* and *...explosante-fixe....* Finally, there is the expression of *difference* and multiplicity through the simultaneous sounding of *heterophonous* lines which are also found in the aforementioned works. We will now examine these four stages in Boulez's treatment of *difference* in turn, beginning with the early works and the establishment of a *virtual theme*.

Athematicism: The Virtual Theme

Having described and evaluated the thematic practices of his musical forebears, Boulez likewise reflects upon his own compositional development in terms of *repetition*, *difference*, *thematicism* and *athematicism*. As we have already noted, Webern's principal achievement, in Boulez's estimation, was the transformation of the idea of the musical theme from a real theme to a *virtual theme* (Boulez 1989a, p.188). In the 1980's *Collège de France* lectures he applies this Webernian concept of athematicism to his own *Sonatine for flute and piano* (1946), which was also his first serial composition. It is important to bear in mind that there is a 35-40 year gap between the composition of the *Sonatine* in 1946 and his *Collège de France* reflections upon it in the 1980's. It should not be imagined that Boulez was able to define concepts such as *athematicism*[5] or the *virtual theme*[6] in the mid 1940's with the kind of philosophical and musicological clarity which forty years of subsequent theory and practice later permitted.

Boulez describes his initial efforts to confront thematicism and athematicism as naive (1989a p.249) and seems, to some extent, to have stumbled towards *athematicism* since he admits to not having been absolutely certain himself of the precise meaning of the term (p.185). In retrospect, in the 1980's, he recognised and reported that it consisted:

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[5] When asked about the origins of his athematicism Boulez spoke of it as a reaction against Schoenberg's thematic method and as a response to the ambiguity of theme and structure found in Beethoven (Interview 28.8.98).

[6] When asked about the origin of his use of the term *virtuality,* Boulez admitted to not really knowing its source exactly but presumed that it came from his early scientific studies. He went on to explain the basic relationship between the real and the virtual in physics saying that he "did not make an exact appraisal" and that "reality and virtuality are two notions which can be expanded beyond this first description." Boulez distinguished the idea of a real theme from a *virtual* theme in that, with a real theme, all of the elements are already present and can be freely manipulated, but always with the original combination in mind. The virtual theme, in distinction, consists merely of uncombined parameters whose objects can then be combined in a great variety of ways without giving priority to any of them. The parameters of pitch and rhythm are more traditionally fused together in the "theme," whereas here "thematic" arrangements appear unfused in individual parametric strata (Interview 28.8.98).

> in rejecting an *absolute* form of a theme, in order to end up with a notion of a virtual theme, (1) where the elements are not fixed at the beginning in a totally defined form, (2) where priority is not given above all to the intervals as the source of musical development, but where the other elements, duration in particular, can play a more important role to which the pitches are subordinated (1989a p.185).

Boulez says that athematicism is an important element within the *Sonatine* where the material, which is referred to as athematic, is deduced from "an abstract network of possibilities which defines the circumstances of this or that appearance" (p.118). Despite this, the *Sonatine* does not in fact mark a definitive break with thematicism. Boulez tells us that it contrasts:

> general thematicism, the theme reduced to a single cell, athematicism based on the neutrality of the constituent elements and on the force of the envelope, and precompositional athematicism (p.253).

The theme is said to no longer exist within itself but rather as a developmental function in the articulation of form (p.202; p.253). Consequently, it can be explicit, amorphous or anywhere between the two (p.249). Like its formal model, Schoenberg's first *Chamber Symphony* Op.9, Boulez's *Sonatine* contains four distinct movements within a continuous composition. Each of the four sections or movements of the *Sonatine* has its own "principal theme" which is "deduced" from, what Boulez calls, the "initial theme" which is enunciated in the first movement (p.250). In this sense, each of the four movements is defined by the particularity of its thematic means (p.253). Athematicism, on the other hand, is used as a means of transition for linking the four movements within the continuous thread of the piece. These transitions are of "'vague' character", "do not have a precise thematic profile" and serve to introduce a formal opposition providing athematic contrasts to the four thematic movements. The boundary separating thematicism and athematicism is breached when the threshold of perceptibility has been crossed. Boulez tells us that he produces athematicism in the *Sonatine* through "privileging" one of the parameters in relation to the others and through employing "sufficiently neutral" material. In the transitions, Boulez makes rhythm the single organisational factor and repeats a single rhythmic cell which has been abstracted from the "the principal theme". Removed from its context, it assumes "a totally neutral character." Secondly, Boulez tells us that he neutralises the pitch material through leaving the "choice of pitches to the application of a rhythmic grid" which was used in a totally "undifferentiated" way (p.251). Coherence in the longest transitions is provided, we are told, by their distinctive envelopes of density and register (p.252).

It is important at this stage to consider some musical examples from the *Flute Sonatine* and from succeeding works to help illustrate the theoretical ideas which have been expounded. In what follows, as will be the case with all considerations of Boulez's compositions throughout this study, analytical comment will be provided purely by way of illustration of the concepts discussed. In the present case, our concern will be simply to provide concrete musical examples of the various degrees of thematicism and athematicism which would lead Boulez to progressively theorise and actualise the idea of a *virtual theme*.

Carol Baron demonstrated the serial pitch organisation of the *Sonatine* in her 1975 study which reveals the series in pitch grid form (Ex. 3.1) and uses it to account for most of the pitches within the introduction of the piece (bs 1-31). In the *Rapide* first movement (bs 32-96), for example, it can be seen that Boulez, at times, uses the series as a resource to provide an ordinary recognisable theme, a phenomenon he refers to as *general thematicism*. While this short movement does feature retrograde and inverted retrograde serial fragments, what could be called the main thematic occurrences of the series involve mainly inverted and prime forms of the series. Example 3.2 lists the most significant thematic appearances of the series in this movement. Despite marked differences in duration, all of the serial forms in Ex. 3.2 are examples of conventional *general thematicism* in their melodic fidelity to the basic series. Bradshaw goes so far as to refer to the complete statement of series form I (10) on the flute, with which the movement begins (bs 33-40), "as a true first-subject theme" (Bradshaw 1986, p.141).

Ex. 3.1

P

		1	2	3	4	5	6	7	8	9	10	11	12		
I	1	C	B	G	C#	G#	E	Eb	A	D	Bb	F	F#	12	
	2	C#	C	Ab	D	A	F	E	Bb	Eb	B	F#	G	11	
	3	F	E	C	F#	C#	A	Ab	D	G	Eb	Bb	B	10	
	4	B	Bb	F#	C	G	Eb	D	G#	C#	A	E	F	9	
	5	E	Eb	B	F	C	Ab	G	C#	F#	D	A	Bb	8	
	6	G#	G	Eb	A	E	C	B	F	Bb	F#	C#	D	7	
	7	A	Ab	E	Bb	F	C#	C	F#	B	G	D	Eb	6	
	8	Eb	D	Bb	E	B	G	F#	C	F	C#	Ab	A	5	
	9	Bb	A	F	B	F#	D	C#	G	C	Ab	Eb	E	4	
	10	D	C#	A	Eb	Bb	F#	F	B	E	C	G	Ab	3	
	11	G	F#	D	Ab	Eb	B	Bb	E	A	F	C	C#	2	
	12	F#	F	C#	G	D	Bb	A	Eb	Ab	E	B	C	1	**RI**
		12	11	10	9	8	7	6	5	4	3	2	1		

R

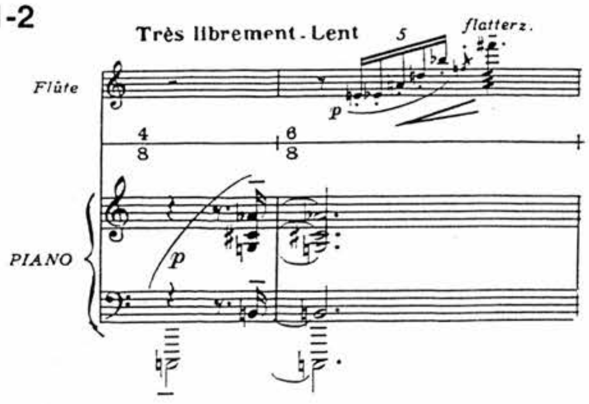
Ex. 3.2

Inversions	b. 32	I (8)	pitches 1-7	piano
	bs 33-40	I (10)	complete	flute
	bs 41-47	I (2)	complete	flute
	bs 54-55	I (8)	pitches 1-5	piano
	bs 71-73	I (4)	pitches 1-7	flute & piano
Primes	bs 47-50	P (9)	pitches 1-10	flute
	bs 61-64	P (8)	complete (except pitch 7)	piano
	bs 67-69	P (8)	pitches 1-5	piano
	b. 70	P (0)	pitches 3,4,5&7	piano
	bs 82-84	P (3)	complete	piano & flute
	bs 93-96	P (9)	complete	flute & piano

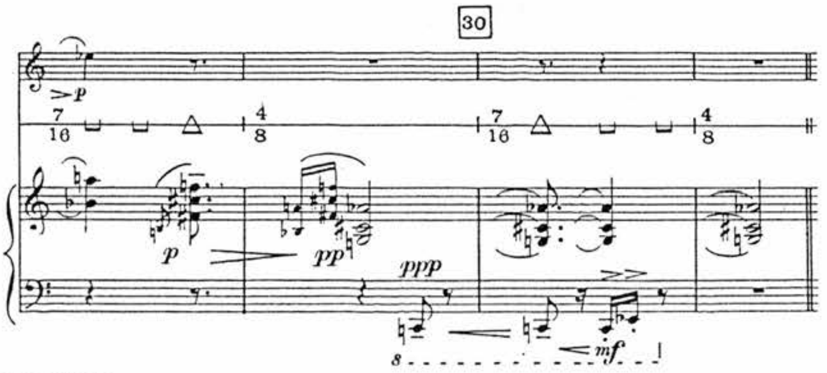
In addition to this *general thematicism* which involves the unfolding of entire serial forms, Boulez also employs smaller motives which are devised from the row and which he refers to as *thematic cells* or "the theme reduced to a single cell" (Boulez

1989a, p.253). Among the clearest examples of this is the trichord (G, C sharp, A flat) which opens and closes the introduction on piano (bs 1-2; bs 29-31) and which appears again in the coda (bs 507-509). Occurrences of this trichord, which is taken from row forms P (0) and I (9), can be seen in Example 3.3 a, b & c. The presence of such trichords may well point to the influence of the similar trichords in the first movement of Webern's *Piano Variations*.

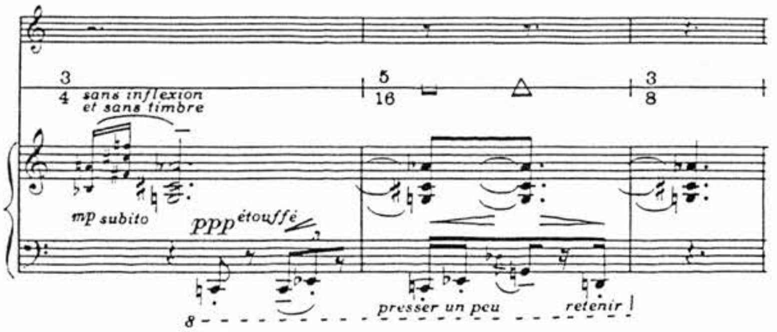
Ex. 3.3a - Flute Sonatine bs 1-2


Très librement - Lent
5
flatterz.
Flûte
p
4/8
6/8
PIANO
p

Ex. 3.3b - bs 29-31

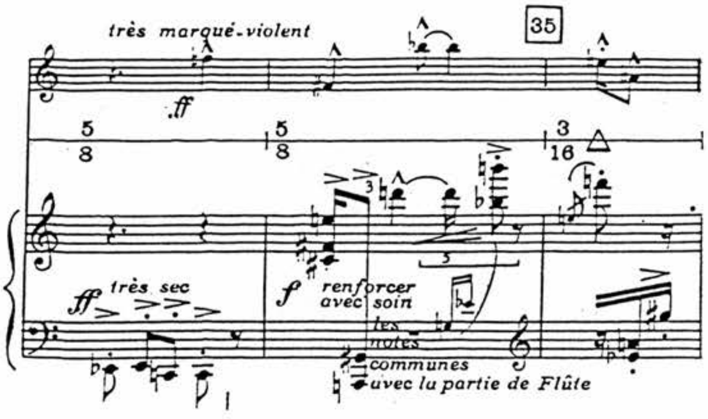

30
>p
7/16
4/8
7/16
4/8
p
pp
ppp
mf
8

Ex. 3.3c - bs 507-509


3/4
sans inflexion et sans timbre
5/16
3/8
mp subito
ppp étouffé
presser un peu
retenir !
8

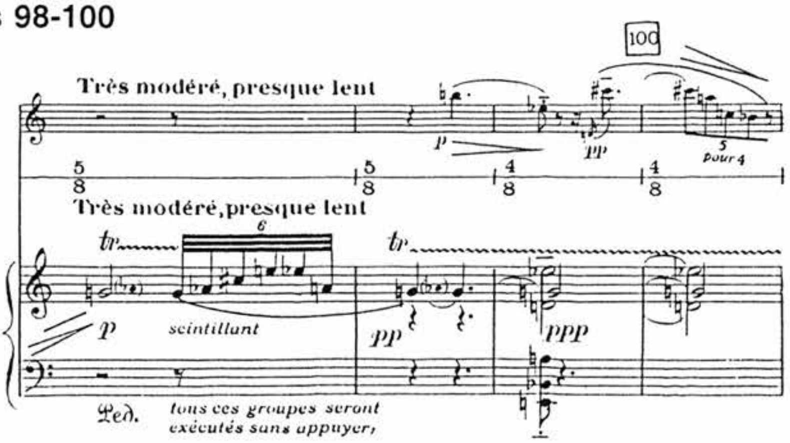
The *Rapide* first movement is characterised by several occurrences of a rhythmic motive (Ex. 3.4) which appears in the flute part in bs 33-35, bs 41-43, bs 51-52 and in the piano part at bs 55-57 and bs 67-69.

Ex. 3.4 - bs 33-35


très marqué-violent
35
ff
5 8
5 8
3 16
très sec
ff
f
renforcer avec soin
les notes communes avec la partie de Flûte

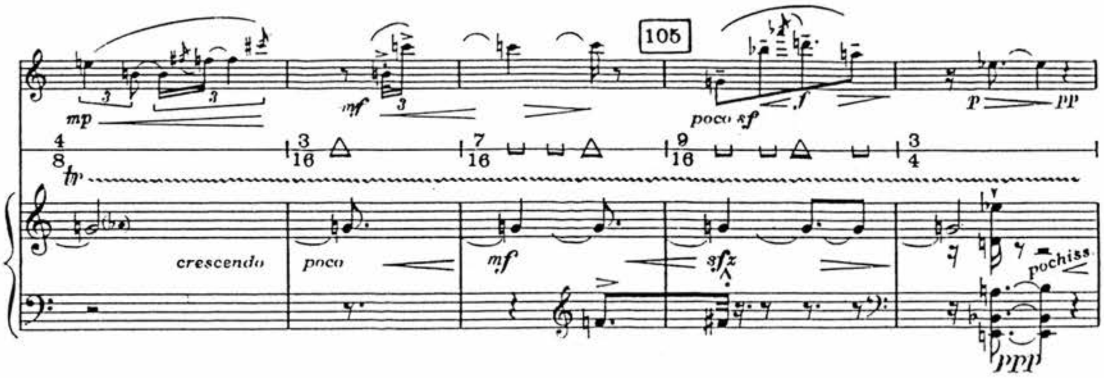
Thematicism operates at several levels simultaneously in the *Très modéré, presque lent* second movement. The backbone of the entire movement (bs 97-138) is formed by one cantus firmus statement of series form I (2) in long trilled notes. Apart from this long-range statement of the theme, Boulez uses a variety of additional motives or thematic cells. There is a demisemiquaver arpeggiated motive which varies in number of notes, from six to nine. The main rhythmic thematic cell/motive from the *Rapide* section features again in bs 116-118; bs 126-128; bs 131-133 and b.134. The main melodic motive (Ex. 3.5), which opens this movement on the flute in bs 98-100, returns to varying degrees in bs 112-113; bs 135-136; b.137; bs 148-149; b.198 and bs 201-202 which takes it into the third movement.

Ex. 3.5 - bs 98-100


100
Très modéré, presque lent
p
pp
5 pour 4
5 8
5 8
4 8
4 8
Très modéré, presque lent
tr
6
tr
p
scintillant
pp
ppp
Ped.
tous ces groupes seront exécutés sans appuyer,

The movement features one more motive (Ex. 3.6) which is first heard at bs 105-106 and which occurs again to varying degrees and in different transpositions in the following places: bs 142-143; bs 146-147; bs 151-152; b.153; b.170; b.195; bs 196-197; bs 199-200; bs 205-206; bs 413-414 and bs 507-508.

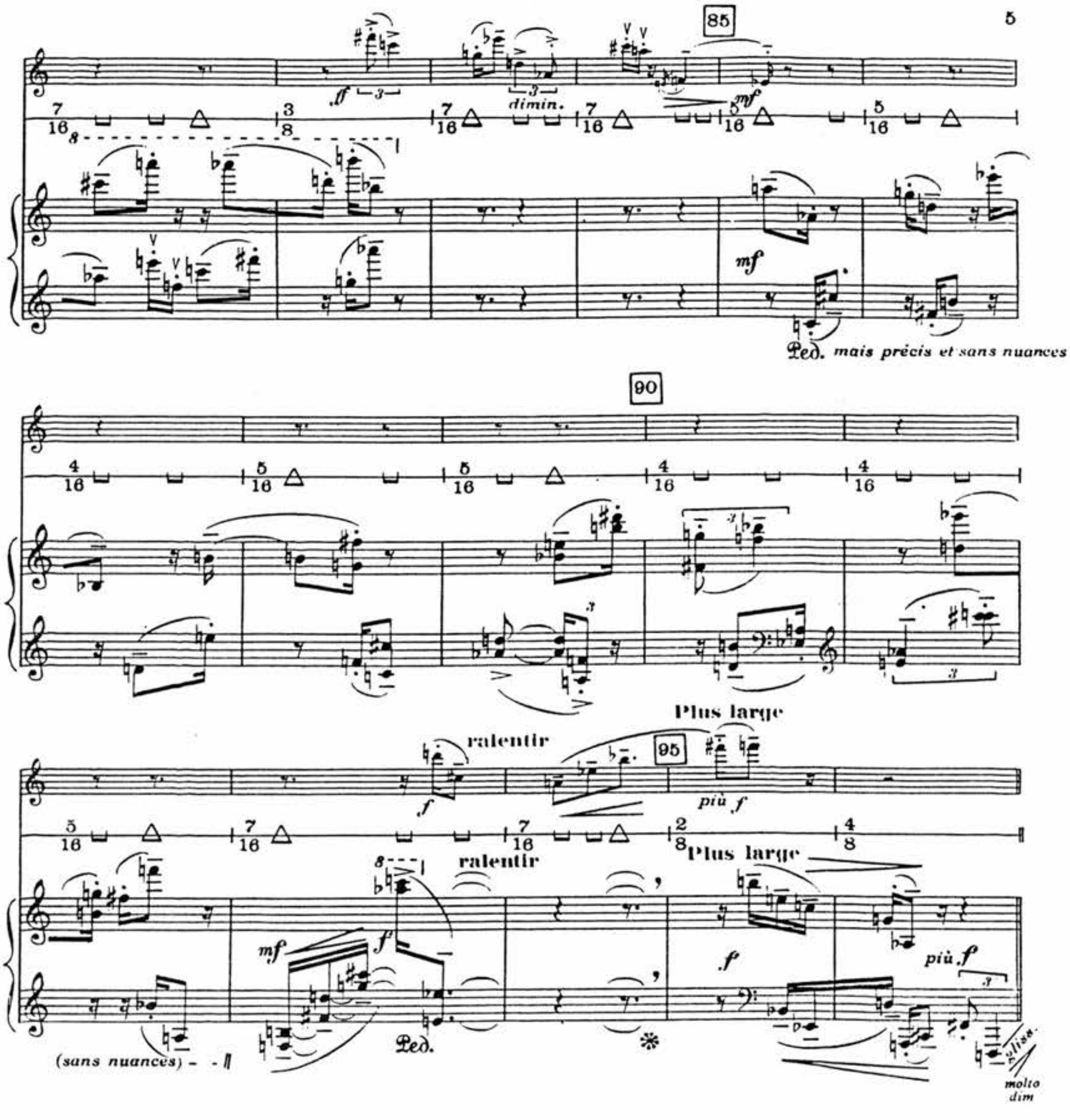
Ex. 3.6 - bs 105-106



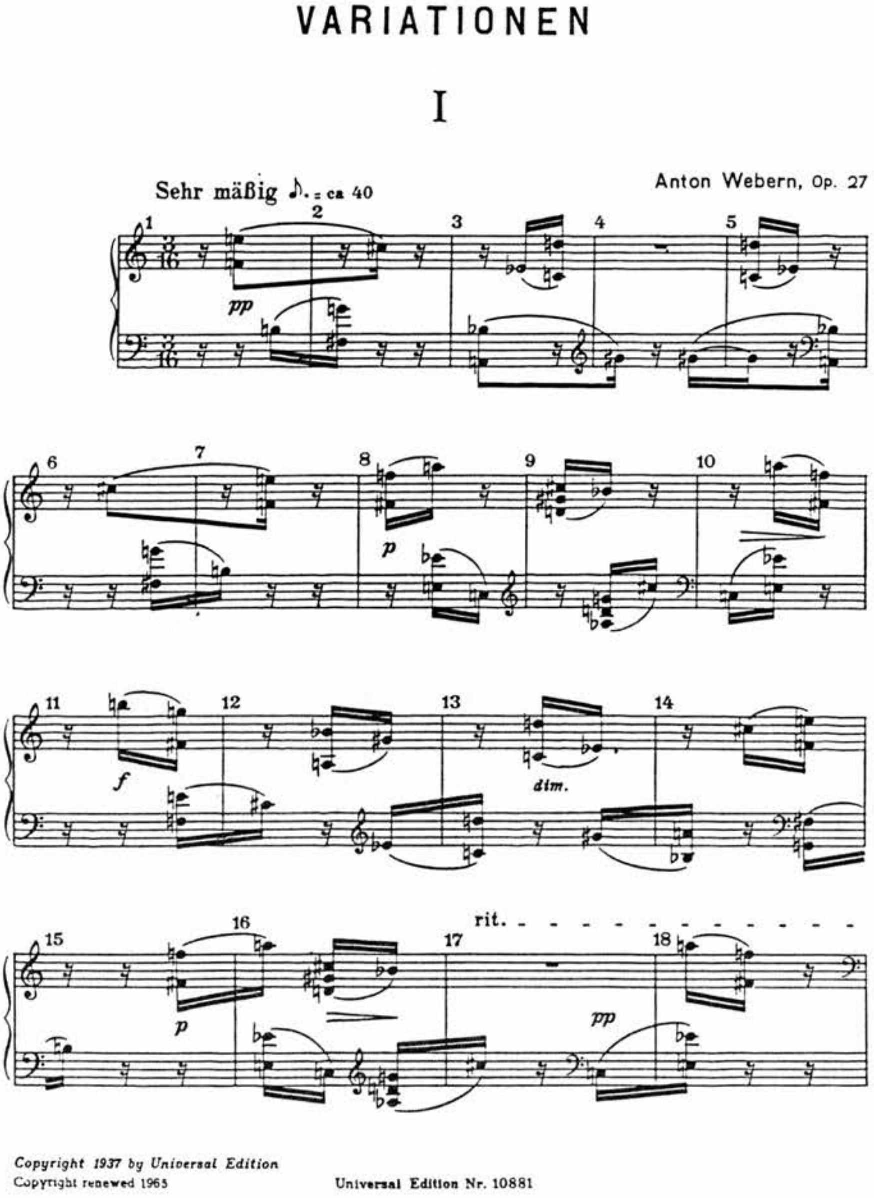
The third movement *Scherzando* (bs 151-295) is dominated by a three-note motive based upon the intervals of the trichord (G natural-C sharp-A flat) which is first heard in b.1 of the piece. In the first part of the *Scherzando* (bs 151-200) the motive is heard no less than thirty-one times and it completely saturates the remainder of the *Scherzando* (bs 222-295) with the exception of the brief interlude at bs 252-256. The fourth movement features the motive of the repeated minor third.

So far we have confirmed the existence of *generalised themes* and *thematic cells*. It remains to demonstrate the presence of athematicism. Earlier in this chapter we looked at how Boulez rooted the idea of the virtual theme within Webern's Op.27 *Variations for Piano*. In *Jalons*, Boulez says that athematic transitions are used in his own *Sonatine* to link the four thematic sections or movements. Jameux has noticed the similarity between bs 85-92 of Boulez's *Sonatine* (Ex. 3.7) and Webern's *Piano Variations* (Ex. 3.8) (Jameux 1991, p.231). This is a significant observation in the light of the value which Boulez places upon the first movement of Webern's *Piano Variations* as a privileged locus of virtual thematicism. Like the Webern Variations, bars 85-92 of the *Sonatine* are played on the piano alone, share similar phrasing and involve a series of interlocking single notes and dyads made up of the

Ex. 3.7 - bs 85-92


5
85
90
95
ff
dimin.
mf
Ped. mais précis et sans nuances
ralentir
Plus large
più f
f
(sans nuances)
molto dim
gliss.

Ex. 3.8 - Webern: Piano Variations


VARIATIONEN
I
Sehr mäßig ♪. = ca 40
Anton Webern, Op. 27
pp
p
f
dim.
rit.
pp

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Universal Edition Nr. 10881

same sparse intervals such as perfect and augmented 4ths, and minor 9ths which feature in the first and third sections of the Webern movement. While the pitches in bs 85-92 of the *Sonatine* are mostly traceable to about five serial statements, all thematic traces have been dissolved and we are left with only characteristic intervals and rhythms, with athematicism.

The transition between the second and third movements (approximately bs 140-150) shares something of the intervallic character and phrasing of the first transition. Nevertheless, it is difficult to hear this transition as completely athematic, as Boulez would suggest, since the motive which we have already identified in bs 105-106 sounds clearly in bs 142-143 and more obliquely in bs 146-147. The transition between the third and fourth movements (bs 296-340) is conveniently identified by Boulez in *Proposals* (1948), as "an athematic passage where the development proceeds without the support of characteristic contrapuntal cells" (Boulez 1991, p.52). Baron tells us that its rhythmic cells are "unrelated to any melodic cells" and that "small groups of discontinuous dyads from specific rows overlap with such groups from other rows", for example, F natural-F sharp; G natural-G sharp (1975 p.92). This overlapping is once again reminiscent of the Webern *Piano Variations* encountered in transitions one and two.

For Gerald Bennett, the co-existence of thematicism and athematicism within one piece signals a certain "stylistic inconsistency" and a lack of homogeneity (1986 p.61). Bennett believes this discrepancy to be the reason for Boulez's more decisive break with thematic writing in the compositions immediately following the *Sonatine*. Robert Piencikowski has drawn my attention to the manuscript score of the *Flute Sonatine* which is held within the *Paul Sacher Stiftung* in Basel. According to Piencikowski, the manuscript reveals repeated bars which have been crossed out. Piencikowski interprets such changes as signifying stylistic elements which later disturbed Boulez and which were consequently excised from the completed score. In other words, as Boulez turned his face away from repetition, he deleted certain traces of literal repetition from the piece. Piencikowski has spoken, in this regard, of the early influence of Jolivet upon Boulez. Since repetition is a significant factor within Jolivet's music, this became an influence, according to Piencikowski, which Boulez wished to suppress. One would obviously need to examine Boulez's autographed score again to see just exactly what changes Boulez made to the *Sonatine,* and when. In conversation with Golea, Boulez maintains that he changed only about ten bars of the piece between its composition in 1946 and its publication in 1954 (Golea 1958, p.38).

While repetition and thematicism in its various forms clearly maintain an important unifying function within the *Sonatine*, the *First Piano Sonata* (1946) makes a much more emphatic move away from the identity-based repetition of traditional thematicism. Boulez tells us that the sonata, like the *Sonatine*, features "groups of intervals organised in thematic cells, in opposition to freely chosen intervals within a totally defined chromatic" (1989a p.254). The total definition of the pitch material is provided by Boulez's fairly rigorous adherence to the initial pitch series which has been identified by Franck Jedrzejewski (1987). The serial pitch squares can be seen in Example 3.9.

Ex. 3.9

P **R**

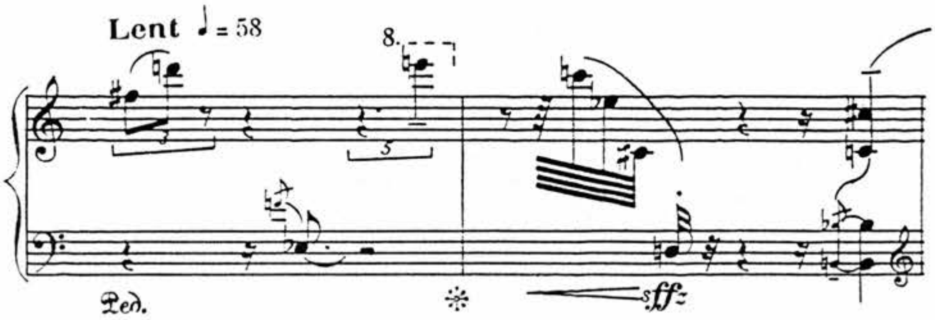
1	2	3	4	5	6	7	8	9	10	11	12
Eb	F	E	Ab	D	G	F#	B	Bb	C	A	C#
E	F#	F	A	Eb	Ab	G	C	B	C#	Bb	D
F	G	F#	Bb	E	A	Ab	C#	C	D	B	Eb
F#	Ab	G	B	F	Bb	A	D	C#	Eb	C	E
G	A	Ab	C	F#	B	Bb	Eb	D	E	C#	F
Ab	Bb	A	C#	G	C	B	E	Eb	F	D	F#
A	B	Bb	D	Ab	C#	C	F	E	F#	Eb	G
Bb	C	B	Eb	A	D	C#	F#	F	G	E	Ab
B	C#	C	E	Bb	Eb	D	G	F#	Ab	F	A
C	D	C#	F	B	E	Eb	Ab	G	A	F#	Bb
C#	Eb	D	F#	C	F	E	A	Ab	Bb	G	B
D	E	Eb	G	C#	F#	F	Bb	A	B	Ab	C

I **IR**

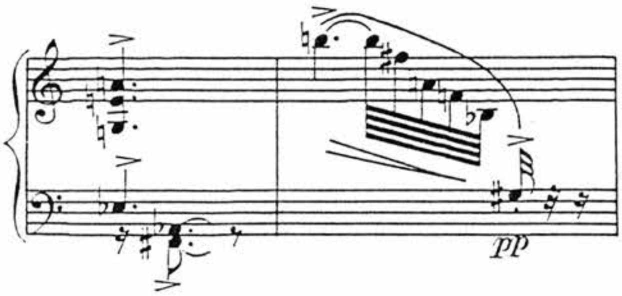
1	2	3	4	5	6	7	8	9	10	11	12
G	F	F#	D	Ab	Eb	E	B	C	Bb	C#	A
Ab	F#	G	Eb	A	E	F	C	C#	B	D	Bb
A	G	Ab	E	Bb	F	F#	C#	D	C	Eb	B
Bb	Ab	A	F	B	F#	G	D	Eb	C#	E	C
B	A	Bb	F#	C	G	Ab	Eb	E	D	F	C#
C	Bb	B	G	C#	Ab	A	E	F	Eb	F#	D
C#	B	C	Ab	D	A	Bb	F	F#	E	G	Eb
D	C	C#	A	Eb	Bb	B	F#	G	F	Ab	E
Eb	C#	D	Bb	E	B	C	G	Ab	F#	A	F
E	D	Eb	B	F	C	C#	Ab	A	G	Bb	F#
F	Eb	E	C	F#	C#	D	A	Bb	Ab	B	G
F#	E	F	C#	G	D	Eb	Bb	B	A	C	Ab

Jedrzejewski analyses the *First Piano Sonata* in terms of two thematic cells or motives (termed motives A and B) which together form a complete statement of the basic series. Study of the score confirms that these two thematic cells, between them, constitute the pitch material of the work. In his analysis of the first movement, Jedrzejewski goes so far as to refer to cell A (Ex. 3.10a) as "the principal theme" on the strength of its ninety-one occurrences within this movement (1987 p.70). Its properties are said to form "the quasi-immutable referential unity" of the work (p.74). Likewise, cell B (Ex. 3.10b), which is heard sixty-one times in the first movement, is said to be a secondary theme (p.70). In the second movement, cell A features eighty-five times and cell B eighty-four times.

Ex. 3.10a - Piano Sonata no.1: bs 1-2



Ex. 3.10b - bs 13-14



Restricting our examination of Boulez's motivic procedures to his treatment of cell A within the first movement, it can be seen, for example, that bs 1-10 are composed of eleven successive appearances of cell A. The entire movement proceeds in this way with many statements of cells A and B intersecting through shared common notes and various other devices. While the pitch collections used are largely dictated by the contents of the two cells, the surface result is not the pervasive repetition of a theme but rather an athematicism where the intervals within the cell are combined freely in such an assortment of ways that any sense of return or association of each cell appearance with a primordial identity is avoided.

Alongside this pervasive athematicism, Boulez continues to retain a place for repetition within the *First Sonata*. Commenting on the first movement, Jedrzejewski notes that the three rhythmic motives of the first bar, "the triplet, appoggiatura and the quintuplet", which form part of cell A, form "the quasi-immutable referential unity" of the entire work (p.74). Example 3.11 charts those places where the triplet, the appoggiatura and the quintuplet figures (referred to here as a, b and c) appear together, as they do in the first bar of the movement.

As can be seen from Example 3.11, when these three figures appear together they often have characteristic interval forms. The triplet figure most often spans the interval of a minor 6th while the appoggiatura spans either a major 9th (or higher registral version) or a minor 7th. In certain other instances, where they appear alone, Boulez is freer in varying their intervallic content. The triplet figure, for example, spans a major 10th at b.6, a major 9th at b.12 and a major 6th at b.74, while the appoggiaturas at b.22 and b.30 span a minor 9th and a major 7th respectively.

It is clear that cells A and B do not provide the kind of general thematicism which is found in certain places within the *Sonatine* for flute and which was illustrated above. The thematic or athematic function of the cells should perhaps be read in the light of the following remarks made by Gerald Bennet for whom:

> the beginning of the first movement does take on something of the function of a first theme .... these first bars are not a theme in the sense of a fixed, clearly-recognizable bit of music; they are a collection of intervals which usually appear in somewhat the same rhythmic garb, though never exactly the same .... One can no longer speak of a theme here; this is a group of closely-related structures with no hierarchy between original and derived versions. Whereas

traditional forms typically move from clarity of theme to relative obscurity and back to clarity, here no form is clearer or more obscure than any other (Bennett 1986, p.63).

Ex. 3.11

Bar	Cell Segment	Interval	Series
b.1	a b c	a - min 6th	R (6)
		b - maj 9th	
		c	
b.11	a b c	a - min 6th	R (2)
		b - maj 9th	
		c	
b.23	c a b	c	R (12)
		a - min 6th	
		b - maj 9th	
bb.25-26	a b c	a - min 6th	R (12)
		b - maj 7th	
		c	
b.68	a b c	a - min 6th	IR (7)
		b - maj 17th	
		c	
b.70	a b c	a - min 6th	IR (11)
		b - maj 9th	
		c	
b.74	a b	a - maj 6th	R (3)
		b - min 9th	
b.98	a b c	a - min 6th	IR (7)
		b - min 7th	
		c	
b.101	a b	a - min 6th	R (8)
		b - maj 9th	
b.103	a b c	a - min 6th	IR (3)
		b - min 7th	
		c	
b.107	a b	a - min 6th	IR (9)
		b - min 7th	

What Bennett is describing is what we have come to call a *virtual theme* (or *virtual thematic cell*), the realisation of which Boulez was progressively moving towards in successive compositions. While the *First Sonata* has been shown to feature brief fragments of repetition where the three figures within cell A at times occur together with identical or similar intervals, this kind of direct repetition is much less the case than in the *Sonatine*. In the *First Sonata*, the two thematic cells are treated as virtual objects having initial, but not primordial forms. While Jedrzejewski is correct to identify the two thematic cells or motives as largely constituting the work, the example of cell A which he gives from bs 1-2 of the first movement and of cell B from bs 13-14 are only singular manifestations of the virtual cell and not the cell itself. These are not privileged identities from which all difference is to be measured. They are simply individual appearances from among the many which Boulez chose to use or could have used within the piece. Even within those multiple examples where figures a, b and c from cell A appear together with identical or similar intervallic content, difference is maintained through the number of transpositions and serial forms used, in addition to the variety of registral positions, by means of which each manifestation of cell A is clearly related to all others but yet different.

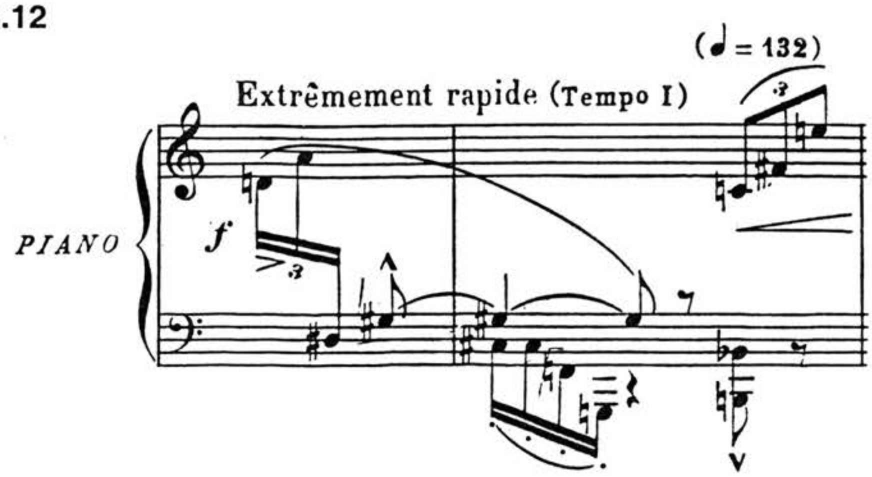
Boulez makes no explicit mention of the *Second Piano Sonata* (1948) in his *Collège de France* account of the development of athematicism and the *virtual theme*. Nevertheless, in conversation with Deliège, he speaks of the work as having an "explosive, disintegrating and dispersive character" since each of the four movements aims to destroy its own historical formal model. The first movement, for example, attempts "to destroy the first-movement sonata form" and Boulez tells us that he was working on "a contrast between a style based on thematic motifs and an athematic one" (Boulez/Deliege 1976, pp.40-42). According to Peter McCallum's study of the first movement, disintegration is achieved firstly through dismantling the basic motives into their elemental intervals in such a way that "structural events lose their identity" and secondly through superimposing detail to such a degree that no specific contours are perceptible (McCallum 1992, p.63). In Boulez's words:

> The very strong, sharply-outlined thematic structures of the opening gradually dissolve in a development that is completely amorphous from this point of view, until they gradually return. The whole of the first movement is made up of this contrast between very precise motifs and their dissolution into imprecise intervals (Boulez/Deliege 1976, p.40).

Despite Boulez's remarks, McCallum observes that what Boulez considers to be "very precise motifs are still, in many ways, analytical objects rather than perceptual objects" since what can be seen in the score is often imperceptible to the listener. In fact, for McCallum, Boulez has succeeded so well in "destroying" sonata form that it is impossible to actually hear the recurrence of the motives (1992 p.63).

McCallum identifies the opening motif (D, A, D sharp, G sharp) as structurally significant because of the leading role it mostly assumes within the contrapuntal passages of the first movement, in various presentations and transpositions. Furthermore, its untransposed version (D, A, D sharp, G sharp), serves to act as "a kind of structural pillar, occurring at moments of structural importance" in what McCallum interprets to be a quasi-tonal way (p.66). For McCallum, the reappearance of the opening motif (Ex. 3.12) at the close of the exposition (b.68) is very clear in the score but nevertheless seems to lie beyond the range of our perceptual capacities. The supposed recapitulation of the movement provides an even more extreme case (pp.71-72). Consequently, for McCallum, "the vast majority of the motivic argument only exists at the analytical level and can only enter

Ex. 3.12



our perceptual experience in a very general way" (p.72). Like the *First Piano Sonata*, Boulez does, in fact, privilege a particular manifestation of the main motive within the *Second Piano Sonata*, but presents it in such a variety of ways that, while it can be recognised as an initial identity on paper, this is almost impossible for a listener to perceive.

The play of thematicism and athematicism, of identity and difference, that is still to be found within the first two piano sonatas is finally extinguished within *Structures Ia* (1951-52) which, in Rosen's words, "erases the last traces of thematic form that still attached themselves to the elements of music" (Rosen 1986, p.94). Boulez had become convinced of the existence of an imbalance in the work of Schoenberg, Webern and Berg to the degree in which the pitch organisation is much more sophisticated than the provision made for the other parameters. One of the central aims of Boulez's early pieces was to find ways of organising the other parameters which would give them equal importance with pitch. In *Structures Ia*, following on from Messiaen's *Modes de valeurs et d'intensités*, Boulez found the means necessary to accomplish such an objective. He took his series of twelve pitches from the first of the pitch modes (3 x 12) used by Messiaen in *Modes de valeurs* and used an analogous duration scale of twelve values, beginning from the value of a demisemiquaver and increasing incrementally by this duration. To this he added a dynamic series of twelve degrees and a series of twelve attacks. *Structures Ia* is a radical experiment in variation where Boulez, having defined series for all of the parameters and systems with which to employ them, then left these to their own mechanistic unfolding without further compositional interference. The composer's role was simply one of writing out what the systems dictated to him, since all free compositional decision-making had taken place at the pre-compositional stage of planning. The result is a composition which consists of constant variation.

Boulez speaks of his musical evolution to this point as the passage "from a real theme to a virtual theme" (1989a p.263) since the automatic processes at the root of *Structures Ia* amount to the complete absence of return. Experiencing the monotony of the result, however, Boulez saw that the manipulation of such basic systems alone was insufficient for composition. The procedures he had used to produce a *virtual theme* did not take into account the very real limitations inherent within perception and had created problems for the listener through their overabundance of detail and number of superimposed elements (1989a p.263). The result was too undifferentiated, lacked clearly definable characteristics, was beyond the capacities of human perception and, in the end, demonstrated that absence of variation is very similar to total variation (p.260; p.264). Consequently, he began to recognise the need to provide more perceptible landmarks for the listener to facilitate improved perception and comprehension. In a phrase which forms one of the key themes of the present study, Boulez says that after *Structures Ia* his goal was to "render the écriture perceptible through obvious sound events, to make means and perception reunite in a sensible identity" (p.262).

After the degree zero, absolute determinism of *Structures Ia*, Boulez loosened the total systemic control of integral serialism and progressively began to reintroduce elements of freedom into composition. To escape from the continual unfolding of melodic serial statements, such as he had used in *Structures Ia*, Boulez developed a new way of working with the series in which the twelve pitches are divided into cells of unequal numbers of pitches. The pitches within each cell are then placed vertically as chords (sound blocks) and the intervals of one sound block are then used to multiply the intervals of the other sound blocks, thus producing a very large amount of intervalically-related pitch material. This material could be used vertically or horizontally and permitted much greater variation in the density of pitches employed at any one time. Pitch multiplication, as the process is called, is described in some detail in *Boulez on Music Today* and *Jalons* and is fully demonstrated by Koblyakov (1990) in his analysis of *Le Marteau sans maître* (1953-55).

Of *L'Artisanat Furieux* from *Le Marteau*, which is the first work in which Boulez used pitch multiplication, Boulez says that its thematicism "is diffuse" and not actually "visibly present" anywhere in the score. Indeed, there is no "literal thematicism" but there are certain similarities within the sound objects (Boulez 1989a, p.266). As with *Structures*, Boulez affirms that the thematicism of *Le*

Marteau is "multiple and virtual", but while similarity is established through the manipulation of intervallic correspondences and ornamental figures, amongst other means, what we are dealing with is "not real but virtual identity", identity from a similarly derived family of musical objects (p.267). As he explains:

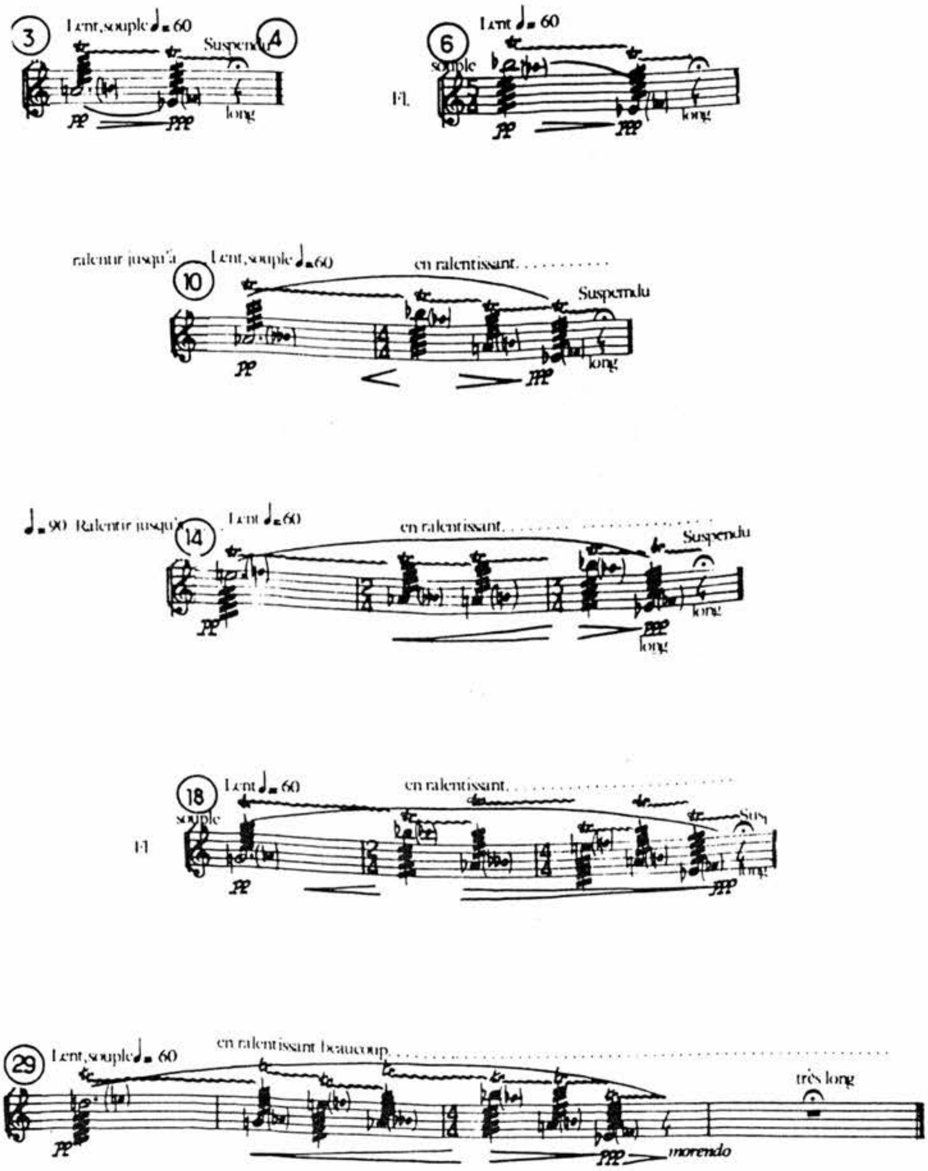
> The thematic components are no longer extracted from a finished object, the theme, in detaching certain melodic, harmonic, rhythmic or dynamic properties from it. They are expressed in the form of principles and can only be perceived through the diverse 'materialisations' which they are able to effect (p.267).

We can therefore conclude that by *virtual identity* Boulez means the return of the same which is always different, which is precisely what Deleuze terms *difference*. In other words, personal terminology should not obscure the reality that the *virtual theme* which Boulez has achieved does, in fact, correspond to Deleuzian *difference*.

To complete this consideration of the *virtual theme* we will examine the place of athematicism within two more recent compositions in which Boulez pays much closer attention to the question of perceptibility. While *Originel* from *...explosante-fixe...* was begun in 1971, it was only produced in definitive chamber music form as *Memoriale* in 1985 and eventually completed in final form for (midi) flute solo and ensemble in 1991/93. Boulez's later music features a somewhat simpler harmonic style which is much more readily perceptible and comprehensible. In fact, the obvious coherence which informs the melodic and harmonic aspects of *Originel* may convey the mistaken impression that Boulez has finally resorted to the straightforward repetition of musical themes or thematic cells. Analysis of the work shows, however, that the main musical ideas are virtual ones in terms of both pitch and rhythm. Virtuality and *difference* are manifested or expressed within the piece in a variety of ways, a few instances of which will now be considered.

One of the most distinctive and perceptible features of *Originel* is the relationship between the six cadences which conclude each of the six sections (Ex. 3.13). These grow progressively in length with the following numbers of pitches (2,2,4,5,6,7). The sixth and last is a seven-note row in which no pitches are repeated. While they all conclude on the polar E flat, the central pitch of the entire piece, they are all different from one another. The leading note of each cadence is always either A natural or B flat but, apart from this, Boulez varies the pitch order of each cadence while still maintaining a clearly recognisable quality. Boulez, thus creates what can be termed the *virtual cadence* since it has no privileged primordial manifestation.

Ex. 3.13



3
Lent, souple ♩= 60
Suspendu
4
pp
ppp
long
6
Lent ♩= 60
souple
Fl.
pp
ppp
long
ralentir jusqu'à
10
Lent, souple ♩= 60
en ralentissant
Suspendu
pp
ppp
long
♩= 90 Ralentir jusqu'à
14
Lent ♩= 60
en ralentissant
Suspendu
pp
ppp
long
18
Lent ♩= 60
souple
Fl.
en ralentissant
Sus
pp
ppp
long
29
Lent, souple ♩= 60
en ralentissant beaucoup
très long
pp
ppp
morendo

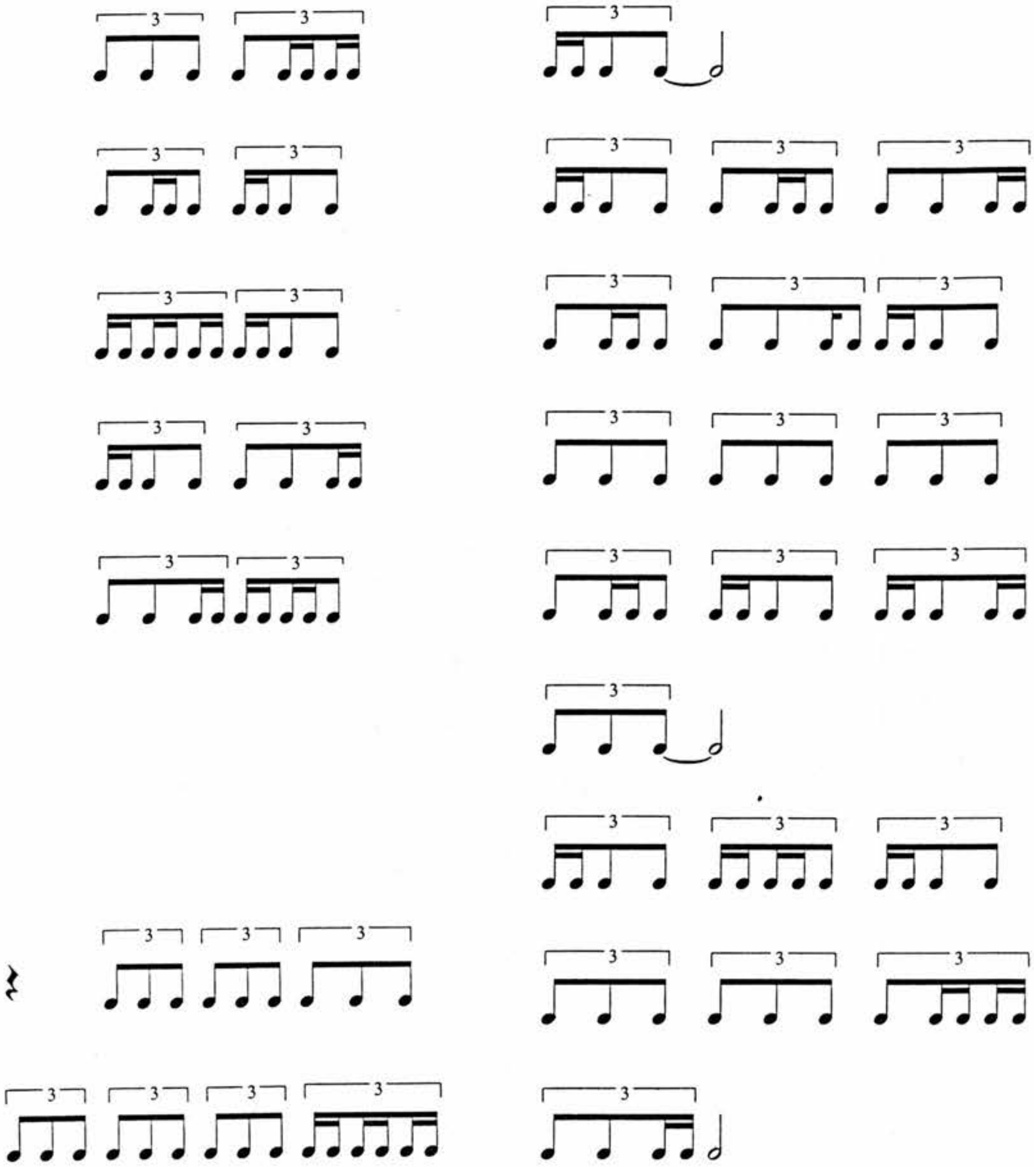
A second virtual feature of *Originel* involves Boulez's treatment of duration. Of the 117 bars of the piece, the principal flute plays for 112 of them. Discounting two bars of held notes, of the remaining 110 bars, 75 bars have unique durational compounds while the remaining 35 bars repeat the durations of some of these 75 bars from one to seven times in the course of the work, but not in any recognisable succession. It is possible to group many of these durations into families or groups to see how Boulez has created variation through the constant proliferation of very simple durational means. Example 3.14 simply shows the various permutations of durations featuring minims, crotchets and quaver triplets which he uses. This analytical exercise could be extended to take into account all of the durations of the piece since the figures featured in the example consider only three of several durational families which are employed.

The pitch dimension is no less varied than that of duration. We have already noted the elusive nature of the six cadences which are recognisably related to one another, yet all different. In the course of *Originel* we become familiar with certain characteristic rhythmic shapes, the pitches and intervals of which are always different. Example 3.15 illustrates this point with four phrases from *Originel* which are all different from one another yet clearly related to the phrase with which the solo flute part begins.

It is impossible to say that any one of these figures has precedence over any other except in the order of their temporal unfolding. They are simply manifestations of a *virtual theme* or figure. There are no repeated pitch themes in *Originel*, but there are several places where the solo flute line features repeated intervals, permutated intervals and sometimes even brief palindromes. What *Originel* seems to show is that the concept of the *virtual theme* has remained at the heart of Boulez's musical practice right up to the present.

Like *Originel*, *Anthèmes* (1992) for solo violin features several figures which, while always different from one another, are clearly related to one another, without being derived from any one favoured enunciation. The piece opens with a seven-note

Ex. 3.14



Ex. 3.15

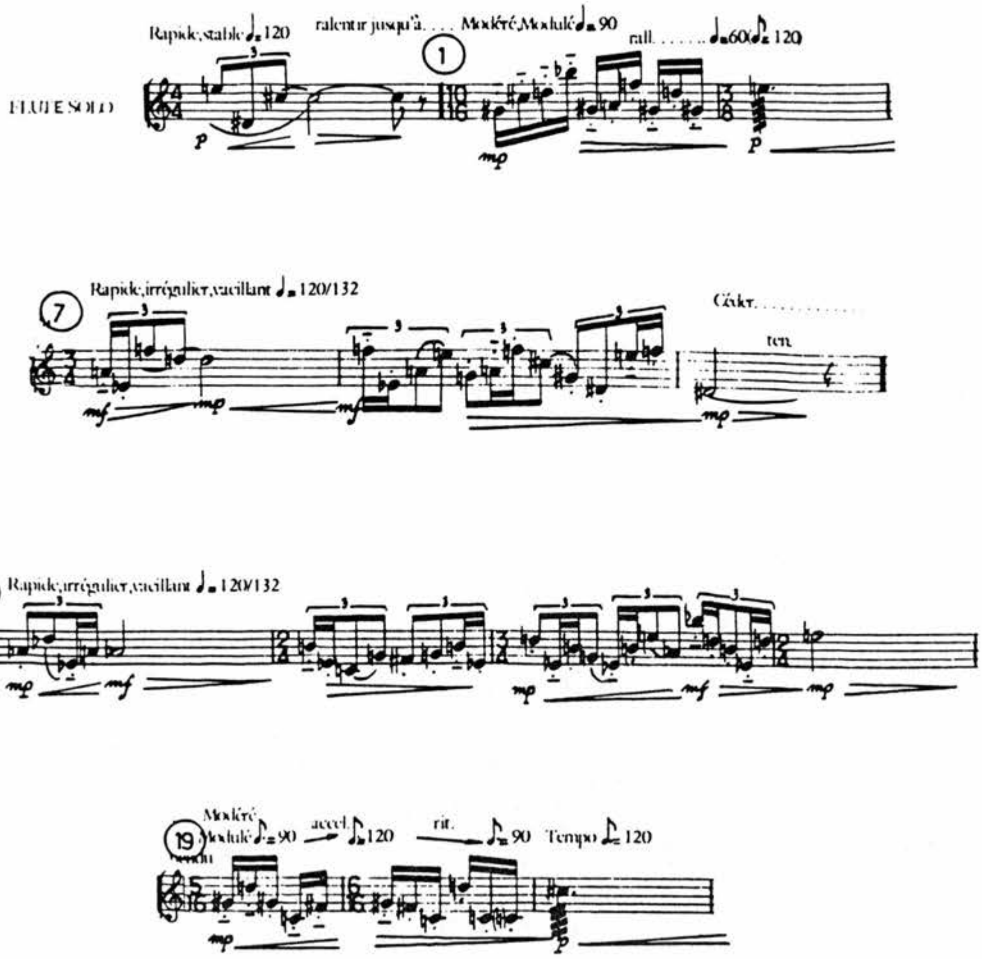
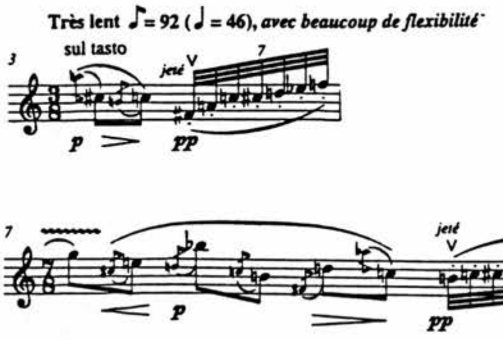

FLUTE SOLO
Rapide, stable ♩. = 120
ralentir jusqu'à. . . .
Modéré, Modulé ♩ = 90
rall. . . . . . ♩ = 60 (♪. = 120
Rapide, irrégulier, vacillant ♩ = 120/132
Cédez. . . . .
ten.
Fl.
Modéré Modulé ♪. = 90
accel. ♪ = 120
rit.
♪ = 90
Tempo ♪ = 120
1
7
15
19
p
mp
mf

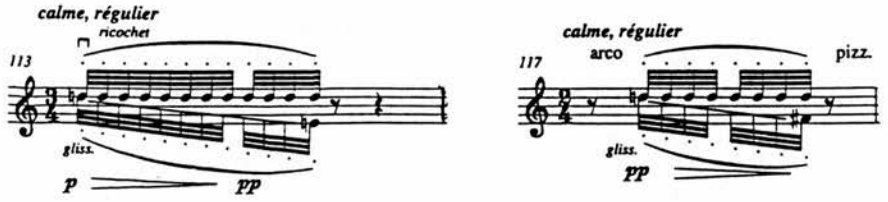
figure (Ex. 3.16) which reappears many times throughout the piece but each time differently (b.1 b.3; b.7; b.9; b.10; b.12; b.90; b.96). The intervallic content of the figure is changed with every occurrence so that, while the figure is always recognisably perceptible, it does not have a primordial manifestation. It can therefore be said to be a virtual figure. The principle by means of which Boulez has generated such virtual pitch collections is not known and may not ultimately matter since the processes are clear.

Another characteristic figure within *Anthèmes* involves the use of a repeated note above a glissando in which the lower point of arrival within the glissando is normally

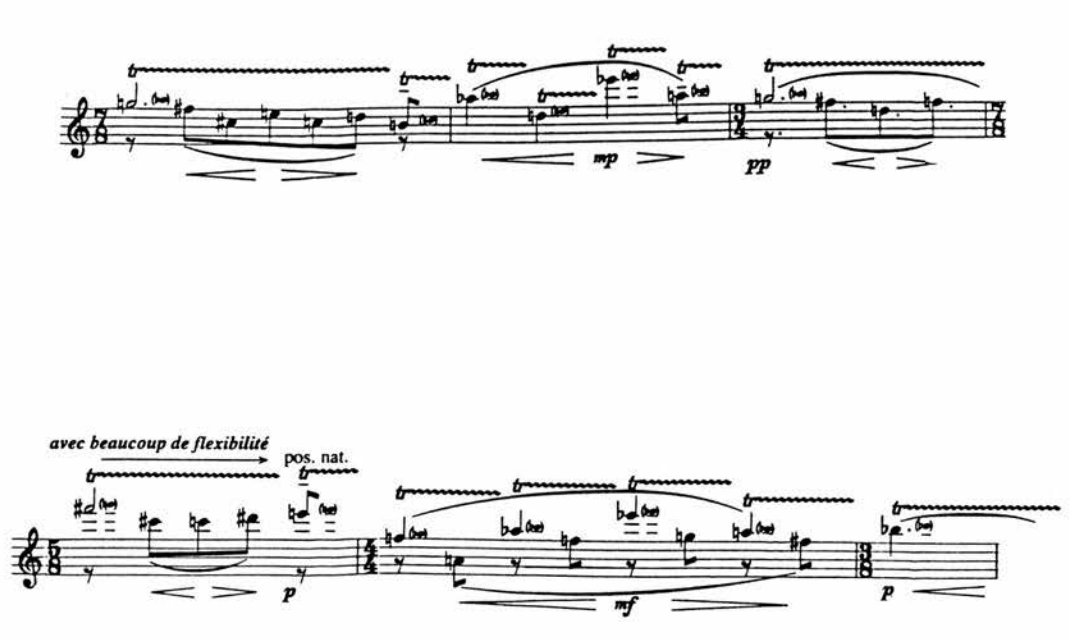
Ex. 3.16 - Anthèmes - b.3 & b.7


Très lent ♪= 92 (♩ = 46), avec beaucoup de flexibilité
sul tasto
3
jeté
7
p
pp
7
jeté
p
pp
7

Ex. 3.17 - b.113 & b.117


calme, régulier
ricochet
113
gliss.
p
pp
calme, régulier
arco
pizz.
117
gliss.
pp

Ex. 3.18 - bs 4-6 & bs 58-60


tr
mp
pp
avec beaucoup de flexibilité
pos. nat.
p
mf
p

varied from case to case (Ex. 3.17). Examples of this figure occur as follows (b.1; b.113; b.117; b.125; b.129; b.133; b.135; b.137; b.139; b.141; b.143). The figure appears twelve times in the course of the piece, most often in a varied form, but there are also three exact repetitions (b.117 and b.139; b.125 and b.141; b.129 and b.137).

A third frequently occurring figure within *Anthèmes* features a sequence of trilled notes (Ex. 3.18). This does not include the many isolated trills within the piece but rather a particular, characteristic figure which occurs always differently in the following places (bs 4-6; bs 58-60; bs 67-71; bs 80-88; bs 94-96). In addition to these explicit occurrences of the figure, much of the material between bs 98-112 may also be related to it. Again, while each manifestation is different, the figure is clearly recognisable and perceptible.

The Open Work: Virtual Form

In the *Collège de France* lectures of the 1980's, Boulez acknowledges that the opposition between thematicism and athematicism has remained a fundamental one for him throughout his compositional life (Boulez 1989a, pp.249-250). In the mid-1950's, this interest in *difference* over identity, manifest at the level of the *virtual theme* from the *Flute Sonatine* onwards, next extended to the level of musical form itself. In his 1957 article *Aléa*, Boulez addressed the topical question of chance within music, opposing the total indeterminacy favoured by Cage, which entailed the throwing of dice, tossing of coins, use of radio tuners and multidirectional score-reading. For Boulez, chance was unacceptable since it excludes choice and "completely denies the creative act" (p.278). Instead, Boulez countered with what he called "controlled chance" (Jameux 1991, p.91). This controlled chance found its expression in what became known as *open form* which aimed to create a "sort of multi-circuited labyrinth" (p.91) offering, not the infinite chance possibilities preferred by Cage, but rather, multiple choices of equal weight and value for the performer, set within a composed framework (Boulez 1989a, p.275).

Open form may have been, in part, a reaction to Cage's ideas on total chance, however the influence of the nineteenth century French poet, Stephane Mallarmé is also most apparent. The notes for Mallarmé's *Livre*, an unfinished mobile book, were published incomplete by Jacques Scherer in 1957. The *Livre* was to allow mobility at every level of the text, from that of individual words and phrases to complete pages, and would read in more than one direction. Boulez found the multiple routes, reversibility and variability of Mallarmé's *Livre* to be a "revelation" and says that Scherer's sketches "corroborated" his own ideas "on multiple form, on the subordination of ideas to this kind of form, on the multiple reading of an ensemble of structures where the meaning is renewed in each dimension of the reading" (1989a p.133).

For Boulez, the "formal, visual, physical - and indeed decorative presentation" used by Mallarmé in works such as the *Livre* or the poem, *Un Coup de dés,* suggested to him "the idea of finding equivalents in music" (Boulez 1986, p.147). Boulez noted music's apparent backwardness in relation to literature, where neither Mallarmé's *Un Coup de dés* nor Joyce's great novels had any contemporary musical equivalent. He wrote of the expansive universe of Joyce's *Ulysses* and *Finnegans Wake* and aspired to realise such a vision equally within music (p.144). While Boulez, in retrospect, does not like to draw too close a comparison between his own project and the literary achievements of Mallarmé and Joyce, he nevertheless used them as "reference points" in the search for a new musical poetics (Boulez 1991, p.18).

In *Aléa*, Boulez described his intention as a search for "an evolving form which rebels against its own repetition; in short, a relative formal virtuality" (p.29). For Boulez, such a conception of form was simply a further extension of the tendency within contemporary music in the mid 1950's towards variable concepts (p.35). In the 1980's Boulez attributed the development of the concept of *open form* and, more generally, the interest in chance cultivated by other composers and artists at this time, to an "excess of determinism" within previous Western art music. Open form calls into question traditional Western notions such as "closed form" and the singular perfection of the completed masterpiece (Boulez 1989a, p.156).

Open form, as Boulez conceived it, is based instead upon multiple relationships which, in an effort to break with traditional "unidirectional form", require the performer to make certain choices involving several possible routes through a score comprising both fixed and a certain number of mobile elements (pp.161-162). The mobile components within the material are composed of a number of "transposable elements" which are given characteristic profiles and are then "classed in families." In this way, Boulez accepts the responsibility for composing out the various possibilities within an idea but then leaves the task of choosing, from among these possibilities, to the performer. In the face of several musically interesting alternatives, Boulez was reluctant to restrict himself to only one when he could retain multiple options. Consequently, Boulez speaks of the possible contrast of:

> on the one hand ... a real, completed text, beginning from fixed and privileged thematic givens; on the other hand, a potential virtual text, realising itself in the instant beginning from renewed givens in constant evolution (Boulez 1989a, p.280).

With a *virtual* or *open form* no one version or performance will be theoretically any more valid than any other since each possible version of the work, which exercises certain options while bypassing others, becomes simply a "virtual variation" of the *virtual form* (p.379). Works by Boulez which include elements of *open form* are *Don* from *Pli selon pli*, *Structures Book 2*, *Eclat, Domaines and Rituel*, but it is most clearly used in the *Third Piano Sonata* whose multiple possibilities defy, at least in theory, any definitive ordering and therefore performative repetition. In the *Third Piano Sonata* Boulez, like Mallarmé, attempted to provide an *open form* in which the performer has a certain degree of choice over the material which is used and the order in which it is played. To date, only two of the five formants (movements) have been completed, which enables them to be combined in a total of four ways, which will be increased to eight on completion of all five formants.

In a study which is in many ways consonant with the present one, Ivanka Stoïanova (1974a; 1978) has expressed the link between Boulez's *Third Piano Sonata* and Mallarmé's *Livre* and mobile poetry in terms of Deleuzian *difference* and *repetition*.

Unlike the present study, Stoïanova draws not only upon *difference,* as understood by Deleuze, but also upon parallel insights from thinkers such as Derrida.[7] Schérer reveals to us Mallarmé's desire for identity within the *Livre* at the global level and within each of its component parts, such as the page and volume, in order to ensure a certain architectural unity (quoted in Stoïanova 1974a, p.11). Stoïanova views Mallarmé's quest for unity and identity in the light of the Deleuzian concept of *difference*. She tells us that "the permutational technique" of the *Livre* puts its elements "in play in order to engender multiple meanings ... from the same equation" (p.12). In Mallarmé's poetry, words cease to operate in conventional ways and now function through a kind of mutual reflection, whereby each word no longer has its own colour. Instead the continual realignment and "reciprocal reflections of the syllables, words, lines, pages and volumes" results in the creation of a "universe of multiple meanings" (pp.12-13). *Difference* is thus charged with making the "multidirectional" Mallarméan text operate through the plurality of meanings engendered by its "intersecting currents of thought" (p.15). Identity within the *Livre* is to be understood in the identity of the structural principles which operate within it at different levels. This constitutes a "profound identity" within which repetition functions as a play of *difference* resulting in the multidirectional possibilities which constitute the work. Stoïanova believes that Boulez's *Third Piano Sonata* realises, within music, a similar "profound identity" and play of repetition as *difference.*

Boulez has produced his own well-known and oft-copied diagrams (Ex. 3.19 & Ex. 3.21: Boulez 1986, p.153; p.150) which clearly illustrate the possibilities for mobility within the *Third Piano Sonata*. Their inclusion here plays an important part in demonstrating the practical workings of virtuality within *open form*. Examples 3.19 and 3.20 take an overview of the entire sonata and show the eight possible ways in which the five formants will eventually be capable of being arranged.

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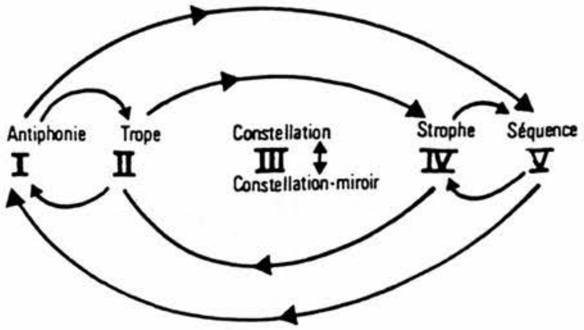
[7] Stoïanova's *Geste-texte-musique* (1978) considers post-war avant-garde music in terms of many of the same Modernist concepts used by Deleuze and Guattari. While Stoïanova draws on the work of many theorists including Kristeva, Lyotard, Hjelmslev, Heidegger and Derrida, Deleuze's concept of *difference* is of primary importance for her and she acknowledges that she was "inspired" by Deleuze's work. Stoïanova seems to be the first writer to have made an explicit connection linking Deleuzian *difference* with contemporary music. She uses Deleuze's concept as a useful tool but does not suggest that Boulezian athematicism, open form, and so on, are manifestations of Deleuzian *difference*. She is right, however, in recognising Deleuzian *difference* and *repetition* also in compositions by Berio, Schnebel and others.

Ex. 3.19

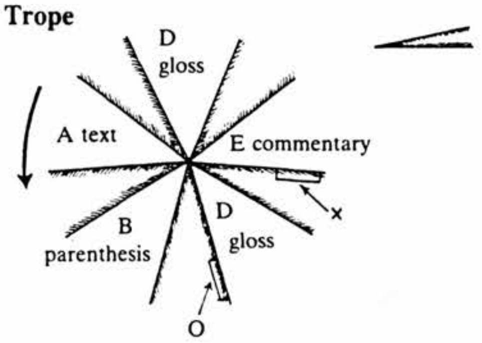


Ex. 3.20

(1)	I	II	III	IV	V
(2)	I	II	III	V	IV
(3)	V	IV	III	II	I
(4)	V	IV	III	I	II
(5)	II	I	III	IV	V
(6)	II	I	III	V	IV
(7)	IV	V	III	II	I
(8)	IV	V	III	I	II

In addition to the open nature of the global relationships linking the five formants, important aleatoric opportunities are to be found within the formants themselves. We will consider only the two formants which Boulez has so far completed. The second formant, *Trope* (Ex. 3.21), is subdivided into four sections entitled *Text* (T), *Parenthesis* (P), *Commentary* (C) and *Gloss* (G). The performer can begin with any one of the four sections which can be ordered in any one of four ways. Furthermore, the performer has to choose whether to play *Gloss* before or after *Commentary*. This results in a total of eight possible formal permutations (Ex. 3.22). In addition to this, the troped material (embellishment) can be introduced into whatever form of the formant is chosen in any of three ways which Boulez specifies.

Ex. 3.21



Ex. 3.22

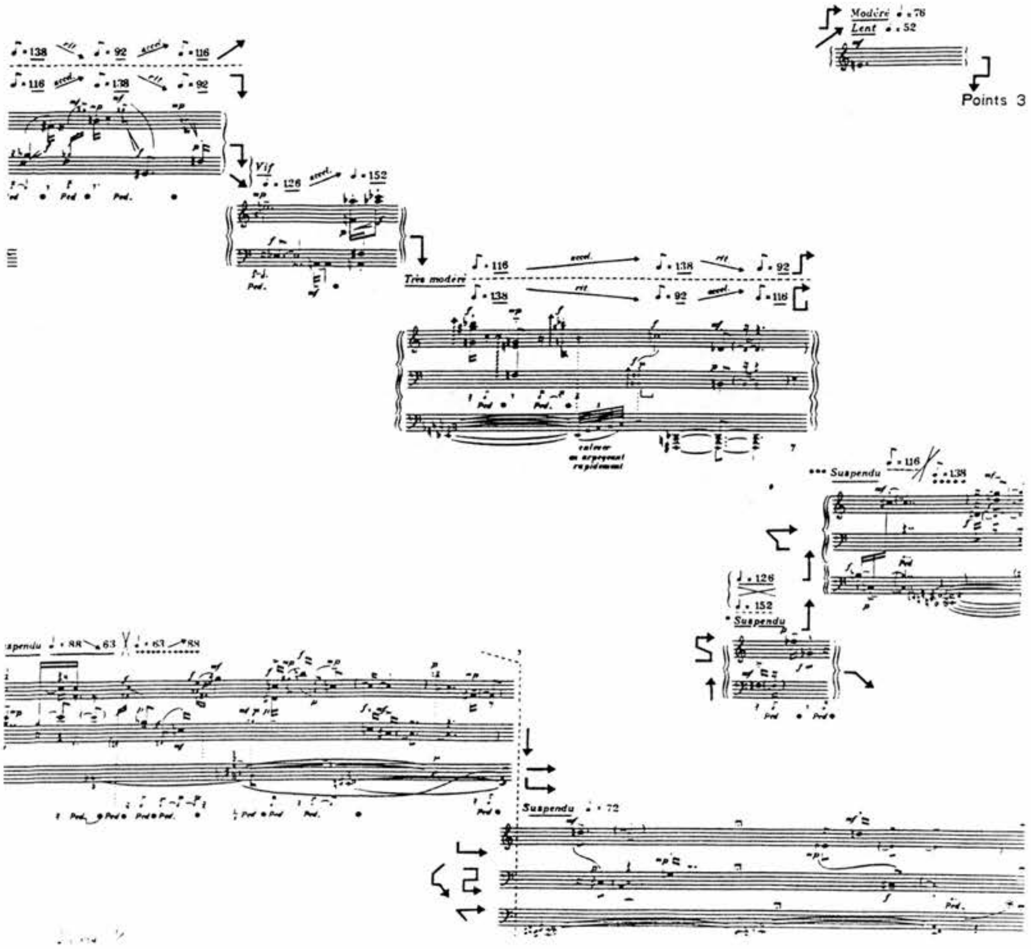
(1)	T	P	C	G
(2)	T	P	G	C
(3)	P	C	G	T
(4)	P	G	C	T
(5)	C	G	T	P
(6)	G	C	T	P
(7)	G	T	P	C
(8)	C	T	P	G

The third formant, *Constellation (Constellation-Miroir)* always forms the centre within the structure of the sonata. *Constellation-Miroir* is, in fact, the retrograde of *Constellation*. *Constellation* is made up of nine sizeable individual pages which contain five basic musical structures divided into *points* and *blocks*. There are three structures of *points* marked out in green ink and two structures of *blocks* which are distinguished from the *points* by their red ink. This sets up the contrast of *points* and *blocks* which is at the centre of the piece. In Jameux's words:

> The five main structures are played alternately, beginning and ending with a structure of points. They are preceded (*Constellation*) or followed (*Constellation-Miroir*) by a brief sixth structure called *mélange*, comprising three sequences of points and three of blocks (with colours reversed): ... Within these five main structures the performer can to a certain extent choose his route, or at least the means of linking the various fragmentary structures available within the large blocks or points (Jameux 1991, p.307).

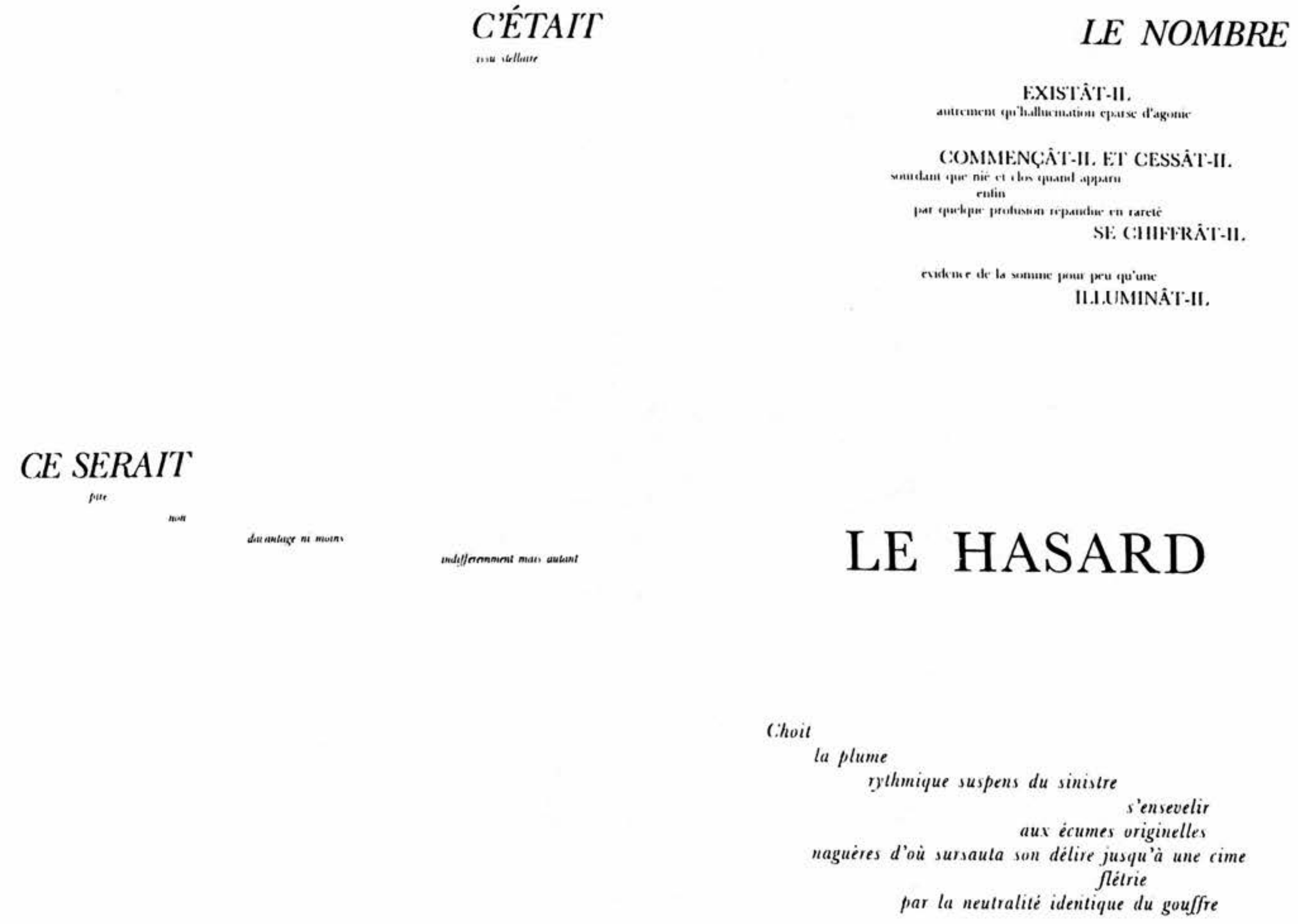
Examples 3.23 and 3.24 feature a section from Boulez's *Constellation/Constellation-Miroir* and a page of Mallarmé's *Le Coup de dés* which cannot fail to make the connection between the aesthetic of the two works clear. The typographical layout itself reveals something of the openness of the texts and the possibilities for multiple routes which they permit.

Ex. 3.23



Modéré
Lent
Points 3
Vif
Très modéré
Suspendu
Suspendu
Suspendu
Suspendu

Ex. 3.24



C'ÉTAIT
issu stellaire

LE NOMBRE

EXISTÂT-IL
autrement qu'hallucination éparse d'agonie

COMMENÇÂT-IL ET CESSÂT-IL
sourdant que nié et clos quand apparu
enfin
par quelque profusion répandue en rareté
SE CHIFFRÂT-IL

évidence de la somme pour peu qu'une
ILLUMINÂT-IL

CE SERAIT
pire
non
davantage ni moins
indifféremment mais autant

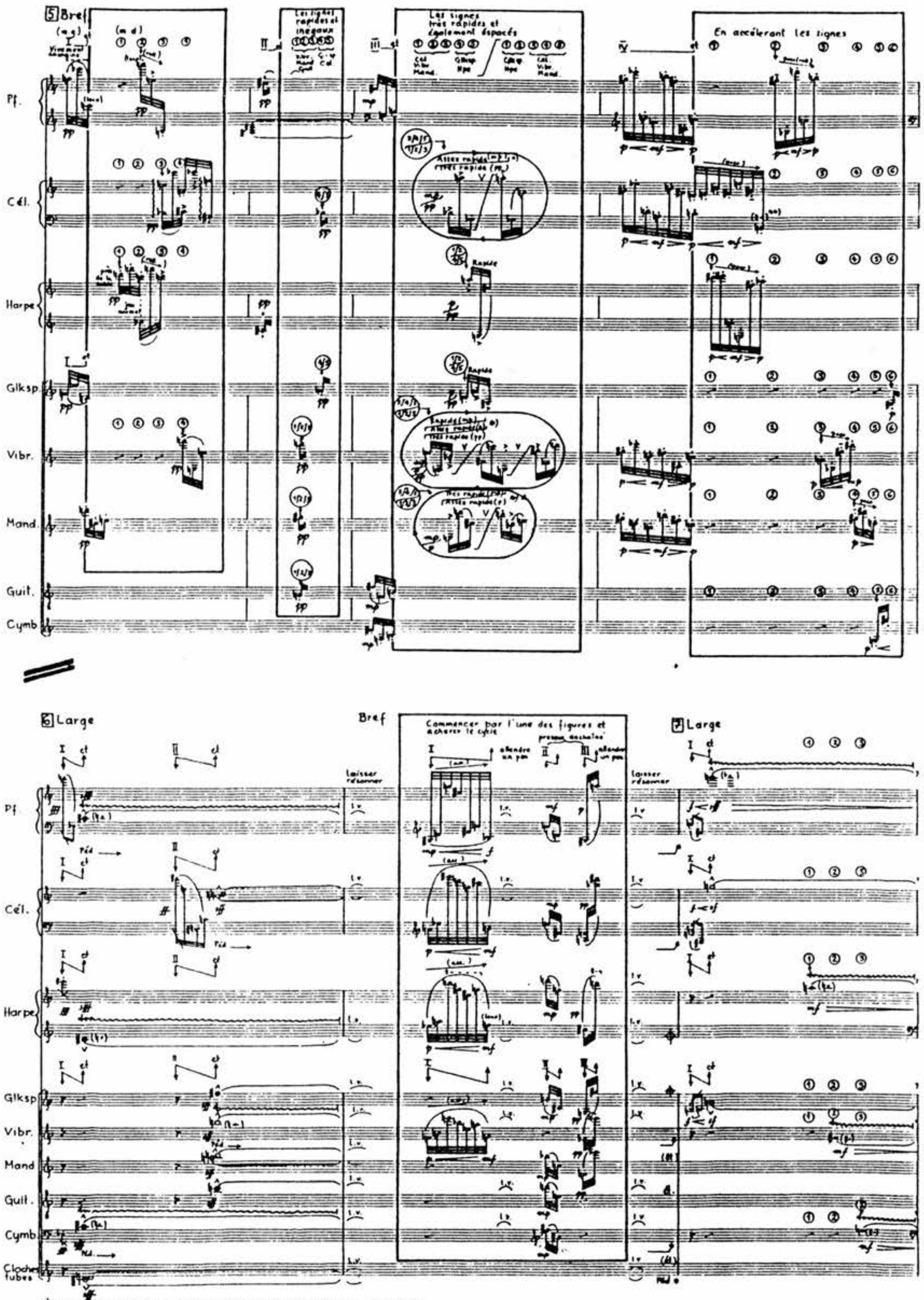
LE HASARD

Choit
la plume
rythmique suspens du sinistre
s'ensevelir
aux écumes originelles
naguères d'où sursauta son délire jusqu'à une cime
flétrie
par la neutralité identique du gouffre

If *difference* or variation is employed at the overall level of form within *Constellation-Miroir*, through its optional successions of events, in *Don* (1962), the opening piece within *Pli selon pli*, aleatoricism features in three main ways. First of all, from pp.2-17 of the score, the orchestra is divided (only in terms of the score) into three separate ensembles with their own blocks of material which can relate in a "conjunct or disjunct" way "overlapping in succession or superposed" (Bradshaw 1986, p.197). Secondly, at two points within the piece, the singer has to make certain choices from a variety of options where some statements can be chosen and others omitted (p.24 and p.27). Finally, from p.28 to the end of the score, the orchestra is divided into two groups which alternate in accordance with any one of six possible sequences from which the conductor can choose.

Boulez provides indeterminacy in an entirely different fashion in *Eclat* (1965) through the sixteen inserts within the piece which include a variety of options for both conductor and performers. Apart from the variable unfolding of these inserts, the overall form of *Eclat* is entirely fixed, with indeterminacy restricted to the local level of the individual insert. Example 3.25 features the inserts at fig. 5 and fig. 6. In some inserts (fig. 3; fig. 20) the conductor gives a sign to all of the performers to begin with one of a series of figures and to complete the cycle. These signs are to be given at irregular intervals. At fig. 5 (II) the conductor is instructed to give five signs rapidly and unequally to five instrumentalists who have one note each to play. In some inserts like fig. 5 (III) and fig. 13, the conductor can choose between possible sets of instructions. In terms of performer choice, at fig. 6 (+1) performers choose to begin with one of the figures and complete the cycle from that point, while in the insert at fig. 16 the solo pianist can choose to play the eight short sections in whatever order she/he prefers. At fig. 18 (III) and fig. 19 (II) the performers choose the order in which each instrument is to sound, while the insert at fig. 20 (+1) is to be performed irregularly but allows no other options. While the overall form of *Eclat* is always the same, there are obviously several possible variants for the unfolding of each insert.

Ex. 3.25


5 Bref
(m g) I et
Vivement
(m d)
II et
Les signes rapides et inégaux
Vibr. Mand. Guit.
Cél.
III et
Les signes très rapides et également espacés
Cél. Vibr. Mand.
Glksp. Hpe
IV et
En accélérant les signes
Assez rapide
Très rapide
Rapide
Pf.
Cél.
Harpe
Glksp.
Vibr.
Mand.
Guit.
Cymb.
6 Large
Bref
Commencer par l'une des figures et achever le cycle
attendre un peu
presque enchaîné
laisser résonner
l.v.
Péd.
7 Large
Pf.
Cél.
Harpe
Glksp.
Vibr.
Mand.
Guit.
Cymb.
Cloches tubes
UE 17746

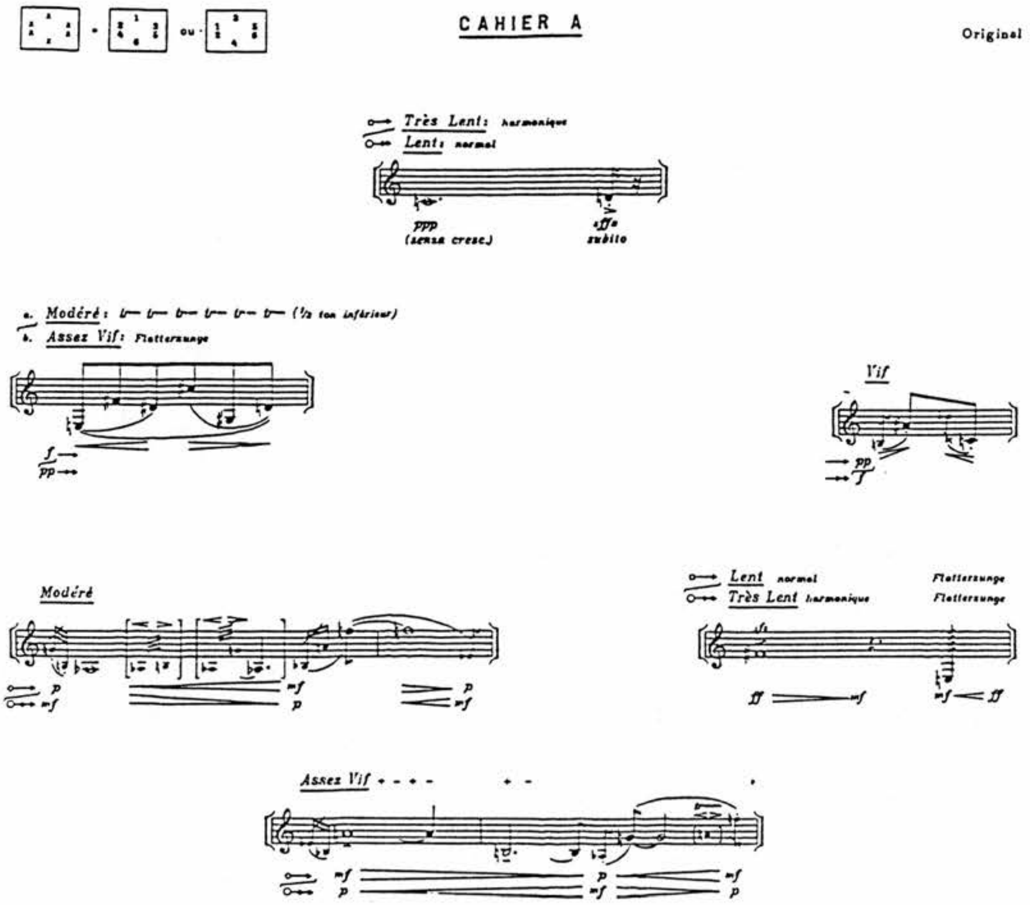
*) Chaque groupe affecté d'une nuance différente et du tempo approprié

**) Jouer ♮la à la place de ♮sol si le celesta n'a que 4 octaves

In *Domaines* (1961-68) for clarinet or alternatively clarinet and six instrumental groups, the mobile form of the piece is represented in the loose-leaf format of the six *Original* "cahiers" and the six *Miroir* "cahiers". When the piece is played in its solo format, the clarinettist is free to play the six *Original* cahiers in whatever order she/he chooses, after which the six *Miroir* cahiers are played. In the ensemble version, the clarinettist again plays the six *Original* cahiers in whatever order is preferred, but this time, at the end of the six *Originals*, the conductor chooses one of the cahiers to be played *ad lib* by the ensemble, after which the soloist plays the appropriate *Miroir* cahier. The other *Miroir* cahiers unfold likewise in this fashion. In addition to this primary formal level of aleatoricism, the clarinet soloist also has options within the unfolding of the cahiers. Each cahier is made up of six independent musical fragments which can be performed in one of two ways, either from left to right or from top to bottom. If the performer chooses to play an *Original* cahier from top to bottom, then its *Miroir* must be played from right to left and vice versa. A third level of aleatoricism permits the performer to choose, in many places, from alternative dynamic and performance directions in which, for example in cahier A (Ex. 3.26), one fragment can be performed with harmonics or normally while another can be played with fluttertonguing or trills.

As we have seen, *open form* enabled Boulez to envisage a composition with no definitive unfolding but rather with *virtual form*. One of the problems posed by the existence of such virtual forms has been the possibility of appreciating the real elements of formal difference within them since only one realisation can be achieved at a time. Boulez rejects the possibility of repeating an *open form* work in more than one version in the same concert as superficial. Likewise, he is not impressed with the idea of playing certain mobile elements several times in order to display the differences between sequences in successive versions (Boulez 1989a, p.160). In time he turned away altogether from the concept of the *open form* work, becoming convinced that its nature is in fact problematic, since it seems to be based upon "two contradictory principles." From one point of view, the multiple choice of the *open form* work is supposed to present the performer with a free choice from a variety of component possibilities of equal value. In practice, however, the performer must

Ex. 3.26


CAHIER A
Original
Très Lent: harmonique
Lent: normal
ppp
(senza cresc.)
sffz
subito
Modéré
Assez Vif: Flatterzunge
Vif
Modéré
Lent normal
Très Lent harmonique
Flatterzunge
Assez Vif

decide whether to leave her/his choice to the spontaneous moment of a performance itself or to prepare certain "spontaneous" choices in advance. For Boulez, the first option seems to allow the performer to make purely superficial choices mostly from among secondary elements within the score, whilst the second option seems to create a curious paradox. If the performer has previously studied the score, then his choice can hardly be free and spontaneous (p.275). Boulez acknowledges that the material within *open form* works, such as his own *Third Sonata*, is often extremely complex and too difficult for almost any human performer to approach without prior study. Nevertheless, once the piece has been explored by a performer, it is impossible for that person to be sufficiently free from this knowledge to enable the expected freedom of choice within a performance. Despite this discrepancy, Boulez maintains that this necessary process of prior reflection leading to prepared routes between sound objects, does not, in fact, weaken the concept of *open form*. Looking back in 1985 he said that "spontaneity was an illusion" contrary to the complex character of the text (p.276). Instead of spontaneity of chosen route within the piece, Boulez now suggests that personal study will lead to a better performance which will highlight the "privileged senses" and "stronger relations" from within the "multiple possibilities". Nevertheless, he acknowledges the inevitable result of study, that a few "privileged pathways" become established since some routes are perceived to be "more satisfying" than others (p.159).

In time, open form came to be abandoned at the primary formal level and was reduced to the provision of more modest choices for performers concerning only "minor categories" (p.276). This decisive move away from aleatoricism involving moment to moment performer choice is clearly seen in the final versions of *Improvisation sur Mallarmé III* (1984-85) and the 1986 version of *cummings ist der dichter* where Boulez removes choice altogether. This does not, however, mark the end of Boulez's interest in multiple outcomes. In the 1980's, Boulez transferred the main thrust of his aleatoric interest from the momentary choice of the human performer to the newly possible instantaneous decision-making powers of computer technology which could now respond to the human performer within the "real-time" of a performance.

Discussing the electronic aspects of *Répons*, Boulez described the possibilities inherent within the real-time interaction of musicians and technology as producing compositional "processes not completed works." Works like *Répons* can therefore never be complete in the form of a notated score, but require rather the participation of "the machine at the moment of the performance" for their completion. In other words, the electronic part of *Répons* is, at one level, a continuation of the open work aesthetic" (Griffiths: BBC Radio Interview).

Boulez has further described something of the machinic aleatoricism within *...explosante-fixe...* and *Anthèmes* for violin and electronics. He speaks of the machine having many possibilities and of his deliberate relation of "aleatoric functions" programmed within the machine, contrasting with "very precise functions for the performer." He describes how, within the electronic version of *Anthèmes,* aleatoricism is inscribed within an exact field of possibilities in which a given range of durations can occur with particular frequencies thus enabling what he calls changes in the "profile". Similarly, at the beginning of *Transitoire VII* from *...explosante-fixe...*, we are told that the electronic rhythmic element within the accompaniment is completely aleatoric while the notated score which the performers interpret is absolutely fixed. The key point for Boulez consists in the fact that the aleatoric electronic field of options "coincides with the field of the instruments" (Interview 28.8.98). All of this would seem to suggest that aleatoricism has become much more subtle within Boulez's music since, with the advent of the computer, he has managed to bypass the aporia of performer choice, consequently removing aleatoricism from the level of the notated score.

In addition to this new computer-generated aleatoric twist, Boulez has also expressed the view that even if *open form* was not ultimately successful in its original aims, it undoubtedly left its mark on subsequent music in other ways (Boulez 1989a, p.279). Each of the three so far completed movements within *...explosante-fixe...,* for example, can be played either together in the preferred order of VII-V-I or separately in a way which, at least for Boulez, seems analogous to the mobile aspects of Mallarmé's *Livre* (Benjamin: BBC Radio Interview).

Another example of this relative mobility is perhaps the *spiral form* which Boulez associates with those of his works which, although incomplete, are suitable for performance. *Spiral form* allows a work to be performed at a particular stage of its development while remaining open-ended and forever susceptible to further, even infinite, development at another level of the spiral (Samuel 1986, pp.107-108; p.112). For Boulez, the idea of the spiral suggests images of "perpetual evolution" and an expanding universe reflecting "the complexity and infinity of relations within the system and the idea" (Boulez 1989a, pp.389-390). *Répons* is an example of a *spiral form* since, in Boulez's words, "it goes back always enriching the same ideas" in a way which suggests to him the spiral architecture of the Guggenheim in New York City. Employing such a notion of form enabled Boulez to perform *Répons* at various incomplete stages within its development. Going one stage further, it is possible to view Boulez's many *works in progress* as perhaps encompassing this same principle of openness only at a higher level. Understood from this point of view, Boulez's entire output could be said to be open-ended and as one continuous variation. He acknowledged this aspect of his work to Deliège when he said that all of his works were "basically different facets of one central work, of one central concept" (Boulez/Deliège 1976, p.50).

One of the most striking elements within Boulez's use of aleatoricism is the absence of repetition of procedure and the great variety of means by which it is realised within each piece. *Constellation/Miroir* from the *Third Piano Sonata* with its blocks, points and variable routes; *Don* with its aleatoric instrumental blocks, vocal inserts and optional closing sequences for the independent instrumental blocks; *Eclat* with its inserts featuring various aleatoric devices; *Domaines* with the optional ordering of the six *Original* cahiers and six *Miroirs*, the optional performance of the six musical fragments of each cahier from left to right or top to bottom plus the other secondary options such as dynamics. Finally, the aleatoric elements within works such as *Répons* where the electronic modification of the soloist's music results in something different every time; the score-shadowing of *...explosante-fixe...* and *Anthèmes* for violin and electronics where particular rhythmic options are no longer written within the score for the performer but are instead encoded within the machine and come as a surprise to the performer as well as to the audience.

Difference as "Accumulative Development"

While Boulez's interest in the possibilities of the *open form* work has clearly cooled in recent years, elements of mobility continue to feature within his music and he has remained as committed as ever to ideas of *difference* and multiplicity. Nevertheless, it is apparent that many of Boulez's works from the 1970's onwards exhibit a new simplification of means and clarity of form when compared with the athematicism of the integral serial works or the formal complexity of the aleatoric works. From this time onwards, Boulez permits specific harmonic areas to retain greater perceptibility. Bradshaw writes of *cummings ist der dichter* as marking "the reintroduction of harmony as a quasi-thematic basis for development" (1986 p.206) while *...explosante-fixe...* and *Rituel* clearly allow variation to assume a more perceptible focus. In general, the works of the 1970's and 1980's exhibit increased "harmonic selectivity" as Boulez focuses greater attention upon "ever more clearly defined thematic objects, essentially neutral though they may still be" (p.219; p.223). *...explosante-fixe...* and *Rituel*, for example, are based upon the same seven-note row, *Messagesquisse and Dérive* are both centred upon a note-row based upon the name of Paul Sacher, to whom *Messagesquisse* is dedicated (p.220; p.222), and the pitch material of *Répons* is largely based upon the possibilities inherent within the five chords which sound at the opening of the piece.

At a formal level, Boulez's pieces began more readily to resemble Stravinsky's sectional forms. In the lectures *La notion de thème et son évolution* (1983) and *Thème, variations et forme* (1984), Boulez commends the originality of Stravinsky's discourse which bases musical form upon the permutation and return of recognisable sections. He notes, in particular, how Stravinsky, in *Les Noces* and the *Symphonies of Wind Instruments*, succeeded in transforming the ancient forms of the *litany* and the *verse response couplet* into an entirely new concept in which formal development is paradoxically produced through formal return in a thematicism which is based upon modified repetition (Boulez 1989a, p.194; p.233). Boulez says that:

> Stravinsky's conception of melodic development is based on psalmody and litany where deviation is minute in relation to the original model, but where the intervening extensions, contractions, displacement of accents ... find their profound force in accumulation (p.197).

In his *Poetics of Music*, Stravinsky discusses his views on difference and variation in terms of similarity and contrast. He says that he prefers to aim for similarity rather than contrast, which he perceives to be a seductive but weaker option. He justifies this predilection for similarity over contrast or variation in the divisive effects which he believes variation to have on our attention and he draws upon the philosophical maxim "that the One precedes the Many." He professes that "variety is valid only as a means of attaining similarity" (Stravinsky 1942, pp.31-33).

Stravinsky's sectional forms operate through the alternation of blocks of familiar material whose varied re-occurrences constitute the formal development (Boulez 1989a, p.197). Van den Toorn writes of *Les Noces* as possessing "a form or architecture constructed with relatively heterogeneous blocks of material, which exhibit, upon successive (near) repeats, an unusual degree of distinction and insulation in instrumental, dynamic, rhythmic-metric, and referential character" (1983 p.177). On the *Symphonies of Wind Instruments*, Van den Toorn again writes of "a highly incisive form of abrupt block juxtaposition" and "(near) repeats" (p.339), while Taruskin highlights "its fascinating mosaic structure, in which discrete sections ("blocks") in varying but strictly coordinated tempi are juxtaposed without conventional transitions" (1996 p.1486).

Perhaps thinking more of his own forms, Boulez prefers to refer to Stravinsky's sectional forms as constituting "accumulative development", thus avoiding any sense of repetition and, perhaps also, Stravinsky's identity-based aesthetic (Boulez 1989a, p.198). Boulez says that he wishes "to speak of a kaleidoscopic form where the alternation of accumulative thematic developments creates the form" (p.198). Again, in *Athématisme, identité et variation* (1985), Boulez professes his desire and growing attraction for a formal conception which gives equal status to "return and variation" (p.273). In practical terms he invokes the musico-historical concepts of *antiphony*, *response* and *sequence* which he believes can be re-employed and re-interpreted more liberally to meet present needs since they are not inextricably bound to any historical definition or previous use, referring to "allusion" rather than to literal return (p.274).

The kind of sectional alternation which becomes such an important feature from *Rituel* onwards is to some extent foreshadowed between figs 3-14 of *Eclat*, in its alternation of inserts, trills, unisons and *rapide* passages. Each event is, however, very short-winded so that if this really is an embryonic example of accumulative development, it is on a very small scale.

Perhaps the simplest form of accumulative development is the verse-response form of a piece such as *Rituel* (1974-75) which is made up of fifteen sections in which the even-numbered sections are verses and the odd-numbered sections are responses. In *Originel* from *...explosante-fixe...* Boulez simply alternates two kinds of music, this time a series of six poetic, improvisatory sections, each time punctuated with a cadence. *Transitoire VII* from *...explosante-fixe...* is clearly sectional in form but in a much more elaborate way than the two pieces already mentioned. It has ten distinct ideas which occur variously from one to six times in the course of the movement. Example 3.27 outlines the succession of the ten sections (marked A-J) as they interlock in a kind of musical chain.

Each of the sections within *Transitoire VII* has its own distinctive character. The *Lent* sections, for example, are reminiscent of Stravinsky's *Rite of Spring*. The *Assez Rapide* sections have a notated *rit*, the *Assez Lent Flexible* sections are more poetic and free and the *Très Vif* sections are heterophonous. As can be seen from example 3.27, and as Boulez has confirmed in a BBC radio interview with George Benjamin, the succession of the sections is discontinuous and does not follow any "permutational scheme." *Transitoire V*, the only other so far completed part of *...explosante-fixe...*, can likewise be seen to have a similarly sectional accumulative developmental form.

Ex. 3.27

FIGURE NO	SECTION	A	B	C	D	E	F	G	H	I	J
1	Vif	1									
2	Très Vif		1								
3	Rapide			1							
4	Très Vif		2								
5	Rapide			2							
6	Modéré				1						
7	Très Vif		3								
8	Même temps										
9	Même temps										
10	Rapide			3							
11	Modéré				2						
12	Lent					1					
13	Assez lent, flexible						1				
14	Assez Rapide							1			
15	Rapide			4							
16	Modéré				3						
17	Lent					2					
18	Rapide			5							
19	Modéré				4						
20	Très Modéré								1		
21	Très Lent									1	
22	Extrêmement Vif										1
23	Assez Rapide							2			
24	Modéré				5						
25	Lent					3					
26	Modéré				6						
27	Même temps										
28	Lent					4					
29	Assez lent, flexible						2				
30	Assez Rapide							3			
31	Lent					5					
32	Extrêmement Vif										2
33	Assez lent, flexible						3				
34	Assez Rapide							4			
35	Extrêmement Vif										3
36	Assez lent, flexible						4				
37	Assez Rapide							5			
38	Extrêmement Vif										4
39	Allant										
40	Assez Rapide							6			

Heterophony: The Virtual Line

The final Boulezian manifestation of *difference* to be considered within this study involves what Boulez refers to as *heterophony*. Boulezian heterophony consists of the production of *virtual melodic lines* in a way which is analogous to the *virtual themes* and *virtual forms* which we have already considered. While the original meaning of the term *heterophony,* which was coined by Plato, is now uncertain, the term itself is commonly employed today, particularly by ethnomusicologists, "to describe [the] simultaneous variation, accidental or deliberate, of what is identified as the same melody" (Cooke 1980, p.537). In heterophony, while all of the parts perform the same tune simultaneously, each part produces "its own melodic or rhythmic variants of it" (Malm 1977, p.10).

Heterophony is fundamental to many non-European musics including "the gamelan music of south-east Asia..." (Cooke 1980, p.537) and the instrumental music for the Japanese Gagaku (Malm 1977, p.194). The term is also used in relation to the "accompanied vocal music of the Near East and the Orient, where the instrument provides an embellished version of the vocal part" (Cooke 1980, p.537). Some examples include: the chanting of Bornean head-hunters to instrumental accompaniment (Malm 1977, p.33); the singing of Tuareg love songs (pp.59-60) and Mongolian folk singing (p.143). Heterophony is finally to be found "in group singing within orally transmitted monophonic traditions", for example, in the Hebridean tradition of metrical psalm singing (Cooke 1980, p.537).

Heterophony was not something new for Boulez. He defined it as part of his creative wherewithal in *Boulez on Music Today* (1963 pp.117-129) and spoke of the need to broaden and generalise its use. According to Boulez:

> Heterophony can be defined, generally speaking, as the superposition on a primary structure of a modified *aspect* of the same structure; .... In heterophony, several aspects of a fundamental formulation coincide ... its density will consist of various strata, rather as if several sheets of glass were to be superposed, each one bearing a variation of the same pattern (pp.117-118).

Boulez provides a comprehensive classification of heterophonies, telling us that it can be "convergent" or "divergent" depending upon "its degree of differentiation from the antecedent" (p.121). In terms of its nature it can be ornamental or structural, in terms of existence it can be obligatory or optional, in terms of number it can be single, double, triple and so on, while in terms of dependence it can either be "*attached* ... to the antecedent, at an unchangeable determined point" or "*floating*, when its departure or arrival takes place at a given interval of time" (pp.121-122). Boulez further explores the possibilities for heterophony in terms of the fixed or mobile transposition or multiplication of the antecedent as well as the alteration of register and variation in size of register.

Examples of heterophonic writing can be found in many of his pieces including the sixteen-part writing for chorus within *Le Visage Nuptial*, *Don* from *Pli selon pli*, *Figures Doubles Prismes* and *cummings ist der dichter.* Nevertheless, it becomes a more prominent feature within certain compositions from the 1970's onwards. Just as Mallarmé is recognised as an important influence on Boulez's discovery of mobile musical forms, Boulez has similarly acknowledged the connection linking the development of his own heterophonous lines with the visual experiments, drawings and paintings of the artist Paul Klee. In the lecture *La composition et ses différents gestes* (1980), Boulez tells us of the powerful impression which Klee's *On Modern Art* made upon him as he recognised "the coincidence of ideas" between himself and Klee. In Klee he found corroboration of his own ideas and a "specifically visual approach" which, he believes, led him to "extensions and consequences" which had previously escaped him through habit and learned response (Boulez 1989a, p.133).

Boulez was interested in Klee's ideas of "multiple perspective" and his insights into the way "an object, a scene, can be viewed from different simultaneous perspectives, and how the object, the scene, can be the *source* of these diverse perspectives" (p.133). In *Le Pays Fertile* (1989), an extended study of Klee, Boulez acknowledges Klee's influence in demonstrating the proliferating multiple possibilities which can be deduced from any given starting point, and he shares his concern that to be content with only one solution or point of view within a work of art or music is unsatisfactory (Boulez 1989b, pp.10-11). Paradoxically, Klee's development of multi-perspectivism within the visual arts resulted, in part, from his envious awareness of polyphonic music and its capacity to express several linear dimensions simultaneously (Klee 1961, p.86). Klee's drawings and paintings are consequently conceived with the explicit intention of providing for the eye the multiplicity which he perceived to be available for the ear within traditional musical polyphony (Boulez 1989b, p.166).

For Boulez the important principle to be learned from Klee, in terms of heterophony, is the simple notion of an original line being surrounded by a number of secondary lines and the geometric organisation of such secondary lines relative to the original line (p.53) (Ex. 3.28). Klee explains this possibility in the *Pedagogical Sketchbook* (1953 pp.16-17) and in the *Bauhaus Lectures* (1961 p.105; p.107; p.123), where he envisages a curved line, first of all on its own, secondly, decorated by complementary lines and thirdly, "circumscribing itself". In the final stage of this reflection Klee has "two secondary lines, moving around an imaginary main line" (Klee 1953, pp.16-17). Klee illustrates the point humorously with the image of a walking man whose dog is also walking freely at his side (Boulez 1989b, p.55). Klee's own illustrations of the concept, which appear in Boulez's *Le Pays Fertile*, are excellent visualisations, and indeed anticipations, of the renewed musical principle of heterophony which Boulez spoke of in his Darmstadt lectures and which comes into its own in works such as *Rituel*, *Répons*, and *...explosante-fixe...*

Boulez describes this process explicitly in *Le Pays Fertile* in order to acknowledge the clear parallelism on this point between his own work and that of Klee. For Boulez, Klee's multiple, ornamented lines suggest "the faithful transcription of a melodic line" and that "a melodic line is the equivalent of a drawn line" (p.52). As before, in the case of Mallarmé, Boulez is solicitous that any parallel between the visual or literary arts and music should not be interpreted in a simplistic way. Nevertheless, the parallel between Klee's drawings and Boulez's description and practice of heterophony is striking, as can be seen from Boulez's explanation of the workings of heterophony in *Le système et l'idée* (1986):

Ex. 3.28

An **active** line on a walk, moving freely, without goal. A walk for a walk's sake. The mobility agent is a point, shifting its position forward (Fig. 1):

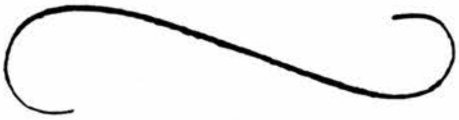


Fig. 1

The same line, accompanied by complementary forms (Figs. 2 and 3):

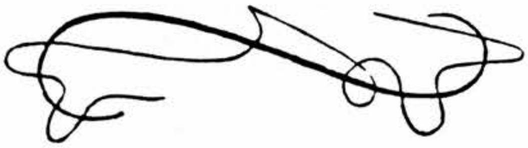


Fig. 2

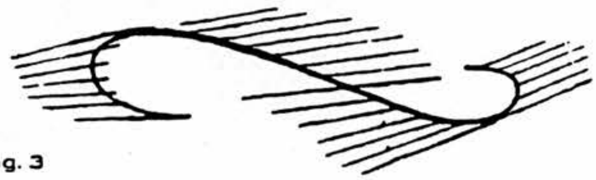
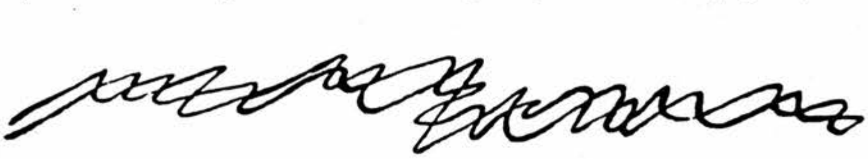


Fig. 3

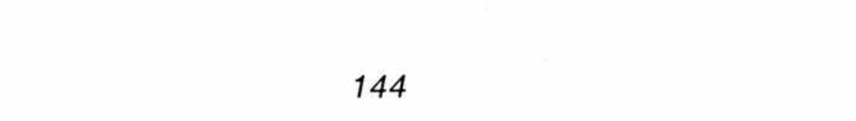
The same line, circumscribing itself (Fig. 4):

Fig 4



Two secondary lines, moving around an imaginary main line (Fig. 5):

Fig. 5

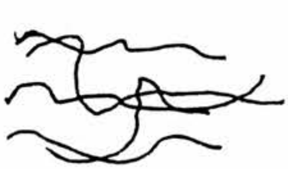


> A sound can be considered, in effect, as a centre around which satellites are available to enrich it, to give it an importance which it would not have by itself; that aura can be a linear ornamentation, it can present itself also under the form of a vertical aggregate; it can graft itself onto the sound at an appointed moment without dividing the integrity of the structure to which this sound belongs. Similarly, a heterophony is ... the aura of a melodic line; ... the curls which it will trace around the principal line are derived in a free and unforeseeable manner, enriching its presentation, without modifying the structure. The orchestral writing benefits greatly from this added dimension of invention; these auras around the lines of force of the construction, create an illusion based upon the perspectives, the contrasts of the plan, upon the accumulation of points of view (Boulez 1989a, p.373).

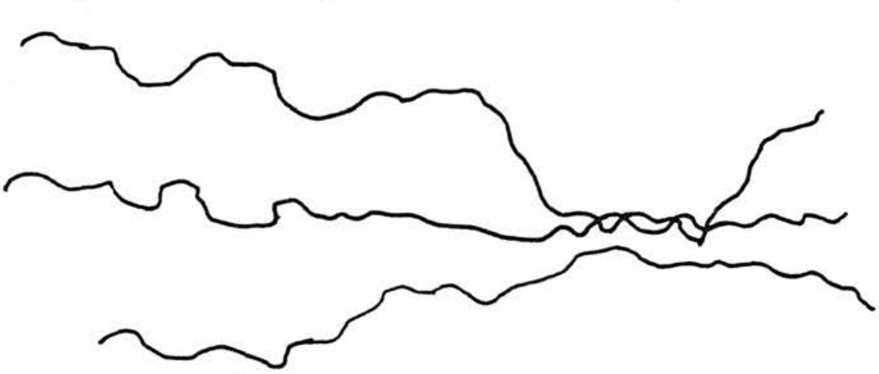
For Boulez the heterophonous variations of a line result in it being "richer", having "greater sense, extending it in time and enlarging it in space" (Boulez 1989b, pp.51-52). Linda Doeser, describing how Klee uses "secondary lines to enhance, complement and counterbalance a primary line", highlights what would seem, from the point of view of the present study, to be the essential issue when she writes that Klee's primary line "was not, in fact, drawn and existed as only a concept" (Doeser p.44). In other words, if Klee has a primary line, it certainly does not appear within the frame of the picture since it is a *virtual line*. This does not deny that Klee must draw one line before he draws the others; it is to say rather that once the initial line is joined with its variants, priority is no longer the issue. Likewise, Boulez's heterophonies, in which simultaneous manifestations of a melodic line appear in superposition, are equally different manifestations of a *virtual melodic line*. This virtual line cannot be simplistically reduced to any one favoured version of the line and will certainly not be found within the score since all of the drawn melodic lines are simply particular manifestations of the virtual line.

Susan Bradshaw has drawn attention to an anticipation of Boulezian heterophony in an early version of *Le Visage Nuptial* (1947-1989) where Boulez uses two quarter-tone scales canonically in such a way that it results in the production of a single musical line accompanied by another distorted version of itself. According to Bradshaw, it was this experiment in "setting a melodic line on a polyphonic tracing of its outline" which later suggested to Boulez the renewed concept of heterophony as "simultaneous variation" (1986 pp.150-151). Sketches for *Don* from *Pli selon pli* (microfilm 137, p.58) (Ex. 3.29) and *cummings ist der dichter* (microfilm 136, p.603) (Ex. 3.30) at the *Sacher Stiftung*, feature two drawings which suggest heterophonies and which are very similar to Klee's *man walking the dog* sketch. Boulez's sketch for *Don* has five lines instead of Klee's three, while the sketch for *cummings ist der dichter* images the passage from disjunct intervals to conjunct intervals and then back again to disjunct intervals.

Ex. 3.29 - Sacher Stiftung: microfilm 137, p.58 (Author's tracing from Boulez's sketch)



Ex. 3.30 - Sacher Stiftung: microfilm 136, p.603 (Author's tracing from Boulez's sketch)



The six *Modéré* sections of *Rituel* (figs 4-5; figs 6-7; figs 8-9; figs 10-11; figs 12-13; figs 14-15) are noticeably freer than the other sections of the piece and produce what Stoïanova refers to as "linear multiplicity" (1976 pp.21-24). Although the music for each of the eight instrumental ensembles is notated homophonically, the aleatoric entries of each ensemble, defined by the conductor, disrupts the homophony and creates a sense of heterophonic ensembles playing around one another. Conductor choice alters the phasing of the ensembles from performance to performance and results in unpredictable consequences as they meet vertically in ever new ways.

In *Répons*, the section between figs 55-70 is largely composed of the alternation of re-iterated pitches and cascading streams of demisemiquavers played as a very fast *perpetuum mobile*. This creates an extremely exciting roller coaster-like effect. The individual shapes of the cascading figures are constantly varied as is their length in terms of numbers of notes. As a result, homophony is avoided, a smoother time is created and a type of heterophony composed of variously conjunct, disjunct and intersecting scalar lines is produced.

Boulez's most impressive and sustained use of heterophony is perhaps to be found in the 1991-93 version of *...explosante-fixe...* where it is present within all three completed movements. In these finally accomplished sections, a solo midi-flute is "heterophonically shadowed by two subsidiary flutes" to create heterophony of real complexity (Bradshaw 1996, pp.11-12). Bradshaw writes of "the heterophonic orchestral counterpoints" which "generate a comparable vertical density that of itself conveys a textural frenzy sufficient to need no elaboration" and she describes "the shifting heterophonic alignment between groups of instruments" which "begins more and more to occupy the musical foreground" as the flute part (of the 1973 chamber music version) "has in turn become the matrix for a vast network of heterophonic possibilities" (p.12). In *Transitoire VII,* which Boulez tells us is the most difficult piece of the set, while the heterophony is pervasive, each musical section is clearly differentiated from the others in character.

Boulezian Heterophony and The Deleuzian Fold

This discussion of Boulezian heterophony brings us back to the philosophy of Deleuze, to one of his last works, *The Fold: Leibniz and the Baroque* (1993). In this book Deleuze further develops his philosophy of *difference* and multiplicity in terms of lines and curves, expressed through the concept of *the fold*. Put simply, the fold communicates *difference* and multiplicity in terms of multiple lines of thought, just as

Klee and Boulez, within their own respective media, communicated *difference* through multiple visual and musical lines. To illustrate the concept of the *fold* Deleuze, as with Boulez and heterophony, turns to Klee's inflection of a geometric point which results in the production of a curved line. In fact, Deleuze elucidates the concept of *the fold* with exactly the same illustration from Klee's *Pedagogical Sketchbook* which Boulez used when discussing heterophony and which appears above in Example 3.28 (Deleuze 1993, pp.14-15).

While Klee and Boulez, in practice, produce multiple lines or heterophonies of several simultaneous musical lines, Deleuze develops the concept with the insight that the inflection of the singular point within Klee's example can actually produce an infinite number of related curves or, in his own words, "an infinite variation or an infinitely variable curve" (p.16). Deleuze, accordingly, replaces the notion of the unique curve or the permanent object with Bernard Cache's idea of the *objectile* which, in contrast with the singular nature of the object or line, expresses the multiplicity of the *virtual line* or *virtual curve* (p.19). In terms of the observer of such a multiple phenomenon, Deleuze posits that for every variation in the *objectile* there must be a corresponding unique viewpoint since the traditional viewing subject becomes, to use Whitehead's term, a *superject,* and since point of view and variation now replace the idea of a fixed figure with a fixed centre which can be perceived by all neutral observers in the same way (pp.20-21).

The import of Deleuze's speculations becomes clearer when he introduces Leibniz's notion that events within the world can be pictured in terms of converging and diverging lines or curves, "a calculus of infinite series ruled by convergences and divergences" (p.61). Deleuze invokes the Leibnizian concepts of *compossibility* and *incompossibility* to respectively picture the traditional world of singular, unique meaning and the Modernist world where meaning can be multiple (p.61). *Compossibility* is the property of co-possibility, of compatibility. It is the notion that certain ideas or facts can exist together at the same time within the same possible world without contradiction. Deleuze perceives this as involving converging lines or series. *Incompossibility* is simply the converse of this and refers to ideas or notions which are mutually contradictory and which cannot co-exist without contradiction within the same world, at least within a traditional worldview. Deleuze perceives this as comprising divergent lines or series.

In the philosophy of Leibniz, worlds are made up solely of convergent compossible elements called *monads*. Deleuze parallels this Leibnizian world of purely compossibles with the unilinearity of pre-Modernist art with its espousal of identity and the unitary. For many modern philosophers and artists, however, "divergences, incompossibilities and discord" coexist "in the same chaotic world." Deleuze spells out some now possible classic incompossibilities in this new Modernist situation of multiplicity "where Sextus will rape *and* not rape Lucretia, where Caesar crosses *and* does not cross the Rubicon, where Fang kills, is killed and neither kills nor is killed" (p.82). Deleuze defines chaos, from a cosmological point of view, as "the sum of all possibilities" and, from a psychic point of view, as "the sum of all possible perceptions" (p.77). He parallels the passage from the closed world of compossibles to the open world of divergent incompossibles with the progressive development of musical harmony which led, at various points in musical history, to the emancipation of dissonance, the development of harmony, its eventual dissolution, to polytonality and to the incompossibilty of Boulez's polyphony of polyphonies or heterophonies (p.82). For Deleuze, Modernist creators such as Mallarmé, Klee, Boulez and others are perceived as turning away from the unilinearity of compossibles in favour of incompossibles and consequently as transforming the singular perspective of Leibnizian monadology into a Deleuzian *nomadology*, which instead affirms divergences (p.xv) and no longer suggests the traditional world of the familiar.

Difference and Repetition: Loose Ends

As we have proceeded throughout this chapter, connections have been made linking Boulez's ideas and practice with the work of many other musical and non-musical creative figures. We have now completed the main work of the chapter, which has been to present several key aspects of Boulez's practice from the perspective of

Deleuzoguattarian difference. Nevertheless, many important connections remain unacknowledged and it is to some of these we now turn. While elements of what follows could have been quite easily integrated into the main body of the text at obvious key points, it was felt that this would strain continuity further and distract attention from the central concern of the chapter which is, after all, the expression of *difference* within Boulez's music and thought.

While Mallarmé, Joyce and Klee have already been referred to within the course of the chapter, yet other non-musical *lines of flight* contributing to Boulez's sense of the multiple can be traced to Antonin Artaud and René Char. In 1958 Boulez wrote that he found in Artaud "the basic preoccupations of music today" which he related, at least in part, to Artaud's method of reading his own texts with their radical fragmentation of language. Artaud's practice was to dissolve words with precise meaning into more instinctively expressed sounds and cries, or alternatively, to solder words together. We find severe opposition to repetition within his writings. He aspired, for example, to make films which could "seize fragmentation" and compel the viewer to adopt alternative perspectives (Barber 1993, p.37) and he proposed a theatre which would destroy repetition through its uniqueness (p.66). His *Theatre of Cruelty* was to be staged only once, distrusting even words themselves on account of their repetitiveness (p.44).

Multiplicity also connects Boulez with the poet René Char, whose poetry is used in several of Boulez's works. Michael J. Worton considers the phenomenon of multiplicity and the refusal of "single valid interpretation(s)" to be a major conceptual link uniting the pair and suggests that Char's "poetic of the archipelago" (labyrinth) directly influenced the form of *Le Marteau sans maître* (1981 p.65). Worton says that the "quasi-infinite number of connotations" which Char assembles results in a labyrinthine text in which any reader will only discover a few of the possible routes and meanings (p.58). Boulez's *Le Marteau sans maître* is similarly said to create a labyrinth where the listener can only uncover something of the vast network of labyrinthine material (p.64).

Boulez was not the only composer within the post-war avant-garde to focus upon issues of *difference*, non-repetition and multiplicity. In the early 1950's Stockhausen produced an atomised pointillistic music which, like Boulez's progression towards the idea of the *virtual theme*, had its roots in Webern's reduction of musical themes and motifs. In *Bearings* dating from 1952/53 Stockhausen writes:

> no repetition, no development, no contrast. Those devices all assume the existence of *Gestalten* - themes, motives, objects - that are repeated, varied, developed, contrasted; dissected, elaborated, expanded, contracted, modulated, transposed, inverted or turned back to front. All that has been given up since the first purely pointillistic works .... One never hears the same thing twice (quoted in Maconie 1976, p.35).

In 1957, at the same time as Boulez, Stockhausen turned to the composition of *open form* works. Stockhausen's *Klavierstuck XI,* which received its premiere in April 1957, is written on a single page. Like Boulez's *Third Piano Sonata*, also dating from 1956-57, *Klavierstuck XI* involves a certain degree of indeterminacy through its nineteen mobile structures which the performer chooses randomly and performs with the aid of fixed performing instructions. This, likewise, results in a work with many possible versions. It has been debated just who exactly, Boulez or Stockhausen, first conceived of the idea of the *open form* work but the question has never been conclusively answered. Many open works were composed in this period by a variety of composers and a distinction was eventually drawn marking out the *indeterminacy of meaning* favoured by Eco and Berio, as well as Cage's *indeterminacy of sound* from Boulez's *indeterminacy of form* (Griffiths 1995, p.113).

A profound interest in multiplicity is a powerful bond uniting the aesthetics of Boulez and Harrison Birtwistle. Like Boulez, Birtwistle views all of his works as manifestations of a "multiple object" which can never be completely perceived in any one work. As Birtwistle says, "what is shown at any one time can only be a facet of it. I can never show its entirety" (Hall 1984, p.150). Again, like Boulez, heterophony is a significant part of Birtwistle's compositional technique. Michael Hall has summarised all of Birtwistle's music as "a single line filled out by other lines moving in parallel motion with it, or by heterophony, the presentation of differing versions of the same line simultaneously" (p.8). Birtwistle believes that "a musical object should be looked at from different perspectives not only sequentially but also simultaneously" (p.37). In *Verses for Clarinet and piano,* for example, successive verses explore the same territory but each time from a different point of view (p.36). Like Boulez, Birtwistle has drawn upon the concepts of the *spiral* and the *labyrinth* (p.109) and in some pieces includes elements of performer choice, allowing performers to choose from a range of options which he has provided (p.151).

What I have been able to provide within the course of this chapter is in no sense an exhaustive inventory of all of the connections which could be made linking Boulez and other artists, writers and musicians through *difference* and multiplicity. It should be sufficient, however, to show that such questions feature, not only within Boulez's music and thought, but are indeed central within the Modernist aesthetic.

Summary and Conclusion

This chapter has proposed a reading of certain aspects of Boulez's music and thought beginning from the concept of *difference* as theorised by Gilles Deleuze. It has been postulated that this concept/percept is one of the key notions which is expressed through a variety of means within Boulez's music. In the course of the chapter we have considered the roots of Boulez's thinking of *difference* and non-repetition especially through the influence of Schoenberg and Webern. In terms of Boulez's music, we have encountered *difference* in four successive stages, as the *virtual theme*, as *virtual form*, *accumulative development* and finally the *virtual line*. While these four categories are not strictly chronological, it is not entirely misguided to have chronology somewhere in mind when considering them.

Two potential problems, arising from the work of Alastair Williams, remain to be addressed. Williams reads Boulez from an Adornian perspective focusing, in particular, upon Adorno's distinction of identity and non-identity thinking. Adorno's concept of identity-thinking or identity logic forms an intrinsic part of his materialist analysis and refers to systems of thought which desire to "exclude the non-identical", the "non-assimilable .... those elements of experience resistant to classification" (Williams 1997, p.5; p.9). Williams, who adopts Adorno's distinction, believes that Boulez operates within a dialectical approach to "identity and non-identity thinking" (Williams 1994, p.199). In Williams' view, Boulez favours identity, but frees non-identity sufficiently to allow it to provide more "local and contingent configurations thrown up by the material to have an intrinsic role in the musical discourse" (p.199). While Williams nowhere mentions Deleuzian *difference*, certain overlaps in terminology suggest that his study may pose two potential problems for the present one: (1) He suggests that Boulez favours identity over non-identity. This will most likely only be a serious difficulty if Adornian identity and non-identity can be shown to be the same as Deleuzian identity and difference. (2) Williams interprets Boulez as relating to identity and non-identity in a dialectical way. If Boulez is a fundamentally dialectical thinker, in a philosophical sense, a problem may arise for a Deleuzian approach to Boulez, given Deleuze's intense opposition to dialectics.

Williams's views raise serious questions which are not easy to deal with and only the beginnings of a response can realistically be formulated here. While it may be said that the terminologies used by Adorno and Deleuze may share some degree of meaning, I do not believe that they can really be equated. The concepts they employ would seem to be specific to the very distinct problems they define. In Adorno's case, a materialist analysis in which he discusses the domination and manipulation of the post-enlightenment world by instrumental reason through the concept of identity thinking, while in Deleuze's case, the desire to create a new abstract *image of thought*. Nevertheless, Adornian non-identity and Deleuzian *difference* do seem to share the common quality of dealing with what may be called *the other*; for Adorno *the other* which is non-assimilable in terms of instrumental reason, for Deleuze *the other* of Platonic simulacra which are judged to be imperfect in relation to originary identities. This, however, would seem to be the limit of their connection since Adorno's concepts occupy a materialist analysis of capitalism in which art music, like its economic counterpart, is exposed as being dominated by an instrumental reason which excludes non-identity. Alternatively, Deleuze's concepts occupy a metaphysical plane in which a new *difference*-based image of thought is assembled which seeks to avoid materialist dialectics and binary oppositions such as that between identity and non-identity altogether.

When Williams says that Boulez favours identity, he is saying that Boulez's principal mode of working is analogous with the dominant thinking of instrumental reason, a thinking which subjects musical material to the identity of systems just as, in Adorno's analysis of labour, instrumental reason subjects the worker to the tyranny of the capitalist system. This is said to happen musically through the "high modernist obsession with technique" and its use of "prefabricated material" (Williams 1997, p.47). *Structures Ia* is interpreted here as the most obvious manifestation of "an all-embracing rationality" (p.48). To the degree that Boulez allows freedom from system within his music he is said to feature non-identity. It is interesting that Williams moves much closer to the present study when he refers, for example, to the "three-dimensional arpeggio[s]" within *Répons* as "syntactically related yet distinct" and displaying "a concern with isomorphism and difference" (p.105). Again he says that *Répons* "offers ways of opening difference within a flow of repetition" (p.115). It would be presumptuous, however, to interpret these statements in a specifically Deleuzian sense.

In line with Adorno, the present study does not wish to make inflated organicist claims for its concepts including the concept of *difference*. It is not suggested that Boulez's music and thought are reducible to a handful of all-embracing skeleton-key concepts which can completely encapsulate its complexity. It is important to openly acknowledge that Boulez does in many places refer to his work in terms of "dialectics". Nattiez even considers binary opposition and dialectic to be "the fundamental characteristic of Boulez's thinking" (Nattiez 1986, p.27). In the course of the discussion within the present chapter no careful editing has taken place to lessen the impact of "inconvenient" references within Boulez's writings to the concepts of *identity* and dialectics, whatever that means for him.

It is interesting to note the title of one of the most important chapters from *Jalons* dealing with athematicism. In *Athématisme, identité et variation* Boulez refers to identity and perhaps to *difference* but under its musical title of *variation*. Is this a further indication that Boulez is primarily an identity-based composer and that a dialectical approach would be a more faithful one? Boulez even writes of "analogy and difference" being linked within a "dialectical relation" (Boulez 1989a, p.200) and of variation form as a play on "the *identity* of the theme." No matter how the theme is varied "the immediate reference is always linked to *identity*, to the fundamental structure, to the formal distribution. The entire play is based upon *identity* and the *identification* of a unique musical being which one isolates at the start as given" (p.205).

Despite such potential problems it remains my conviction that, at the level of the score, Boulez produces manifestations of *difference* in the various ways which have already been discussed. Identity, nevertheless, is indisputably present at one level of his activity, namely that of pre-composition. It is here that Boulez begins with the identity of the basic series. Such is his practice, however, that after the early works, where the series is at times used in an outright thematic way, the series is more often no longer employed as a surface phenomenon but rather retreats beneath the surface of the score to the level of pre-composition. It becomes instead the generating force from which Boulez creates virtual objects which can ultimately be related to the series from which they have been produced through one procedure or another. Since the series is no longer an ultrathematic object to be found within the score and its various manipulations traced through the generalised theme, it no longer relates through identity with the material which has been abstracted from it. The basic series has become simply a source of qualities which Boulez abstracts from it and combines in multifarious ways within the score, but not in any one privileged way. This line of reasoning should be equally applied to all of the other manifestations of Boulezian *difference* already discussed.

That Boulez is concerned with identity in the context of athematicism and variation is natural. The path from the *Flute Sonatine* to *Structures* book 1 had resulted in music lacking sufficient differentiation of materials and in which ideas are no longer readily perceptible. The restoration of perceptibility through the recurrence of the familiar was obviously of capital importance to him at this point in his development. I interpret *identity* to largely mean for Boulez, from the time of *Structures* book 1 onwards, the provision of material which gives the listener the opportunity for recognition through its more obvious connection with what has gone before. While there are moments of outright repetition within some of his scores, this is not generally the case. What is more frequently encountered, as has been outlined at length in the course of the chapter, is *the return of the same which is always different* and which cannot be reduced to any originary identity within the score. It can be related in a variety of ways to other aspects of the score and, as Boulez develops and his materials become simpler, connections and relationships are multiplied. Nevertheless, *difference* is not sacrificed to identity since Boulez manages to create something which, within the context of a piece, is familiar yet always different.

This seems to me to be very much what Deleuze is about within his philosophy of *difference*. This is not the *difference* of chaos, but *the return of the same which is always different*. This may seem to some to be a needless complication of affairs. It may be said: if Boulez is concerned with identity as recognition, why is it necessary to introduce Deleuzian *difference* at all? The answer is simple. While recognition is important, indeed essential for the satisfactory perception of music, Boulez's reintroduction of recognisable objects, subsequent to *Structures Ia,* is not based upon the postulate of originary identities, of defined themes, but rather is centred upon the multiply valid manifestations of a *virtual theme* which may exist within a piece. This is equally the case in the multiple choices of the open form works, the varied returns of *accumulative repetition* and the simultaneous lines of heterophony. This is plain from both his writings and his scores. To give identity a role beyond the guarantee of perceptibility is to do violence to the fundamental aspiration of Boulez's rethinking of thematicism and form and to confirm the premiss of Deleuzian philosophy that Western thinking from Plato onwards is indeed dominated by identity. I do not imply that Boulez envisions his work to be a conscious turn away from Platonic identity. He has explained his developing treatment of thematicism and form clearly in purely musical terms, as one would expect from a composer. Nevertheless, his writings clearly locate the musical questions of *difference*, repetition, variation, recognition and unrecognition within the wider picture of Western history (Boulez 1989a, p.123). It is left to Deleuze to gather together Boulez's music with Klee's art, Mallarmé's poetry and Joyce's novels and to formulate a philosophy of *difference*. It is something which seems to me to be worth expressing, in philosophy as in music.

There is no necessary link between Boulez's virtual themes, virtual forms, accumulative developments, heterophonous lines and Deleuzian *difference*. One can co-exist quite happily with the other and each can be explained satisfactorily without the other. Nevertheless, Deleuzian *difference*, whilst having no causal link with Boulezian virtuality, does seem to provide a rich context for understanding a process which Boulez himself has not initiated but rather been implicated in through historical contingency. The roots of the questions are deep and it seems to me that to provide explanations or interpretations of a music such as Boulez's on the single level of musical technique fails somehow to do justice to the place it occupies within a broader Modernist culture. Better to view the compositions within a Deleuzian assemblage of heterogeneous materials from art, literature, philosophy, music and elsewhere which together make the historically belated cry that there is *difference* and multiplicity, and that music can make it creatively audible.

Chapter 4

Boulez and Musical Spatiality

Introduction

In Chapter Three the notion of *difference* was considered, on the one hand in its structural role as a formal envelope and, on the other, in its expressive role as a Deleuzoguattarian percept/concept. *Difference*, it was shown, helps to articulate the formal shape of some of Boulez's earlier works in a number of ways: through the play of thematicism and athematicism, through the operation of open and closed/free and determined elements within certain pieces from the mid-fifties to the early sixties, and latterly through accumulative development and the production of heterophonous lines. It was argued, however, that *difference* is more than a formal device, since it provides a significant point of interconnection linking Boulez's music with certain elements within philosophy, literature and art. The music can thus be said to *express* the kind of conceptual *difference* of which Gilles Deleuze has written.

The present chapter now considers a second *percept/concept*, namely that of musical spatiality. The idea of music inhabiting a space is one which is not always clearly understood or universally accepted, but is one which I believe to be extremely important for the understanding of much twentieth century music in general and Boulez's music in particular. Emmanuel Nunes, among others, has criticised the imprecise use of terms such as *musical space*, *registral space* and *acoustic space,* which he finds in the work of certain musicologists and composers who, he believes, fail to provide sufficiently unambiguous definitions for their vocabulary (Nunes 1994, p.122). His comments make the need for clear terminology apparent.

Boulez's music exhibits spatiality in two discrete senses which will be referred to in the course of this chapter as *interior spatiality* and *exterior spatiality*. Boulez does not in fact use these terms and they have been taken from a categorisation of musical spaces provided by Eero Tarasti (1994a and 1994b). Interior space refers to the so-called pitch-space continuum while exterior space denotes the arena in which a performance occurs. That music takes place within a particular performance space would seem to be a fairly unambiguous claim. To say that music inhabits a pitch-space and that the articulation of such a pitch-space can be a highly significant factor in both formal and expressive terms is less clear. Consequently, a first aim of this chapter will be to discuss the notion of *interior pitch-space* in order to clarify, with help from other writers, what is meant by the term and what epistemological status it may be given. Having clarified this concept we will then explore some of the most important ways in which Boulez has exploited interior pitch-space within his music and writings. Boulez's contribution will be viewed in the context of those composers whose ideas have had the greatest influence upon his thinking of pitch-space, in particular, Debussy, Varèse, Schoenberg and Webern as well as his colleagues within the post-war avant-garde for whom the manipulation of musical space became an equally important preoccupation. In this way we will successively consider: (1) Boulez's post-Webernian concept of a diagonal dimension within pitch-space; (2) the division of pitch-space into *smooth* and *striated* space; (3) the deployment of pitch register; (4) the use of polar notes within the pitch-space; (5) the exploitation of the exterior performance space, and finally (6) the opening up of an enlarged timbre space.

As with *difference*, it will be shown in the course of the chapter that Boulez's music is often articulated with the help of spatial *signals* and *envelopes* which provide fixed reference points within the work, thereby facilitating its enhanced perception. The contrast of *smooth* and *striated* pitch-space, the deliberate manipulation of pitch-register, the employment of polar notes, the active utilisation of the performance space and the play of timbre will be seen to provide clues for the memory as the listener assembles the form of the work through the simple recognition and placing of such objects in musical space. If such means are used to clarify form within works, the thesis can be developed further to suggest that, in doing so, Boulez draws attention to a phenomenon within music which has often been acknowledged, but seldom explicitly explored. Music is commonly perceived as existing within the exterior space of an auditorium but also within an interior pitch-space. Boulez's music, it will be argued, draws our attention to, embodies and expresses ideas of musical spatiality (interior and exterior) which are most often taken for granted. In Boulez's music, as in the music of certain other twentieth century composers, whose music and writings will be referred to in the course of the chapter, spatiality ceases to be some kind of formal container, a preexistent framework within which music takes place. Instead, spatiality is invested with a new prominence as a primary, central factor in the unfolding of music.

What is Musical Pitch-Space?

The concept of musical space in the sense of a pitch-space is a fundamental one for many writers. The philosopher Roger Scruton, who gives the concept a key position within his *Aesthetics of Music* (1997), does not accept that pitch is spatial in any real sense or that the pitch spectrum is a material dimension "analogous to the dimensions of physical space." Despite the convincing impression made upon perception by this spatial sense of pitch, for Scruton the ordering of sounds in pitch-space is merely "apparent" and not something corresponding to reality (1997 p.14). According to Scruton, if a space is real, we must be able to distinguish the space itself from what occupies it, something he believes to be impossible in the case of the pitch spectrum, since, as he argues, we cannot conceive of pitch-space apart from the pitches which form it (p.74).

Despite closing the door on all realistic explanations of pitch-space, Scruton believes our sense of the pitch spectrum and its description in terms of *up* and *down*, of *high* and *low*, to be absolutely essential to our experience of music. Its importance for musical perception is, however, no guarantee of its material existence. He compares our perception of pitch in which sounds seem to rise and fall with the high and low of the thermometer scale in order to suggest that our sense of pitch-space indicates "the existence of a continuum, but not that of a dimension" (pp.14-15). Scruton acknowledges the peculiar connection whereby the terminology with which we describe our sense of pitch is intimately dependent upon the particularities of the language we happen to speak. While the English language is content to apply the terms *high* and *low* to musical pitch, the ancient "Greeks used 'high' where we speak of 'low' and vice-versa, since they were guided by the places of the strings on the lyre" (p.14). Despite such difficulties in the linguistic description of pitch-space, Scruton nevertheless acknowledges that the experience seems to be a universal of musical perception since we do in fact "recognise movement in music from low to high (in our sense) as an *upward* movement, and the opposite as *downward"* in such a way that it appears to be a real dimension of sound itself (p.15; pp.20-21).

Scruton is similarly opposed to the view expressed by Ernst Kurth, in which the pitch-space is said to be organised analogously to real lived space with pitches moving much as people do in the world space which we inhabit (p.51). For Scruton this cannot be so since, in his view, musical pitches do not actually move in any real sense. Scruton cannot therefore allow that sound and music inhabit a real space or that there is even an analogy between lived space and musical pitch-space. Alternatively, Scruton seeks to reconcile our perceptual experience of pitch-space with its seeming lack of physical reality by ascribing to it the status of a musical metaphor. This designation is not intended to devalue our perceptions since we do indeed perceive the movement from the bass register to the treble as some kind of rising while the reverse is heard as a falling. While our auditory perception may not provide evidence of a real pitch-space, Scruton believes that it "exactly parallels the physical order" (pp.20-21) and is "modelled on the phenomenal space of everyday perception - the space in terms of which we orientate ourselves" with its qualities of "'up' and 'down', height and depth ... attraction and repulsion" (p.75). He theorises that it is "derived from our experience as embodied and 'extended' beings" (p.50).

Scruton perceives this to be such an important metaphor that he cannot conceive that we could recognise or describe what we now take to be music without its operation (p.52). Indeed, we find ourselves "compelled" to use it (p.75). Human apprehension of music is so profoundly enabled by such metaphors that to remove the metaphorical dimension from musical experience would be to "cease to describe the experience of music" itself. Even if the familiar descriptive terms, *high* and *low,* were to be replaced by others, this would not significantly alter the basis of the underlying spatial metaphor or the fact that we would continue to experience movement to a higher frequency as rising and movement to a lower frequency as falling. To forgo this metaphorical spatial dimension, in Scruton's opinion, would therefore be to abandon all sense of musical "orientation" (pp.92-93).[1]

According to Willi Plöger (1988), music has "universally accepted" "spatial connotations". As with Scruton, Plöger's concern is primarily with the interior spatiality of pitch but, unlike Scruton, he is willing to describe the link between our experience of pitch-space and our experience of real lived space in analogical terms (1988 p.1). For Plöger, the system of traditional Western musical notation is based upon the making of this analogical connection. He asks whether the association is a product of some natural law rather than a culturally derived means of understanding music, and he wishes to determine the nature of "the causal link" which binds them within musical perception (p.2).[2]

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[1] Zuckerkandl (1956) responds to the argument that description of pitch in terms of rising and falling within tonal space is simply "primitive verbal and emotional suggestion", perhaps caused by "the permanent association of tones with spatial symbols and bodily movements" and the transfer of "the spatial meaning of high and low" into the differentiation of pitches. He does not deny "the presence of the characteristic that permits the arrangement of tones in a series, nor that it is a genuine characteristic of tones, directly perceptible to the ear, not an illusion. What is denied is the *true spatiality* of the characteristic, the assumption that the word *height* in connection with tone is anything more than a metaphor." He believes that we are dealing with "a unique characteristic of aural perception, which can only be described metaphorically by words from the realms of the other senses" (1956 pp.85-86).

For Zuckerkandl "music appears [on the one hand] as the art that - in Schopenhauer's words - 'is perceived solely in and through time, to the complete exclusion of space'; on the other hand, it is full of phenomena that seem to presuppose a spatial order and that in any case are wholly incomprehensible if space is 'completely excluded'" (1956 p.270). Starting from a statement of Bergson's, Zuckerkandl says that "far from taking us out of space ... music discloses to us a mode of being of spatiality that, except through music, is accessible only with difficulty and indirectly" (p.339). We are told that "the person hearing music .... hears time as force and ... hears space as force" (p.347).

[2] Despite acknowledging the existence of analogy between pitch-space and lived space, Plöger, like Scruton and Zuckerkandl, refers to the language with which we describe pitch phenomena as metaphorical in order to avoid all literal interpretation.

Drawing upon Husserl's clear distinction of logic and psychology, Plöger suggests that consideration of musical spatiality must take into account both "the influence of language in the elaboration of a theory and the role of psychology in linguistic and musical research" (p.5). Plöger thinks that problems arise when we "suppress" Husserl's distinction. It can lead to the objectivisation of linguistically dependent pitch models on the one hand, or of perception on the other. Zuckerkandl (1956), for example, is said to "situate the concepts [of musical motion, time and space] entirely on the side of consciousness" through transposing "objective phenomena into the interior and subjective world of perception" (Plöger 1988, p.7).

Plöger suggests that our spatial understanding of pitch is at one level a function of language since it is language which provides us with the appropriate linguistic models which enable us to describe, interpret and explain our experience of sound. Our sense of pitch-space would therefore be the result of the linguistic limitations which determine and control the generation of the kinds of perceptive models which enable us to account accurately for our experience of pitch. The seeming objectivity of the experience would then be explained as signifying nothing more than the tremendous success of the spatial model of musical perception to which we have become accustomed. Interior musical spatiality or pitch-space would therefore exist within the listener, as a perceptual model facilitating musical understanding. Plöger thus leads us from the physical lived space outside of ourselves to a psychic or interior sound space within ourselves.

Plöger provides three main reasons why, in his view, we should accept the existence of such an interior sound space: (1) he believes that our bodily movements in external space, which are dependent upon the internal workings of the nervous system, would be impossible without a corresponding internal space operating within us; (2) the experience of phenomena such as dreams, memory and daydreaming implies the existence of an interior space within which we situate the events of such phenomena; (3) the illusion of depth which we experience in looking at a painting gives the impression that it would be possible to enter into the painting itself. No-one, however, imagines that he or she could actually enter into the painting. All three cases are provided as examples of spaces which do not exist outside of us, "independent of the projections of our perceptual habits or of our imagination" (p.11). Plöger further attempts to ground the formation of this interior mind space in a theory which purports to trace human development in awareness of motion and spatiality in four successive stages beginning from childhood. In stage 3 of this theory Plöger suggests that a child:

> partly conditioned by linguistic metaphors, creates synaesthetic analogies between the movements of the body and what it perceives auditively. The conceptual pairing of movement and emotion ... can be in this case the sign of a synaesthetic relation between an emotional cry that the child hears from within itself or from its mother (unconsciously) and the corresponding gesture; it is a question therefore of the putting in parallel of emerging sensations at two different perceptual levels that the child learns to assimilate and with time even name as an assemblage (p.12).

In other words, over a period of time in childhood we somehow or other come to pair or associate human sound with the spatial movement of our bodies, a response which becomes more and more automatic to us through its repetition (p.12). This process is further developed in stage 4 of Plöger's theory where, depending on such variables as talent, education or upbringing, "the faculty of assimilating and knowingly interpreting all sorts of musical stimulations in his environment" is developed within the individual (p.13).

Plöger therefore suggests that the link which is created over time between events in the exterior world and our own interior sensations results in a "spatial hallucination" in which "the limit between space experienced as exterior and interior space becomes less clear and with it the sense of reality also becomes less clear" (p.13). Plöger again warns of the danger of confusing this perceived psychic space with the lived external space. Returning to his earlier examples he maintains that if we "take the metaphor for the original object to which it applies ... one could almost say that the linguist enters into the painting - falls into the panel. Is it the same with the musicologist?" (p.14). Plöger refers to the pitch-space as a "quasi-space", a term which is intended to capture "the idea that music and its perception produce something spatial", avoiding hyper-realism on the one hand while simultaneously avoiding the reduction of the concept to a mere product of the imagination on the other (p.20).

In a study devoted to interior spatiality in music from Schoenberg to Cage, Francis Bayer highlights musical spatiality as a major, but nevertheless neglected preoccupation of many twentieth-century composers, both in their theoretical writings and in their compositions. Bayer, following Boulez and others, recognises that all music can be said to take place within or to form an individual pitch-space since tonality, chromaticism and modality, can all be viewed from this perspective as a variety of ways of exploring pitch-space. Nevertheless, the present study is in full agreement with Bayer in affirming that, while spatiality is an inherent quality within all music, contemporary music brings the idea of pitch-space to our attention more clearly than any previous Western music (1981 p.9).

Bayer's purpose is to account as precisely as possible for the varied musical spaces which are formed in the acoustic (non-electronic) music of several key figures from Schoenberg to Cage (pp.15-16). This undertaking stems from the conviction that Modernist music reveals music's spatial qualities in ways that are not quite the case in most other musics. Instead of confirming old listening habits and revisiting familiar sound spaces, Modernist music often seeks to open up new, perhaps previously unimagined, musical spaces for the listener (p.201).

As with Scruton, Bayer recognises the ambiguity inherent within musical appropriation of the concept of spatiality. He is quick to dissociate it from the spaces proper to the visual arts of painting, sculpture and architecture and recalls the explicit denunciations by the German musical critic Albert Welleck in the 1930's, who perceived statements about spatiality in music to be confused or contradictory (pp.9-10). Despite all difficulties and ambiguities, Bayer believes that whether or not music is primarily a spatial art, it manifests significantly spatial characteristics at several levels of understanding, in particular in the common spatial perception of sounds as high and low and as rising and falling (p.11).

It is beyond the competence and remit of the present study to make a definitive pronouncement on the epistemological status of the concept of interior pitch-space. Such a definition has not been the intention of this brief exposition of views. What is important is that the perceptual parameter referred to as *interior pitch-space* has been set out and hopefully clarified thus enabling its unambiguous use within a discussion of Boulez's music. Whether we care to view the concept analogically, metaphorically, psychologically or as purely imaginary is surely secondary to the inescapable fact that human perception of music seems to be inextricably linked to a sense of pitch-space, and that without such a sense we could not really understand music as we have come to recognise it.

In further agreement with Bayer it can be said that this sense of pitch-space, which is such an integral factor in the perception of all musics, is even more so the case for much of the most demanding music of the twentieth century including the music of Boulez. Several writers comment upon spatial elements within Boulez's music. Charles Rosen, for example, has written of it as drawing metaphorically upon our awareness of ordinary human space for its appreciation (Rosen 1986, p.87). Indeed, Rosen believes Boulez's application of "spatial metaphor" to be "perhaps the most remarkable in the history of music" and he suggests that Boulez has developed the concept further than any previous composer (p.88; p.94).[3] Consequently, we now turn to a brief examination of four formal and expressive uses of interior pitch-space arising from Boulez's music and theory.

Interior Pitch-Space and the Diagonal

One of the most obvious difficulties encountered in listening to many of Boulez's pieces, especially from the late forties and early fifties, is the absence of melody and harmony of the kind which enabled listeners of tonal music to orient themselves and to trace a perceptual path through a work. From a spatial perspective, tonal music can be said to trace a path through musical pitch-space by means of the system of keys and their modulation, shifting through the pitch-space from a tonic key to some other key marking out a distinct, though related space. Analogous with this, dodecaphonic music, as theorised and practised by Schoenberg, Webern and Berg can be thought of as tracing paths through musical pitch-space, not this time through the agency of keys as in tonality, but instead by means of the twelve-tone series with its twelve transpositional forms, twelve retrogrades, twelve inversions and twelve inverted retrogrades. These can be manipulated whole or "ultrathematically" (Boulez's term), as in Schoenberg, or can be treated motivically, as in Webern, whose series exploit particular intervallic characteristics in order to enable the generation of entire pieces. To further understanding of Boulez's sense of pitch-space as it developed, at least in part, from the work of the Second Viennese School, we now look to the pitch-space conceptions of Schoenberg and Webern.

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[3] For Piencikowski "acoustic space and the notion of interval are among the fundamental essentials of Boulez's musical poetic" (1985 p.80).

Regina Busch, who has studied the concept of interior spatiality within the music and theory of Schoenberg and Webern, acknowledges it as one of a number of concepts used by the Second Viennese School composers "which had not up till then been established as musico-theoretical ones in the narrower sense" (Busch 1985, p.4). There is a sense here in which Second Viennese School composers and theorists were forging almost a new musical vocabulary with its own set of concepts. Nevertheless, while discussion of musical pitch-space is to be found within the writings of Schoenberg, Webern, Berg, Spinner, Stein and Rufer, Busch notes that they do not provide clear or common definitions for their terminology. Furthermore, while the term *musical space* is used by Schoenberg, Busch is astonished to find that, as with other innovative concepts, we know almost nothing about his development of it. Given such ignorance, Busch believes that it would be problematic to presume that Schoenberg always used the concept in the same way with the same meaning. She does not know whether this lack of clarity lies within the concept itself, "in Schoenberg's thinking" or in inadequate musicology which has not yet considered Schoenberg's usage with sufficient regard for context (p.4).

In the 1934 version of the essay *Composition with Twelve Tones*, Schoenberg writes of "the law concerning *the unity of musical space*" and "the law of the absolute view of musical space", a formulation which in the 1941/50 version becomes "*the unity of musical space demands an absolute and unitary perception*" (quoted in Busch 1985, pp.5-6). Busch is interested in Schoenberg's retention of the "absolute" and "unitary" nature of musical space in both lectures. In the 1941/50 version, Schoenberg's "absolute" musical space is said to possess its own musical properties and not the qualities familiar to us from ordinary lived space since it has "no absolute down, no right or left, forward or backward" (1985 p.8). Schoenberg refers to the recognisability of a series in any of its configurations in pitch-space as if the series was an object which could be revolved or manipulated in a three-dimensional space. Stein relates that "Schoenberg once picked up a hat during a lecture and turned it 'in all directions': 'Do you see - this is a hat, whether I look at it from above, from below, from in front, from behind, from the left, from the right; it is and remains a hat, even if it looks different from above than from below'" (Busch 1985, p.7). Webern, in turn, illustrates the point with the example of an ash-tray which always remains "the same" no matter from which angle it is viewed.

Schoenberg's "law of the unity of musical space" became highly significant for Webern who, in turn, developed his own spatial understanding. While Busch acknowledges that this is "only metaphorically explained by Webern" (in lectures III and V) (Busch 1985, pp.6-7), she nevertheless maintains that Webern's terminological use, in contrast with Schoenberg's, is much clearer and more consistent (p.4). In his published lectures Webern refers to "the *space* a musical idea can occupy" and speaks of musical ideas being "distributed in space", thus creating musical form (Webern 1963, pp.18-19). Furthermore, he briefly sketches the history of Western music from the point of view of its varied treatments of musical space, concluding that, from one historical period to another, music has alternated "between greater and more modest demands on musical space" (p.23).

Comparing Schoenberg and Webern, Busch describes Schoenberg's space as a two-dimensional one with horizontal and vertical coordinates within which ideas are presented. Busch does not know for certain if Schoenberg ever used the terms "vertical" and "horizontal" of musical space, since he normally described such phenomena in terms of the "homophonic" and "polyphonic" aspects of music. Webern, in contrast, is said to create a "three-dimensional" musical space (Busch 1986, p.7; p.12). He speaks explicitly of "horizontal" and "vertical" dimensions in his 1933 lectures (Webern 1963, p.35) and Busch believes that "at the latest by the middle of 1938 'horizontal presentation' and 'vertical presentation' had been firmly established as concepts" (Busch 1986, pp.10-11). As for Webern's third spatial dimension, this is expounded by Boulez who wrote in 1951 that:

> a dispensation which had to take into account harmonic (vertical) relations in organizing monodic (horizontal) elements is succeeded by a world whose structural laws are based on relations between polyphonies conceived as fixed distributions of sounds in the available sound space: so that this way of thinking transcends the notion of vertical and horizontal (1991 p.8).

A year later, Boulez wrote that:

> The only one, in truth, who was conscious of a new dimension in sound, of the abolition of the horizontal-vertical opposition in favour of a view of the series as simply a way of giving structure - or, so to speak, *texture* - to musical space, was Webern ... (1991 p.114).

Again in 1958 Boulez wrote of:

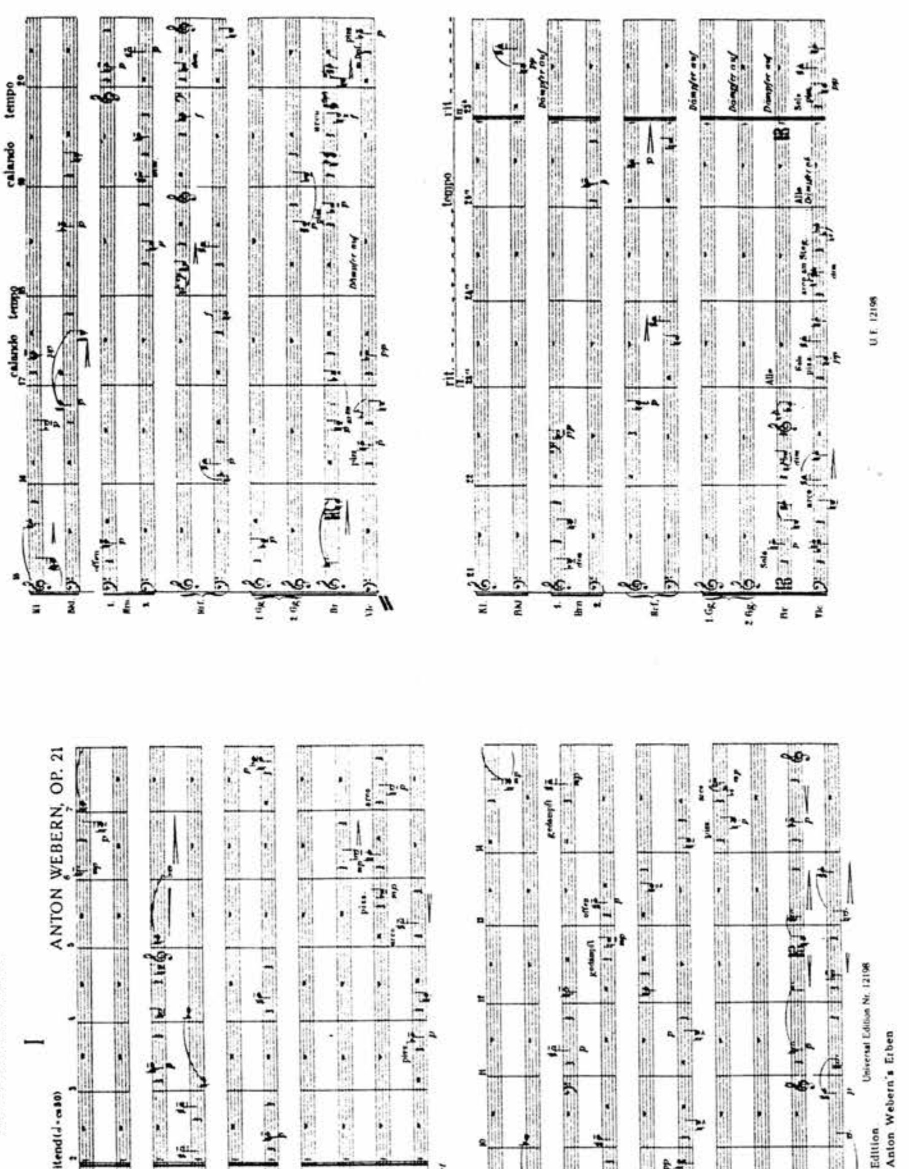
> the abolition of the old contradiction between vertical and horizontal in tonal music. In its place he set up a new dimension, which one might label diagonal, a kind of distribution of points, blocks, or figures, not so much in the sound-plane as in the sound-space ... (1991 p.297).

Where Busch theorises Webern's pitch-space as a three-dimensional phenomenon, Boulez perceives the new third diagonal dimension as assuming priority over the two traditional dimensions of the vertical and the horizontal. Bailey's reading of Webern's Op.21 *Symphony* clearly corroborates Boulez's understanding of the Webern work as constituting a dimension somehow in-between the purely horizontal and vertical coordinates. While the rows are presented linearly, Webern nevertheless disposes with the horizontal axis through the mostly pointillistic orchestration, which, as Bailey tells us, is extreme in places "with only one or two or, infrequently, three, consecutive notes of a row played by the same instrument." Webern equally disposes of the vertical dimension. Noting incidences of homophony within the piece, Bailey tells us that "there is very little other verticalization in this work. While two or more notes are often struck together, in the overwhelming majority of cases this is the result of the momentary rhythmic coincidence of two linear voices" (Bailey 1991, pp.44-45). Example 4.1 features bs 1-25 of the first movement.

Boulez's statements, quoted above, clearly indicate the important influence which Webern's thinking of pitch-space effected upon him and he evidently adopted the term in order to conceptualise music's pitch dimensions in a Webernian sense. For Boulez, as a young composer attempting to forge his own personal style, Webern's diagonal route through pitch-space was "a radically new conception" which he described as "a crucial moment in the history of the language" (Boulez 1991, p.114; p.175). It became perhaps the most important aspect of Boulez's early conception of musical pitch-space as he worked, at one level, towards a serial system which concentrated, like that of Webern, upon the distinctive intervallic qualities of series. In *Boulez on Music Today*, he wrote that "from now on the two dimensions of classical (horizontal and vertical) polyphony are linked by a kind of diagonal dimension, whose characteristics figure in each of them, in varying degrees" (1971 pp.27-28). Within this new diagonal polyphony "'parts' or 'voices', no longer exist, strictly speaking" (p.119).

Even within his early *Notations*, composed in 1945, yet not published until 1985, Boulez revealed an interest in the manipulation of pitch-space "as an indication of structural layout" (Piencikowski 1989, p.13). In several other early pieces such as the *Flute Sonatine* and the first two *Piano Sonatas*, as was shown in the previous chapter, Boulez often created the pitch elements of the musical surface from small intervallic cells and motives in a pointillistic post-Webernian texture. In the integral serialist pieces of the early 1950's the perceptible articulation of pitch-space became a casualty of a kind of total organisation which, as Xenakis later argued, operated at

Ex. 4.1 - Webern Symphony: First movement bs 1-25


MEINER TOCHTER CHRISTINE
I
ANTON WEBERN, OP. 21
Ruhig schreitend
Klarinette
Baß-Klarinette
Hörner
Harfe
1. Geige
2. Geige
Bratsche
Violoncell
Kl
Bkl
Hrn
Hrf
Br
Vc
calando
tempo
rit.
Dämpfer auf
gedämpft
offen
arco
pizz.
Solo
Alle
Copyright 1929 by Universal Edition
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Universal Edition Nr. 12198
U.E. 12198

the local moment-to-moment level of operations to the detriment of the larger scale of events perhaps necessary for overall coherence and recognition within a composition. Boulez recognised the dangers of continuing along such a path fairly quickly and grasped the inevitable musical losses which such total organisation entailed. Consequently, he again modified his approach and began to reintegrate elements of freedom into the system.

A freer and more deliberate control of pitch-space was reintroduced with *Le Marteau sans maître* (1953-55) in which Boulez began to use an impressive array of new techniques which radically transformed the role of the pitch series. The series no longer appeared literally on the surface of the music, even in the form of reduced motifs, but instead became a provider or generator of material through the pre-compositional operations to which Boulez subjected it. These new compositional resources are revealed in *Boulez on Music Today* where he tells us that he can only envisage the musical "sound-space continuum" in terms of "limited fields" (1971 p.41) which are defined at the stage of forming the series. He explains the importance of "the internal structure of a series which determines potential transformations and its connecting links" (p.70). In doing so he describes a variety of his serial techniques, in particular the care and importance which he gives to the creation of the sub-elements of a series. Boulez describes how series can be: (a) "totally symmetrical"; (b) "partially symmetrical and asymmetrical" (with either "manifest isomorphic figures" or "concealed isomorphic figures") and (c) "totally asymmetrical" (p.76). We likewise see the kind of interrelationships he attempts to form between the sub-sections of an original series and its multiple derivations.

In making such connections, Boulez creates what he calls *privileged regions* of sound space (p.45). This relates to the case in which several series may share one or more figures with an original series from which they derive. Boulez refers to such series and their shared regions of sound space as *privileged*. He demonstrates one possible method for generating such privileged areas of sound space by, first of all, dividing a pitch series into, for example, "five totally asymmetrical objects" or sections. The pitches of each object or segment are then "multiplied" by every other, a procedure which serves the purpose of creating series, with "multiple isomorphic relationships", and which are all equally derived from the original series. Boulez categorises the derived series into the "totally isomorphic", "partially isomorphic" and "non-isomorphic", depending on the degree of convergence between them (pp.79-80). Lev Koblyakov, as already noted, has demonstrated the workings of pitch multiplication very clearly in the first cycle of *Le Marteau sans maître* (1990 pp.3-26).

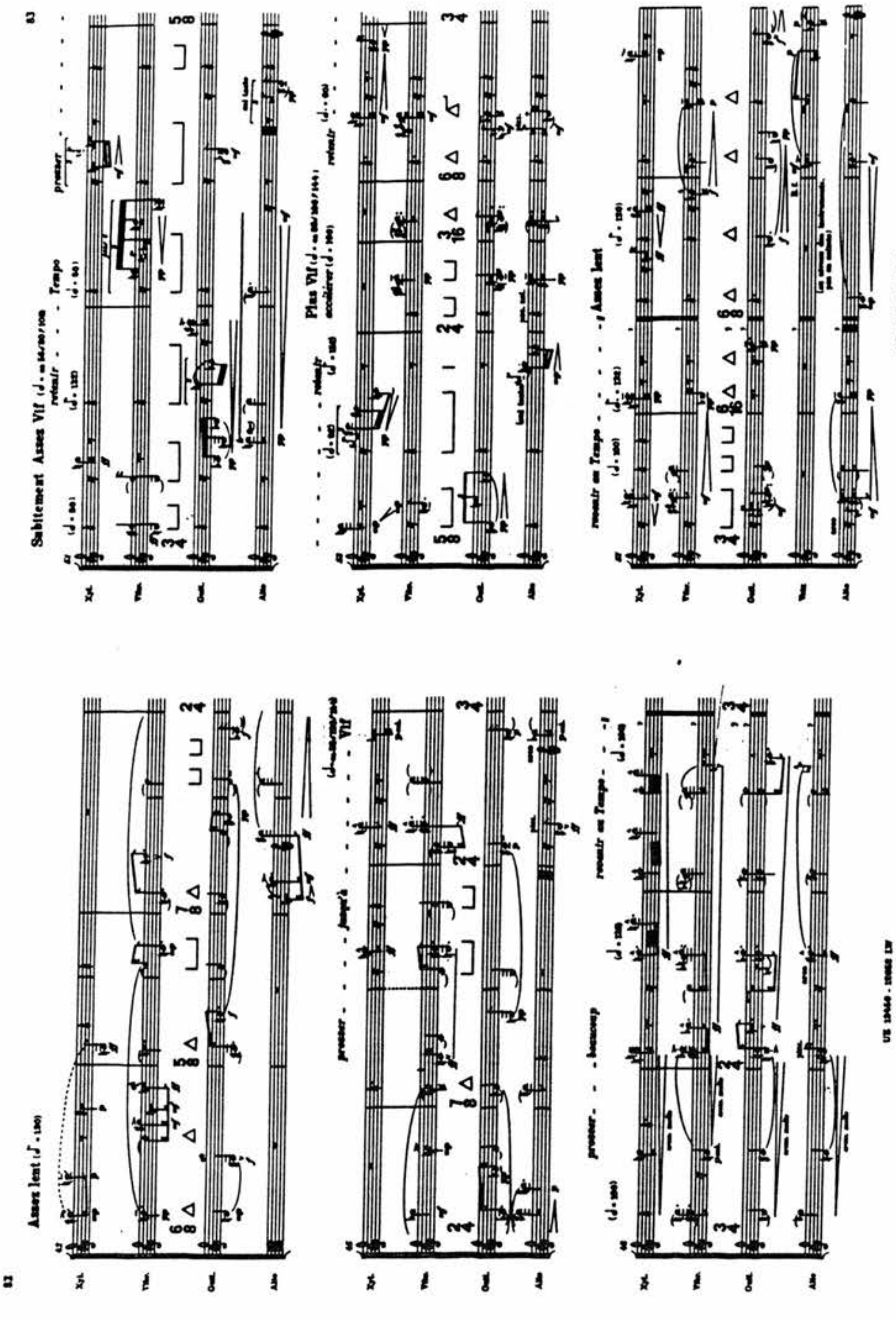
In addition to these techniques, with which Boulez manipulates complete series and proliferates pitch material from them, he is also able to deduce "partial structures" from them. *Limited series* use only some parts, even a single segment of the complete series, while *defective series* are "deduced by applying to the original series a mechanical procedure such as changing the module or 'filtering' the frequencies". Boulez cites the example of a series with the ambit of a major seventh. To render this series a defective series, it is necessary to reduce the ambit of the intervals by a half so that, in this case, they now encompass the span of a fourth rather than the previous major seventh. The original series is now in fact reconstituted as two defective series, each within the ambit of a fourth (Boulez 1971, p.81). Koblyakov provides corroboration of the workings of defective series in *Le Marteau sans maître* and shows that within the second of the three cycles, that is the second, fourth and eighth movements, "all the series are presented as defective only" (Koblyakov 1990, p.37). Boulez tells us that limited and defective series "are extremely important if continuous use of the whole of the chosen sound-spectrum is to be avoided" (1971 p.81). Nevertheless, he believes that "the filtering of frequencies must ... have a structural justification (axis of symmetry, privileged family of intervals) but it will thereafter be applied automatically, like a change of module" (p.82). Overall, such procedures serve the purpose of limiting the extent of the pitch-space which is being used, thus privileging certain pitch-spaces over others.

Hopkins, in his 1980 survey of Boulez's development, disagrees with any reading of Boulez's music which gives primary importance to the notion of diagonal harmony. For Hopkins, with "rare exceptions" such as the *Third Piano Sonata*, Boulez's music is primarily melodic whether it is the melody of the Webernian "melodic cells" of the early pieces or the "instrumental overlapping" of the orchestral works from the late 1940's. Even the totally serial works from 1951-52 are not thought of as demonstrating "the marked discontinuity of horizontal line which characterises the 'point' (isolated note) composition of Stockhausen's contemporary works (e.g. *Punkte* for orchestra)" (1980, p.104). Despite Boulez's aim to create a *diagonal* music, Hopkins believes that the music is principally horizontal and melodic and that it is the multiplication technique expounded in *Boulez on Music today* and first featured in *Le Marteau* "that represents the true 'diagonal' between melody and harmony" (1980 p.106).

Like Hopkins, Koblyakov suggests that it is Boulez's multiplication technique which "eliminates the priority of the horizontal and vertical, establishing a new diagonal dimension" (1990 p.31). Example 4.2 which features bs 42-58 of *"bel édifice et les pressentiments" double*, the ninth piece within *Le Marteau sans maître*, is striking in its diagonal effect and is reminiscent of the first movement of Webern's Op.21 *Symphony,* only without Webern's canonic imitation. In this extract, horizontal prolongation and vertical coincidence are even less in evidence than in the Webern piece and are clearly secondary to the diagonal dimension which passes between them. The frequent changing of timbre from instrument to instrument plus the rhythmic irregularity within the writing results in music which cannot be satisfactorily described if only the traditional coordinates of melody and harmony are taken into account. What is heard is patently neither one nor the other and is perhaps best described in Boulez's own term of a diagonal, harmonic dimension.

While Webern's restriction of intervallic means to certain key qualities resulted in music of almost transparent simplicity, Boulez, in contrast, came to recognise the problematic complexity of his own practice. While producing music which was interesting and at times beautiful, the intricacy of his schemes and the surface athematicism, described in the previous chapter, often made sophisticated perception and comprehension extremely difficult if not impossible. He described his concerns to Deliège as follows:

Ex. 4.2 - Le Marteau sans maître
bs 42-58 of "bel édifice et les pressentiments" double


Subitement Assez Vif
retenir
Tempo
presser
Plus Vif
accélérer
retenir
revenir au Tempo
Assez lent
presser
jusqu'à
presser
beaucoup
revenir au Tempo
Xyl.
Vibr.
Guit.
Alto

> What worried me increasingly in my own early works and, for instance, in the works of Schoenberg was the absence of control over vertical structure. Harmonic encounters took place more or less by accident. Melodic lines had reached an extreme degree of refinement, but side by side with them were harmonic relationships that not only lacked refinement but were the result of pure chance (1976 p.90).

Furthermore, he saw in the fifth movement of Webern's *Second Cantata* Op.31 how "the vertical, the horizontal and the diagonal aspects are controlled by the same laws." Consequently he told Deliège how he had come to believe that "it is impossible to write in two different dimensions following two different sets of rules, and that one must in fact follow laws that apply reciprocally to the horizontal and the vertical" (pp.90-91).

While the new resources which were pioneered within *Le Marteau* served to create a harmony in which sound objects are related to one another through their mutual derivation from the initial series, the extremely fast rate of harmonic change within *Le Marteau* continued to obscure the overall sense of harmony. To counteract lack of differentiation Boulez began to formulate further ways of helping the listener through the pitch-space of his pieces. He included *signals* and *envelopes*, perceptual landmarks, which he hoped would enable listeners to navigate paths through his music more successfully. In the process of correcting the imbalance whereby technical procedure had come to dominate perceptibility, the clearly vertical and horizontal, the recognisably harmonic and melodic gradually recovered their importance within Boulez's composition.

Having exploded the theme and the motif with athematicism and having subverted the vertical and horizontal coordinates with diagonal harmony, discrete vertical chords begin to reassert themselves, for example at the beginning of *Don* and at the end of *Tombeau,* and the clearly horizontal is once again found within the vocal writing of *Improvisation sur Mallarmé I* and the violin writing within *Figures Doubles Prismes*. Having reintroduced the horizontal and vertical dimensions and having significantly slowed down the rate of harmonic change, Boulez continued from the 1970's onwards in works such as *cummings ist der dichter*, *...explosante-fixe...*, *Rituel,* *Messagesquisse, Répons* and *Dérive* to derive all of the harmonic dimensions, horizontal, vertical and diagonal from the same basic material which is generally more selective and restricted than before.

While more can clearly be said about Boulez's diagonal harmony and its gradual integration within a more coherent approach uniting it with the horizontal and the vertical dimensions, we will not pursue the topic further since many of the factors which led Boulez to further develop his approach to harmony have already been, or will be, considered elsewhere within the study. The decline of a purely diagonal harmony is surely inextricably linked, for example, with the advances in registral control and the growing emphasis upon polar pitches which will be considered later within this chapter.

We complete this short study of the Boulezian *diagonal* with a brief consideration of its adaptation by Deleuze and Guattari who employ it to articulate an important aspect of their new *image of thought*. Deleuze and Guattari use the terms *diagonal* and *transversal* interchangeably as a way of describing the new and distinctive contribution made by every innovative writer, scientist, philosopher, musician and so on within her or his respective area of inquiry. According to this way of thinking, all creators trace out their own particular contribution to knowledge, a process which is pictured by Deleuze and Guattari as the drawing of a line. Every new creator entering any field of knowledge takes her or his place on an already existing plane, composed of many such lines. The originality of their contribution is thought of as the drawing of a new diagonal or transversal line which is not formed simply through the connection of points on already existing lines, in other words, through an eclectic amalgamation of aspects from the work of others. Instead it forms itself between already existing points and lines and, doing so, creates a new line in a new space. This new line, this *transversal* or *diagonal*, marks out a scientific, philosophical or musical territory of its own, one which has never been known before.

According to Deleuze and Guattari, for Boulez, every great musician invents a new diagonal which is irreducible to and passes between previous and current harmonic vertical and melodic horizontal coordinates upon the musical plane. Each diagonal or transversal introduces new techniques and "is really a line of deterritorialization" which traces its own unique coordinates and draws a new plane of consistency (1987 pp.295-299; 1994 p.191). Deleuze and Guattari employ the concept of the diagonal or the transversal to sketch some of the major developments within the history of Western art music, perceiving each stage in music's history as a "deframing", the finding of an opening, the plotting of a transversal, as composers go beyond the confining musical frames and norms which they have inherited, to open onto a compositional plane with greater possibilities (1984 pp.189-191). It is indeed a paradox of composition, that the phenomenon of "closing-off" which takes place, for example, when a new musical form comes into being, is even then accompanied by ever-present possibilities for its own unframing.

With these reflections Deleuze and Guattari transform Boulez's musical percept of a third diagonal pitch dimension, perhaps hitherto meaningful purely within his own idiosyncratic musical terminology, into a philosophical concept capable of clarifying an integral part of their new *image of thought*. Once again it is important to bear in mind that there is no suggestion that Boulez's pitch diagonal implies the Deleuzoguattarian transversal or vice versa. Nevertheless, it is a striking thought that in defining a third musical pitch dimension, which escapes from the more historical vertical and horizontal dimensions of interior pitch-space, Boulez has provided Deleuze and Guattari with a significant philosophical concept capable of expressing the Deleuzoguattarian notion of a *line of flight*.

Having considered the development of Boulez's diagonal dimension of pitch-space, stemming from the work of Schoenberg and Webern, we will now examine three further ways in which Boulez practically differentiates the pitch-space, at once creating a clearer sense of form while drawing our attention to the phenomenon of spatiality in itself. We begin with Boulez's conception of pitch-space as *smooth* and *striated* space.

Smooth and Striated Space

In his Darmstadt lectures, Boulez identifies "the conception and realisation of a *relativity* of the various musical spaces in use" as "one of the most urgent objectives of present-day musical thought" (1971 p.83). He calls for the exploration of musical pitch-space and says that the musical space-continuum "is *manifested* by the possibility of *partitioning* space according to certain laws" (p.85). Boulez acknowledges two main pitch-space states which he terms - *striated space* and *smooth space*. Striated space is marked by a standard, regular measure which creates clear perceptual landmarks for the ear to orient itself, whereas smooth space is free, irregular and dispenses with all points of reference (p.85). While Western music, including serialism, has mostly retained the traditional twelve semitonal striations of tempered space, any number of alternative ways of striating pitch-space could theoretically be adopted, allowing for the limitations of human perception and the present restrictive state of conventional instruments which were designed with traditional tempered space in mind. Boulez envisages any number of possible striations being enacted upon untempered sound space and he acknowledges the possibility that the pitch series, as he has expounded it, can be used in "any tempered space, according to any temperament, and to any non-tempered space, according to any module, whether it be the octave or some other interval" (1971 p.83; 1991 p.117). Series could thus be formed of intervals which no longer conform to any homogeneous measure such as the semitone and could include any number of intervals (1991 pp.117-118).

Boulez is not the first twentieth century musician to theorise the possibility of alternative intervals and temperaments. In non-Western music, for example Indian music, "minute subdivision of musical space and a conception of it as an unpartitioned continuum are commonplace" while in Western music "the minute subdivision of musical space (and its possibilities as an unbroken continuum) fascinated composers" such as Ives, Carillo, Bartók, Hába, Varèse and Partch and stimulated their microtonal compositional explorations (Cogan &Escot 1976, p.213). Boulez reports on their experiments with intervals as small as a third, a quarter or a sixth of a tone without seeming to be impressed by the compositions which resulted. In Boulez's view "a micro-interval can only be perceived clearly within a narrow tessitura" which obviously restricts its wider use (Boulez 1991, p.162). Nevertheless, Boulez used quarter-tones himself in the *Gravité* and *Post-Scriptum* movements of *Le Visage nuptial* (1946-1989) but they did not become a permanent feature within his composition.[4]

Boulez supports Varèse, who scathingly described equal temperament as "the octave's cheesewire" (1991 p.174). Working within the limitations of the era, Varèse used sirens in works such as *Amériques* as a way of accessing "the spaces between the semitones of the tempered scale" (Bernard 1987, p.27). Varèse recalls:

> When I was about twenty .... my thinking even then began turning around the idea of liberating music from the tempered system, from the limitations of musical instruments, and from years of bad habits, erroneously called tradition. ... I ... picked up two small (sirens) .... With these, and using also children's whistles, I made my first experiments in what later I called *spatial music* (Varèse 1998, pp.204-205).

Boulez goes so far as to assert that equal temperament, despite the "full flowering of western music" which it enabled, was never anything more than an eighteenth century "convenience", a system which had "rendered immense service but has no further *raison d'être*, since the tonal organization which required such standardization is now practically destroyed" (Boulez 1991, pp.174-176).

Having elaborated the principle of *striated space*, Boulez pushes the analysis of possible striated spaces still further. He envisages further categories of *striated space* such as *straight spaces* where an "unvarying module reproduces the basic frequencies over the whole range of audible sounds .... *curved spaces* ... which depend on a regularly or irregularly variable module .... *regular spaces* ... which always adopt the same temperament whatever the module" and *irregular spaces* which do the reverse (1971 pp.86-87). While Boulez theorises the possibility of such variably striated spaces in the Darmstadt lectures published in *Boulez on Music Today*, it is not known whether these ideas have ever been actualised anywhere in his music. It may be the case that they have remained strictly within the realm of speculative theory. Nevertheless, such a judgement would undoubtedly be premature since, as far as I am aware, the relationship between this spatial theorising and his compositional practice has not yet been the focus of analysis. In addition, not enough is yet widely known of the details of the computer-assisted procedures employed in works such as *Répons*, *Dialogue de l'ombre double*, *...explosante fixe...* and *Anthèmes* for violin and electronics, where it is perfectly possible that Boulez has at last realised such long-theorised possibilities.

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[4] In 1949 Boulez spoke of Cage's desire "to organize a world of sounds of indefinite pitch" (Boulez/Cage 1993, p.28). A year later, in 1950, Boulez wrote to Cage that he planned to implement some of his ideas and that he intended "using a grid of quarter-tones placed across the series" (p.43). Later that year he wrote of "widening the principle to extreme conclusions". He tells Cage that he is aiming at developing quarter-tones so that "in two or three years, they will be 1/12 and 1/24 tones .... Moreover, I have also found a graphic formula to cover absolutely the whole scale of sounds with 1/4 and 1/3 tones" (pp.86-87).

According to Boulez, *smooth space*, on the other hand, "can only be classified in a more general fashion ... by the statistical distribution of the frequencies found within it" (p.87). The smaller the partitions or the micro-intervals within a *striated space*, the closer it will be to being conceived of as an unbroken smooth continuum. Boulez was realistic enough to acknowledge, at the time of writing in the early sixties, the practical difficulties in terms of achieving such smooth musical spaces, given a situation where musical theory was in advance of instrumental technology. He looked admiringly, at least in 1952, to John Cage's experiments in "creating non-tempered sound spaces, even with existing instruments", courtesy of his prepared piano with its eccentric appendages. Likewise, Pierre Schaeffer's *musique concrète* at first seemed to Boulez to be capable of permitting the exploitation of non-tempered sound spaces and he went so far as to compose two short musique concrète *Etudes* (1951-52) (Boulez 1991, pp.134-138). There simply were no instruments at that time capable of transferring ideas of *smooth space* and certain striations from the realm of theory to that of accomplished sound.

In the 1955 article *At the Edge of Fertile Land*, Boulez imagined a synthesis of electronic and instrumental sources which would enable movement from temperament to non-temperament (1991 pp.161-164). He looked forward to "the construction of instruments whose temperament could be precisely varied according to prepared and ordered combinations". In the interim, however, he had to be satisfied with exploiting the distinctive qualities of percussion instruments such as the xylophone or tubular bells, instruments which have complex sound spectra which could at least go some of the way towards providing the expanded spatiality of sound that he desired (1971 pp.89-90). The distinctive sonorities of the unpitched percussion within *Le Marteau sans maître*, for example, produced an innovative sound world which was later recreated by many other composers. Again, in *Improvisation II* from *Pli selon pli*, Boulez deliberately contrasted "three different kinds of sounds - fixed pitch, partially pitched, and unpitched ('noise')" (Boulez 1986, p.157). While Boulez was aware that smooth spaces and all kinds of non-tempered striated spaces would become more easily attainable through electro-acoustic and computer-assisted means, he did not want "to abandon 'the realm of music' to mechanical electro-acoustic media alone." Indeed, the commitment to live performance and acoustic instruments which underpins this position has remained with him throughout his career.

It is interesting to note that, despite such logical and consistent theorising, most of Boulez's compositions are in fact restricted to the exploration of *striated space* and, at that, the traditional striations of equal temperament. Bayer interprets this as signalling Boulez's preference for an aesthetic of spatial discontinuity instead of the "spatial continuity" favoured by composers such as Cowell, Penderecki, Xenakis and Ligeti who have all, at one time or another, favoured the use of clusters and glissandi. For Bayer, *smooth space* is to be found in Boulez only as a "limit case" (Bayer 1981, pp.133-134).

Boulez wrote of the difficulties in perceiving minute intervals in his 1955 essay, saying:

> We therefore have to resign ourselves to notions less simple than that of a 'continuum' which would free the composer from all fetters and recognize that even this famous 'continuum' implies a degree of submission to the ear ... (1991 p.163).

While Boulez clearly criticises what he considers to be the "elementary" and "caricatured" nature of clusters and glissandi as they appear within the music of the late fifties and early sixties, it seems to me to be presumptuous of Bayer to equate distaste for such technical means and the sparing practical compositional evidence of *smooth space* with a preference for *striated space*. Boulez's comments, though fragmentary, seem to offer a more likely explanation. Having theorised the possibility of smooth spaces, they were at first practically impossible to achieve except in the most limited ways. When more sophisticated instrumental means later facilitated their possibility, this did not always cohere with Boulez's strict performance ideals for the use of machines, where the machine must participate in real-time with the performers. This, as well as a growing sense of a need for greater local perceptibility, perhaps explains why Boulez does not seem to have developed *smooth space* as far in practice as in theory.

Despite the practical difficulties in developing striated and smooth spaces of equal sophistication with the theory, Boulez has nevertheless been able to use smooth and striated pitch-spaces as a means of articulating form. He perhaps comes closest to achieving a smooth pitch-space, or at least a more flexibly striated one, in *Répons* (1981-84) where the pitches of the solo instruments are transformed electronically. The exactly notated music for the instrumental ensemble, which is completely untransformed, is placed in direct contrast with the transformed sounds of the six soloists. Full details of the specific layout of the six soloists, the electronics and loudspeakers are provided later in this chapter when external spatiality is discussed. The immediate point of interest, however, resides in the contrasting acoustic nature of the two sets of instruments, since while the instruments within the main ensemble are not at all resonant, the solo instruments, namely two pianos, harp, cimbalom, xylophone (doubling glockenspiel) and vibraphone are all particularly resonant. *Striated space* is clearly marked out in *Répons* through the conventional use of tempered instruments. *Smooth space*, on the other hand, is suggested in a number of ways, through the complex simultaneities produced by the resonant tuned percussion, through the dense abundance of trills, and lastly through the electronic transformation of pitch.

Boulez recalls that his first ideas for *Répons* involved the use of two pianos which he considered tuning unconventionally as he had previously done with the harp in *Pli selon pli*. After further consideration, however, he decided that he could achieve better results instead by exploring the partnership linking the piano with the newly available electronic technology. This would enable him to define a musical pitch-space without being limited to the standard piano tuning or even to a peculiar tuning of his own involving quarter-tones or a similarly consistent division. This option, he reflected, while increasing the pool of available pitches, would still have restricted him to "the same scale all the time", an outcome which he judged to be inimical to "the idea of mobility of the scales" (Interview 28.9.98).

Retaining the conventional pitch tuning of the piano, Boulez made precise calculations in order to transform the original pitches played by the piano in a great number of ways which could all be realised in "real time" by the transformational power of the computer. In this way, Boulez produced much greater pitch proliferation than would have been provided by simply adopting an alternative tuning. While the pianist plays as normal, her/his customary fingerings produce scales which are "completely different and non-tempered." According to Boulez, the innovative pitches and scales which emerge as a result of such transformation cannot be notated traditionally and can only be identified according to their pitch frequency in terms of hertz. Boulez tells us that this process does not involve the division of the tempered octave into an alternative scale of divisions, but rather entails calculations which, to some extent, recall the pitch multiplication which he began in the early 1950's with *Le Marteau sans maître*. He says:

> at the beginning of *Répons* I calculate the intervals of the chord the piano plays or the vibraphone plays and I augment that by another scale and then everything is multiplied and every pitch is multiplied six or eight or nine times. So you have an arpeggio of pitches and you have an arpeggio of arpeggios (Interview 28.8.98).

Andrew Gerzso provides an example of this practice within *Répons* from the chord played by piano no. 1 just after fig. 21. He explains that "there are five frequency shifters" each of which has "two important parameters: the direction of the transposition or shift and the amount thereof expressed as a frequency." Examining just one note, the low B flat from the arpeggiated chord, Gerzso shows how it is simultaneously transformed by the five frequency shifters which alter it by the following parameters: "shift up 233.0 Hz, shift down 987.0 Hz, shift up 783.0 Hz, shift up 987.0 Hz, and shift down 233.0 Hz" (Gerzso 1984, p.33). To provide for such an expanded pitch-space, in addition to the considerable instrumental score for *Répons*, there is an electronic score encoded within the computer which guarantees that, while the timing of pitch transformations may be aleatoric, none of the new available pitches is the product of chance since they are all the result of careful calculation.

Pitch is similarly transformed within *Dialogue de l'ombre double* (1985) and *...explosante-fixe...* (Interview 28.8.98; Benjamin: BBC Radio Interview). As Gerzso tells us, whereas with *Répons* the transformation of sound was "coordinated manually through following the score and the orchestral conductor in order to start up the appropriate programme at the correct moment", the subsequent technological development of the "score-follower" at IRCAM meant that in works such as *...explosante-fixe...* coordination of transformations became completely automated. With the score-follower, the computer now "listens to the soloist comparing what is played to the score which is stored within its memory and which defines the precise moment for activating its sound modifications" (quoted in Szendy 1998, p.5).

The innovative pitch-space possibilities opened up by this new technology constitute an area which has not received sufficient attention to date. Only with improved information will we be in a position to determine the extent to which Boulez has managed to realise his early theoretical ideas of variably *smooth* and *striated* pitch spaces.

Whatever the practical musical difficulties, Deleuze and Guattari picked up Boulez's concepts of *smooth* and *striated space* in *A Thousand Plateaus* as they had done with the notion of the pitch diagonal. According to Brian Massumi, "*A Thousand Plateaus* is an effort to construct a smooth space of thought" (Massumi 1987, p.xiii). An entire plateau (chapter) of the book is devoted to *The Smooth and The Striated* in which Deleuze and Guattari acknowledge the origins of these concepts within Boulez's musical theory and survey a variety of models of smoothness and striation within technological, maritime, mathematical, physical and aesthetic contexts (Deleuze and Guattari 1987, pp.474-500).[5] Such models represent merely a few of the multifarious "aspects of the two spaces and the relations between them" which Deleuze and Guattari could have chosen (p.475). They contrast the vertical and horizontal striations found within embroidery with the smooth, amorphous nature of felt. They refer to the sea as the "smooth space par excellence" which becomes increasingly striated for navigational purposes. The sea is consequently described both as "the archetype of smooth space" and as "the archetype of all striations of smooth space: the striation of the desert, the air, the stratosphere" (p.480). Further, Deleuze and Guattari contrast the smooth sea with the city which, for them, is the paradigmatic striated space (p.481).

For Deleuze and Guattari, Boulez makes these fundamentally different spacing types, the smooth and the striated, perceptible through music. In purely musical terms what they have to say is perhaps more citation than commentary, but nevertheless may be worth repeating. Boulez is seen to be:

> concerned with the communication between the two kinds of space, their alternations and superpositions: how a 'strongly directed smooth space tends to meld with a striated space,' how 'a striated space in which the statistical distribution of the pitches used is *in fact* equal tends to meld with a smooth space'; how the octave can be replaced by 'non-octave-forming scales' that reproduce themselves through a principle of spiraling; how 'texture' can be crafted in such a way as to lose fixed and homogeneous values, becoming a

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[5] Deleuze and Guattari say that "the two spaces in fact exist only in mixture: smooth space is constantly being translated, transversed into a striated space; striated space is constantly being reversed, returned to a smooth space" (1987 p.474).

> support for slips in tempo, diplacements of intervals, and *son art* transformations comparable to the transformations of *op art* (Deleuze and Guattari 1987, p.478).

While Deleuze and Guattari describe Boulez's musical theory of pitch-space beautifully, their reflections are in fact far from purely musicological and serve their own distinct and very different purpose. They use Boulez's sense of smooth and striated pitch-space (and all of the other smooth and striated spaces) as "models" to enable them to articulate two distinct *images of thought*, smooth thought and striated thought. As Massumi notes, the entire Deleuzoguattarian project is "an effort to construct a smooth space of thought."[6] Deleuze and Guattari wish to oppose traditional striated representational philosophy which they term *State philosophy* with what they call *Nomad thought* (Massumi 1992, pp.4-6). In Massumi's words:

> The space of nomad thought is qualitatively different from State space. Air against earth. State space is 'striated,' or gridded. Movement in it is confined as by gravity to a horizontal plane, and limited by the order of that plane to preset paths between fixed and identifiable points. Nomad space is 'smooth,' or open-ended. One can rise up at any point and move to any other (Massumi 1992, p.6).

In other words, nomad thought is the smooth, rhizomatic thinking of *difference* and is opposed to the striated, arborescent thinking of State philosophy and identity (Deleuze and Guattari 1987, p.482). To re-iterate a central idea of this thesis, for Deleuze and Guattari, Boulez makes these fundamentally different spacing types musical and perceptible. They say that Boulez "makes palpable or perceptible the difference between nonmetric and metric multiplicities, directional and dimensional spaces. He renders them sonorous or musical" (p.477). Deleuze articulates this special relationship between music and philosophy when he says:

> It seems clear to me that philosophy is truly an unvoiced song, with the same feel for movement that music has .... It's not a matter of setting philosophy to

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[6] Massumi says that "on a strictly formal level, it is mathematics and music that create the smoothest of the smooth spaces", but adds that "Deleuze and Guattari would probably be more inclined to call philosophy music with content than music a rarefied form of philosophy" (Massumi 1992, p.6).

> music, or vice versa. Rather, it's once again one thing folding into another: 'fold by fold,' like Boulez and Mallarmé (Deleuze 1995, p.163).

It is important to acknowledge once again that Deleuze and Guattari use Boulez's musical concepts for their own philosophical purposes. They seem to equate striated pitch-space with the production and organisation of "horizontal melodic lines and vertical harmonic planes" while smooth space is said to constitute "the fusion of harmony and melody", in other words, the diagonal dimension which was discussed earlier in the chapter. Whatever the philosophical validity of conflating Boulez's ideas of smooth and striated space with the concept of the pitch diagonal, the resulting conjunction of concepts produces only musical confusion. I have already suggested that Boulez's pitch diagonal is the result of compositional processes which result in music which is neither primarily melodic nor harmonic in the sense of horizontal or vertical. The diagonal pitch dimension is consequently independent of whether or not a composition is based upon the fixed or variable intervals of a striated space, or instead upon the kind of smooth pitch continuum made possible by electronic and computer technology.

Registral Space

If the conception of music in terms of pitch-space is a relatively modern one, as Regina Busch suggests, this is no less the case with the formal manipulation of register within pitch-space. Cogan and Escot have noted that "registral motion has been largely ignored" as a musical feature except for infrequent and sporadic attention (1976 p.83). Perhaps this is because the deliberate manipulation of pitch register as an independent musical component has really only come into its own in the twentieth century. Contemporary musicological and analytical interest in register may stem from a new, more prominent structuring of register within some of the most important strands of twentieth century music. It is perhaps this more significant compositional role for register which has created a new awareness of register among musicologists.

Treatment of register is one of the most important elements within the spatial conception of the post-war avant-garde. David Gable locates its significance for Boulez, Stockhausen and Berio in their attempts to manipulate the "neutral tonal space" to which their theorising had led them. It became necessary to find new means to restore and reshape a sense of musical form within the sound space. One of the most significant mechanisms used to achieve this was the manipulation of register, the roots of which are to be found in the registral effects of composers such as Debussy, Varèse and Webern. For Gable, Berio, Boulez and Stockhausen are the first composers to take full advantage of the possibilities inherent within a broader, malleable registral space (Gable 1990, p.446), but Rosen believes that Boulez develops the manipulation of register beyond what anyone had hitherto achieved (Rosen 1985, p.94).

In the 1980's Boulez acknowledged a lack of registral organisation within some of his early works and he spoke of the increasing importance of register within his music. He said that "when you don't pay attention [in composition] to the overall envelope of the pitch, then you cannot follow anything. You are lost" (Gable 1985-86, p.111). This quality of pitch perceptibility, which Boulez believes register can offer, is illustrated through the example of *Répons*. Boulez says:

> in Répons, especially where the tempo is very fast, the harmony is absolutely - not reduced, but very severely controlled. Then even when you have quite a lot of things going on, you can follow the envelope. I have heard it both while conducting and without conducting, and I think it's very clear. As the register moves up and down, you can very readily follow it, something which I think was missing in my first works. For instance, in my Second Sonata, which I still like very much as a kind of organized counterpoint, the registers were not only a little bit, they *were* anarchic. There was some direction, but not enough control for me (Gable 1985-86, p.111).

Rosen traces Boulez's interest in interior pitch-space to his study of the music of Debussy, saying that Boulez's use of register "is more idiosyncratic than any other composer except Debussy (1986 p.88; p.94).[7] Paradoxically, Richard S. Parks (1989) notes that while some commentators have acknowledged the importance of register within Debussy's music, its structural function has received very little serious attention in practice. In order to root Boulez's interest in register more specifically, it may be useful, therefore, to simply inventory the kinds of registral procedures which Parks has discovered in Debussy. Parks shows that register functions "as a source of structure in Debussy's music, both independent of and in conjunction with other elements." He concentrates attention on five particular registral features which he explores in turn providing examples by way of illustration from throughout Debussy's output. The following is simply the briefest of overviews of the five categories of registral practice. (1) Debussy has a tendency to fix his themes in set transpositions and octave registers, particularly in the solo piano music where a theme or motive will maintain its registral placing until its last appearance where it is usually heard an octave or two higher (Parks 1989, p.303). (2) Debussy often tends to gradually expand the register spans within a piece until they reach some kind of musical climax. This technique can be used at different levels which means that expansions at one level can take place within expansions at a higher level of the organisation (pp.308-309). (3) Debussy likes to expand the registral space only to then compress it gradually (p.311). Through such oscillations in register, Debussy is able to use register as a means of articulating form. (4) Debussy often uses register expressively, connecting explicit dramatic moments with registers which vary in placing and in range depending on the emotion expressed (p.315). (5) Debussy uses register for a variety of other purposes including the separation of "conflicting metric schemes" (p.317).

Jonathan W. Bernard similarly recognises the treatment of registral space to be a primary force within Varèse's music. More given to the dissemination of his theoretical reflections than Debussy, Varèse often describes his music as "spatial - as bodies of intelligent sounds moving freely in space." Indeed, he looks forward to a time when new electrical machines would enable:

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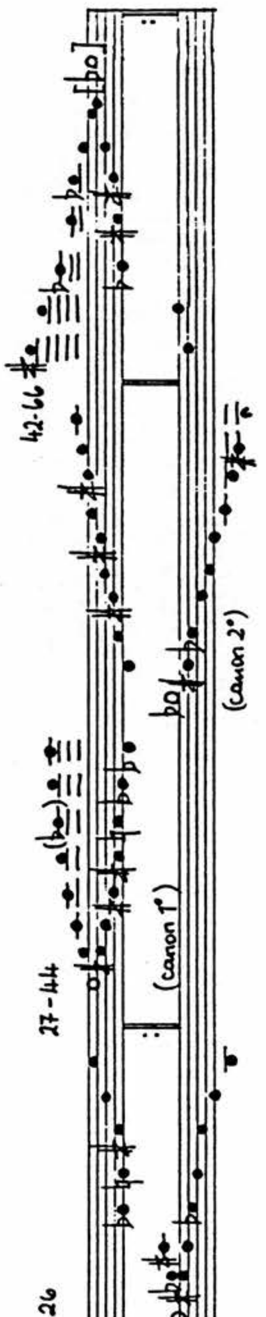
[7] Rosen believes that if Boulez "often exploits this use of register in the interests of spatial metaphor, this is only rarely an intrusion of extra-musical considerations, as the analogy with space may be said to have been built physically into musical elements" (1986 p.94).

> the possibility of obtaining any number of ... subdivisions of the octave, and consequently the formation of any desired scale; unsuspected range in low and high registers ... 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 (Varèse 1998, pp.200-201).

Varèse uses the phrases *spatial music* and *music in space* many times in his writings, signalling its great importance for him. Indeed, for Bernard, it is the "single unifying principle" of Varèse's music (Bernard 1987, p.41). Bernard catalogues a variety of interior spatial pitch procedures used by Varèse which all feature elements of symmetry (p.44). These include mirror symmetry where the sequence of intervals read from the top down is exactly the same as that read from the bottom up. Parallel symmetry exists where "the sonority is divisible into two or more groups, each of which displays the same intervallic order from lowest to highest pitch" (p.45). Varèse sometimes uses timbre to demarcate sound space, adding dynamics to timbre to accentuate the symmetrical nature of musical sections (p.47). In a process which Bernard terms "projection", Varèse arranges the "transference of structure to a new pitch/registral level". With "rotation", the internal makeup of a sonority is reversed (pp.48-49). Further processes, as in Debussy, facilitate the expansion and contraction of the registral space (pp.50-51).

In addition to the registral innovations of Debussy and Varèse, Boulez has drawn attention to Webern's use of pitch-register (Boulez 1991, p.298) and his practice of fixing pitches within particular registers. This device is found to a limited degree in the first movement of Webern's Op.21 *Symphony*; however, the same fixed registers are not maintained throughout. The movement is divided into three sections: bs 1-26; bs 27-44 and bs 42-66. The specific placings of the pitches in all three sections have been identified by Peter Nelson and can be seen in Example 4.3. Registral fixity of pitch is most noticeably the case in the first and third sections of the movement, which each feature fifteen pitches in all (with two or three pitches sounding in more than one register). All of the pitches in bs 1-26 have fixed registers with only five exceptions. In a similar way there are only five exceptions to the rule between bs 42-66. Fixity of register is not a feature within the central section (bs 27-44) where a

Ex. 4.3 - Webern: Symphony - First Movement



bars: 1-26
27-44
42-66
(canon 1°)
(canon 2°)

much larger pool of pitch registers is in play across an expanded range. Koblyakov further identifies elements of pitch fixity at the start of Webern's *Concerto* Op.24 and in the second movement of his Op.27 *Piano Variations* (1990 p.104). The partial nature of this fixity is explained by Boulez in his observation that Webern "strove more and more to base each section of a work on specific characteristics, to the exclusion of all other possibilities contained in the series" (1971 p.100).[8]

In *Boulez on Music Today* Boulez built upon the registral possibilities which he had inherited from Webern and he theorised the potential presented by fixity and mobility of tessitura, envisaging a continuum of registral possibilities from "total fixity to total mobility" (1971 pp.106-114). What Boulez terms the "*index of fixity* is the ratio between the number of fixed frequencies and that of mobile or semi-mobile frequencies (whether an absolute pitch has its tessitura renewed on each of its appearances, or whether the tessitura changes regularly or irregularly after one or more appearances)" (p.111). Boulez acknowledges that while fixity can be total or not at all, it may also exist to any intermediate degree between these two extremes with some fixed pitches and some mobile pitches.[9]

Despite this careful theorising in the early 1960's, Boulez acknowledged, in the already cited quotation from the 1980's, that some of his earliest works were flawed by a lack of registral control. His own retrospective assessment notwithstanding, several commentators have found many interesting registral features within these early pieces which Boulez later found fault with precisely from that point of view. Before examining specific examples of Boulez's emerging registral practice, what follows here is simply a resumé of critical observations which have been made by other writers on the subject. While a number of writers have commented upon aspects of registral use within Boulez's compositions, it has not really been the object of systematic exploration.

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[8] Boulez also acknowledges the importance of register within Klee's pictorial art. According to Boulez:

> the equivalent of pictorial space can be defined by register: high, medium, low; dense, sparse; with small intervals, with larger intervals; the intervals being equal or unequal; a symmetrical register with a given centre or a totally asymmetrical register. From this point of view, some drawings by Klee can be conveyed through an equivalence of registers. Pitch-space for a musician is almost visual (Boulez 1989b, p.111).

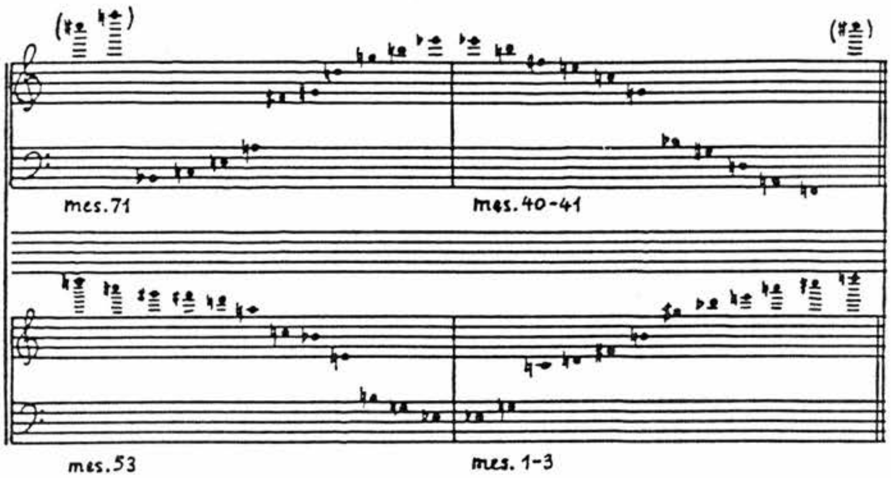
[9] In *Proposals* (1948), Boulez writes of "different procedures based on the mobility or fixity of the pitches. Mobility means that each time a note occurs it will be in a different register; and fixity, that the contrapuntal line will be traced within a disposition in which each of the twelve notes has a fixed location". This explanation is illustrated with an example from the *Second Piano Sonata* (1991 p.50).

Gable points to Boulez's use of the complete range of the piano in the 1945 *Notations* (published 1985) while Piencikowski highlights the significant part played by registral divisions "in the differentiation of figures" within the same piece (1995 p.5). Bradshaw notes the importance of register in the *Flute Sonatine* for the identification of chords and sections, for "clarifying the individual movement of lines; and as a means of expanding or contracting the contours of both lines and chords, through altering the placing of individual pitches" (1986, p.143).

Hopkins writes of wide registral leaps as playing a melodic role in Boulez's piano music from the *First Piano Sonata* onwards (1980 p.105), while Rosen interprets the same sonata in terms of "the ambiguous relation of the full chromatic space to the module of the octave within which the series is conceived" (1986 p.86). Gable remarks upon the motivic writing of the *Second Sonata* in which sounds are registrally dispersed within the available sound space (1990 p.447), and Griffiths judges the prominent pitches within the piece as exhibiting a "desperate insistence" (Griffiths 1978, p.23). Piencikowski draws attention to the deployment of three distinct registral ranges in *Structures Ia* which Boulez uses in order to organise the pitches systematically throughout the sound space (Piencikowski 1985, p.68). Griffiths notes "the preponderance of the bass register in section 7, the upper in 8, and the middle in 9 and 10, and the changing degree to which notes are fixed in register, this being total in sections 2c, 3, 5 and 8 (inevitably so, of course, in the single-strand sections 2c and 5), and nearly total in 11 (one 'roving' pitch)" (Griffiths 1978, p.23). Boulez acknowledges that while his role in *Structures Ia* consisted in the "selection of registers", they were nevertheless "completely undifferentiated" (Boulez 1976, p.55).

As was stated in Chapter Three, the first book of *Structures* marked the extreme point of automated composition for Boulez, after which he began to reintroduce freedom of choice back into his composition. When Boulez loosened the strict control of integral serialism within *Le Marteau sans maître*, he began to move away from the absolutely neutral sound space which his totally organised works had engendered through their equalisation of phenomena. Despite this departure from complete control, the harmonically static effect of *Le Marteau* testifies to the extent to which the music was still largely in the grip of strict serial procedures. Nevertheless, Piencikowski highlights how several movements in *Le Marteau* "play on the ... extension and contraction of the space" (1985 p.76) and he notes that "registration based on fixed axes is the basis upon which the articulation of the ninth piece, *Bel édifice et les pressentiments (double)*, rests." Example 4.4 features Piencikowski's reduction, in which the pitches from a few carefully chosen bars are assembled in order to demonstrate how the E flat axis is in one place in a high register and in another in a low register (p.77).

Ex. 4.4



As we shall see, Boulez's treatment of register changed significantly in the mid to late 1950's at the time of the *Third Piano Sonata* and *Pli selon pli*. It should perhaps be stated, in parenthesis, that the registral interest which Bradshaw finds within *Le Visage nuptial* and *Le soleil des eaux* cannot be easily placed from a chronological point of view, since both works underwent substantial reworking over a long period of time. Nevertheless, Bradshaw sees "the beginnings of harmony as a means of defining musical space" as a feature of both works and writes of an increasing interest in "contrasting registers as a means of defining tessitura" leading "to the notion of musical space as an enveloping quality" (1986 pp.147-150). She points to *Post-scriptum*, the final song of *Le Visage nuptial* in which "the sectional form is defined by contrasts in register between low, medium, high and 'mixed' pitches" (p.151).

Returning to safer chronological ground, Gable comments on the impressive spatial effects within *Pli selon pli,* where the registral field has settled and no longer fluctuates constantly in the manner of the *Second Sonata* or the first book of *Structures*. This slowing down of the rate of registral change is intended to produce a new stylistic simplicity in order to facilitate greater spatial definition and improved perception of events (Gable 1990, p.449; Hopkins 1980, p.102). Anthony Cross writes of the use of register in *Don,* describing the way in which between figures 2-4 the orchestra is divided into the three registral groups of high, medium and low. Cross outlines a simple scheme whereby four chords in the high register are paralleled by four chords in the low register and vice-versa, with a third sequence of chords sounding simultaneously in the middle register. For Cross, schemes such as this can be seen simply enough in the score but he does not believe them to be as easily perceptible to the ear because of their "extreme register, density and variations of spacing" (1975 p.217).

In a study of *Doubles* (1957-58) and *Figures Doubles Prismes* (1963; 1968), Allen Edwards has revealed the existence of registral grids in the compositional plans and sketches which are held at the *Paul Sacher Stiftung*. According to the plans, the three stages of *Doubles* "were to be defined by distinctive sets of registral grids" (Edwards 1993, p.6). Edwards tells us how Boulez applies the registral grids to the pitches. The slow theme, for example, is seen to be made up of six segments, each of which was to have its own registral grid (pp.8-10). In the later *Figures Doubles Prismes*, Edwards says that the registral grids for the *Rappel* and *Effacement* episodes, are indicated as A,B,C,D and E, and are taken from *Doubles*" (p.15). We will consider the phenomenon of the registral grid more closely when we next examine the place of register within *Constellation-Miroir*. Meanwhile, we complete this inventory of registral comment noting, with Arnold Whittall, the significant role played by "fixed registers" in creating memorable gestures in *Eclat* (1984 p.424) and Piencikowski's observation of "an opposition of registers" within the second book of *Structures*, with the "region of greatest concentration in the middle range" (1985 p.73). Boulez tells us that while he employed the entire keyboard range within the first book, in the second he:

> wanted to define specific areas of sonority and to create sonorities that would be as striking as possible in individualised registers using small sections of the keyboard: one piano keeps to a central register whilst the other zigzags from one register to another; there are long stretches in the high registers and long stretches in the low. It is fairly striking to hear sonorities that are extremely contrasted and sometimes also close together ... (Boulez 1976, p.89).

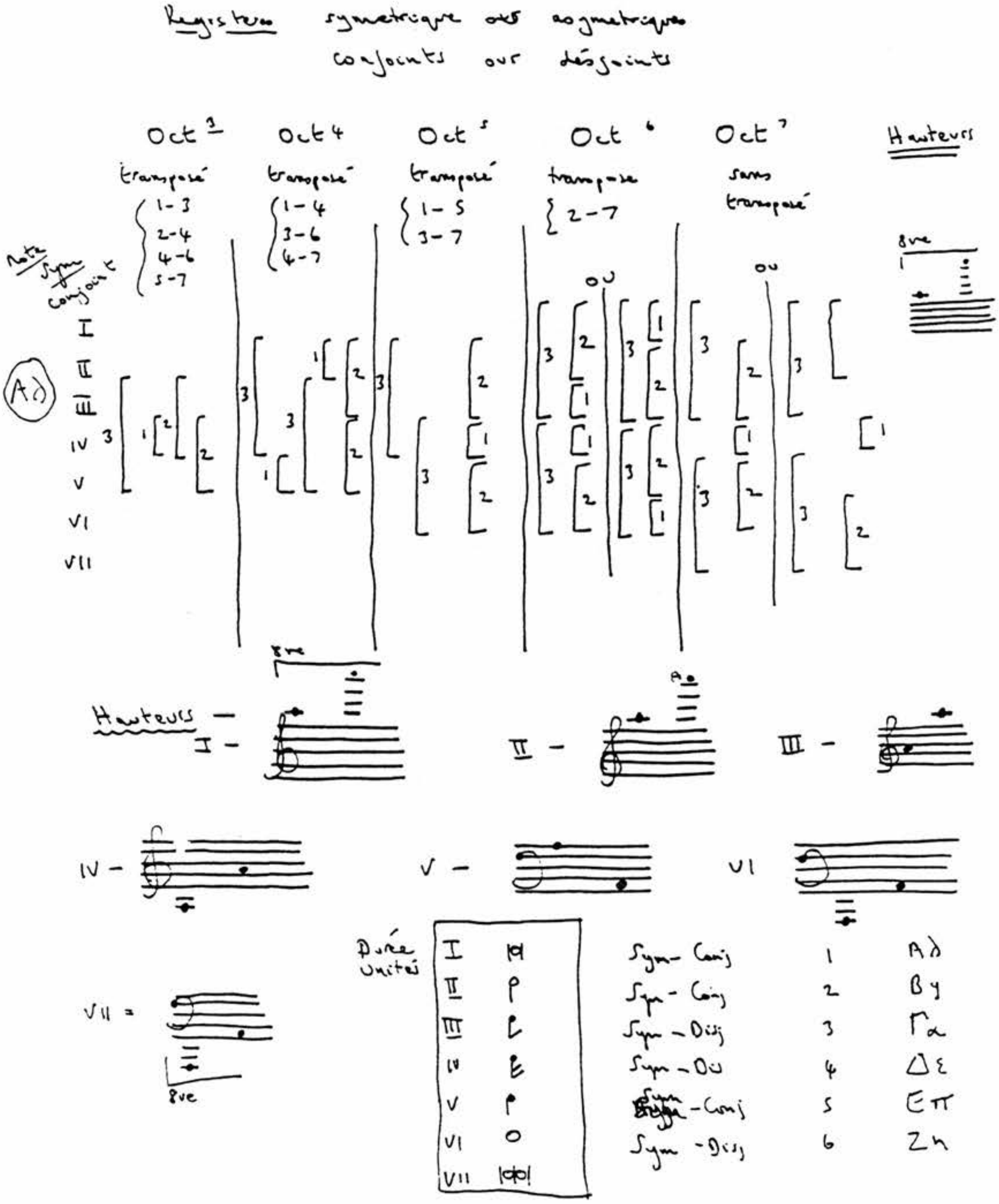
Sketches within the Boulez archive at the *Paul Sacher Stiftung* (Ex. 4.5a-c) demonstrate Boulez's preoccupation with register as a means of organising form, and hopefully also of enhancing perceptibility, in the case of the *Third Piano Sonata* and the beginning of *Pli selon pli*. After the more "anarchic" registral jumps of the pointillistic integral serialist pieces, Boulez sought to provide increased registral coherence, and today acknowledges that register is treated with great care in pieces such as the *Third Sonata*. This admission is corroborated convincingly by a page from among the Sacher sketches which features several registral plans relating to *Constellation-Miroir*.

This page of sketches (microfilm 138, p.818) features four sets of registral arrangements for *Constellation-Miroir* in which Boulez sets out the ranges of seven continuous registers (from A to A) which are numbered (I II III IV V VI VII) from the highest to the lowest register across the piano keyboard. These registers are pictured vertically within the sketches from the highest down to the lowest. All in all, page 818 contains five grids of registral sketches, each featuring worked examples which range over three, four, five, six and seven octaves respectively. Possibilities for transposing these arrangements into different areas of the registral spectrum are also given.

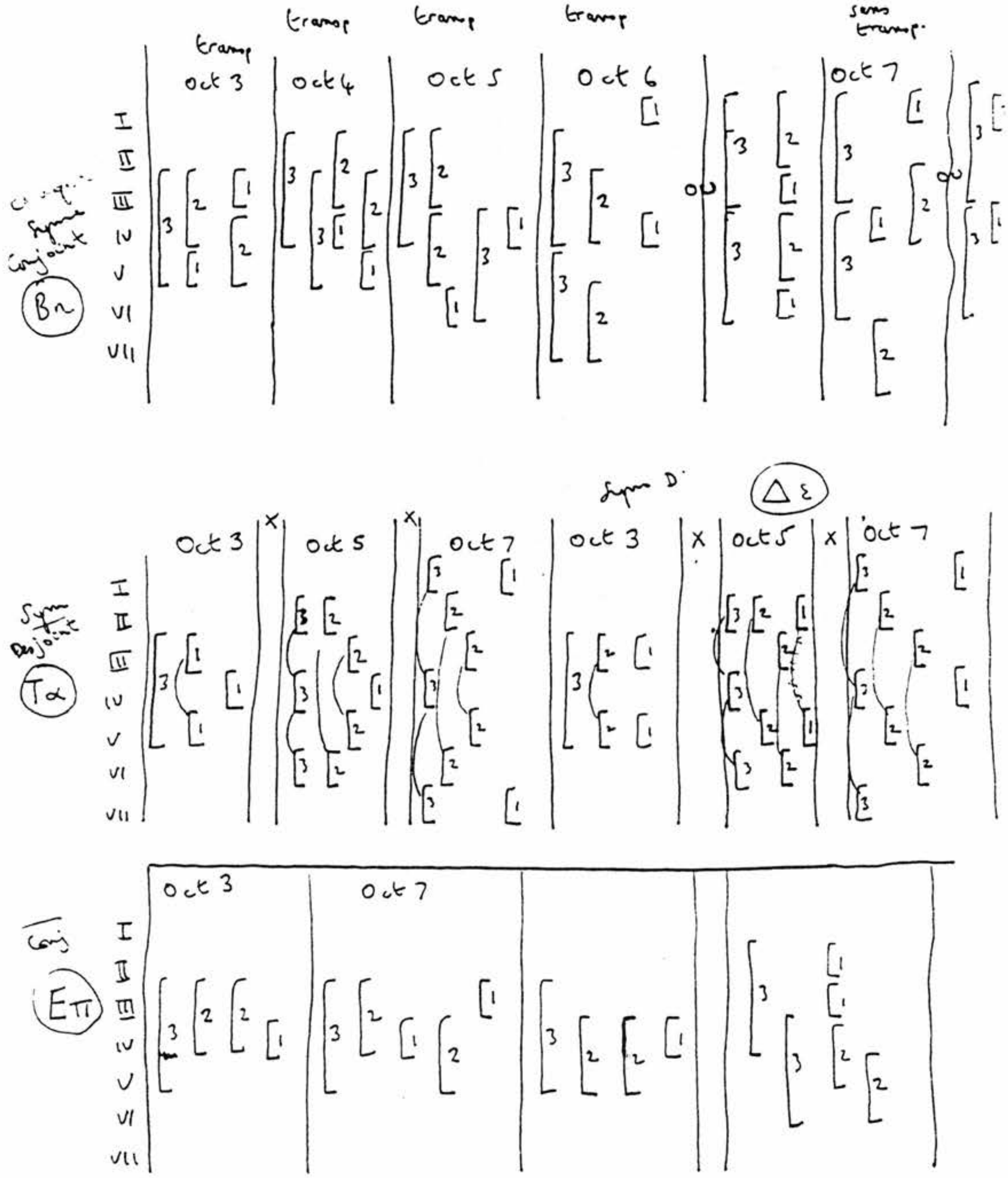
In each example, Boulez simply indicates which registers are used, broadly speaking, but gives no more specific information about the particular pitches which are used within them. We do not know, for example, whether a given sound block ranges throughout a complete register or whether it merely crosses the border from a neighbouring register. In addition, Boulez's sketched examples give no indication of the duration of sound blocks in relation to one another, which means that we cannot simply presume that events follow one another with fixed regularity. There is a particular difficulty in figuring sustained notes or harmonic blocks according to this notation. Furthermore, the examples in no way distinguish whether we are dealing with ordinary sound blocks, sound blocks made up of harmonics, little flurries of notes covering a certain registral span or any other alternative configuration. Despite, perhaps even because of, these rather obvious limitations, the charts are able to display the overall shape of registral organisation in a particularly clear way. Boulez labels the grids according to whether their shape is symmetrical or asymmetrical and conjunctive or disjunctive. The first grid is accordingly labelled "symmetrical and conjunctive", the second "'oblique' symmetrical and conjunctive". The third is "symmetrical and disjunctive", the fourth is "asymmetrical and conjunctive" and the fifth is "asymmetrical and disjunctive".

Since a systematic study of register across the entire piece has not yet been conducted, it is not known at this time whether the possibilities outlined in the sketches appear in the completed score of *Constellation-Miroir*. It is possible that Boulez's sketched examples do occur within the score, but while no direct "quotations" have so far been identified, it can be stated that the same registral principles which inform the sketches are clearly employed within the score. Consequently, until a more systematic study is undertaken, I have adopted the working hypothesis that the sketches provide examples of pre-compositional registral possibilities which Boulez experimented with in preparation for the composition of the piece. This being the case, the matching of examples from the

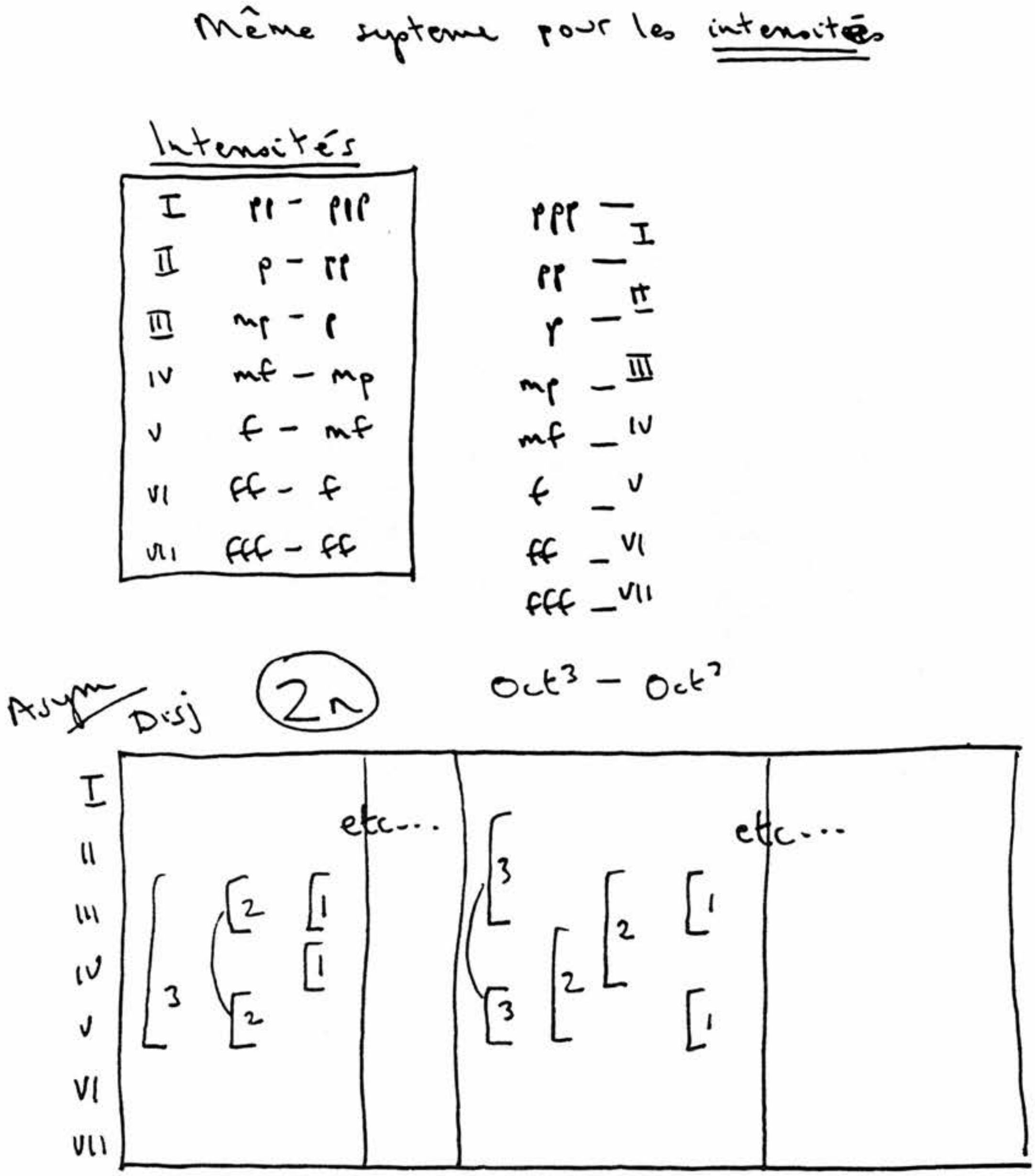
Ex. 4.5a - Sacher Stiftung: microfilm 138, p.818
(Author's tracing from Boulez's sketch)


Registres symetrique ou asymetriques
conjoints ou disjoints
Oct 3 transposé 1-3 2-4 4-6 5-7
Oct 4 transposé 1-4 3-6 4-7
Oct 5 transposé 1-5 3-7
Oct 6 transposé 2-7
Oct 7 sans transposé
Hauteurs
Note Sym conjoint
Aλ
I II III IV V VI VII
ou
8ve
Hauteurs — I – II – III –
IV – V – VI
VII =
Durée unités
Sym - Conj 1 Aλ
Sym - Conj 2 By
Sym - Disj 3 Γα
Sym - Ou 4 ΔΕ
Sym - Conj 5 Επ
Sym - Disj 6 Zη

Ex. 4.5b - Sacher Stiftung: microfilm 138, p.818
(Author's tracing from Boulez's sketch)


tramp
oct 3
tramp
oct 4
tramp
oct 5
tramp
oct 6
ou
sans tramp.
oct 7
ou
I
II
III
IV
V
VI
VII
Sym Conjoint
Bn
Sym D.
ΔΣ
Oct 3
X
oct 5
X
oct 7
oct 3
X
oct 5
X
oct 7
Sym Disjoint
Tα
oct 3
oct 7
Conj
Eπ

Ex. 4.5c - Sacher Stiftung: microfilm 138, p.818
(Author's tracing from Boulez's sketch)



Même systeme pour les intensités

Intensités

I	pp - ppp
II	p - pp
III	mp - p
IV	mf - mp
V	f - mf
VI	ff - f
VII	fff - ff

ppp — I
pp —
p — II
mp — III
mf — IV
f — V
ff — VI
fff — VII

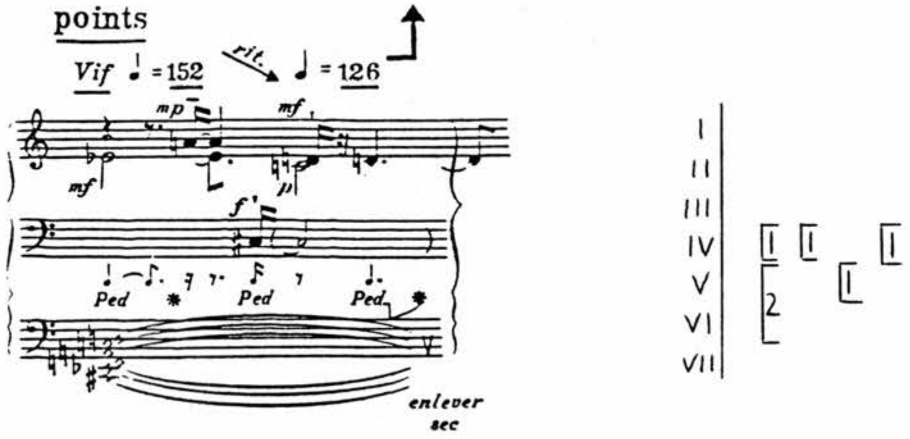
Asym
Disj
2n
Oct³ - Oct⁷
I
II
III
IV
V
VI
VII
3
2
2
1
1
etc...
3
3
2
2
1
1
etc...

sketches with the score becomes less important than showing that Boulez has exploited the same properties of symmetry and asymmetry, conjunction and disjunction within the score that he experimented with in the sketches. The resulting registral configurations must therefore be shown to give perceptible formal coherence to the individual sections within the piece.

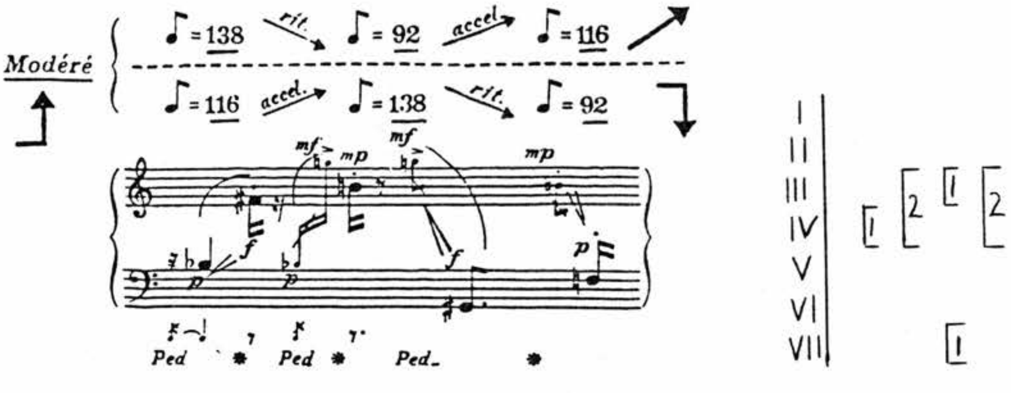
The layout of the score of *Constellation-Miroir* does not immediately assist appreciation of its registral schemes since sections are often notated on three staves at a time, for example three bass staves. While facilitating performance, this arrangement tends to dilute the normally vivid visual sense of register which can most often be quickly read from a more conventionally notated treble-bass piano score. In the case of *Constellation-Miroir*, it is much easier to perceive what is going on visually when the registers are reduced to Boulez's own chart format. Using Boulez's sketches simply to indicate something of the nature of his registral experiments, I have reduced some of the *points* and *blocks* sections from *Constellation-Miroir* into the same registral format (Ex. 4.6a-i). While, as has been noted, this particular form of registral reduction tends to ignore the extent to which a particular sound block ventures within a certain register, it nevertheless provides a sufficient sense of the registral relationships linking the points and blocks within a given section for present purposes. Restated in this form we begin to see the same symmetrical and asymmetrical, conjunctive and disjunctive characteristics from Boulez's sketches appear within the sections of *Constellation-Miroir* itself. In the examples which follow, I have notated sustained notes or chords only once without displaying their duration relative to the rest of the block. In some places I have notated very short notes individually while in other places, because of context, I have linked two or three consecutive sounds together within one figure.

The Sacher sketches clearly testify to Boulez's desire to organise register in a variety of ways within *Constellation-Miroi*r. It would seem, in the light of his previously quoted statement from the 1980's, that his purpose in doing so was to articulate form and structure through directing the listener registrally within the sound space. Examination of the visual registral reductions as found in Example 4.6 a-i, however, may suggest the notion of an aural Rorschach test and may prompt us to question whether the shapes and patterns, which may be found within the registral reductions, are really within the music or merely within the mind of the perceiver. Additionally, it may be asked whether it is really possible for an analyst to now use these registral grids as an analytical tool since they were originally intended to serve as a practical means of defining registral possibilities.

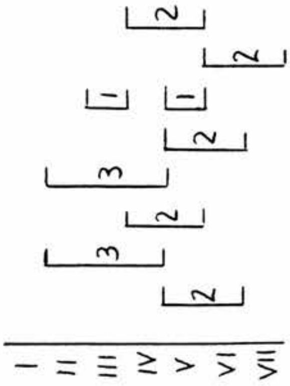
Ex. 4.6a

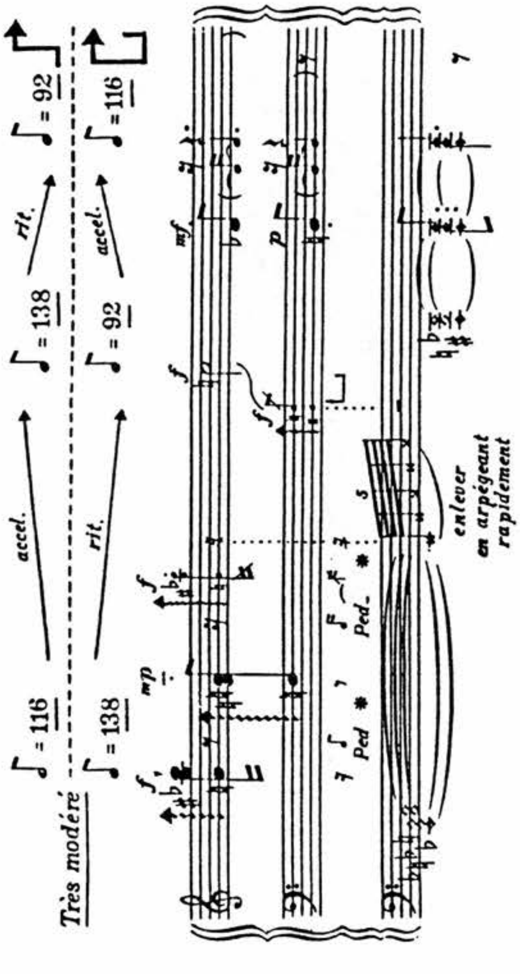

points
Vif ♩ = 152
rit.
♩ = 126
mp
mf
p
f
Ped
Ped
Ped
enlever
sec
I
II
III
IV
V
VI
VII
1
1
1
1
2

Ex. 4.6b

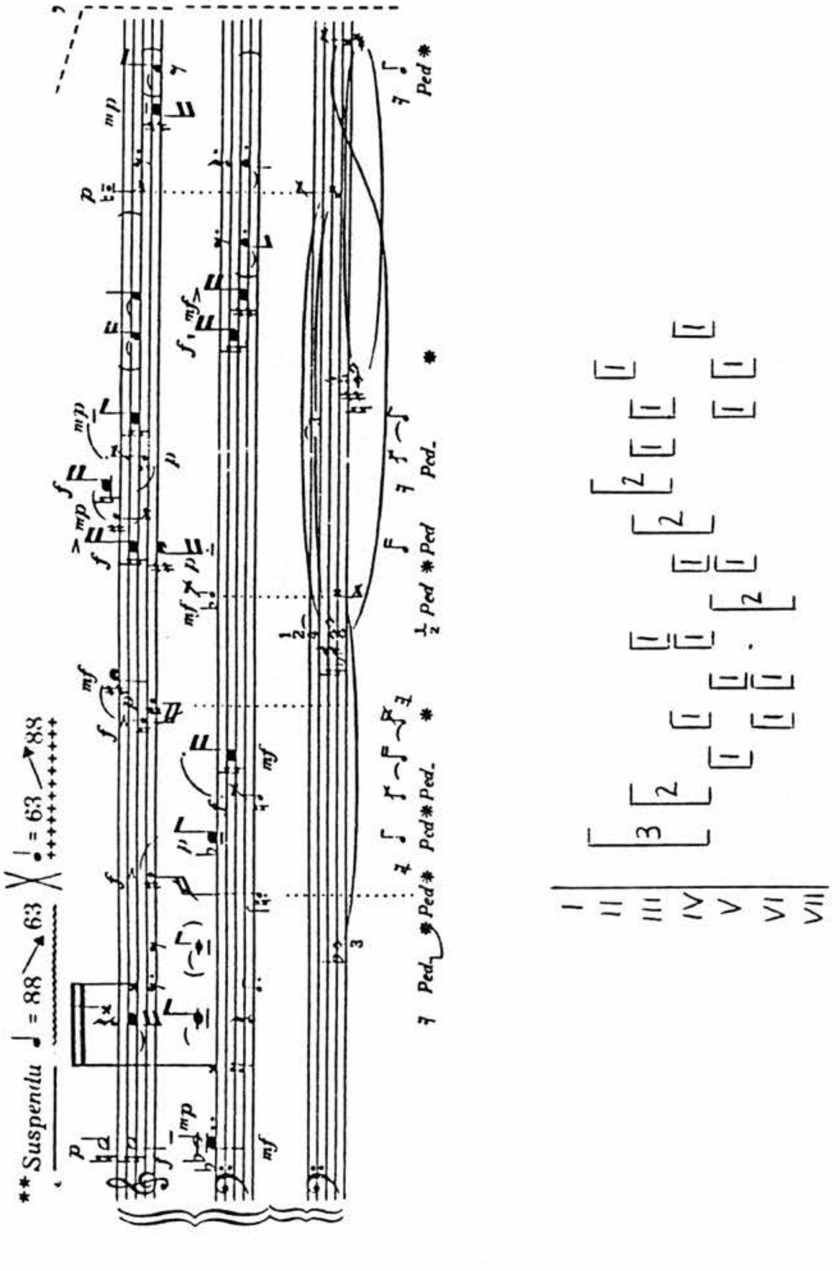

Modéré
♪ = 138
rit.
♪ = 92
accel.
♪ = 116
♪ = 116
accel.
♪ = 138
rit.
♪ = 92
mf
mp
mf
mp
f
p
f
p
Ped
Ped
Ped
I
II
III
IV
V
VI
VII
1
2
1
2
1

Ex. 4.6c

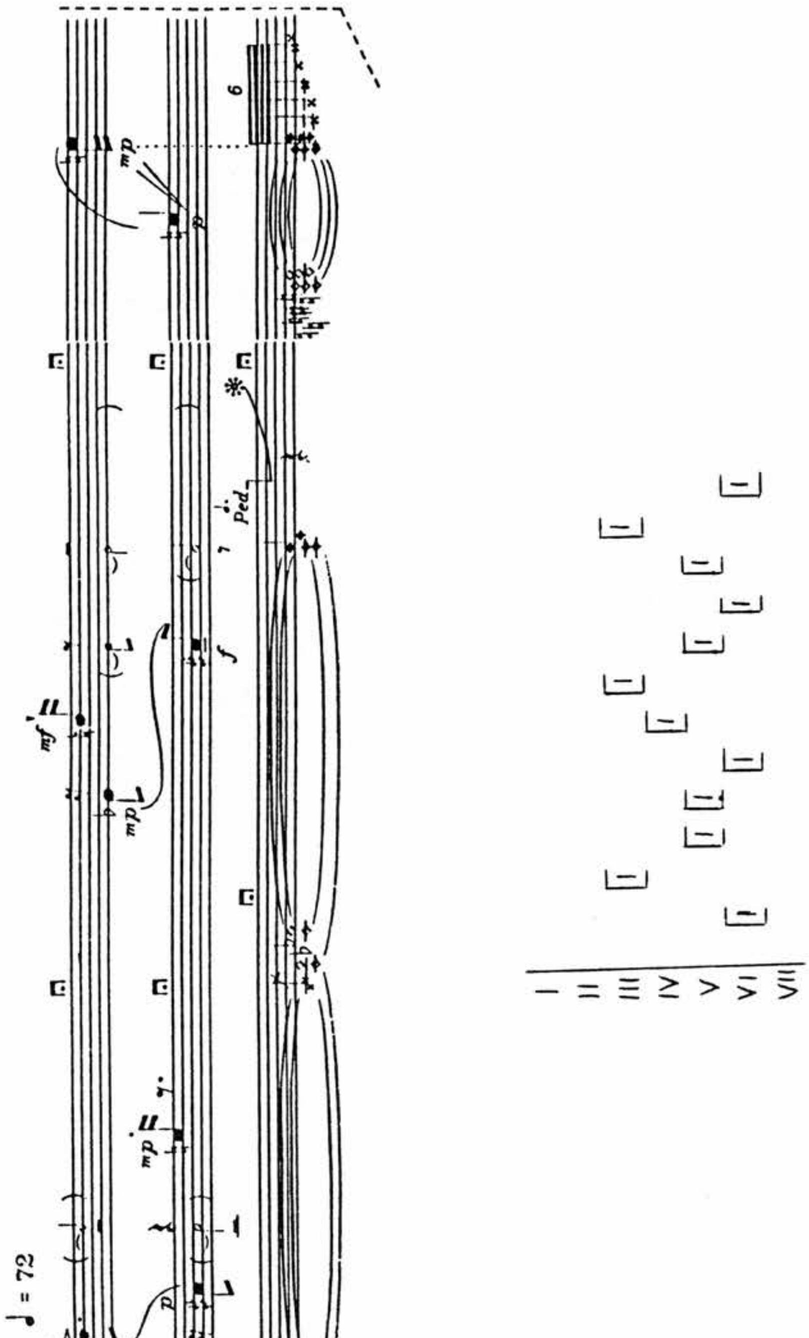

I
II
III
IV
V
VI
VII
3
3
1
2
2
2
1
2
2


Très modéré
♩ = 116
accel.
♩ = 138
rit.
♩ = 92
♩ = 138
rit.
♩ = 92
accel.
♩ = 116
f
mp
f
f
mf
p
Ped
*
Ped
*
5
enlever
en arpégeant
rapidement

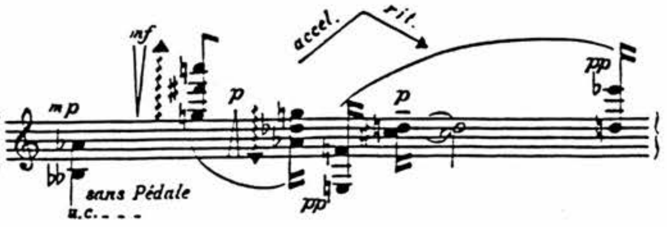
Ex. 4.6d

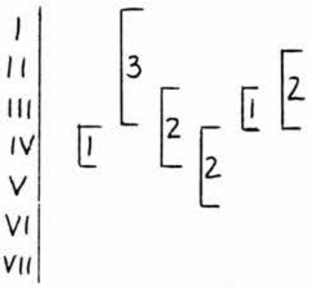

** Suspendu
♩ = 88 → 63
♩ = 63 → 88
p
mp
mf
f
Ped
Ped ✱
I
II
III
IV
V
VI
VII
3
2
1

Ex. 4.6e

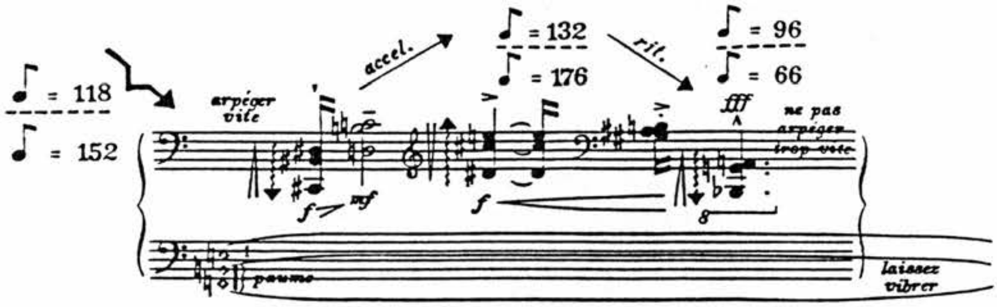

Suspendu
♩ = 72
mf
p
mp
mf
mp
f
p
mp
Ped.
6
I
II
III
IV
V
VI
VII

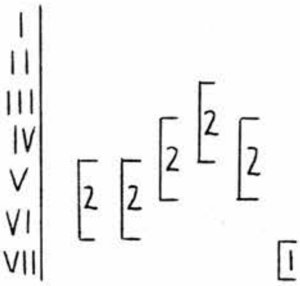
Ex. 4.6f


mp
mf
p
pp
accel.
rit.
p
pp
sans Pédale
u.c. - - -

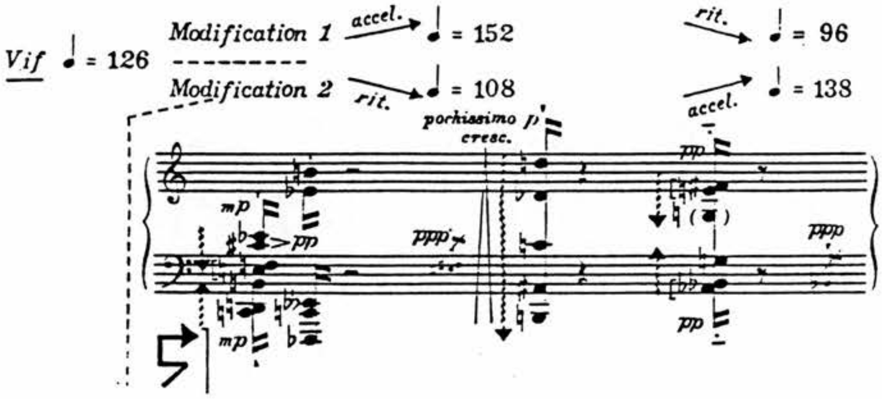

I
II
III
IV
V
VI
VII
1
3
2
2
1
2

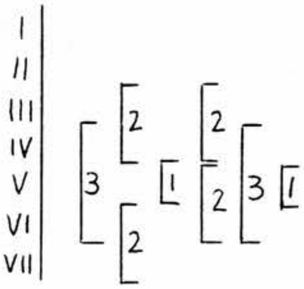
Ex. 4.6g


♩ = 118
♩ = 152
arpéger vite
accel.
♩ = 132
♩ = 176
rit.
♩ = 96
♩ = 66
fff
ne pas arpéger trop vite
f
mf
f
8
paume
laissez vibrer

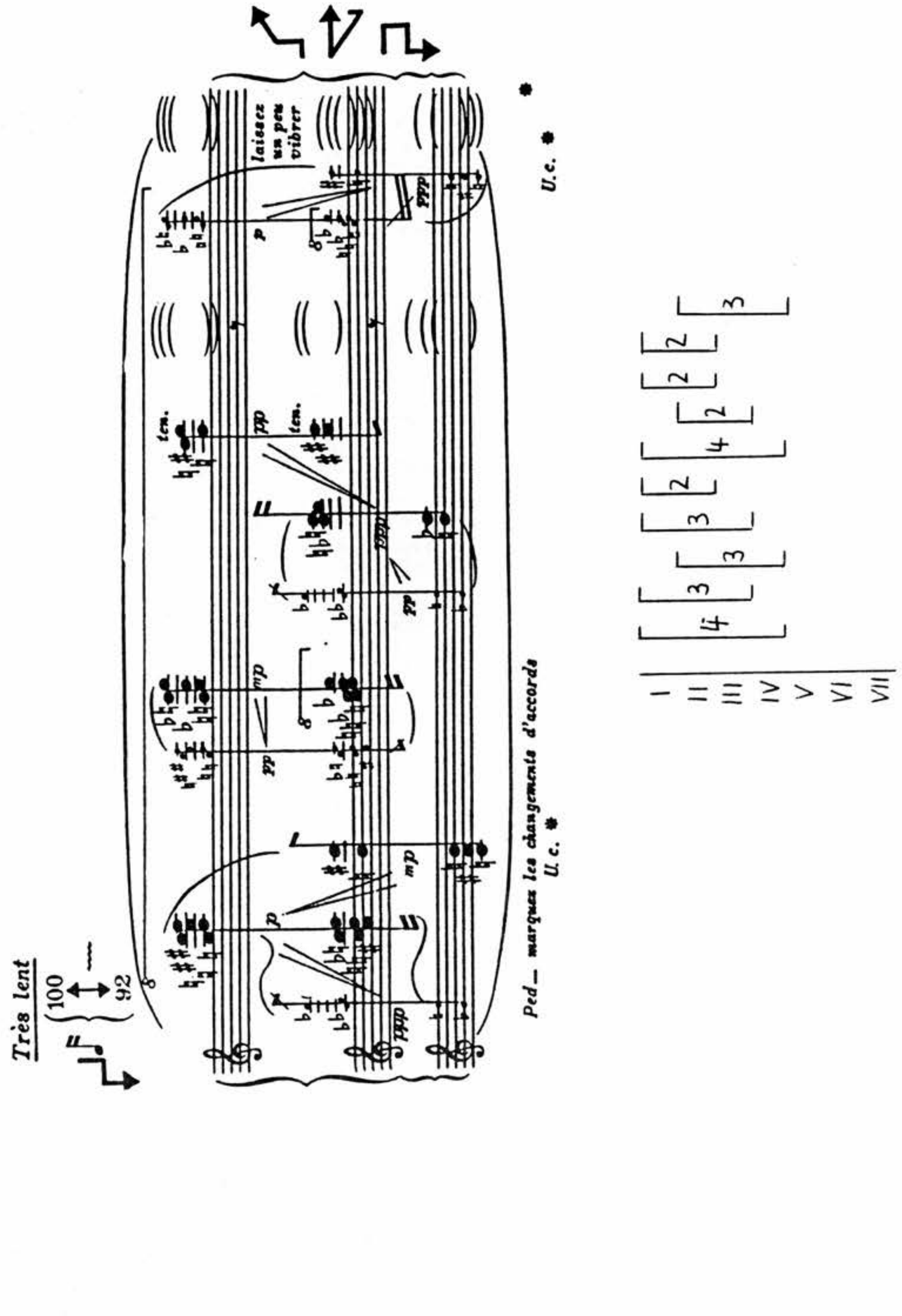

I
II
III
IV
V
VI
VII
2
2
2
2
2
1

Ex. 4.6h


Vif ♩ = 126
Modification 1
accel.
♩ = 152
rit.
♩ = 96
Modification 2
rit.
♩ = 108
accel.
♩ = 138
pochissimo p
cresc.
mp
pp
ppp
mp
pp
ppp
pp


I
II
III
IV
V
VI
VII
3
2
2
1
2
2
3
1

Ex. 4.6i

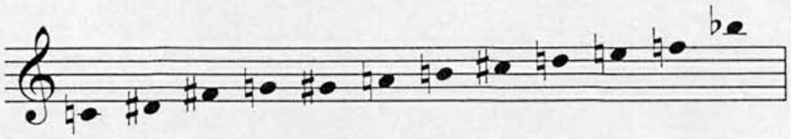

Très lent
100
92
laissez un peu vibrer
tem.
p
pp
ppp
mp
Ped_ marquez les changements d'accord
U.c.
I
II
III
IV
V
VI
VII
4
3
3
3
2
4
2
2
2
3

In the sections of *Constellation-Miroir* which I have examined there are no cases of complete symmetry. Nevertheless, the registral reductions show that Boulez does produce striking symmetries, but most often achieves greater complexity within sections through the simultaneous presence of asymmetrical elements. Examples 4.6a and 4.6b, which occur at the beginning of the piece, illustrate the point very simply. Example 4.6c is a slightly longer case which displays the same qualities, while Examples 4.6d and 4.6e are even longer again and similarly combine symmetry and asymmetry. This is no less true of the blocks sections as can be seen from Examples 4.6f-i.

The existence of the registral plans, in addition to the registral shapes which emerge from this type of analysis, provides ample confirmation that the formal articulation of register clearly concerned Boulez as he shaped the *points* and *blocks* sections of *Constellation-Miroir*. Nevertheless, the question of their aural perceptibility remains. To what extent can Boulez's registral symmetries and asymmetries, conjunctive and disjunctive motions be heard by the listener in a way which could meaningfully assist perception? Despite the clear evidence of their existence from a formal point of view, their ultimate success may rest on the criterion of perceptibility alone. Once again we need to be cautious in making judgements concerning perception since musical recognition is a highly individual phenomenon. It would be interesting to produce a full registral analysis of *Constellation-Miroir*, but such a task lies beyond the purposes of the present study. The admittedly random examples provided here seek simply to demonstrate that the deliberate shaping of pitch-space through manipulation of pitch register first became a significant concern for Boulez at the time of the *Third Piano Sonata*. From what we know, it would seem to be the case that the registral symmetries and asymmetries and the conjunctive and disjunctive motions within the piece are organised purely at the local level, at the level of the individual *blocks* or *points* section. This is perhaps the inevitable consequence of the aleatoric nature of the piece. Despite its clear rationale, the short-windedness of the individual sections may nevertheless be the greatest obstacle to their perceptibility. It seems to me to be much easier to develop a sense of local and global form when listening to the piece while simultaneously following the score. Without the score it is easier to become rather lost within the many sections of *blocks* and *points*. To this extent, while register is carefully organised at the local level, this may ultimately be at the expense of our perception of global form.

If Boulez's careful organisation of register can be seen in the late 1950's with the *Third Piano Sonata*, he acknowledges that by the time of *Répons* in the 1980's it was such that it could be more easily followed throughout an entire piece. In *Dialogue de l'ombre double* (1985), Boulez tells us that he even thought of changes in register as a kind of modulation (Interview 28.8.98), and Ramaut notes that within *Dialogue,* pitches always appear within the same octave (Ramaut 1992, p.72). Careful attention to the formal and perceptual qualities of register has persisted into the 1990's and Boulez has spoken of it as a principal determinant within the three so far completed sections of *...explosante-fixe...* In *Originel*, for example, the pitch-space is controlled by restricting all of the pitches in the solo midi-flute part to fixed registral positions. Each pitch has its allotted place and appears in no other register of the pitch-space. The twelve pitches of the chromatic scale, which are all used, can be re-ordered chromatically to provide the series which is reproduced in Example 4.7.

Ex. 4.7



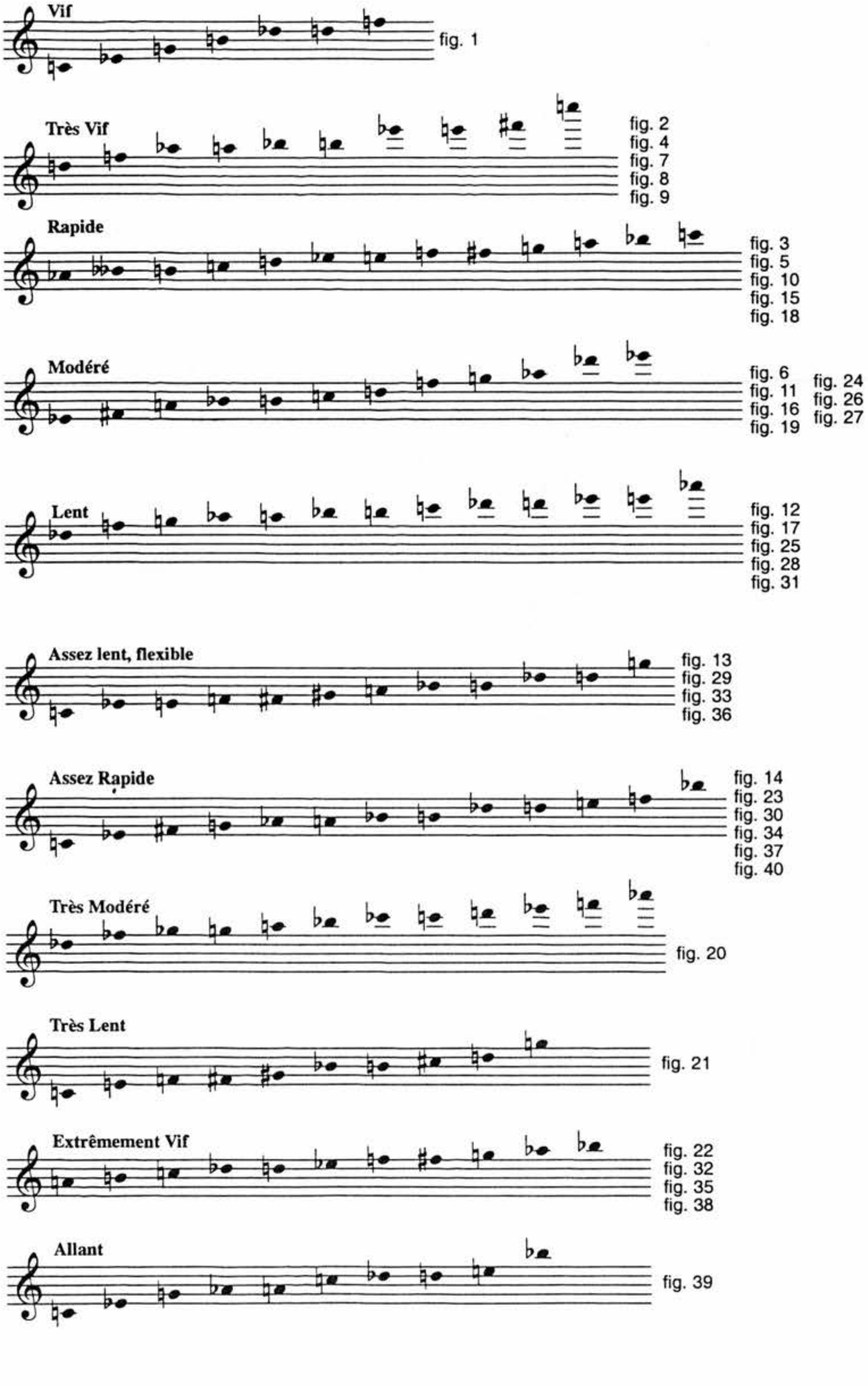
It is interesting to note that the pitches within *Originel* are arranged in such a way so as to divide the already narrow pitch-space of just under two octaves into two sections, a lower section (from middle C natural up to B natural) and an upper section (from C sharp up to B flat). All of the pitches in the solo flute part appear in these placings only. The other two flutes, which join the solo flute at eight points in the piece, likewise follow this registral placing with only two exceptions. In terms of the string instruments of the ensemble, most of the pitches played by violins 1, 2 and 3 are faithful to the fixed placings, there being less than fifty exceptions in the violin parts and only about eighty deviations within the viola and cello parts. It would be interesting to examine these parts further to see exactly where change and adaptation are most encountered. This seems to indicate that while Boulez clearly has a system, he does not follow it slavishly and is prepared to adapt or change it for good musical reasons, such as to improve the flow of a line or to spread out the parts vertically across a wider expanse at cadence points. This is confirmed in the woodwind and brass sections of the piece where, once again, although there are a significant number of exceptions and variations, much of the music does indeed correspond to the fixed pitch registers. Alternatively, it may be that there is a play of fixity and mobility at work, as Boulez theorised within the Darmstadt lectures.

In *Transitoire VII* each of the eleven different alternating sections which make up the forty sections of the entire piece similarly have their own individual pitch collections in which each note (e.g. G natural etc.) is normally assigned to a fixed registral position. Surveying the three flute parts over the entire transitoire, it can be seen that the solo midi-flute keeps to the prescribed registral positions to a very large extent while the other two flutes observe them to an important, albeit a lesser, degree. Once again, as in *Originel*, Boulez does not seem to be doctrinaire in his application of the registral grid since there are a number of exceptions to the rule.

Boulez uses register in *Transitoire VII* as a means of characterising the individuality of the sections, which feature from between one to six times in the course of the piece (Ex. 4.8). While the restrictive registral placing of pitches undoubtedly contributes to the particular character of sections, the range of the flute is such that several sections cover much the same registral space (although with different pitches). This is not a serious problem since differentiation of section by register and pitch collection is only one among several means which Boulez employs in order to articulate sections clearly.

The pitch collections for the eleven sections can be seen in Example 4.8. In collating these pitch collections from the score, I am not absolutely certain that I have always been able to identify each pitch correctly since the present score is in Boulez's handwriting and is rather difficult to read in places. In addition, I have not considered

Ex. 4.8



Vif
fig. 1
Très Vif
fig. 2
fig. 4
fig. 7
fig. 8
fig. 9
Rapide
fig. 3
fig. 5
fig. 10
fig. 15
fig. 18
Modéré
fig. 6
fig. 11
fig. 16
fig. 19
fig. 24
fig. 26
fig. 27
Lent
fig. 12
fig. 17
fig. 25
fig. 28
fig. 31
Assez lent, flexible
fig. 13
fig. 29
fig. 33
fig. 36
Assez Rapide
fig. 14
fig. 23
fig. 30
fig. 34
fig. 37
fig. 40
Très Modéré
fig. 20
Très Lent
fig. 21
Extrêmement Vif
fig. 22
fig. 32
fig. 35
fig. 38
Allant
fig. 39

the registral positions of the pitches played by the other instruments within the ensemble. Despite such analytical shortcomings it may be said in summary that in *...explosante-fixe...* Boulez clearly demonstrates that he has left behind the organisation of register at a purely local level in order to maximise its qualities for shaping global form and for facilitating greater perceptual coherence.

One final example of Boulez's manipulation of pitch register relates to *Sur Incises* (1998) in which he acknowledges using the available registral transposition of a chord to facilitate perception and form. He describes giving one piano a musical object with a particular rhythm. A second piano has exactly the same object with the same intervals but in a different register, while a third piano has a different rhythmic combination to avoid complete coincidence between the three instruments. Boulez relates this practice to his study of the first movement of Webern's *Second Cantata* in which he attributes the recognition of the chord to Webern's use of pivots (Interview 28.8.98). Unfortunately, however, no example from *Sur Incises* can be provided at the moment by way of illustration since the score has not yet been published.

As indicated already, interest in register was not restricted to Boulez alone at this time. Many of Stockhausen's works from the 1950's likewise exhibit a keen fascination with registral possibilities. Maconie has written of Goeyvaerts' structural interest in register and his influence upon Stockhausen who became familiar with Goeyvaerts' *Sonata for two pianos* (1950-51) at Darmstadt in 1951. In the second movement of the sonata the music, in a sense, rotates "cylindrically about a horizontal pitch-axis" while Goeyvaerts "narrows the available pitch range during the movement gradually from just over five to two and a half octaves." The procedure is inverted in the third movement, where the pitch range spreads over time from two and a half octaves to over five octaves. Maconie informs us that it was this idea of register-form, first encountered in the Goeyvaerts Sonata, which most significantly influenced Stockhausen's own approach to register in early pieces such as *Kreuzspiel*

(1951), the *Schlagtrio* (1952) and the first version of *Punkte* (1952) (Maconie 1976, p.7).[10]

Stockhausen has described the registral procedures within *Kreuzspiel* (1951), for oboe, bass clarinet, piano and three percussionists, in much fuller technical detail than is usual for Boulez. We are told that in the piano part of the first movement there are:

> six notes in the highest octave, and six notes in the lowest octave. During the movement, each note crosses over, one by one, passing through the seven octaves, until at the end of the movement the six notes that started in the highest octave are in the lowest, and vice versa. The development process can be clearly perceived because as each note crosses into the three middle octaves, it is picked up and played by two other instruments, bass clarinet and oboe. So the middle region gradually fills up towards the middle of the movement, and then empties again as the notes continue out to the edges. But it is a clear development, lasting all of two minutes (Stockhausen 1988b, p.55).

Stockhausen similarly describes the registral workings of the second and third movements, telling us that:

> The second movement of KREUZSPIEL begins in the middle region and spreads out until it fills all the octaves. There is the same crossing of registers as before. Finally the third movement combines the tendencies of the two previous movements simultaneously (Stockhausen 1988b, pp.55-56).

In the essay *Musique dans l'espace* (1958), Stockhausen explains that the function of the musical interval has changed from its use in Webern. While the interval was the "fundamental compositional element" for Webern, it has come to play no more than a minor role in his own music. "Listening for intervals" has been replaced by a "listening for structures" in which registral range has become more important than particular intervallic considerations (Stockhausen 1988a, pp.95-96).

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[10] Griffiths speculates that the sonata's registral practice stems from Goeyvaerts' study of Webern's *Piano Variations* and Messiaen's *Regard de l'onction terrible* from the *Vingt Regards sur L'Enfant Jesus* (1995 pp.31-32).

This new structural awareness of register is therefore a shared phenomenon linking Boulez, Stockhausen and others. Through it, compositions are formally articulated and the registral extent of the pitch-space, perhaps formerly conceived merely as a quasi pitch frame, instead becomes a primary concern for music both in terms of its form and its expression.

Polar Notes

In the Darmstadt lectures, while setting out some basic principles of serial composition, Boulez stresses the importance of avoiding any kind of intervallic relationship which conveys the conventional associations of tonality and which, in a serial context, could be said to be "inappropriate". Boulez writes of the need to avoid octaves, melodic and harmonic triads, indeed "all intervals or combinations of intervals, which have a tendency to reinstate a functional principle of identity - of structural identification". Among such forbidden intervallic relationships, Boulez includes "strongly gravitational intervals" and, in general, "combinations of intervals already assimilated into an established function" (1971 pp.49-50).

David Gable notes, however, that from *Le Marteau sans maître* onwards, Boulez begins to centre his compositions upon "a single static controlling harmony" (1990 p.444). This progressive simplification of harmonic means was a response to the extreme lack of differentiation within the integral serialist pieces. The present study has already drawn attention to Boulez's post-integral-serialist attempts to increase control over pitch in order to facilitate improved perceptibility. Despite advocating the avoidance of all intervals which could suggest tonal gravitation, Boulez began, in the early 1960's, to reintegrate significant pitches or polar centres in the quest to increase formal and perceptual coherence. It is a device which has grown in importance within his work and it features in many pieces. Boulez has expressed his satisfaction with "polarisation on a single pitch" since it provides "an element of stability" within a piece (Benjamin: BBC Radio Interview) and he has spoken, for example, of *Improvisation II* from *Pli selon pli* in which "the vocal line itself is at once syllabic and melismatic around a given note" (Boulez/Deliege 1976, p.95). He likewise draws attention to "the end of the first chapter of the second book of *Structures*" where there is "polarisation around a B flat that is repeated three times. The entire peroration is based solely on chords and sound objects pivoting around this B flat" (pp.91-92). The idea of the polar note is perhaps related to the concept of the *aura* which, for Boulez, refers to the practice of treating a sound as a centre and then surrounding it with satellites which enrich it and give it greater importance than it would have by itself (Boulez 1989a, p.373). A polar note could therefore be defined by the presence of an *aura* around it.[11]

In *Eclat* (1965), a recurrent C natural polar note is played by the bells between figures 14-19, the non-pulsed static section at the centre of the piece. Piencikowski describes this polar C natural as offering "a perfect realisation of space modified around an axis" (1985 p.78), since all of its occurrences appear in the same register (Ex. 4.9). The polar note is found at fig. 14 (V); fig. 15 (I), (IV) & (V); fig. 17 (III) & (IV); fig. 18 (I) & (II) and fig. 19 (V).

Deliège (1988) highlights the conspicuous use of polar notes within *Répons* and the fixed registers which are employed in their articulation. Deliège tells us that it is possible to follow these long polar notes which are "accentuated by timbre and register" in order to provide significant aid for the memory in tracing a path through the work. Deliège looks in particular to the possibility of marking such a pathway from "the first complex trill (reference chord - b.2) up to the entry of the second [complex trill] (one bar before fig. 2 of the score)." He perceives the functioning of this line of polar notes to be analogous to the working of a traditional melody since it

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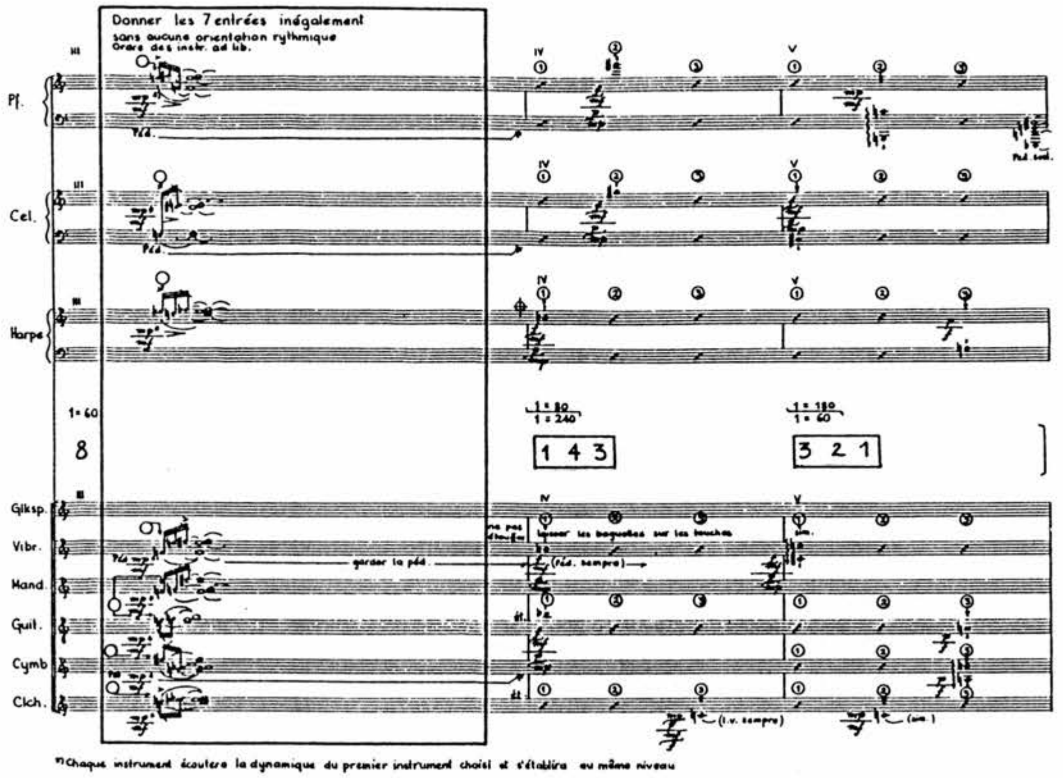
[11] Despite the move away from "classic tonality", Stravinsky, writing in his *Poetics of Music,* says that "it is no less indispensable to obey ... the axis of our music and to recognize the existence of certain poles of attraction. Diatonic tonality is only one means of orienting music towards these poles. The function of tonality is completely subordinated to the force of attraction of the pole of sonority. All music is nothing more than a succession of impulses that converge towards a definite point of repose" (1942 p.35). Again Stravinsky writes that "our chief concern is not so much what is known as tonality as what one might term the polar attraction of sound, of an interval, or even of a complex of tones .... Musical form would be unimaginable in the absence of elements of attraction which make up every musical organism and which are bound up with its psychology .... All music being nothing but a succession of impulses and repose, it is easy to see that the drawing together and separation of poles of attraction in a way determine the respiration of music" (p.36).

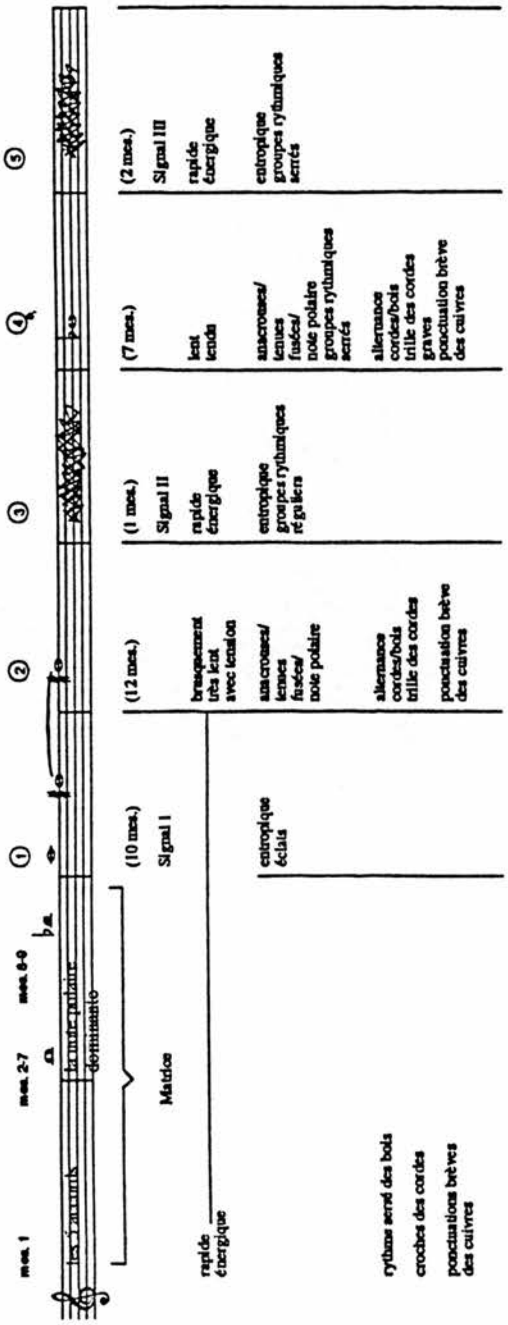
Ex. 4.9 - Eclat: fig. 15 (IV) and (V)


Donner les 7 entrées inégalement
sans aucune orientation rythmique
Ordre des instr. ad lib.
Pf.
Cel.
Harpe
Glksp.
Vibr.
Mand.
Guit.
Cymb
Clch.
1=60
8
1 4 3
3 2 1
IV
V
garder la péd.
ne pas étouffer
laisser les baguettes sur les touches
(Péd. sempre)
(l.v. sempre)
Péd.
*) Chaque instrument écoutera la dynamique du premier instrument choisi et s'établira au même niveau

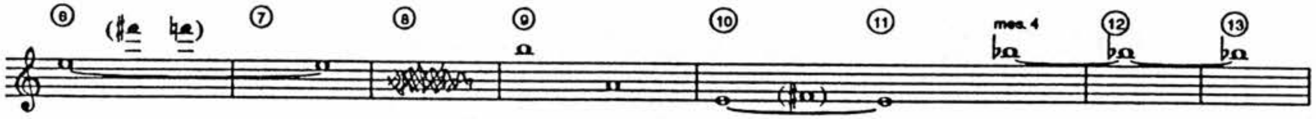
guides perception just as the conventional theme had done (1988, p.189). Since Deliège is more concerned with demonstrating the existence of the polar concept within *Répons* than with exhaustively listing its occurrences, he does not follow this kind of analytical transcription any further through the piece, though he clearly believes such a task to be performable. He limits himself instead to a brief consideration of the ways in which Boulez decorates his static polar notes with appoggiaturas, rapid figures and heterophonies.

In a study of the orchestral introduction to *Répons,* Nattiez (1993b pp.197-199) proceeds further than Deliège and has charted the incidence of polar notes from the beginning of the piece right up to the first entrance of the soloists at the end of the orchestral introduction at fig. 21 (Ex. 4.10).

Ex. 4.10

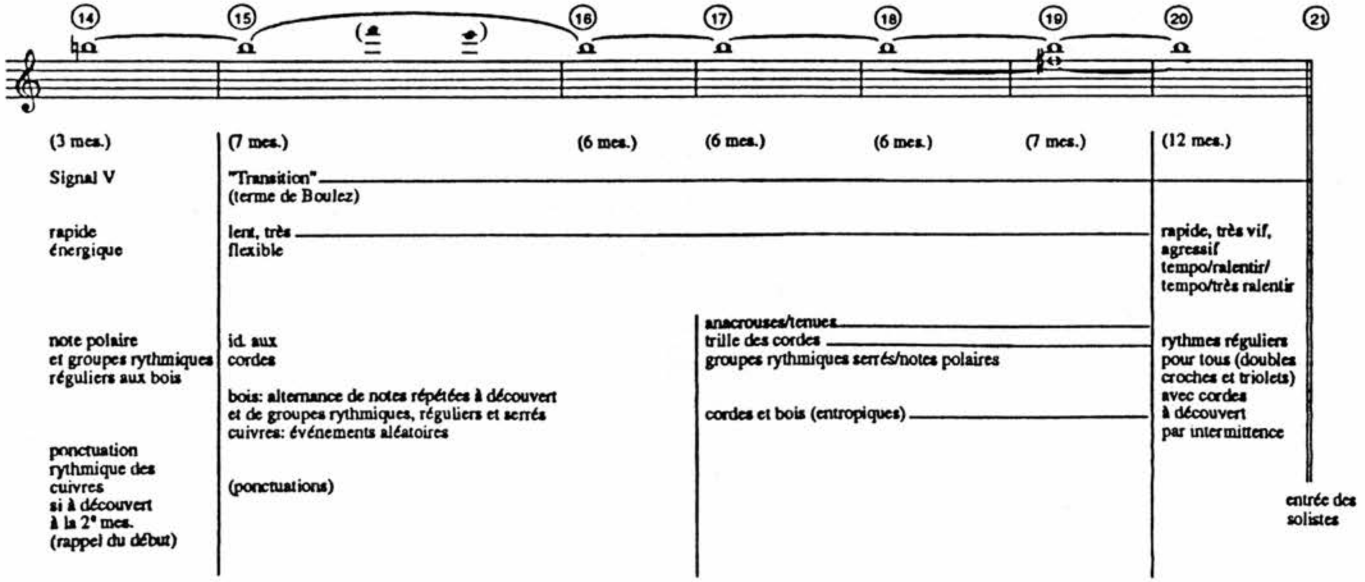

mes. 1
mes. 2-7
mes. 8-9
les 5 accords
la note polaire
dominante
Matrice
rapide
énergique
rythme serré des bois
croches des cordes
ponctuations brèves
des cuivres
①
(10 mes.)
Signal I
entropique
éclats
②
(12 mes.)
brusquement
très lent
avec tension
anacrouses/
tenues
fusées/
note polaire
alternance
cordes/bois
trille des cordes
ponctuation brève
des cuivres
③
(1 mes.)
Signal II
rapide
énergique
entropique
groupes rythmiques
réguliers
④
(7 mes.)
lent
tendu
anacrouses/
tenues
fusées/
note polaire
groupes rythmiques
serrés
alternance
cordes/bois
trille des cordes
graves
ponctuation brève
des cuivres
⑤
(2 mes.)
Signal III
rapide
énergique
entropique
groupes rythmiques
serrés

Ex. 4.10 cont.



⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬
(7 mes.)	(5 mes.)	(2 mes.)	(4 mes.)	(4 mes.)	(4 mes.)	(4 mes.)	(4 mes.)
		Signal IV					
lent, tendu sans traîner		rapide énergique	lent, tendu sans traîner	alternance lent/flexible			
anacrouses/tenues		entropique groupes rythmiques serrés	anacrouses/ tenues notes polaires et groupes rythmiques serrés des bois et cordes	fusées/notes polaires bois et cordes — groupes rythmiques réguliers et serrés			
fusées/note polaire alternées aux bois et aux cordes							
trilles des cordes	adjonction de trilles aux vents						
ponctuations aléatoires des cuivres	ponctuations régulières des cuivres		notes répétées des cuivres —		disparition progressive des cuivres		

Ex. 4.10 cont.


⑭
⑮
⑯
⑰
⑱
⑲
⑳
㉑
(3 mes.)
(7 mes.)
(6 mes.)
(6 mes.)
(6 mes.)
(7 mes.)
(12 mes.)
Signal V
"Transition"
(terme de Boulez)
rapide
énergique
lent, très
flexible
rapide, très vif,
agressif
tempo/ralentir/
tempo/très ralentir
note polaire
et groupes rythmiques
réguliers aux bois
id. aux
cordes
bois: alternance de notes répétées à découvert
et de groupes rythmiques, réguliers et serrés
cuivres: événements aléatoires
anacrouses/tenues
trille des cordes
groupes rythmiques serrés/notes polaires
cordes et bois (entropiques)
rythmes réguliers
pour tous (doubles
croches et triolets)
avec cordes
à découvert
par intermittence
ponctuation
rythmique des
cuivres
si à découvert
à la 2ᵉ mes.
(rappel du début)
(ponctuations)
entrée des
solistes

While Nattiez also acknowledges that this type of analysis could be continued further, he has not published such an analysis himself. What follows here does not complete the task, but simply attempts to take Nattiez's account a little further forward. Examples 4.11a-e chart the polar notes which feature between fig. 22 and fig. 26, a section of *Répons* in which the orchestral ensemble re-enters after the first clangorous arpeggios of the soloists in order to engage with them antiphonally.

The section between fig. 27 and fig. 31 is characterised by a series of short melodies which all conclude with a sustained pitch which may be referred to as a polar note. The sustained pitch completing each phrase is different every time. At fig. 27 (Ex. 4.12a), a very clear melody played by the strings in unison ends on a polar B flat. At fig. 28 (Ex. 4.12b) a fragmented, pointillistic woodwind and strings melody (played most clearly on clarinets) ends on a polar F natural. At fig. 29 (Ex. 4.12c) a third melody, played on clarinets 1 and 2, ends on a polar F sharp while at fig. 30 (Ex. 4.12d) a shorter figure, again played on the two clarinets, ends on a polar D flat. Finally, at fig. 31 (Ex. 4.12e), a melody played on the first violins ends on a polar B natural. In all of these cases, the polar note at the end of each orchestral section is sustained throughout the gamelan-like sounds of the soloists, creating an audible sense of coherence and line. It is this functional provision of stability which justifies their description as polar notes.

Béatrice Ramaut refers to the use of polar notes within *Dialogue de l'ombre double* (1985) as one of three pregnant gestures within the piece. She draws particular attention to the low D natural which "returns at the end of each phrase as a fundamental note." For Ramaut, whose study is centred upon certain musical citations which Boulez has integrated within *Dialogue*, the low D natural polar note is a borrowing from Berio's *Chemins V* (1980, withdrawn), a not entirely surprising connection since *Dialogue* was written to mark the occasion of Berio's sixtieth birthday. According to Ramaut, Boulez has compared the constant return of the low polar D within *Dialogue* to the traditional antiphonal treatment of the psalms. She tell us that "this low D moreover organises a transformation of space, since at each of its returns the loudspeakers which diffuse the clarinet double change" (1992 p.71).

Ex 4.11a- e

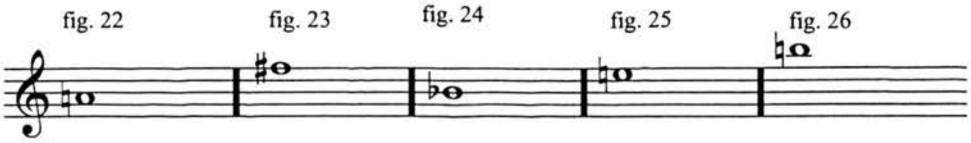
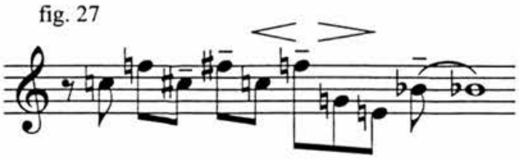
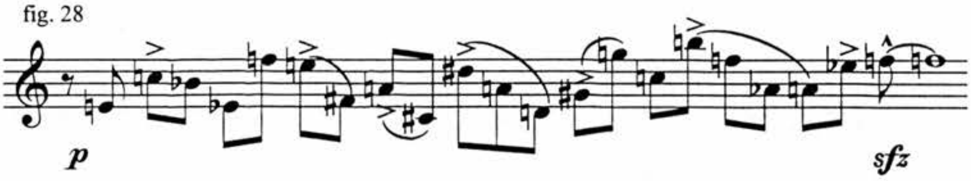


fig. 22
fig. 23
fig. 24
fig. 25
fig. 26

Ex 4.12a



Ex 4.12b



Ex 4.12c

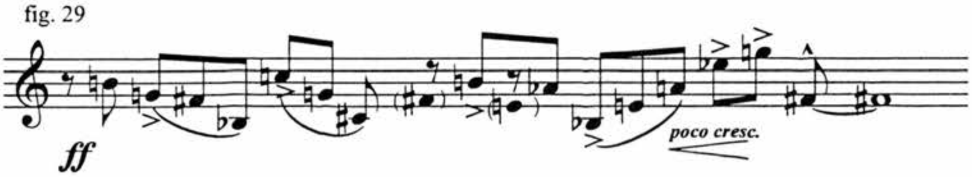
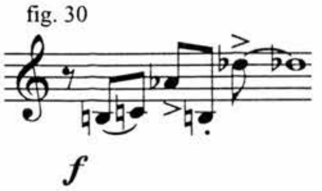
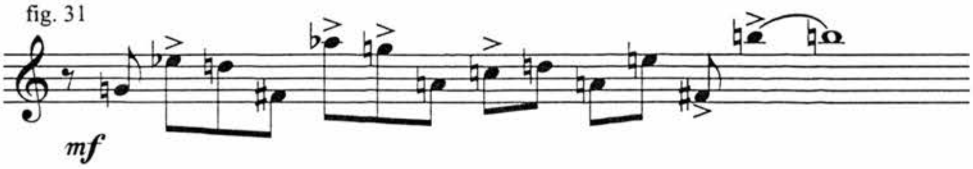


fig. 29
ff
poco cresc.

Ex 4.12d



Ex 4.12e



She says that "the homage to Berio is rendered ... three times, always around fleeting polar notes at the end of a phrase or ... as a vanishing point, in the perspective of which everything is heard" (p.72). Ramaut similarly reveals a second citation from Stockhausen's *Im Freundschaft* which, in Boulez's *Dialogue*, takes the form of a polar note which is characterised by its vibrato (p.73).

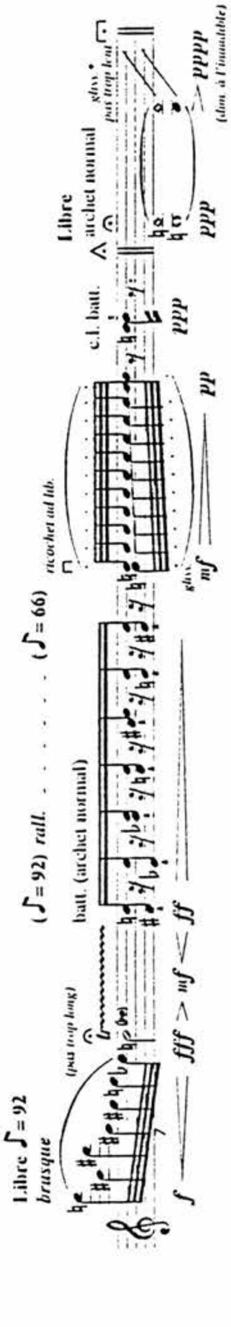
In *Rituel* (1974-75) and later in *Memoriale* (1985) (alternatively *Originel* from *...explosante-fixe...*), which are both derived from the same basic musical materials, Boulez uses the pitch Eb as a polar centre. In *Rituel,* the sections move cadentially towards the always-unison E flat. Piencikowski tells us that all three so far completed sections of *...explosante-fixe...* use "an axis of symmetry assuring the function the centre of gravity." *Transitoire VII* is centred on A flat, *Transitoire V* on A natural while *Originel*, as already explained, is centred upon E flat (Piencikowski 1995, p.9).

One of the most obvious functions of the polar E flat within *Originel* is its return as a final at the end of each of the six cadences which punctuate the work (cf. Ex. 3.13). While E flat is clearly the polar pitch centre of the entire piece, sub-polar centres can also be heard locally in the mostly rather short-winded sub-sections. In *Transitoire V,* the long trilled notes (A, E and D) in the *Rapide* section from fig. 2 may be perceived as polar notes, as may the trilled B flat, F sharp, B natural, C natural etc... in the forty three bars of the *Rapide* section beginning at fig. 34. Likewise, there seem to be held B flat/B natural polar notes (or pedal notes) in the *Lent, calme, régulier* section from fig. 40.

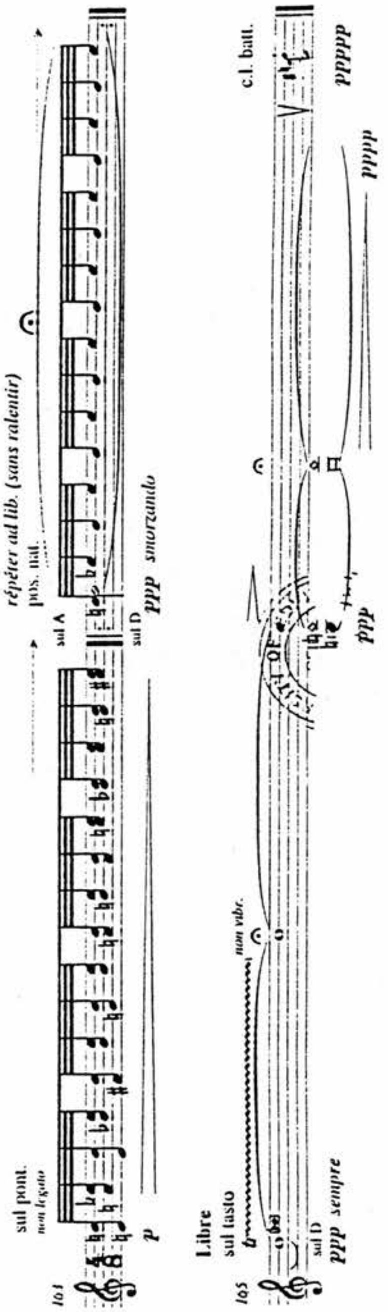
Much of *Anthèmes* for solo violin (1992) centres around a polar D natural. The seven note flourish which begins the piece leads into a D natural trill which sets up the central polar note of the entire piece. It is reiterated throughout the first bar (Ex. 4.13a) and is also used to end the piece (bs 163-165) (Ex. 4.13b). It returns as the central polar pitch in the reiterated glissandos which all feature D natural as their stable reiterated pitch. This, plus a series of upwardly spread chords which all

Ex. 4.13a & b

Ex 4.13a


Libre ♪ = 92
brusque
(pas trop long)
(♪ = 92) rall.
batt. (archet normal)
(♪ = 66)
ricochet ad lib.
c.l. batt.
Libre
archet normal
gliss.
pas trop lent
f
fff > mf < ff
mf
pp
ppp
ppp
pppp
(dim. à l'inaudible)

Ex 4.13b


101
sul pont.
non legato
p
sul A
sul D
répéter ad lib. (sans ralentir)
pos. nat.
ppp smorzando
105
Libre
sul tasto
sul D
ppp sempre
non vibr.
ppp
c.l. batt.
ppppp
ppppp

feature D natural as their upper note, guarantees that D natural is the central polar pitch between bs 144-165.

While the score of *Sur Incises* (1998) is as yet unavailable and no commercial recording has been produced, the world premiere of the thirty-five minute version of the piece at the 1998 Edinburgh Festival clearly revealed the presence of several polar notes which help to articulate the overall shape of the piece and provide perceptible points of recognition. This would seem to confirm that polar notes have continued to be a significant part of Boulez's compositional practice from the 1970's right up to the present.

Exterior Spatiality

Having considered four distinct aspects of Boulez's treatment of interior pitch-space, we turn now to his use of the exterior performance space. In *Boulez on Music Today*, Boulez describes the external performance space as a "fifth dimension" or parameter of music. He suggests that the external positioning of musicians, instruments, electronics and audience within a performance space should merit the same attention and refinement as the other parameters have been given, since it has been "almost always reduced to altogether anecdotal or decorative proportions" (1971 pp.66-70). Before looking to the specifics of Boulez's practice, we will briefly review the spatial practice of Varèse, Stockhausen and Xenakis, three composers whose compositions have often, like those of Boulez, exploited the performance space as a primary dimension.

Experimentation with sounds in the exterior sound space is not an exclusively twentieth century phenomenon. In the Renaissance, composers such as Ockeghem, Willaert, and Giovanni Gabrieli created antiphonal and polychoral, spatial effects through the separation of choirs within the performance space (coro spezzato). Stockhausen recalls the development of such procedures and draws our attention to the Baroque echo effects within Mozart's *Serenata Notturna* (K.239) and *Notturno*

(K.286) as well as the spatial effects used by Berlioz in his *Requiem* for two orchestras and choir (Stockhausen 1988a, pp.78-79).

Edgard Varèse has been a highly significant influence upon the manipulation of the exterior sound space in the early twentieth century. We have already discussed the importance of registral space within his work. If manipulation of the internal registral pitch-space is important to Varèse, the exterior performance space is no less so. In a radio interview, Varèse spoke of *Intégrales* (1924-25), asking his listeners to:

> visualize the changing projection of a geometrical figure on a plane, with both plane and figure moving in space, but each with its own arbitrary and varying speeds of translation and rotation (Varèse, quoted in Bernard 1987, p.7).

For Jonathan Bernard, this description clearly legitimates a spatial understanding of *Intégrales* (1987 p.7). Unfortunately, for Varèse, the musical means necessary for the realisation of his spatial dreams were not yet available and such music would only be made possible with the development of electronic and computer resources. In the lecture *Spatial Music* (1959), Varèse commented upon the habit of certain music critics of describing his music in phrases such as "sound masses molded as though in space" (1998 p.205). Varèse responded by saying that in his earlier pieces their descriptions were "still only ... an aural illusion, so to speak, and not yet literally true." He believed that the first genuinely successful achievement of spatial projection within his own music occurred in 1958 with the *Poème électronique*, a collaboration with Le Corbusier for performance in the Philips Pavilion at the Brussels World Fair. This production involved the use of 425 loudspeakers which were dispersed throughout the building and linked by several amplifiers in order to facilitate a variety of "sound routes" for the taped music. The sound could accordingly travel around the pavilion, change direction, reverberate and so on. Bernard goes so far as to suggest that for Varèse "space is something which both expresses and is expressed by music", which is exactly the point the present study wishes to make concerning the place of external spatiality within Boulez's music.

In the 1958 article, *Musique dans l'espace,* Stockhausen dates the emergence of spatial music to the years 1955/56. As Boulez would later do in his Darmstadt lectures, Stockhausen refers to the exterior sound space as an "independent parameter" and asks whether this "fifth sound parameter" can be treated as the equal of the other four (1988a p.85; p.92). For Stockhausen, the movement of sound within the performance space had become "fixed" and consequently "neutralised" until twentieth century experiments freed it to open up a variety of spatial perspectives for the listener (Stockhausen 1988b, p.101).

In practical terms, Stockhausen first attempted to enhance perception of exterior space in *Gesang der Jünglinge* (1955-56) (Stockhausen 1988a, p.79) which is the first instance of electronic spatial music. In this piece Stockhausen situated the audience in a space with four loudspeakers around them and one in front of them in such a way that they were "within the sound" (Kurtz 1992, p.84). The audience are similarly treated in *Gruppen* (1955-57), where they are placed between three orchestras, as in *Carré* (1959-60) for four orchestras and four choirs. At the Osaka World Fair in 1970, Stockhausen set up an acoustic situation in which he was able, in his own words, "for the first time in history to have the sound moving in a controlled way around the listener, with the listener at the centre." The listeners were surrounded by speakers as Stockhausen manipulated the sounds in a variety of ways around them, for example, rotating them in whatever direction he chose in a "free spatial composition" (Stockhausen 1988b, pp.103-105). Stockhausen continued to develop many different means of using the exterior space. In works such as *Fresco* (1969), *Sternklang* (1971) and *Alphabet für Liège* (1972), the audience is permitted to move around in order to hear the music "from different but equally legitimate perspectives" (p.151). In the epic operatic project, *Licht*, the music consists not only in what happens when the curtain rises but is also played in the foyer and in the corridors of the opera house before and after the stage action, while the audience arrives and leaves.

Xenakis's study of architecture and geometry likewise stimulated within him an interest in the movement of sound within a performance space. The invention of musical spaces which he can shape is consequently an important priority (Matossian 1986, p.210). In his 1958 article, *Sur un Geste Electronique*, Xenakis suggests that sound can mark out "the geometric and mathematical properties of space" (quoted in Matossian 1986, p.213) going so far as to say that "everything which can be said of Euclidian space can be transposed to an acoustic space." In time, Xenakis advanced through Euclidian geometry, projective geometry and group theory in an effort to create interesting sound spaces (p.214).[12]

As with *smooth* and *striated* pitch-space, Boulez provides his own taxonomy of external spaces in *Boulez on Music Today* (1971 pp.66-70). He opposes the idea of "*space-glissandi*" and any manipulation of sound-space which tends to "recall realistic movements much too faithfully" without explicitly naming the target of his objections. For Boulez, ideas which rely on simple geometric forms such as circles or ellipses lack refinement. He would prefer instead to create "Brownian movements" in the distribution of sounds in the performance space (p.67). Boulez suggests that performers can conform to a *fixed distribution* or a *mobile distribution* within a concert space. Mobile distribution, in turn, can operate through either conjunct or disjunct movement. Boulez attempts to explain these concepts with an example based upon the possibilities which can be developed from the sounding of two identical chords at two separate points in the performance space. He describes some of the effects which can be achieved through their sounding from two sources with varied phasing. In *Conjunct movement*, one chord sounds and is later joined by the second sound while the first is still sounding. At this point, the first sound dies away to allow the second sound to be heard. *Disjunct movement*, in contrast, involves the interruption of the independent soundings of the two chords by a perceptible silence of varied length (p.68).

Several of Boulez's works carry specific instructions for novel fixed distributions of performers within the space. In the *Second Improvisation on Mallarmé* from *Pli selon pli* (1958) he places "the instruments on the platform in such a way that the three different kinds of sounds - fixed pitch, partially pitched, and unpitched ('noise') - blend with one another" (Boulez 1986, p.157) (Ex. 4.14).

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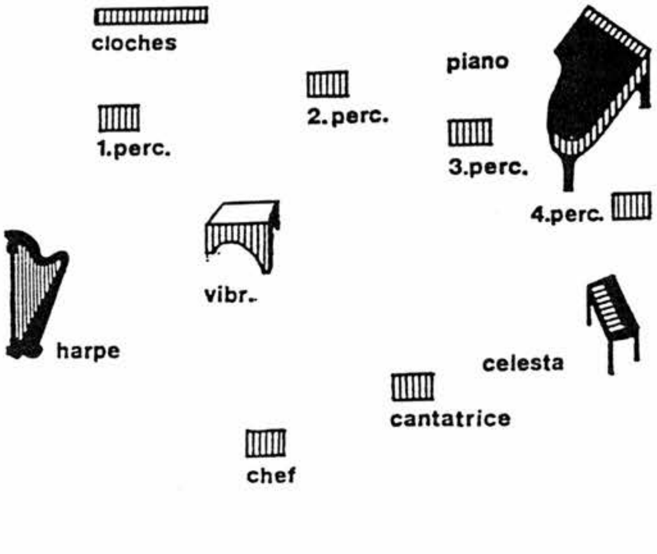
[12] Matossian tells us that Xenakis "took the model of sound as a cloud of elementary particles occupying a volume in a four-dimensional space" (1986 p.133). *Terretektorh* (1965-66) is "his first spatial music" (p.215).

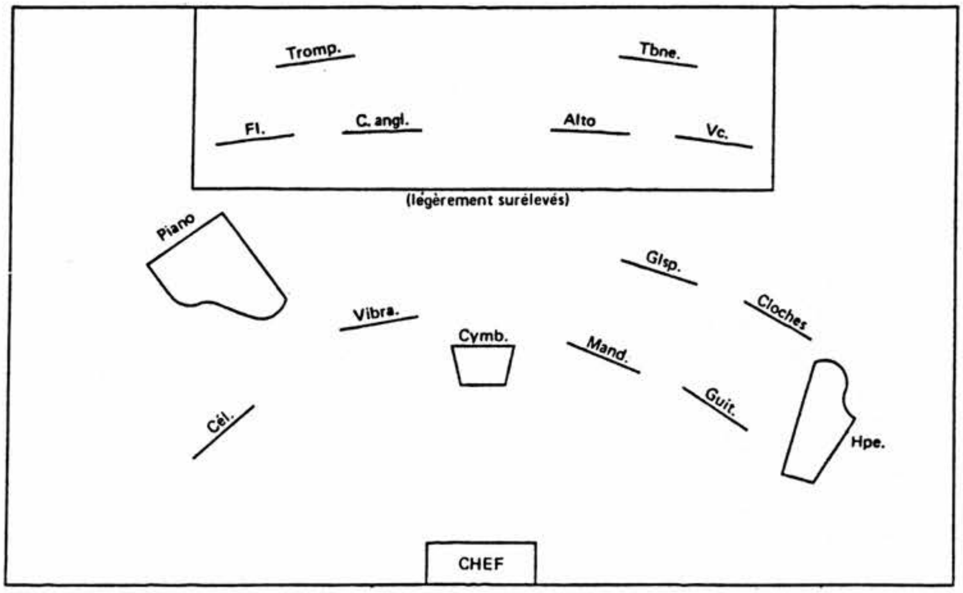
In *Eclat* (1965), the fixed ensemble is split into two groups, "those whose resonance dies unless sustained by trills; and those whose sound is maintained by breath or by some movement on the part of the player, and which may also be inflected by trills" (Jameux 1991, p.336) (Ex. 4.15).

Rituel (1974-75), which Boulez composed in memory of his recently deceased friend, Bruno Maderna, is written for an orchestra which is divided into eight instrumental groups of increasing size plus a very large amount of percussion. A percussion player is assigned to each of the instrumental groups although the eighth group has two percussionists (Ex. 4.16). Although the instrumental groups within *Rituel* are commonly accommodated upon a single platform, this is not Boulez's preference. He recalls with relish a particularly successful performance of *Rituel* which he conducted at *La Villette,* in which the groups, like the audience, were placed all around the hall and very far away from one another. This created a "spectacular" effect since the sound consequently emanated "in all directions" (Interview 28.8.98).

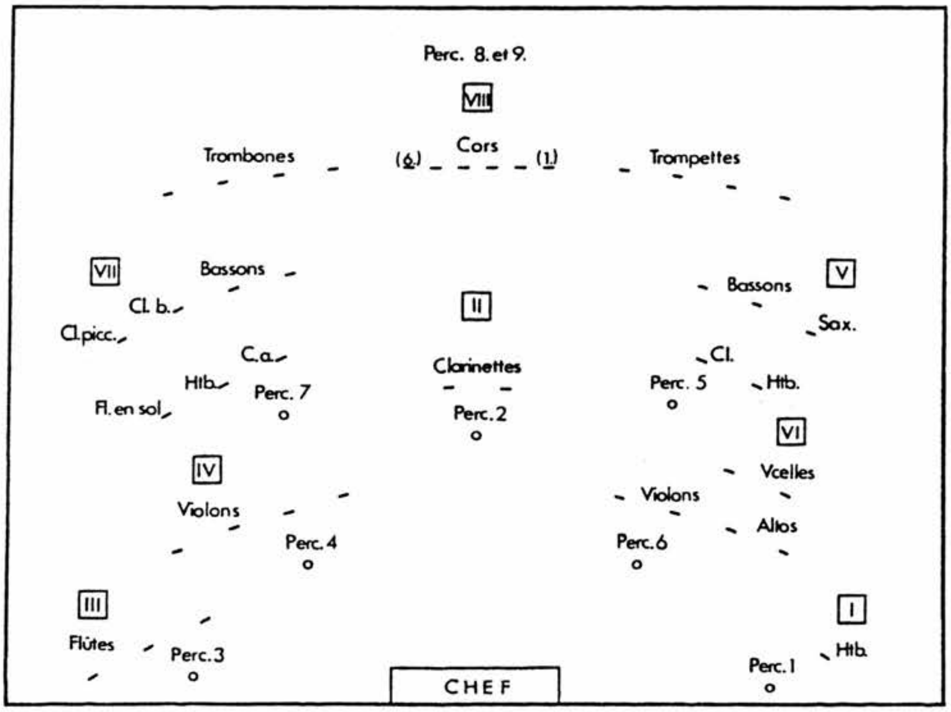
Ex. 4.14 - Improvisation II



Ex. 4.15 - Eclat

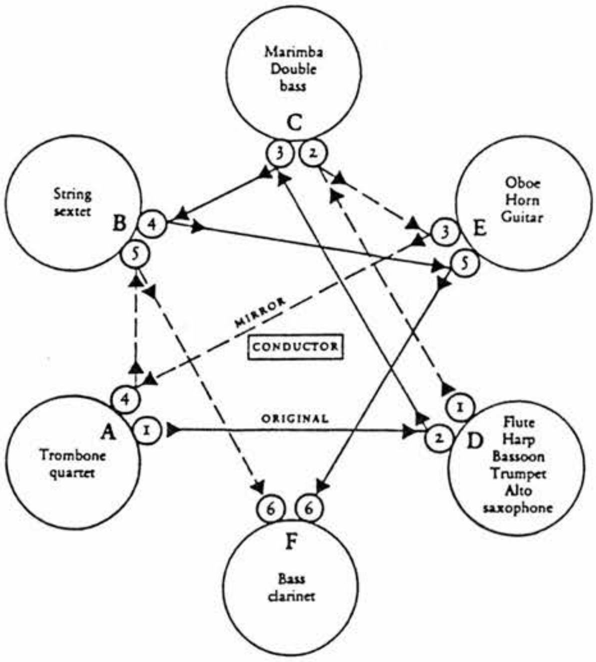

Tromp.
Tbne.
Fl.
C. angl.
Alto
Vc.
(légèrement surélevés)
Piano
Glsp.
Cloches
Vibra.
Cymb.
Mand.
Guit.
Cél.
Hpe.
CHEF

Ex. 4.16 - Rituel


Perc. 8. et 9.
VIII
Trombones
(6) Cors (1)
Trompettes
VII
Bassons
Cl. b.
Cl. picc.
C.a.
Htb.
Perc. 7
Fl. en sol
II
Clarinettes
Perc. 2
V
Bassons
Sax.
Cl.
Perc. 5
Htb.
VI
IV
Violons
Perc. 4
Vcelles
Violons
Altos
Perc. 6
III
Flûtes
Perc. 3
I
Htb.
Perc. 1
CHEF

Performer mobility is a characteristic feature of *Domaines II* for clarinet solo and six instrumental groups (1961-68). The clarinet soloist performs from six double sheets of music marked A,B,C,D,E and F (Ex. 4.17). In the first half of the piece, the *Original*, these are played in any order chosen by the soloist, who positions her/himself in front of the relevant instrumental group, while in the second part, *Miroir*, the conductor decides on the order of the sections with the soloist intervening after each one with a *Miroir* section. Jameux, who informs us that there are 518 400 possible successions for *Domaines II*, says that "the route of the work may be understood in a spatial sense, since the soloist changes his position in relation to the circle of instrumental groups." Boulez himself says that there is no better way of visualising a structure than to make it a visible part of the performer's route (Boulez/Deliege 1976, p.87).[13]

Ex. 4.17 - Domaines II (Jameux 1991, p.345)


Marimba
Double
bass
C
3
2
String
sextet
B
4
5
Oboe
Horn
Guitar
E
3
5
MIRROR
CONDUCTOR
4
A
1
Trombone
quartet
ORIGINAL
1
2
D
Flute
Harp
Bassoon
Trumpet
Alto
saxophone
6
6
F
Bass
clarinet

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[13] Other examples of pieces involving musicians who move around the performance space include Berio's *Circles*, Stockhausen's *Harlekin* for solo clarinet (1975), and Nunes's *Quodlibet* (1990-91). Nono's *Caminantes* (1986-87) and *No hay caminos, hay que caminar* (1987), both arrange the orchestral musicians in various groupings.

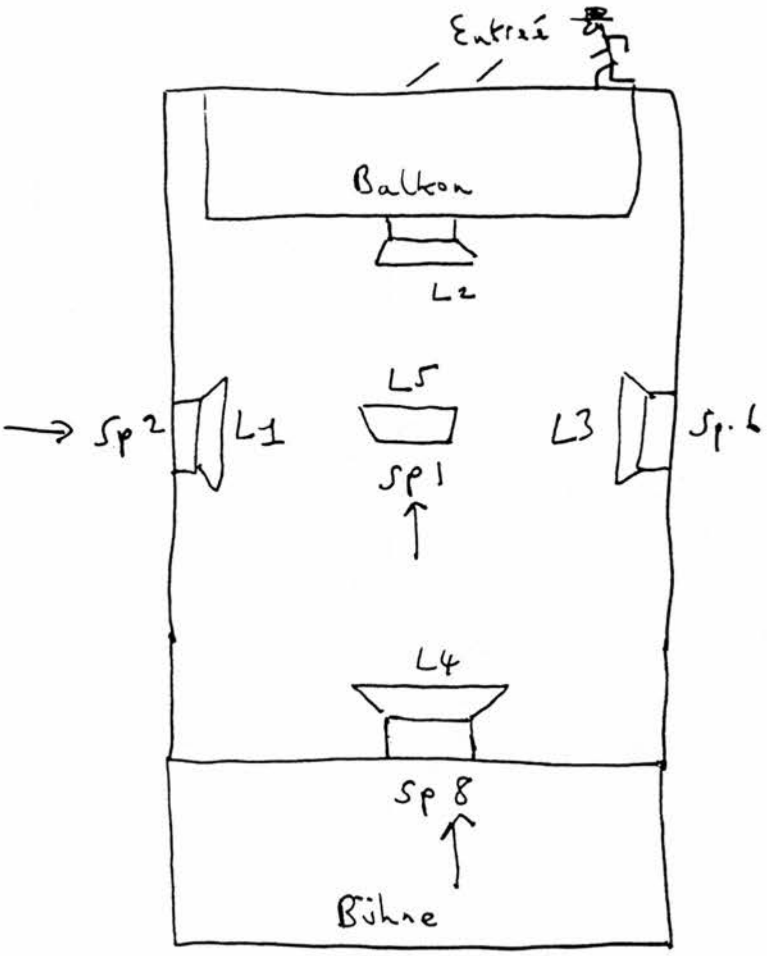
Apart from the fixed and mobile distribution of performers within the exterior space, Boulez, like Varèse, Stockhausen and Xenakis, also sought to produce what has come to be known as the *spatialisation* of sound. This refers to the projection of sound around the performance space. Boulez first attempted this in *Poésie pour pouvoir* (1958) which was also his first attempt to link acoustic and electronic instruments. The piece, which was only ever performed once (at Donaueschingen), involved three orchestras, 84 loudspeakers and pre-recorded tape. Four loudspeakers were arranged on each of the four sides of the hall. The rest were spread out along the walls either on their own or grouped together. The three orchestras were arranged on platforms in a spiral shape in front of the audience and a number of loudspeakers were suspended from the ceiling and revolved during the performance in a variety of ways. Electronic sounds emanated from the speakers at the sides of the hall and the three orchestras entered the proceedings in different combinations, sometimes with electronic sound and at other times without. At other points, the electronic sound from the loudspeakers was heard on its own (Helm 1958, p.676). The conception was for the raised orchestras to form a rising spiral which would be continued and completed by the suspended loudspeakers (Interview 28.8.98). Boulez's plan for the spatial layout of the loudspeakers, recorded in the form of a sketch in the *Paul Sacher Stiftung*, can be seen in Example 4.18 (microfilm no 140, p.551).

Everett Helm, in a scathing review of this Donaueschingen performance, described the close of the work as follows:

> The music stops, and the work is at an end. Lukewarm applause. No sensation. A few abortive catcalls. The show is over, and nobody knows what the point of the whole thing was .... Was it perhaps to recall to our minds that music is heard in space, that orchestras can be divided? (1958 p.676).

While one of the most significant purposes of *Poésie pour pouvoir* was indeed to emphasise that "music is heard in space", Helm clearly placed a lower valuation on this enterprise than the present study does. Nevertheless, *Poésie pour pouvoir* was not a successful experiment for Boulez. He was unhappy with the incongruous mix

Ex. 4.18 - Sacher Stiftung: microfilm 140, p.551
Author's tracing from Boulez's sketch



of sounds which were produced by the electronics, acoustic instruments and tape (Jameux 1991, p.115) and he consequently withdrew it after its one and only performance. After *Poésie pour pouvoir* Boulez turned away from electronic media, since he was determined to settle for nothing less than a type of composition in which electro-acoustic means could be somehow integrated within the real-time conditions of a live performance. Over the next few years, Boulez restricted his exploration of the exterior space to what could be achieved by traditional acoustic instruments. Piencikowski refers, for example, to the spatial distribution of instruments within *Figures Doubles Prismes* and to the variations in sonority which result from the variable use of constituent, instrumental groups (1990 p.5).

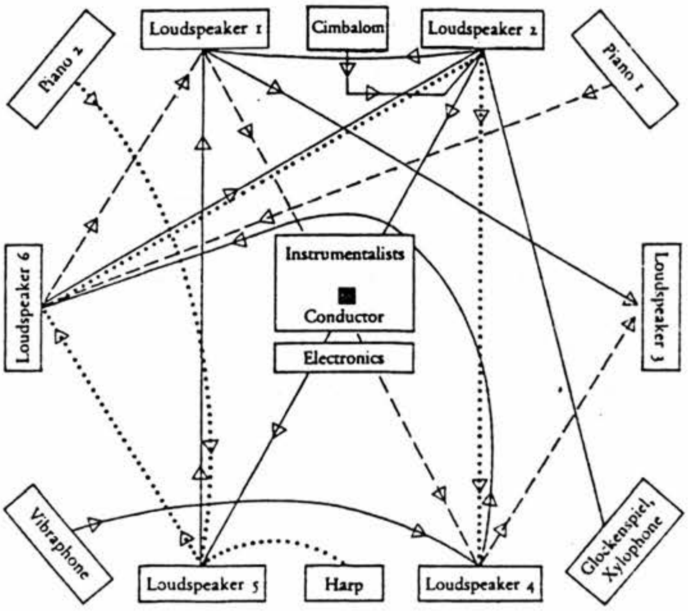
Boulez's next attempt to integrate acoustic instruments with electro-acoustic means resulted in the first version of *...explosante-fixe...* (1971) which, like *Poésie pour pouvoir,* proved to be unsatisfactory and was similarly withdrawn. Once again, the spatialisation of sound was a primary intention of the piece. Unlike its predecessor, however, the development of new computer technology at IRCAM allowed Boulez to take up the piece again in 1979 but this attempt was again unsuccessful. It was only in the early 1990's that Boulez finally managed to complete three sections of *...explosante-fixe...* in a satisfactory, definitive form allowing the kind of performance possibilities which he sought.

Boulez's most far-reaching experiment in the manipulation of external musical space has been *Répons* (1981-84) for instrumental ensemble, six soloists, six loudspeakers and electro-acoustic equipment. *Répons* undoubtedly marked Boulez's return to the previously unsuccessful spatialisation project of *Poésie pour pouvoir*, creating an externally spatial music through the amalgamation of acoustic and electronic resources. The piece cannot be performed in a traditional concert hall due to its special acoustic requirements. Consequently it was, at first, performed in moderately large, square or rectangular, "neutral" spaces until the opening of the state of the art *Cité de la Musique* in Paris.

In *Répons*, the instrumental group of twenty-four players is placed on a central platform where it is directed by the conductor (Ex. 4.19). Its sound is neither amplified nor electro-acoustically transformed. Six soloists are situated at the extremities around the hall playing instruments which have been chosen for their resonance and "capacity to respond to electro-acoustic treatment." The audience is situated "between the instrumental group and the soloists and loudspeakers."

All of the soloists have tape-recorders which, for part of the piece, play sounds which have been synthesised by computer (originally the 4X computer). The taped music is heard through loudspeakers which are positioned above each of the soloists, but there are also six large loudspeakers which are placed above and between the six soloists. The original computer technology for *Répons* was placed in front of the main instrumental ensemble where it was operated by the production assistant. The main electronic components which were employed in the 1980's when successive versions of *Répons* were being created (the 4X computer, the PDP 11/55 computer and the halaphone) have all been overtaken by technological advances which have consigned them to the status of historical "period instruments" (Boulez's joke!). Nevertheless, it is important to acknowledge that it was with this particular technology that Boulez was first able to facilitate real-time alteration of sound.

Ex. 4.19 - Répons (Jameux 1991, p.363)


Loudspeaker 1
Cimbalom
Loudspeaker 2
Piano 2
Piano 1
Loudspeaker 6
Instrumentalists
Conductor
Electronics
Loudspeaker 3
Vibraphone
Glockenspiel, Xylophone
Loudspeaker 5
Harp
Loudspeaker 4

The 4X computer, which was developed by Giuseppe Di Giugno at IRCAM around 1980, was an extremely powerful machine capable of performing 200 million operations per second, thus enabling the instant manipulation of the "real-time" sounds "produced by the soloists". A second machine, the PDP 11/55, was used to give commands to the 4X, while a third, the halaphone, which Boulez had already used in an early version of *...explosante-fixe...,* was originally used to distribute the sound to the loudspeakers throughout the hall. According to Peter Szendy, the 4X was used at IRCAM until 1992. It was the first computer powerful enough to manipulate sound in real time operations, something which today can be commonly achieved by commercial computers. In fact, all of the functions previously undertaken by the above machines are now performed by a Macintosh computer equipped with Miller Puckette's commercially available *Max* programme which can achieve everything that the previous systems did without the need for the intervention of a manual operator (Szendy 1998, p.7).[14]

Boulez's *Répons* takes its title from the French medieval *Répons* which involved antiphonal choral music featuring a solo singer and a responding choir. Boulez's *Répons* appropriately features its own electro-acoustic dialogues which take place "between the soloists and the ensemble; between one soloist and the others; between transformed and non-transformed passages" (Gerzso 1988, p.75). Gerzso describes the first entry of the soloists which takes place at the end of the orchestral introduction as follows:

> At the time of the dramatic entry of the soloists, each simultaneously plays a different short arpeggio .... The arpeggios resound in the hall for about 8 seconds up to almost the total extinction of the sound. It is in this musical gesture that the 4X and the MATRIX 32 are used for the first time. They pick up the sound of the arpeggiated chords of the soloists and make them travel from one loudspeaker to another. This displacement of sound in the concert hall space is called 'spatialisation.' The attention of the listeners is suddenly diverted from the centre of the hall and directed to the periphery to the soloists and the loudspeakers. The public hears the sounds of the soloists which is displaced without being able to follow their individual trajectory. This gesture brings to light the antiphonal relationship between the central group and the soloists, underlining the space which separates them and the distance between them (Gerzso 1988, pp.77-78).

While *Répons* is clearly the high point in Boulez's use of spatialisation, it is not his last venture into the field and it features in later compositions such as *Dialogue de l'ombre double* and *...explosante-fixe...* but never again on the scale encountered within *Repons*.[15] In *Dialogue de l'ombre double,* real-time electronic transformation is used to create a computer-generated shadow for the clarinet soloist so that there seem to be two clarinets playing together. The computer-generated shadow, which is the instantaneously transformed recording of the soloist, is manipulated spatially in such a way that the shadow clarinet sounds variously from several different loudspeakers. Ramaut tells us that this allows the recorded sound of the shadow clarinet to become displaced and anonymous since the positioning of the loudspeakers varies according to the layout of the performance space. The speakers may accordingly be positioned either in front of or around the spectators. As a result, "the spatial distribution renders the clarinet omnipresent through displacement of continuous sounds (circular for example) or punctual means (from one point to another)" (Ramaut 1992, p.69).

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[14] Manoury says that "the 4X system - developed at Ircam by Giuseppe di Giugno ... was the first really powerful system for real-time computing. This system was replaced in the 1990's by the Signal Processing Workstation, developed by Eric Lindemann's team at Ircam" (Manoury 1997, p.24).

The so far completed sections of *...explosante-fixe...* feature an orchestral ensemble of twenty-four players, a midi-flute soloist and two other flutes whose role, as we have seen already, is to play around the midi-flute line. Piencikowski tells us that:

> on the basis of an electro-acoustic relay drawing upon a selective repertoire of its own sonorities, the flute solo is linked to a computer transformation system which assures the modification and reduction of its timbre in real time, in order to distribute it on a spatialised system through six loudspeakers (1995 p.8).

It was the availability of real-time computer technology which enabled Boulez in the 1980's to realise such effects of spatialisation within certain compositions from *Répons* onwards. Nevertheless, as we have seen, attention to the exterior space and effects of spatialisation, in particular, did not begin with Boulez and have been pursued by many other post-war composers including several musicians working at IRCAM. It would be interesting to study Boulez's IRCAM works from the perspective of the emerging technology and the new, shared compositional concerns which are patently present in Boulez's works, but also within the works of some of his IRCAM colleagues. It may be possible within such a study to chart the mutual influences operating between particular composers and compositions in this regard and the incremental developments in technology which made such advances possible. Whatever the network of influences operating within the IRCAM compositional community, Szendy was able to write in a 1998 summary of real-time technology within IRCAM that "from *Répons* to *...explosante-fixe...*, Boulez's works have been the most visible milestones for the technological evolution of real-time at Ircam" (Szendy 1998, p.5).

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[15] Alastair Williams has written of *Répons* as "primarily a spatial work" which "takes on spatial organisation as a creative issue" (1994 pp.195-196; 1997 p.116). For Williams, "much of *Répons* evokes the feel of objects reacting to one another in space'' (1994 p.209; 1997 p.116) and he suggests that it "projects a sensitivity to the feel of space" (1997 p.105).

I would take Szendy's summation one step further forward and suggest that the same efficient real-time operations which mark Boulez's compositions using computer technology also enable the manipulation and dissemination of sound within exterior sound space in a way which had previously been impossible. Where previous composers had dispersed sound throughout performance spaces in the most dramatic ways, it was only with the development of real-time technology that spatialisation could be the result of instantaneous production and transformation. This was not purely the product of chance but the fortuitous development of technology which seemed perfectly tailored to solve musical problems which Boulez had posed long before.

Timbre Space

Having considered a range of means whereby Boulez explores both interior and exterior space, we now look to one last aspect of spatiality, namely the concept of *timbre space*. While timbre can be conceptualised as a dimension of interior space along with pitch, I have reserved its consideration until this point of the chapter since it is likewise implicated in the manipulation of the exterior space.

Timbre, which has traditionally been subordinated to pitch and rhythm, has proved difficult to define since, as Risset, expanding on Boulez, notes, it is "a strange and multiple 'parameter' defined by what it is not - neither pitch, duration, nor intensity ... 'a second order component'" (Risset 1991, p.239). Such has been its place in the development of Western music until the twentieth century. While the *American Standards Association* defined timbre as "the term covering all ways that two sounds of the same pitch, loudness, and apparent duration may differ" (Slawson 1985, p.19), for Risset and Wessel, it is "the attribute of perception allowing us to distinguish the instruments of the orchestra when they play the same note with the same dynamic." Neither definition, however, is judged to be completely clear (Risset and Wessel 1991, p.102). Before considering timbre within Boulez's theory and composition, we once again briefly reprise the role which timbre has played in the work of those composers who have most influenced Boulez.

Farben, the third piece from Schoenberg's *Five Pieces for Orchestra*, is universally recognised as a significant moment in the history of timbral development. Even in *Schoenberg is Dead* (1952), while castigating Schoenberg's dodecaphonism, Boulez praises his innovative organisation of timbre as *klangfarbenmelodie* (Boulez 1991, p.213) in which the timbre of a five-note chord is constantly transformed "for its own sake ... and not simply as a result of the instrumentation" (p.282). For Boulez, it marks the beginning of exploration into the textural role of instrumentation (Boulez 1987, p.165). Boulez similarly appreciates Webern's instrumental sensitivity whereby orchestration is no longer restricted to an ornamental role but rather participates fully within the development of structure. In the first of Webern's Op.10 *Five Pieces for Orchestra* "the melodic line is analyzed by timbre, each note being vested in an instrumental color, each articulation being underlined by a change in timbre..." (p.167). Similarly, in the double canon which opens the first movement of Webern's Op.21 *Symphony,* "the main canon is identifiable by means of a clear distribution of timbres", whereas "the secondary canon is more discontinuous ... in its distribution of timbres. As such it is difficult to identify" (p.168). This play of timbre is significant in articulating the perceptual structure of the movement.

Boulez recognises that "one of the constant features of French musical expression since the eighteenth century ... has been a preoccupation with sound itself..."

(Boulez/Deliège 1976, p.19), a characteristic which is found in the twentieth century in the timbral developments of Debussy, Varèse and Messiaen. Boulez clearly appreciates the "exceptional delicacy" of Debussy's handling of timbre in compositions such as his *Prélude à l'après-midi d'un faune* (Boulez 1991, p.267) and he recognises the advances in "instrumental technique, instrumental combinations [and] orchestral sonority" which were the result of his timbral investigations (p.276).

Varèse, as we have already seen, has played an important role in the development of timbral possibilities with his innovative use of noise and percussion. His writings frequently refer to the new instruments of the future which would "reproduce all existing sounds and collaborate in the creation of new timbres..." (Varèse 1983, p.60), and he envisaged music in which "colour or timbre will play a completely new role", having "an integral part within the form" (p.92). Varèse defined his conception of timbre as an endeavour "to enable the listener to seize the most extreme differentiation of colorations and densities", and sound colour is employed "in order to distinguish between planes, volumes and zones of sound..." (p.99).

Despite his desire to be involved in "acoustic research" (p.67), Varèse's work was mostly frustrated by the unavailability of the technology necessary for the realisation of his ideas. Before his few late works, in which he was able to exploit the "unbelievable variety of new musical timbres" producible by electronic means (p.164), he was restricted to such basic instruments as the sirène. While Boulez is sympathetic to Varèse's intention in using sirènes, he nevertheless believes the attempt to be spoiled by the mundane connotations which inevitably result (Boulez 1989a, p.86).

Timbre is also an important concern in the work of Messiaen. Sherlaw Johnson has drawn attention to Messiaen's "use of added resonance ... which enables harmony to function as timbre" and, whereby, especially in his later compositions, "chords become 'sound entities', complete in themselves..." (Sherlaw Johnson 1989, p.18). This aspect of Messiaen's practice, particularly in organ works such as the *Livre* *d'Orgue,* influenced Stockhausen's work in the area of timbre development (Maconie 1976, p.37). Sherlaw Johnson highlights the role of timbre in *Couleurs de la Cité céleste* where a plainchant melody is modally transformed and performed as a *Klangfarbenmelodie* (Sherlaw Johnson 1989, p.167). However, perhaps Messiaen's most striking influence upon Boulez's use of timbre was his complete separation of pitch, duration, intensity and attack (timbre) in *Mode de valeurs et d'intensités* (1949), which has already been discussed in relation to pitch in Chapter Three (p.114).

A final timbral influence upon Boulez's work was provided by the "acoustical material" and possibilities for timbre modification inherent within Cage's prepared piano (Boulez/Deliège 1976, p.117; 1991, pp.176-177). Boulez acknowledges the Cagean origin of the idea of the "sound-complex", which is defined "essentially as a kind of sound-amalgam linked to timbre, duration and dynamics ..." (p.135) and he describes Cage's practice of writing "chords in place of notes, each chord having no harmonic function but acting essentially as a resonance-amalgam of superimposed frequencies" (Boulez/Cage 1993, p.30). Furthermore, in a 1950 letter to Cage, Boulez explicitly expresses his intention to apply some of Cage's ideas on sound within *Le soleil des eaux,* and he acknowledges that Cage has stimulated him to question his own use of sound materials (Nattiez 1993a, p.9).

As with the composers whose work has been acknowledged above, timbre plays a highly significant part within Boulez's composition despite the overall neglect which it may be said to have received within the literature. Hopkins even suggests that it is pointless to discuss this aspect of his music since he believes that "it is not 'organized' by a trustworthy rationale" and is rather a matter of sensibility (Hopkins, 1968, p.710). Reflections on timbre are to be found, however, within Boulez's writings from the earliest articles right up to the *Collège de France* lectures of the 1980's. In the Darmstadt lectures, he acknowledged the benefits accruing from scientific work into the nature of timbre while recognising that "musicians ... are condemned to remain amateurs in this field" (Boulez 1971, p.66).

A desire to link timbre with the other musical parameters within a common organisation is considered in *Possibly* (1952), where Boulez theorises the possibility of altering timbre through "modifying either the attack or the dynamics of one or more of its components". Boulez illustrates the serial treatment of timbre and its structural role in *Polyphonie X* (1950-51), in which "eighteen instruments play[ing] in seven symmetrical groups" (Boulez 1991, pp.130-131).

While Boulez did some early work in the field of *musique concrète* and acknowledged the contribution of electronic music within research on timbre, he has consistently maintained the view that this approach has produced mostly "refined harmonic effects" rather than genuinely perceptible timbres, a remark which relates to Stockhausen's electronic *Studien I* and *II* (1952) (Boulez 1991, p.152). In the *Collège de France* lectures, Boulez confirms this position and further judges electronic compositions to be generally amateurish, superficial and "inferior in relation to the musical thought expressed in the instrumental domain" (Boulez 1989a, p.55). This judgement is also applied to instrumental writing, for example, for percussion (p.56). Boulez is similarly opposed to the electronic mimicking of acoustic timbres which, he believes, can only result in poor quality copies (Boulez 1991, p.170). Nevertheless, in *At the Edge of Fertile Land* (1955), he suggests that an important task, which composers of electronic music must confront, is the possibility of "a 'continuum' of timbre" which he describes as "surely the most disconcerting notion" faced by composers "in the whole history of music" (p.169). For Boulez, however, "timbre cannot alter gradually" except as an illusion "created by imperceptible variations within complexes of timbres" (Boulez 1971, p.65).

For Boulez, "the orchestral use of *klangfarbenmelodie* or even of timbre series - based on instrumental groups - has changed the whole meaning of sound combinations .... orchestration is no longer the purely decorative affair that it often was in the nineteenth century, but takes on a hitherto unknown structural force..." (Boulez 1991, p.169). In *Alea* (1957), Boulez writes of timbre as "the most easily grasped aspect of the musical surface" which, when manifest as the contrast of instrumental groupings and combinations, can make the differentiation of sections within a composition more audibly perceptible (p.34). Despite this, however, Boulez recognises that orchestral timbre only succeeds in smoothing the boundary between the orchestral groups since their distinctiveness is dependent also upon "transients, on attack, on the appearance or disappearance of certain harmonics, and on their relative intensity" (p.170).

In *Boulez on Music Today,* while Boulez says that serial thinking "can be applied to all the components of crude sound" including timbre (Boulez 1971, p.36), he clearly differentiates between parameters or sound components in terms of relative importance, which he describes not as a hierarchy but as a *grading,* "according to a scale of decreasing importance." While Boulez holds the four parameters to be "in fact independent, if not in their existence, at least in their evolution", he nevertheless says that "pitch and duration seem ... to form the basis of a compositional dialectic, while intensity and timbre belong to secondary categories" (p.37). This conviction is reinforced from the articles in the 1950's (Boulez 1991, p.154) to the *Collège de France* lectures (Boulez 1989a, pp.59-60). Despite this *grading*, Boulez acknowledges that "no dimension can be perceived in an absolutely isolated way.... [since]... the sound object is an entity...." However, "our attention can attach itself to one component rather than another...", and it is in this sense that the Western emphasis on pitch is to be understood (pp.407-408). For Boulez, "dynamics and timbre, functions of *coordination*, cannot claim the same rigour in their morphology" as is found in pitch and duration (Boulez 1971, p.59). Timbre, however, is said to have "a very special role" since "it frequently articulates pitch and duration ... may also articulate pitch and duration ... and, more rarely, dynamics and duration..." (p.65).

In a taxonomy of timbre, Boulez identifies two timbral families. The first is defined as "*non-evolutionary* or, at least, of *limited and homogeneous evolution*" which entails the use of "the same timbre or the same group of timbres". The second is *"evolutionary and non-homogeneous"* and can proceed either (a) through the use of "*disjunct intervals*, so to speak (passing from one instrument to another, from one homogeneous group to another, from one non-homogeneous complex to another, where the weight of the new timbres is greater than that of the timbres common to the two; passing from an instrument to any group, from a homogeneous to a non-homogeneous group)" or (b) "proceeding by *conjunct intervals* (passing from one non-homogeneous complex to another, where the weight of the new timbres is less or equal to that of the timbres common to the two; passing from a timbre to a modification of the same timbre)" (p.65). This classification is said to be valid for both instrumental and electro-acoustic invention (p.66).

For Boulez (1968), Western music "has tended towards an abstract conception of intervals and of pitch independent of the instrument concerned. Thus sound has become a material independent of its own existence and has an existence that is quite independent of its essence" (Boulez 1986, p.456). Instruments such as the xylophone or tubular bells (as already discussed in relation to pitch), help to create a sense of relative sound space, a phenomenon which is intimately related to the complex spectra produced by these instruments (Boulez 1971, p.90). Boulez applies a modified version of the concepts of the *smooth* and the *striated* to timbre in which a smooth timbral space can be produced from "a single family, composed of similar timbres" (p.96). He clarifies, however, that by timbre he means "not only the spectrum itself, but also the processes involved in attack, suspension and release, from which the evolution of the spectrum is inseparable..." (p.96).

In a 1985 lecture on timbre, Boulez set out two distinct approaches to timbre: (1) "an objective, scientific way" in which "with the help of graphs and diagrams many acoustic phenomena can be described...." However, since "the quality of integration of sound and timbre in the structure of a composition is absent from these measurements", Boulez feels "that the truly artistic value of timbre is fundamentally forgotten using this approach"; (2) "the subjective, artistic manner of dealing with timbre, as a constituent of a musical language, along with the aesthetic and formal criteria which relate to it" (Boulez 1987, pp.161-162). For Boulez, "the functional possibilities of timbre only seem valid if they are linked to language and to the articulation of a discourse through structural relationships; timbre both explains and masks at the same time" (p.170). Boulez, in other words, considers "timbre at the level of écriture" and shows how it emerges from the musical organisation "as a component of the language, with its own aesthetic and formal criteria" (Cadoz, 1991, p.20).

In his *Collège de France* lectures, Boulez discusses the computer-assisted, timbral transformations which he employs in some of his later works. Computer transformation, it is said, can "modify the sound of the instrument" through "filtering, reverberation, various types of modulation, leading to substantial transformations of the original timbre." Boulez, however, believes the results of these processes to be "not always easily controllable" and to be potentially monotonous since the timbre is "generalised" and "anonymous" rather than being "highly individualised, particular [and] selective". As a result, "the principal traits within instrumental timbre have disappeared and are replaced by an amorphous entity" (Boulez 1989a, pp.100-101). A more fruitful alternative, in Boulez's view, involves "the analysis and extraction of the parameters which make up a sound and a timbre." He cites, as an example of this process, the possibility of extracting a "fundamental sound" and of applying to it "a process of synthesis ... which follows the sequence of intervals in a very precise fashion" (Boulez 1989a, p.101). With this kind of procedure and reflection, however, we are close to the experimental frontier of timbral thinking which Boulez has both facilitated and exploited at Ircam.

The early serialist endeavour to permutate all of the sound dimensions within a common framework led composers to integrate timbre in the most radical and rigorous way. In the face of serious difficulties, however, timbre is bracketed in these works in order to free the dimensions of pitch and duration. For Piencikowski, early serial works such as Boulez's *Structures Ia* and Stockhausen's *Kreuzspiel* are consequently seen to exploit a limited range of timbres. Boulez himself acknowledges the inadequate orchestration of *Polyphonie X* (Boulez/Deliège 1976, p.59), and he recognises that his developing timbral sensibility has been helped both by his experience as a conductor and by his compositional research.

The choice of instrumental ensemble for *Le Marteau sans maître* marked the beginning of a deliberate shift from European models towards non-European cultures in which instruments were chosen precisely for their unfamiliarity for European listeners. While acknowledging a number of precedents in certain works by Stravinsky, Webern, Schoenberg, Bartok and Messiaen, Boulez contrasts the Western neglect of timbre and absolutising of pitch with non-European cultures where "the individuality of the sound is primary" (Boulez 1984, p.134). Each movement of *Le Marteau,* like Schoenberg's *Pierrot Lunaire,* is scored for a different permutation of instruments, with the entire ensemble appearing only in the final movement. Boulez has elaborated something of the instrumental associations within the piece in which flute and voice are related by breath; viola and guitar are linked by plucking strings; resonance links the guitar and vibraphone and the dampened vibraphone is linked with the xylophone (Boulez 1986, p.340). Even the use of the voice has been described as creating "a kaleidoscopic effect, of unceasing transformation of vocal colour...", almost a *klangfarbenmelodie* of varied vocal techniques (Gagnard 1987, pp.37-38). Despite the great success of *Le Marteau*, however, Boulez admitted to Deliège that its instrumentation had been so often emulated that its soundworld had come to seem banal (Boulez/Deliège 1976, p.67).

All of Boulez's orchestral and ensemble pieces, from *Le Marteau* onwards, continue to explore timbre in a number of innovative ways. As with *Le Marteau*, Boulez's discussion of *Improvisation II* from *Pli selon pli* focuses on instrumentation as he classifies the instruments into three categories namely, "accurately pitched, partially pitched and unpitched ('noise')...", and systematically explains the particular sonorities which he exploits within each instrument (Boulez 1986, p.157). The use of the harp within *Improvisation II* is said to be based upon the practice of Andean peasants (p.158), while the vibraphone part arises from the Balinese gamelan. Boulez acknowledges the Eastern origins of his "fascination" with the tuned gongs of Indonesian orchestras and the Far Eastern associations produced by tubular bells (pp.161-162). His aim, however, is "to free the instrument from these associations" in order to focus entirely upon its "tone colour" (p.162). The piano is interesting to Boulez "as an instrument of complex sounds produced by harmonics..." and he lists "a number of pedal effects", by means of which "the sound spectrum can be modified..." (p.163).

Stoïanova's account of *Pli selon pli* details the timbral subtleties at the heart of the piece which are manifested through its instrumentation, showing, for example, the symmetrical instrumental structure in *Improvisation I* (Stoïanova 1973, pp.78-80). *Don* is, in fact, the only movement within *Pli selon pli* which features the entire ensemble. According to Bradshaw, it is intended:

> to forecast the orchestral timbres characteristic of the succeeding movements by allowing the solo qualities of the 'percussive' instruments used in the three *Improvisations* gradually to surface from the continual realignment of the instrumental forces within this tutti orchestra. It is as if the *sffz* attack of the opening chord had effectively shattered the orchestra into as many isolated fragments as it has instrumental constituents - fragments which then coalesce into small groups, only to drift apart and re-form into other such groups (Bradshaw 1986, pp.196-197).

Despite the significant role given to timbre within *Tombeau*, Bradshaw believes that it is less successful here since "differences in timbre are often obliterated by the unavoidable dominance of certain instruments, or instrumental ensembles over certain others..." (p.193).

The dispersion of the orchestra into smaller ensembles within *Figures Doubles Prismes* permits Boulez to explore the particular timbres within each ensemble. In an example from *Eclat*, he explains how he superimposes timbres in such a way that "perception can no longer discern which combination is in use in the block of sound" (Boulez 1987, p.168). Bonnet's analysis of *Messagesquisse* considers the variety of playing techniques which are employed (Bonnet 1987, p.180) and the modification of timbre which is effected through the superimposition of the melodic lines (p.202). According to Bonnet, Boulez is not concerned with pure timbre but rather with its compositional possibilities. Timbre is therefore central to Bonnet's reading of *Messagesquisse* in which the timbre of the solo cello line is extended and enriched by the other six cellos (p.208).

For Jameux, Boulez's 1958 proposal of "the establishment of a real *continuum of timbres*" is partially achieved with computer assistance in *Répons* and *...explosante-fixe...* (Jameux 1984, p.16). Boulez modifies the timbre of the instrumental ensemble within *Répons,* for example, in distributing the notes of a seven-note chord between nine woodwind parts in which the constant changes in instrumental grouping create a continual mixing of timbre (Deliège 1988, p.187). For Deliège, *"*the *harmony/timbre complex"* is very important in defining the form of *Répons* (p.188). The timbral play of the woodwind and strings (p.194) is almost polyphonic and serves as a formal envelope (Boulez 1989a, p.269; p.386). In addition, the "real time" processes of "modulation of one instrument by another; retardation and changes of phase...; frequency shifting" and spatialisation (Gerzso 1984, p.27), which transform the sounds of the solo instruments, serve, not only to transform their pitches, creating a new smooth pitch space, but also transform their timbres to create a new, almost meta-timbral space. This results in the opposition of the "natural" timbres of the ensemble against the transformed timbres of the solo instruments, an interplay which shapes the form of *Répons* in a clearly perceptible way.

Nattiez interprets *Répons* against the background of Schaeffer's *Traité des objets musicaux* and *acousmatic music* which are criticised for their perceived failure to provide a musical syntax correlative with their taxonomy of musical objects. Their emphasis on the verticality of timbre is said to lack the structuration necessary for composition (Nattiez 1993b, p.183). Nattiez suggests that after "thirty years of electro-acoustic music, *Répons* puts the sound object in its place", while qualifying his judgement with the observation that the piece is structured, at a more fundamental level, primarily in terms of pitch (p.184), and that Boulez's computer-generated sounds are less varied than most acousmatic works. Nattiez understands *Répons* as a response to electro-acoustic music and as a solution to the problems previously posed within Boulez's own research (p.185). In terms of the emphasis on timbre, *Répons* may be said to resume the project begun with *Le Marteau sans maître* and *Pli selon pli* (p.186), and the opposition of timbral families which it features connects it with the two timbral groups within *Eclat,* the divided orchestra within *Figures Doubles Prismes*, the eight ensembles within *Rituel* and the six instrumental groups within Domaines. Timbre continues to play an important part in Boulez's most recent pieces, *Anthèmes II* and *Sur Incises,* in which many of his previous insights and techniques are employed and further developed, in the first case with instruments and, in the second, with the real time, computer-assisted transformation of the timbre of a solo violin.

While Boulez has explored the timbral possibilities within instrumental ensembles, he has largely rejected the kinds of composition which resulted from the investigation of timbre within the electro-acoustic domain. Stockhausen, in contrast to Boulez, has been more satisfied with the work which he was able to achieve in the latter forum. His timbral developments have consequently been the result of work undertaken in both the instrumental and the electro-acoustic spheres. In the early days of serialism, Stockhausen and Goeyvaerts shared the ideal of "synthesizing ... the timbre of the individual sound..." in an effort "to achieve a unified musical structure..." (Stockhausen 1989, pp.37-38). Stockhausen laboured to produce synthesised "pure, controllable sounds" as he worked towards "the serialization of timbre", on the one hand, and the creation of innovative sounds, on the other (Maconie 1976, p.39).

Stockhausen's systematic consideration of instrumental timbre can be seen in the "extraordinary range of attack instruments" within *Spiel für Orchester* (1952, revised 1973). His discovery "that most musical sounds could be separated into 'attack' and 'decay' components, and that the personalities and distinctive timbres of wind and percussion instruments chiefly reside in the initial attack" suggested "an entirely new categorization of musical instruments according to purely acoustic criteria..." (p.42). Overall, however, Stockhausen's early instrumental and electronic music such as *Spiel* and his theoretical experiments, revealed the failure of pointillism in generating the kind of compositions in which new timbres could be successfully arranged (p.90). Maconie suggests that Stockhausen's strenuous efforts towards "the synthesis of new timbres" in the 1950's, while not succeeding immediately, provided him with rich material to work with in his later compositions (p.253).

Zyklus (1959) for solo percussionist is Stockhausen's first piece to completely break with "pitch-dominated serialism..." (p.119), and *Refrain* (1959) is similarly said to be a "summing-up of past theory ... *Klangfarbensynthese*, the composition of new tone colours..." (p.133). *Kontakte* (1959-60), deals with "the synthesis of new timbres as wave forms in constant evolution" and shifts from "the vertical harmonic combinations of his earlier electronic works" to a focus on "single lines of varying amplitude" (p.136). The large orchestra for *Mixtur* (1967) is configured into five timbral groups suggesting "a music in which one instrumental colour is transformed into another... via an intermediate stage of neutral modulation" and Maconie tells us that "Stockhausen saw the possibility of producing instantaneously continuous scales of timbre..." (p.188). *Stimmung* (1968) for six voices is seen by Stockhausen as the "extreme case" of *Klangfarbenmelodie* since the entire musical structure is worked out in terms of timbral changes (Cott 1974, p.86). The work explores "the prolonged, as it were microscopic, analysis of a single timbre..." over a period of seventy-five minutes (Maconie 1976, p.243).

Where Boulez subjected timbre to serial organisation, computer analysis and synthesis have enabled composers such as Dufourt, Grisey and Murail, to dissolve the traditional pitch supremacy completely and to go beyond composition *with* timbres to the composition *of* timbre. A younger generation of composers and psychoacousticians such as Grey (1977) and Wessel (1979) have used computer synthesis and the study of psychoacoustics to fundamentally question the categories of classical acoustics such as pitch, timbre and duration. Wessel even suggests that "the concept of timbre" is "ultimately useless" and that we should "forget timbre in order to compose with parameters" (Cadoz 1991, p.30). Nevertheless, whatever terminology is used, for Risset and Wessel "the basic idea is to make a timbre, represented by coordinates in a particular timbre space, audible" (Risset and Wessel 1991, p.124).

While Boulez has not been involved in the kinds of timbral transformations achieved by this younger generation and he has not engaged in the kind of experimental consideration of timbre undertaken by Stockhausen, it is clear that the exploration of timbre has been a significant element within his work, primarily however, as an element within a compositional process. Piencikowski ultimately defines the divergence in timbral thinking between Boulez and Stockhausen as one concerning the relative priority of the sound object within the musical space. While intervallic considerations remain primary for Boulez, Stockhausen subordinates intervals "to the structural permutation of the object within a predetermined space" (Piencikowski 1991b p.87).

Summary and Conclusion

This chapter has suggested that musical spatiality, like the concept of *difference* discussed in Chapter Three, is formally and expressively significant within much of Boulez's music. In working towards this thesis, I have tried to provide a consistent terminology for the understanding of musical space through adopting Tarasti's distinction of *interior* and *exterior* space. The discussion of interior pitch-space which followed has not sought to "prove" the existence of such a phenomenon but has rather hoped to ground its use through clarifying the meaning and status of the concept. Following Scruton and Plöger, it has been suggested that a sense of pitch-space is absolutely essential for musical perception, whether the proposed pitch-space itself is ultimately to be understood metaphorically, analogically, imaginatively or in any other way.

Having rooted the sense of pitch-space in a common perception crucial for appreciation of all musics, it was then suggested that this interior spatial dimension plays a more prominent part in the music of certain twentieth century composers including Boulez. While Boulez is not the first twentieth century composer to attempt to harness the possibilities inherent within musical space, it is clear that it is one of the most significant factors in the shaping of his music. We have seen throughout his development how he has formed theoretical and practical compositional means for articulating pieces spatially. In terms of interior pitch-space, he theorises a diagonal dimension for pitch in which harmony is freed from its more traditional horizontal and vertical coordinates. He categorises pitch-space as *smooth* and *striated* and to some extent uses the opposition for compositional play. In an attempt to increase perceptibility, he introduces recognisable landmarks through the use of registral plans, polar notes and distinctive timbres, seeking to guide the listener through a work. Finally, he manipulates sound within the exterior space of the auditorium through the variable positioning of the performers, the audience and their interaction with electro-acoustic means and computer technology.

If Boulez recognises aspects of his own musical practise in Deleuze's concept of *difference*, this process may be thought of as being reversed in terms of spatiality. In this case it is Deleuze and Guattari who pick up Boulez's concepts such as the *diagonal* and the *smooth* and the *striated*, concepts which, for Boulez, are to be understood in a purely musical sense. In the hands of Deleuze and Guattari these musical concepts become *deterritorialised* from their musical use to become key philosophical concepts within the articulation of a new *difference*-based *image of thought*. Once again, a strict one-to-one correspondence should not be facilely drawn linking Deleuzoguattarian philosophy and Boulez's music. As stressed within the previous chapter, there is no necessary connection linking Boulez's musical articulation of interior sound space and the use made of the same concepts by Deleuze and Guattari.

The primary idea within this chapter is a purely musical one which involves demonstrating that Boulez uses a variety of spatial devices to direct perception within his compositions, and that the continuum of interior and exterior musical space itself may be said to constitute the very content of music and the object of musical expression. Nevertheless, in Deleuzoguattarian philosophy we find a second level of spatial expression in relation to Boulez's music, since the deterritorialisation of concepts which has taken place may be understood as having set up an expressive interface between music and philosophy in which, as with the expression of *difference*, the *smooth* and *striated* spaces of Deleuzoguattarian thought and its diagonals become, in a limited sense, one possible philosophical manifestation or expression of ideas to which Boulez has similarly given expression within music.[16]

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[16] Boulez's concern with musical spatiality connects him also with Artaud, Mallarmé and e.e. cummings who likewise declared an interest in "spaces" within their work. Artaud's innovations were intended to affect every element within the theatre space as he explored a great range of human sounds including screams, shouts and instrumental noises in the interior pitch-space and experimented with the exterior spacing of the performers and audience attempting to enable more "direct communication" between them (Barber 1993, p.54). Mallarmé likewise tells us that his great poem *Un coup de dés* includes "nothing new except a certain distribution of space made within the reading", a statement which, for Mary Breatnach, is clear evidence that Mallarmé "intended to depict his subject-matter not only in words but also in ... spatial terms" (Breatnach 1996, p.17; p.35). Commenting on the poem with its distinctive spatial layout including "variable typefaces, the spacing, the imagery, grammatical constructions and word-endings", Paul Valéry said: "it seemed to me that I was seeing the shape of a thought, placed for the first time in our space" (quoted in Breatnach p.35). Ivanka Stoïanova has commented similarly upon the way in which Boulez's *cummings ist der dichter* attempts to translate into music, not only the text of Cummings' poem but also the use which Cummings makes of the space of the white page on which the poem is printed. Stoïanova implies that Boulez's composition renders the visual space of Cummings' poem within a musical sound space (Stoïanova 1974b, p.82).

Chapter 5

Boulez, Time and Temporality

Introduction

The final concept/percept to be considered within this study concerns the musical expression of time and temporality. In Chapter Four the thesis was presented that while all music can be said to take place within *interior pitch-space*, whether this is understood realistically, metaphorically, or analogically, there is a sense in which Boulez's music, and that of other Modernist composers, makes spatiality one of the principal objects of its expression. Analogous with this, it will be argued, in the present chapter, that Boulez's music likewise makes certain experiences of time or *temporalities* the content of musical expression.

Musical time and temporality are not easy topics to deal with. There is no universally agreed terminology with which to discuss them and what terminology there is differs in sense from one writer to another. Accordingly, the present study does not set out to present a complete and coherent theory of musical time and temporality, but seeks only to explore those elements within temporal thinking which may be useful in facilitating appreciation of Boulez's music and theory.

We will first of all consider some general issues surrounding the concepts of *time* and *temporality* in order to clarify their meaning within the present discussion. This will lead us to look at how they have been treated within artistic Modernism, concentrating principally upon Bergson's philosophy of time and the new temporality of Proust's *A la recherche du temps perdu*. Having briefly examined this broader artistic perspective, we will then consider those strands within twentieth century music which have influenced Boulez most and shaped his own distinctive approach to musical time and temporality. The music of Debussy, Stravinsky, Messiaen, Cage and Stockhausen will be seen to be of particular importance here. We will examine the treatment of musical time within Boulez's theoretical writings, concentrating specifically upon his division of time into *smooth time* and *striated time*. We will then be in a position to consider the development of the treatment of time and temporality within his compositions, examining some of the most important scores in which he focuses explicitly upon the expression of contrasting experiences of time.[1]

Having done this we will consider the use which Deleuze and Guattari have made of Boulez's *smooth* and *striated* time in the expression of their philosophy, specifically examining the connections they make between Boulez's *smooth* and *striated* time and the Stoic concepts of *Aion* and *Chronos*. Deleuze's essay, *Boulez, Proust et le temps* (1985), in particular, will help to open up some of the connections between the twin temporalities of Boulez's music, Deleuzoguattarian philosophy and the treatment of time found within Proust's *la Recherche*. The rationale for this pulling together of such heterogeneous materials will be once again to show that one of the most consistent expressive purposes within Boulez's music, for much of his career, has been to make "the non-sonorous forces of time audible"; in other words, to no longer think of time as simply the unavoidable condition and medium of music, but to focus on it as the very content of music which music is in a uniquely powerful position to express. In the words of Raymond Monelle, "since music operates in time, it is peculiarly well-equipped to present an image of the cultural conception of time" (forthcoming).

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[1] Throughout this chapter, Boulez's twin conceptions of time are interchangeably referred to as *smooth* and *striated* time or as *non-pulsed* and *pulsed* time.

Music, Time and Temporality

In *The Time of Music* (1988), Jonathan Kramer laments what he considers to be the lack of due consideration devoted by musicology to the subject of musical time as an independent legitimate field of enquiry. Despite his dismay, he accepts that this neglect is, to some extent, to be expected since the philosophically more fundamental question "What is time?" has itself never been answered in a universally acceptable way.[2] In practice, philosophers, scientists, theologians and entire cultures have articulated their own perceptions and theories of time without ever arriving at anything approaching agreement (Kramer 1988, p.2). If anything, the twentieth century has made matters more complex than ever with the proliferation in temporal thinking which it has produced (p.12).

While complete consensus in our understanding of time seems to be unattainable, an important distinction can nevertheless be made between the concept of *time* and that of *temporality*. Time, according to *Collins English Dictionary*, is the "continuous passage of existence in which events pass from a state of potentiality in the future, through the present, to a state of finality in the past." Time, as we commonly conceptualise it, is thus characterised by its continuity and its singularly forward linear movement. We think of it as a present which constantly becomes the past as we continuously move into the future. We conceive it as a kind of backdrop against which all events, including those of our lives, are located and independently measured. Described in such apparently simple terms, time may seem to be a relatively straightforward concern. However, when we survey the variation in concepts of time formulated by philosophers, scientists, anthropologists, novelists and so forth, we find that theories and perceptions of time are far from homogeneous. We begin to question whether our own conception of time is as certain or as absolute as we may previously have thought. We begin to understand that whatever notion of time we adopt can only ever be a culturally conditioned expression of time, in other words, a *temporality*. Our experience of time cannot escape its cultural roots and so, while we clearly believe that time exists, we find ourselves unable to grasp it within itself and consequently know it only within one or other cultural expression or *temporality*. Temporality is therefore, as Monelle defines it, "the social apprehension of time" (forthcoming).

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[2] Kristeva writes: "Since Hegel, the great modern philosophers - Bergson, Husserl, and especially Heidegger - have been philosophers of time" (1996 p.305).

The musical distinction of *time* and *temporality* is neatly summarised by Monelle when he says that "while music is structured in time, musical temporality is the time music *means*." In other words, while the nature of musical art necessarily involves the passage of time, the way in which time is thought within a composition will inevitably be an expression of a particular temporality. Temporality can thus be said to be "an aspect of musical *content*." It is in this sense that Monelle says that music can "present an image of the cultural conception of time" (forthcoming).[3]

Monelle suggests that music tends to enunciate "the dominant temporality of the society" within which it arises. Kramer and Monelle both cite the case of traditional Javanese culture in which the dominant temporality is not linear and "is based on synchrony rather than successivity." This temporality is expressed through "nonlinear cultural attitudes and lifestyles" (Kramer 1988, p.24) and is found by Judith and Alton Becker to exist within both gamelan music and the Javanese language itself. For Kramer, the existence of such cultures and attitudes is convincing evidence that "temporal linearity is not a necessary component of human experience but rather a cultural creation" (1988 p.25). Nevertheless, Kramer warns that music should not be interpreted too summarily as the expression of a dominant temporality

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[3] Zuckerkandl says that "generations of philosophers and psychologists have taught that although an awareness of time goes along with all our sensations, perceptions, feelings, with all possible states and contents of our consciousness, as the order or form of their appearance - namely succession - in itself time can never be the object of any sensation, perception, or any other kind of experience" (1956 p.202). Zuckerkandl shows how this position is supported philosophically by Hume who holds that it is not "possible for time alone ever to make its appearance or to be taken notice of by the mind"; by Kant for whom "time in itself cannot be perceived" and by Schopenhauer for whom "time in itself is empty and without properties" (p.182). Zuckerkandl nevertheless suggests that music "enlists time as force" and he argues that "if the feeling of rhythm must be granted the status of a genuine experience, perhaps even of a cognition, then what is experienced or cognized in rhythm can be only time itself." He postulates the idea that "music is temporal art in the special sense that in it time reveals itself to experience" (p.200) and that "to experience meter is to experience time" (p.224). He rejects the notion that music is some kind of metaphor for time or that it has "the purpose of bringing to light a hidden meaning of time" (p.256). Nevertheless, he believes that music "creates an image of time" (p.259) through which "we are able to *behold* time" in "the *musicalization* of thought" (p.264).

(p.165), while Monelle equally cautions against the direct application of philosophical theories of time to music which, he believes, often leads to "confusion and special pleading." While noting such dangers, the present study hopes to build upon the essential insight shared by both Kramer and Monelle, that all temporalities arise within specific cultures within which musical expression can play a significant part.

The dominant conception of time within the twentieth century Western world is undoubtedly that of clock time or chronometry. Indeed, it has become almost automatic for many modern Westerners to equate time with the seconds, minutes and hours of clock time, to assume that time is "uniform and linear", and that chronometry provides us with a comprehensive understanding of time. Nevertheless, according to Monelle, clock time cannot be admitted as a valid temporality since it "is not a cultural time at all" being rather "an abstraction" which "cannot be experienced directly" (forthcoming). Monelle argues that clock time is not actually lived, but merely measured. Further, he believes that "the 'dominant temporality' of the 'monochromatic' west is not something we can look for in western music" since "far from reflecting clock-time, music, through its complicity in cultural semiosis, is devoted to recovering western man from the abyss of clock time." Quoting Georges Poulet, Monelle explains the absence of chronometry within music with the justification that "it was ... never a temporality at all" being "nothing more than a practical convenience". Monelle instead locates the origin of musical metre in the rhythms of the human body.

Monelle's position has been outlined at some length for the reason that his distinction of *time* and *temporality* is a very useful one. The present study wishes to adopt this conceptual distinction in order to consider the dual conceptions of time which are to be found within Boulez's music. This proves, however, to be somewhat problematic. While Monelle's reasons for discounting clock time as a *temporality* are logical and consistent, the present study chooses to take cognizance of them but ultimately not to accept them fully. The term *temporality* is consequently used in this study in a sense which is necessarily different from Monelle's own usage. We will, in fact, refer to chronometry as a *temporality* for reasons which will hopefully become more apparent as we proceed. The music which Monelle discusses ranges from the early Baroque era through to the Romantic age. He is dealing with periods in musical history in which the apprehension of time within society undoubtedly underwent change but was nevertheless still very different from the overpowering sense of clock time which forced itself upon the people of the Modern age.

Monelle argues that "music ... is devoted to recovering western man from the abyss of clock time" (forthcoming). As we shall see, the Modernist arts of the late nineteenth and early twentieth century are no less devoted to providing alternative temporal experiences and understandings. Nevertheless, there can be no doubt that chronometry is present within twentieth century consciousness as never before and that the new temporalities thrown up within Modernist philosophy, literature and music, are often a reaction to it and that it is present in such work, if only paradoxically at times, through its deliberate absence.

Monelle argues that musical pulse derives not from the clock but from the rhythms of the body and, for the musical periods with which his study deals, agreement on this point is not difficult. However, when we come to the music of the post-war avant-garde and composers such as Boulez, the connection with the body seems no longer to be so persuasive. While Boulez does not make the connection between musical pulse and clock time, in the light of the links which will be established in the course of the chapter, it will be maintained that the *smooth time* of Boulez's music can be understood as a Modernist reaction to a *striated pulsed time* which is analogous to chronometry. We retain the term *temporality*, despite its difficulties, in order to communicate the idea that whether or not we can experience clock time in ordinary non-musical life, in a certain sense, a pulsed music which has shed all rhythmic association with the body can express a sense of time which is capable of being related to the division of time produced by a ticking clock, whether or not its pulse adheres to strict regular beats.

Stephen Kern tells us that clock time became so commonly accepted in the West as a reliable indicator of duration that it seemed to require no further theoretical justification.[4] Nevertheless, it has been challenged in a number of ways within the twentieth century. The equation of time with the ticking of clocks has been shown by scientists, following Einstein, to be an inadequate reduction, by novelists and philosophers to fail to account for much of our life experience, and by some musicologists to be unsatisfactory in explaining the temporal aspect of music as it is experienced.

Without wishing to overlook these problems, we should first recognise that, while it may not provide a comprehensive understanding of time itself, chronometry serves us very well as a practical means for organising our lives. Nevertheless, acknowledgement of the limited nature of chronometry is also necessary for the successful running of normal life. It is widely accepted, for example, that perception of time must often ignore the division of time into units such as seconds and operate instead as a *gestalt,* combining several successive moments as a unity. Without such a capability we would be unable to undertake a great variety of everyday tasks which would be unthinkable if time was essentially divided into distinct and isolated moments like the ticking seconds of the clock. This point will be considered in greater detail when we come to discuss Bergson's philosophy of time. For the moment, it is enough to acknowledge that the commonplace activities which make up ordinary life require the operation of more than one *temporality*. Consequently, it will be argued that while chronometry has a restricted value, it is still an important element within Boulez's music. It does not appear in any literal sense where time is actually measured out in seconds, but rather in a continual opposition between two distinct conceptions of time, the first of which is analogous to chronometry, involving a pulsed or *striated time* and the second which is a pulseless, *smooth time*.

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[4] Kern's study *The Culture of Time and Space* (1983) roots chronometry within the thinking of Isaac Newton, who wrote in 1687 that "absolute, true, and mathematical time, of itself, and from its own nature, flows equally without relation to anything external." Newton's idea of "absolute, objective time" was, in turn, rejected by Kant in the *Critique of Pure Reason* (1781) because it could not be experienced. Kant instead posited that "time was a subjective form or foundation of all experience", which despite its subjectivity, is also universal and therefore "the same for everybody" (Kern 1983, p.11).

The various lines of enquiry pursued within this chapter are an attempt to move beyond a study of *time* and *temporality* which is grounded purely in the technical description of rhythmic processes. The present study alternatively seeks to trace a variety of cultural currents which, it will be argued, form meaningful rhizomatic connections with the two temporalities which are expressed within Boulez's music as *non-pulsed* and *pulsed*, *smooth* and *striated time*. Having briefly considered the dominance of chronometric thinking within twentieth century Western notions of time, we turn now to Modernist literature and to some of the alternative temporalities which it has produced, in particular those ideas which may have had the greatest impact upon twentieth century music and upon Boulez.[5]

Modernism, Time and Temporality - Bergson and Proust

While Einstein's theory of relativity radically transformed our understanding of time, Kern credits the propagation of twentieth century temporalities primarily to "those novelists, psychologists, physicists, and sociologists who examined the way individuals create as many different times as there are life styles, reference systems, and social forms" (Kern 1983, p.15). Kern brilliantly pulls together a great number of insights from many disparate areas of enquiry and uses them to chronicle the developments which took place in the thinking of time within the period from 1880 to 1918. What emerges, at one level, is the story of the transformation from a temporally uncoordinated world comprising numerous, completely autonomous local time zones, to the rational division and ordering of time across the entire planet into the existing twenty-four time zones at the Prime Meridian Conference in Washington DC in 1884 (p.12).

Kern acknowledges the paradoxical nature of events whereby this great moment of unprecedented temporal unification took place almost simultaneously with an equally unprecedented proliferation of individual times and temporalities arising primarily within the literary efforts of a number of key Modernist writers (Stevenson 1992, p.119). Indeed, the production of new temporalities within literature, philosophy and music may be said to be one of the most interesting accomplishments of aesthetic Modernism (p.112).

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[5] It should not be presumed that all references to time and temporality within this chapter can be understood in exactly the same way. Since a great variety of sources have been consulted, ensuring absolute terminological identity would have resulted in a separate etymological study. Sources and citations have been gathered around the concepts of *time* and *temporality* as defined early within the chapter. It is hoped that this will prevent unnecessary ambiguity.

Many Modernist writers created personal temporalities which stood over and against the "homogeneous public time" of the clock. According to Kern, in the face of the powerful "collective force of uniform public time", many Modernist thinkers declared the existence of more individual private times based rather upon conceptions of "a unique personal past" (1983 p.64).[6] While Proust, Woolf, Joyce, Conrad, Fitzgerald, Faulkner, Forster and William James, all tackled questions of time and temporality, the present study restricts itself to a brief consideration of the idiosyncratic temporalities found within Proust's *la Recherche*, a work which, by Boulez's own admission, has had a significant impact upon him. The treatment of time within Proust's great novel, as Deleuze has shown, can assist our understanding of the kinds of musical time which are found within Boulez's compositions. It is this which prompts us now to examine Proustian time more carefully.

Wyndham Lewis, writing in 1927, identified the philosophy of time formulated by the philosopher Henri Bergson (1859-1941) within Proust's *la Recherche*. Since then several writers have paired Proust and Bergson in the conviction that they share a common philosophy of time. Recent studies, however, seem to show that, while there are common elements within their conceptions of time, it would be wrong to simply reduce Proust's work to the philosophy of Bergson. Before considering Proust's treatment of time, we will, therefore, briefly review one important aspect of Bergson's philosophy of time since it has, in its own right, been a significant force in the development of both musical and literary temporalities.

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[6] Hostility to clocks and chronometry in Modernist writers is recognised today to be the literary expression of a more widely felt antipathy towards a societal system which exercised control through the absolute imposition of clock time. The reluctance displayed by Modernist novelists towards employing chronological sequences in their works is perceived to be a reaction to the rigorous routine which clock-time had introduced into almost every area of contemporary life (Stevenson 1992, p.86; pp.114-115).

Bergson is a philosopher who largely fell out of favour within the academy after his death. His poor reputation today bears no comparison with the great respect he received during his lifetime. Whatever the vagaries of his reception, there is no doubt that he had a profound effect upon some of the twentieth century's greatest literary writers and composers, as well as upon Deleuze, who has written a short study of *Bergsonism*. Bergson was concerned with trying to express "the true nature of our existence in time" since, in his view, the breaking down of time into the individual moments of clock time is a misrepresentation which reduces time to, what he considered to be, an unacceptable spatial model. For Bergson, time is "an indivisible flux" which cannot be thought of "as a sum of temporal atoms without distorting their essentially fluid nature" (Kern 1983, pp.25-26). According to Bergson, "either you must suppose that this universe dies and is born again miraculously at each moment of duration, or you must make of its past a reality which endures and is prolonged into its present." The second option forms the basis of Bergson's concept of *duration* which he explained in 1889 through the idea of the notes of a musical melody which would each be meaningless if perceived individually in an isolated way. To appreciate the melody, memory must somehow grasp all of its notes as a unity, as an instant. Its individual pitches must, in a sense, "'permeate', 'melt', or 'dissolve' into one another".

Bergsonian *duration* is therefore an experience of time, a *temporality*, in which time is no longer conceived in fragmented units but rather as a "mutual penetration" or "interconnection" of successive states of consciousness. Kern provides a much fuller account of the development of *duration* in Bergson's thought which arrives at a view of "human consciousness [which] is not the tranquil passage of discrete ideas ... rather, it is a thunderous action of memories that interlace, permeate, melt into, drag down, and gnaw on present experience" (Kern 1983, p.43). For Monelle, whose study, like the present one, is primarily concerned with music, Bergson's "real importance lies in the separation of perceived time from measured time" and his "intuition that music is heard simultaneously as a Gestalt, rather than successively as points on a line" (forthcoming).[7]

According to Kern, Proust's *la Recherche* shares something of Bergson's view of time and seems, from one point of view, to be almost a response to Bergson (Kern pp.46-47). Nevertheless, Kern believes that it is to be distinguished from Bergson in the following way:

> For Proust duration is a series of isolated moments that produce such pleasure upon retrieval precisely because they are so remote from each other, while Bergsonian duration is at every moment a composite of each successive moment and therefore continuous. If Bergson's duration is like a stream, Proust's is like a series of steep cataracts where the mind recaptures intermittent surges of memory out of oblivion (1983 p.58).

For Julia Kristeva, the fact that "Proust was a novelist and not a theoretician of time" is a warning against any attempt "to 'extract' a philosophical doctrine from his work" or "to identify such a doctrine with one of the models he knew well or with one of the theories developed after his own and said to 'resemble' his supposed conception of time" (1996 p.307). Kristeva acknowledges a vital connection linking Bergson and Proust in that, like Proust, Bergson "deemphasises 'quantitative time' and favours a 'qualitative time' that is experienced and felt, a pure interiority" (p.313). Kristeva nevertheless advises caution when making comparisons and suggests that Proust's involuntary memory, which she refers to as "the Proustian imaginary", is "different from the notion of 'duration' developed by Bergson". For Kristeva, Proust's condensation of two spaces, times and sensations, for example, the two episodes with the madeleine, shows that he:

> does not subscribe to the opposition Bergson sets up between pure subjective duration and an objective time that can be measured in spatio-temporal terms.

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[7] Zuckerkandl (1956) recognises that in Bergson "for the first time we encounter ... the concept of a time that cannot be divided and measured; that can only be lived and apprehended in immediate intuition" (1956 p.243). Zuckerkandl is clear that Bergson intended this time "to be understood psychologically", but he is also aware of Bergson's critics who maintain that he failed to clarify "the dividing line" between "*physical* and *psychological* time" since, while "his investigations related only to the latter", he nevertheless "claimed to be discussing unqualified time, and indeed *true* time" (p.245). Zuckerkandl does not attempt to resolve this dispute.

> In Proust's novel, lost time is immediately 'searched for' within a spatial imaginary and within the discontinuity of language, so that spatio-temporal continuity and its fragmentation are not an antithesis to pure time but its servant, the preferred means for attaining time regained (1996 p.194).

In Kristeva's view, the respective projects of Bergson and Proust are "eminently individual" and cannot be identified (p.314). She perceives this difference to consist in a divergence "between artistic concreteness and philosophical generality" which she ultimately interprets as Proust's rejection of the philosophical enterprise itself (pp.318-319). For Kristeva, Proust provides more than simply confirmation of Bergsonian and Heideggerian ideas of time since "he also verbalizes a sort of *sensory time* beyond metaphysical categories" (p.170).[8]

For Kristeva, Proust "inaugurated a new conception of temporality and thus created the modern aesthetic" (p.168). His *la Recherche* inspires the feeling that he is "manipulating two distinct temporalities", one of which consists in "the immediate temporality of events that constitute the plot (or that, in reverse, follow the thread of the narrator's involuntary memory)", while the other "transcends measurement, space, and duration by telescoping two events, signs or sensations" (p.307). Of the second temporality, Kristeva observes that Proust "opens up time" through the merging and condensing of "two spaces, two times, and two sensations". For example, in the widely separated moments where Proust tastes "Mamma's madeleine *and* Aunt Leonie's" or in "Botticelli's *Zipporah* or Vinteuil's little phrase *and* Odette .... the immediate does not disappear, however, but swells up disproportionately." Proust, according to Kristeva, manages to narrate his story through "the continuous time of the plot fragment ... while remaining caught in the pincers of the immediate metaphor that removes it from temporal duration and adorns it with the exhilaration of 'pure time'" (pp.193-194).

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[8] Kristeva's comparison of Proust and Bergson can be found in Kristeva pp.313-319. According to Kristeva, this divergence "between artistic concreteness and philosophical generality" is "only one of several dramatic differences between Proust's notions of time and sensation and Bergson's." She discusses "three important points of convergence - and divergence" between them (1996 p.314).

The reader of *la Recherche* is led to lose her/his own time and, through following the labyrinthine working of Proust's *involuntary memory*, to "experience the sense of time" (pp.195-196). The final sentence of *la Recherche*, for example, is said to have transformed "temporal duration ... into a real presence ... 'a morsel of time in the pure state,' 'embodiment,' or eternity" (p.304). For Kristeva, Proust achieves "the transformation of linear time into literary timelessness" and "goes beyond the vagaries of linear time", recovering "a sort of temporal anteriority", a "timeless time" which "does away with time and replaces it with an eternity - the spatial eternity of a literary work" (p.189). It is a "new form of temporality" in which "the moment is 'enlarged' and surmounted" (p.190). Proust discloses that *la Recherche* has "that form ... which ordinarily, throughout our lives, is invisible to us: the form of Time", a notion which he describes as "time embodied" (Kristeva 1996, p.191; p.320).

Malcolm Bowie uncovers several further aspects of Proust's "alternative temporality". He tells of Proust's resolution of "all the untidy syncopations of lived time ... into a sublime timeliness" (1998 p.38); the counterpointing of several simultaneous events which unfold at ever-changing speeds (p.45); the opposition of "public time, measurable by events, and mental time, measurable by the development of an individual's ideas or by his changing intensities of feeling" (p.46); and the careful handling of linear time which in places slows to the point of almost congealing while at other moments it is "accelerated mercilessly" (p.63).

We will return to Proust later in the chapter when we consider the parallel which Deleuze draws between the temporalities found within the work of both Boulez and Proust. For the moment it is sufficient to be aware of the "alternative temporality" found within *la Recherche*. Boulez's admiration for Proust's *la Recherche* is well known. Nevertheless, it must equally be acknowledged that Boulez has nowhere made any explicit connection between *temporality* in Proust and the pulsed and non-pulsed times of his own music. Once we have considered *temporality* within Boulez's music, an explicit case will be made linking the temporality of Boulez's music and that of Proust's *la Recherche.* Before doing so, we look now to the development of new temporalities within earlier twentieth century music.[9]

Time and Temporality within Twentieth Century Music

If the creation of alternative temporalities was a prime concern for Modernist writers, it has been no less important for many twentieth century composers. Our interest within the present chapter lies with composers such as Debussy, Stravinsky, Messiaen and Cage, who had considerable interest in compositional questions concerning rhythm, time and temporality and who could all be said to have exercised some kind of influence upon Boulez's emerging notions of musical time. One of the most interesting aspects within their music is the prominence given to new static temporalities which create the effect of suspending time, arresting all feeling of forward movement. Their impact, at least upon many modern Western ears, is often one of disorientation, since Western listeners, at least from the Baroque onwards, have been more traditionally accustomed to music with a sense of forward progression in time. While exceptional traces of temporal stasis can be found within earlier music, the present study begins its consideration with Debussy in whose music a sense of temporal stasis becomes a more significant phenomenon.

In the study *L'impressionisme et la musique,* Michel Fleury considers the static temporality of Debussy's music within the wider context of the late nineteenth century predilection for "statism" in the symbolist, pre-Raphaelite and impressionist painters, the symbolist poetry of Mallarmé and the drama of Maeterlinck. Fleury characterises the epoch as "one of a calling into question of the notion of homogeneous and measured time" (1996 pp.207-210). Fleury's study draws upon the work of the philosopher Vladimir Jankélévitch, whose *Debussy et le mystère de l'instant* takes up the refusal of progression and development within Debussy's music and relates it to the very slow values found within Liszt's late works (1989 p.137).

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[9] Boulez has also acknowledged the influence of Joyce upon his thinking. Kern explores Joyce's concept of time in which several distant events can be experienced simultaneously. Joyce achieved this within *Ulysses* in which, beginning from his love of film techniques, "he improvised montage techniques to show the simultaneous activity of Dublin as a whole, not a history of the city, but a slice of it out of time, spatially extended and embodying its entire past in a vast expanded present" (1983 pp.76-77) Kern says that "in his affirmation of the now, Joyce used various techniques to suggest the experience of simultaneity, and he also compressed memories and expectations into a temporally thickened present" (p.86).

Jankélévitch enumerates a long list of compositions within which Debussy's static temporality is to be found. This includes the end of the *Prelude* from *Pour le piano*, the *Etudes* for repeated notes, eight fingers and chromatic degrees, *The Snow is dancing* and *Jardins sous la pluie* (pp.130-131). Jankélévitch says that *Parfums de la nuit* "sprawls voluptuously as if time no longer existed" (pp.133-134). Of the piano prelude *Des pas sur la neige*, the first *Ballade de Villon*, the third part of *En blanc et noir* and the *Colloque sentimental*, he says that "here nothing develops nor becomes, here becoming is at a standstill and is bogged down". Similarly, the repeated notes which are used within *La neige danse*, the first movement of the *Violin Sonata* and the interlude from the *Sonata for flute, viola and harp* are described as "hypnotic" and as suspending all progress (p.133).

Jankélévitch conceives Debussy's music as containing "eternal presents" which he calls "the instant" (p.300). He says that:

> The twenty-four *éternités instantanées* which are called 'Preludes' correspond to twenty-four immobile visions which fix for us as many static images of the total presence; each Prelude immobilises a minute of the universal life of things, a moment from the history of the world and it arrests this universal life in the *aeternum Nunc* of a vertical cut, that is to say, outside of all becoming and of all succession, without relation to either before or after, nothing evolves, develops or is transformed (1989 pp.290-291).

While Jankélévitch's style may be a little too florid for some tastes, his study does seriously attempt to explore the static element within Debussy's music. Paul Roberts, who writes from the very different perspective of a performer, associates the effects of temporal immobility and stillness which are found in piano pieces such as *Canope* from the second book of *Preludes* and *Cloches à travers les feuilles* with the influence of Javanese and Balinese gamelan music (1996 p.163; p.168).

The effect of the Javanese gamelan upon Debussy at the Paris World Exhibition of 1889 and the Balinese gamelan later in 1900 is well known from Debussy's own remarks and the comments of his friends. Recalling the 1889 exhibition, Debussy's friend, Robert Godet, tells us that Debussy spent a substantial amount of time in "the Javanese *kampong* of the Dutch section listening to the percussive rhythmic complexities of the gamelan with its inexhaustible combinations of ethereal, flashing timbres" (Lockspeiser 1962, p.113). In addition to the immediate effects of the music, Lesure's appraisal of events suggests that a sense of temporal stasis was also communicated by the Javanese dancers who "seduced all of Paris with their almost immobile sacred dances" (1992 pp.89-90). Debussy's personal reflections are restricted to purely technical matters such as rhythmic complexity and timbre and nothing seems to have been reported concerning his thoughts on the wider aspects of Javanese or Balinese temporality. Certainly, Godet believed that some of Debussy's compositions evoked the Eastern experience of the exhibition, although he again does not comment on the question of temporality. This is perhaps to be expected since Debussy did not have the benefit of twentieth century anthropology to provide a broader cultural background within which to interpret Javanese and Balinese music.

Whether or not Kramer is justified in claiming that Debussy "understood that the strange sounds he was hearing were unfolding in a different time world" (1988 p.44), the music which resulted clearly does, in places, express a sense of time consonant with Javanese and Balinese culture and temporality. Just as the gamelan sounds were to be appreciated within themselves and without reference to any kind of linear progression, Debussy produced sounds which could be enjoyed for themselves and not for their position within a harmonic progression such as would be more commonly found within Western Classical and Romantic music. While it is a plausible and attractive explanation to trace Debussy's effects of temporal stillness to the stasis of Javanese and Balinese temporality, like many other questions of specific poetic influence, the matter cannot be resolved within this study.

Acknowledging the importance of temporality within Debussy's music, Boulez wrote in 1958 that:

> With him, often, musical time changes its meaning, especially in his late works .... the fluid and instantaneous irrupted into music: and not merely the impression of the instantaneous, the fugitive, to which some have reduced it, but a genuinely relative and irreversible conception of musical time, and more generally of the musical universe (1991 p.276).

While Boulez recognised that an interest in Eastern cultures had been an important element within French music since the eighteenth century, he also acknowledged that it is expressed at a deeper level than before within the music of Debussy. In the essay *Oriental Music: A Lost Paradise* (1967), Boulez describes Debussy as the composer who has imbibed Eastern influence in the deepest way and transformed it. Looking in particular to the piano piece *La lune descend sur le temple qui fut*, Boulez suggests that "the concepts of time and sonority are clearly determined" (1986 p.422), while he says that within Debussy's *Prélude à l'après-midi d'un faune*, "the art of music began to beat with a new pulse" (Lesure and Nichols 1987, p.50). More recently, Boulez has spoken of his attraction to Debussy's mobile sense of time and the subtle processes of condensation and expansion of time which Debussy produces within some of the *Etudes* and elsewhere (Interview 28.8.98).

Non-developmental, static temporality is an equally important element within the music of Olivier Messiaen, to whom Boulez attributes his own interest "in matters of time and rhythm in general" (Boulez 1986, p.412). Like Debussy, Messiaen recalls the profound and lasting effect made upon him by Balinese gamelan music and dance which he first encountered in Paris at the *Exposition Coloniale* in 1931. Whatever particular influence may derive from this exposure to gamelan is only one, and is certainly not the most significant, among many sources from which Messiaen fashions his conception of time and idiosyncratic rhythmic practice. In contrast with Debussy, Messiaen is much more explicit in detailing the temporalities expressed within his music. His posthumously published seven volume *Traité de Rythme, de Couleur, et d'Ornithologie* (1949-1992) begins with a thirty page chapter on time, which considers the phenomenon from a great variety of musical and non-musical perspectives. In the preface to the treatise, Boulez notes that while Messiaen "abandons himself to the most abstract speculations - on time, on duration .... his reflection on time, on duration, is one of the most original in our age" (Messiaen 1994, p.vi). What follows here is merely a brief summary and commentary upon those sections of the treatise which would seem to be most relevant for present purposes.

Messiaen's discussion of musical time and temporality is remarkably wide-ranging. It contrasts spectacularly with the more economical approach favoured in Boulez's writings. Unlike both Debussy and Boulez, Messiaen understands static and progressive temporalities within the frameworks of both Christian cosmology and Japanese culture. Messiaen envisages these twin conceptions of time, the static and the progressive, as expressing the contrast of the eternal and the earthly, a phenomenon which Griffiths traces to a tendency to perceive music as a spiritual art which was prevalent in the Paris of Messiaen's student life (1985 p.25). Static music is accordingly thought of as suspending our normal experience of the passage of time in order to communicate a sense of the eternal which is beyond time. This static temporality is opposed to linearly progressive music which is thought to be more analogous with our common experience of lived time on earth. Messiaen begins his treatise with such reflections on time and eternity which are perhaps intended to provide an eschatological level of meaning with which to interpret the later defined distinction of *duration* and *structured time*. Messiaen grounds this conception with the help of a series of religious texts from the Bible and from St Thomas Aquinas. He writes:

> Time is the measure of the created, eternity is God himself. Eternity is indivisible .... 'Time responds to movement and eternity remains the same'.... 'The instant of time offers itself to the mind as the number of the mobile: eternity conceives itself as the unity of an immutable being'.... 'Eternity is complete simultaneity ... eternity is the measure of permanent being and time the measure of the same movement' (Messiaen 1994, p.7).

According to Messiaen, the possibility of such a static temporality is suggested not only by his Christian belief in eternity. Looking to Japan he says that:

> Japanese music is static, and I myself am a static composer because I believe in the invisible and in the beyond; I believe in eternity. Now, Orientals are on much closer terms with the beyond than we are, and that's why their music is static. The music written by me, a believer, is equally static (Samuel 1994, pp.103-104).

Messiaen cites his *Sept Haïkaï* (1962) as an example of a work which has resulted from his interest in the "static character" of Gagaku. He tells us that it was this "static, hieratic, and sacred atmosphere" which he tried to emulate "while trying to give it a Christian dimension" (Samuel 1994, p.137). Other pieces which feature temporally static elements include *Visions de l'Amen* (1943), *Turangalîla-Symphonie* (1946-48), *Cantéjodayâ* (1948), *Livre d'orgue* (1951), *Chronochromie* (1960) and *Couleurs de la cité céleste* (1963) (Kramer 1988, p.214).

In addition to such religious and cultural explanations, *The Treatise on Rhythm* invokes a staggering panoply of corroborative sources in its consideration of time. Messiaen draws upon Einstein's theory of relativity as well as quantum theory in order to provide a scientific basis for musical time. Time is successively considered in relation to phenomena ranging from the expansion of the universe, the age of the stars, the geology of the earth, the physiological and psychological "times" of human beings down to the microphysical time of particles within quantum physics. While all of this is very interesting, in a rather eccentric way, perhaps the most relevant sections for the present study are those which examine time from a purely philosophical viewpoint. Messiaen devotes two sections of the first chapter to the philosophy of time, the first which considers the contrary concepts of *structured time* and *duration* (1994 pp.9-12) and the second which links Bergsonian time and musical rhythm (pp.31-36). Messiaen's concepts of *duration* and *structured time* seem to be broadly similar to what Boulez terms *smooth* and *striated time* in that both composers set up an opposition between non-pulsed and pulsed times. While Boulez's account will be seen to remain mostly at the level of musical technique, Messiaen wishes to provide a more explicit philosophical basis for the temporalities underlying his rhythmic practice.[10]

Messiaen, after Bergson, distinguishes two distinct conceptions of time which he terms *lived duration (durée vécue)* and *abstract* or *structured time (temps structuré)*. Summarising the differences between the two types of duration, in terminology borrowed from the philosopher Armand Cuvillier, Messiaen says that *lived duration* is *concrete* since it "merges our successive states of consciousness" into a perceptible unity. It is *heterogeneous*, which means that it can have fasts, slows, and every possible shade of tempo in between depending upon the number of events which merge within it. It is *qualitative* which means that it is not quantifiable or measurable. Finally, it is *subjective* since it is purely within us. *Structured time*, in contrast, is said to be *abstract*, "an empty frame in which we include the world and ourselves." It is *homogeneous* since all of its moments are identical. It is *quantitative* in that it is measured and numbered in relative terms. Finally, it is *objective* since as a measure it exists outside of us (p.12).

In addition to defining these two opposing ideas of time, Messiaen also seeks to explicitly link Bergsonian time and musical rhythm quoting Bergson's celebrated musical illustration of duration:

> Completely pure duration is the form which takes the succession of our states of awareness when our self lets itself live, when it refrains from establishing a separation between the present state and previous states. It no longer needs, for that, to absorb itself entirely in the sensation or the idea which passes, for then, on the contrary, it would cease to last. It no longer needs to forget the

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[10] I do not know when Messiaen developed the terms *structured time* and *duration,* given that his *Treatise on Rhythm* was composed between 1949 and 1992. A study of the mutual influences on matters of time and temporality between Messiaen, Boulez and the others members of the post-war avant-garde remains to be written. Where Messiaen exploits these opposing conceptions of time, Bergson wishes to abolish spatial time (structured time) as not being a "time" at all since he believes "lived time" to be the only time. In *Entre ordre et chaos* (1988) Boulez writes of *smooth* and *striated time* in Messiaen's *Chronochromie* (1960). He says:

> our first and last impression will evidently be that of values written within a time for which we can only estimate chronometric duration because it is too complex; we know instinctively that it is a case of pulsed time and non-pulsed time, but not absolutely smooth, given that we perceive the drawing closer or the stretching of the values within each stratum (1989a p.424).

> previous states: it suffices that in recalling these states it does not juxtapose them in the actual state as one point upon another, but organises them with it, as it happens when we remember the notes of a melody, melted together so to speak (Bergson, quoted in Messiaen 1994, p.34).

As with time, when Messiaen comes to discuss rhythm in Chapter Two of the treatise, he again draws upon an extremely wide range of sources. Considering what he calls "extra-musical rhythms and their influence on musical rhythm", he links musical time with the sounds of nature, birdsongs, the mineral kingdom, the vegetable kingdom, the animal kingdom, dance, language, poetry and the plastic arts. He perceives rhythmic value in such diverse locations as the organisation of stones and mountains, in trees, flowers, leaves and so on. He associates rhythms with the movement of animals as in Hindu tradition. He looks to accentuation within spoken language and "the rhythm of *volumes* in sculpture" (p.65). He even refers to the influence of colour in painting and most particularly to the effects of stained glass windows upon certain of his rhythms and modes (p.66). Chapters Three and Four conclude the first volume of the treatise with extensive explorations of Greek metre and Hindu rhythms.

For Messiaen, rhythm is "probably the most important characteristic of twentieth century music, the one that will set our era apart from previous centuries" (Samuel 1994, p.83). Boulez openly declares the debt which he owes to Messiaen (1991 pp.133-134). He acknowledges him as the first composer to provide an analysis of rhythm as an independent musical component and recognises the originality of his thinking of musical time (1986 p.419). Messiaen's discussion of temporality, within the treatise on rhythm, suggests that he considers time, temporality and rhythm to be clearly connected. Nevertheless, the specific relationship between rhythm, which is a musical category and temporality, which is a philosophical (and anthropological) category, is not an agreed one. Monelle's study of temporality within music leads him to the view that while "metre and rhythm may contribute to an expression of temporality ... there is no direct connection" (forthcoming).

The present study would agree with Monelle to the extent that temporality is not always a self-conscious factor within music such as it is within the music of Messiaen. Neither, it may be said, is rhythm a particularly self-conscious factor within music which follows traditional rhythmic models. This is not the case with Messiaen or Boulez who consciously depart, in a multitude of ways, from both regular rhythms and progressive pulsed temporality. This is not proof of the interconnection of rhythm and temporality, but does allow the case to be made that irregular and irrational rhythms provide some of the technical means through which we encounter a static temporality within their music. To this extent, a connection linking rhythm, metre and temporality may be said to exist, at least for the moment, within the music of Messiaen and Boulez. Before considering Boulez's temporalities of *smooth* and *striated time* we will therefore look, first of all, to his ideas of tempo and duration which provide the technical means for the expression of pulsed and non-pulsed temporalities.

Boulez, Tempo and Duration

The personal musical style which Boulez developed within his early works is widely believed to be the result, at least in part, of his development of the Second Viennese advances within the sphere of pitch organisation alongside the adoption and development of Messiaen's innovative rhythmic practice. In his early essays, Boulez acknowledges the important influence of Debussy, Stravinsky, Messiaen and latterly Cage, upon his own ideas of duration and temporality. Mention has already been made, in general terms, of the influence which Boulez attributes to Debussy and Messiaen. He likewise commends Stravinsky as "the first to make an immense conscious effort in the field of rhythm" (Boulez 1991, p.47) and praises his early music which "developed rhythm on entirely new structural principles, based on the dissymmetry, independence, and development of rhythmic cells" (p.173). A final rhythmic influence is Cage. While it may be the case that the correspondence which passed between them for a while was indeed the result of a creative misunderstanding, Boulez nevertheless showed in a 1949 lecture that he was genuinely interested in Cage's application of whole numbers and in the variety of ways in which time is related to number. According to Nattiez, Boulez adopted the idea of using whole numbers himself in order to structure the tempos within the *Constellation-Miroir* formant of the *Third Piano Sonata* (Nattiez 1993a, p.12). Boulez acknowledges Cage's practice of "conceiving rhythmic structure as something dependent on real time, expressed through numerical relationships" (Boulez 1991, p.135). Boulez believed, at least at the time, that his own *Second Piano Sonata* demonstrated a shared interest with Cage, namely "in researching a work's structure by means of rhythmic structures" (Boulez/Cage 1993, p.44).

Despite obvious similarities in rhythmic practice and in their contrast of pulsed and non-pulsed temporalities, the style of prose which Boulez and Messiaen have produced on the subject could scarcely be more different. Look again to Messiaen's writings in which musical time and rhythm are seen against a plethora of diverse backgrounds including theology, science, architecture and the natural world. Look then to the sparse accounts of musical rhythm and time which Boulez provides, especially in his early writings. In an excellent introductory essay to *Stocktakings*, Piencikowski summarises the general thrust of the articles which Boulez wrote between 1948 and 1953 as being chiefly concerned with generalising the serial principle for all of the musical parameters. Their "main aim is to link 'polyphony and rhythm' into balanced organizations" (Piencikowski 1991a, p.xviii; Boulez 1991, p.115). At this stage in his development, Boulez is preoccupied with providing a renewed rhythmic basis for music rather than with questions of temporality. Discussion is normally of a technical nature. In the 1948 article *Proposals,* for example, in what has become a well-known quotation, he wrote:

> I have a personal reason for giving such an important place to the phenomenon of rhythm. I think that music should be collective hysteria and magic, violently modern - along the lines of Antonin Artaud and not in the sense of a simple ethnographic reconstruction in the image of civilizations more or less remote from us. But here again I have a horror of discussing verbally what is so smugly called the problem of aesthetics (Boulez 1991, p.54).

While acknowledging an extra-musical basis in Artaud for a renewed conception of musical rhythm, Boulez simultaneously expresses an extreme sense of unease in dealing with aesthetic matters. He professes to prefer to discuss rhythm and musical time primarily from a poetic, technical point of view rather than from a cultural or aesthetic standpoint. In *Stravinsky Remains* (Written 1951/published 1953), a rhythmic analysis of the *Rite of Spring*, Boulez declared the attention given to rhythm in musical textbooks to be inadequate, perceiving this fact as merely a symptom of the relative neglect suffered by rhythm in relation to its fellow parameters since the close of the Renaissance. In the isorhythmic motets of de Vitry, Machaut and Dufay, Boulez found evidence which clearly demonstrated to him the importance of rhythm in earlier music, since the rhythmic framework for such music was completed before the pitches were chosen (Boulez 1991, p.109). The combined force of this historical insight alongside Messiaen's rhythmic experiments in the *Etudes de rythme* (1949-50), persuaded Boulez that contemporary composers should likewise isolate rhythm as an individual parameter, leaving it no longer to apparent "spontaneity" and promoting it "to the rank of principal structural agent by recognizing that it can pre-exist polyphony" (1991 p.110). Such a move would restore rhythm to its historical place as an equal compositional partner.

Reinhard Kapp reveals that it was this very question of the priority of rhythm over pitch which became the principal source of disagreement between Boulez and his one time teacher, René Leibowitz. Leibowitz, who believed that rhythm must be "integrated into, if not subordinated to, polyphony", strongly opposed the rhythmic conceptions of Stravinsky and Messaien which permitted rhythmic experimentation to proceed independently of pitch (Kapp 1988, p.10). A full appraisal of the theoretical dispute between Boulez and Leibowitz can be found within Kapp's study. Its importance within the present chapter rests on the fact that it is, to some extent, this separation of pitch and rhythm which enabled Boulez to articulate and express the *smooth* and *striated* times which we will consider shortly.

In the Darmstadt lectures, published as *Boulez on Music Today* (1971), Boulez provides his most extensive theoretical consideration of the technical questions surrounding time and temporality, discussing the mechanics of tempo and duration quite separately from temporality. We will consider both in some detail. Boulez defines tempo as "quite specific to duration; it is, as it were, the standard which will give a *chronometric* value to numerical relationships" (1971 p.50). For Boulez, tempo should not be purely conceived as a fixed norm since it may be varied in precise or imprecise ways (pp.50-59). In the systematic method of his Darmstadt lectures, Boulez provides a continuum of theoretical possibilities provided by tempo, just as he had done for pitch-space. In summary, Boulez's list of categories of tempo divides into either *fixed* or *mobile* tempi. *Fixed tempo* is the simplest case since here the tempo remains the same throughout. There are, however, several types of *mobile tempo*, in which there will be transformation from one tempo to another and Boulez further divides *mobile tempo* into directed or non-directed *mobile tempo*. *Directed mobile tempo* refers to the passage from one fixed tempo to another fixed tempo, which results in either an accelerando or a ritardando. There is also the possibility of a fixed tempo becoming non-fixed and vice-versa. It may be that the technical means which Boulez outlines here correspond to what he describes, later in the lectures, as *striated time* since his directed tempi seem to maintain a sense of pulse throughout in order for an accelerando or ritardando to be perceptible.

The final alternative, for Boulez, is what he terms *non-directed mobile tempo*. He says of this last possibility that "the standard of duration will have a value undefined by any precise chronometric length of time" (p.51). This would seem to imply that the notated musical events could be performed at the discretion of the performer, either within a set chronometric time limit or without any chronometric boundaries whatsoever. Once again, it may be the case that Boulez's non-directed mobile tempo, which he refers to as "floating", corresponds to the non-pulsed temporality of *smooth time*. Boulez suggests as much since he commits himself to the further consideration of each category of tempo in terms of "the presence or absence of an internal pulse" at a later stage (p.52).

Turning from the level of tempo to that of duration, Boulez again considers a variety of procedures which enable him to produce both regular and irregular pulse (p.52).

Whatever the chosen durational values, Boulez recognises that "the choice of tempo will be of prime importance to the perception of pulse" (p.53). As with tempo, Boulez again lays out a variety of means by which a series of durations can be modified. Boulez envisages three possibilities which he terms the "fixed", the "mobile and non-evolutionary" and the "mobile and evolutionary" variation of duration series (p.53). With fixed modification of durations, "the proportions of the original remain when they are multiplied or divided by a single numerical value". With mobile and non-evolutionary modification of durations "the proportions of the original are modified by the addition or subtraction of a fixed value" (pp.53-54). The last possibility for modification of durations, which is both mobile and evolutionary, is where "the proportions of the original are modified by a variable value, which is a fixed or mobile function of its (the original's) constituents, by, for example, 'dotting' all the values, whether or not they are already dotted" (p.54). The resultant rhythms which Boulez produces by these means are then placed in relation to one another and Boulez considers three ways of distributing the resulting durational patterns: symmetrically, asymmetrically or a combination of the two (pp.55-56). For Boulez, such durational procedures can equally be applied to tempo. Finally, Boulez writes of *time bubbles* in which "only the proportions of the macro-structures" which could be a given length of chronometric time or a set number of bars are specified (p.58). Performers are, in this situation, free to provide an infinite variety of rhythmic/durational outcomes within the defined time area. We will encounter these again shortly after we have considered the concepts of *smooth* and *striated time.*

Two Temporalities - Smooth and Striated time - In Theory

We turn now from technical questions of tempo and duration to that of temporality. As with the possibilities for interior sound-space, Boulez conceives musical temporality in terms of *striated time* and *smooth time*. In pulsed or *striated time* regular durations are associated with chronometric time as signposts, while in amorphous, non-pulsed or *smooth time* there are no regular pulses or landmarks. *Smooth time* is only connected with chronometric time in an overall way since, within such a temporality, durations (with or without precise proportions) occur within a broad "field of time." Speed, acceleration and deceleration are consequently only features of *striated time,* while only the density of events within a chronometric time-limit can vary within the passage of *smooth time* (Boulez 1971, pp.88-89).

For Boulez, pulsation plays a role within *striated time* which is analogous to that of temperament within *striated space.* As with interior musical space, the regularity or irregularity of the pulsation within *striated time* will be determined by the "fixed or variable" nature of its divisions (p.91). The most important factor concerning pulsations which are irregular and irregularly divided is the fundamental question of their realisability which, for Boulez, is dependent upon their not going beyond a given degree of practical difficulty in terms of both their proportions and divisions. Nevertheless, as Boulez makes clear in *Jalons*, with particular reference to electronic music, the mere fact that a musical passage is arhythmic does not necessarily guarantee the production of a slow, suspended music or *smooth time* since frenetically, agitated music, which is too complex for perception to unravel, may also result from arhythmic passages without producing a sense of musical stasis (1989a p.61).

Again, as with interior sound space, Boulez provides a much more detailed classification of musical times which draws upon both the concepts of *smooth* and *striated time* and upon the taxonomy of tempo already discussed. Boulez's terminology is not always easy to decipher precisely or to translate into more sympathetic language. The terms *partition* and *module*, which he uses to define various types of *striated time*, seem to me to be particularly confusing since it is not exactly clear to what they refer. Susan Bradshaw who, with Richard Rodney Bennett, produced the English translation of the Darmstadt lectures, *Boulez on Music Today*, maintains that the meaning of such terms and passages was never absolutely clear to her at the time of translation, even with Boulez to consult for clarification. It is ironic that a work such as this which purports to provide greater rigour, even *scientific* rigour, in dealing with musical concepts should result in such ambiguity.

This lack of clarity may be partly due to the foreign nature of the terminology with which Boulez chooses to discuss the subject, since terms such as *partition* and *module* do not belong to any traditional musical vocabulary. Nevertheless, given the relative lack of appropriate agreed terminology within the theoretical texts of the day, it is understandable that Boulez should have looked outwith the history of music theory for suitable terminology with which to articulate the new temporal possibilities which he was exploring. While acknowledging the legitimacy of this problem, a variety of interpretations may be proffered. Boulez's desire to create a sense of mystery around the means by which his works are produced is well known. On this basis, some readers may suggest that Boulez's motives in producing texts such as *Boulez on Music Today* may be far from straightforward. While ostensibly providing a resumé of his own technical apparatus, it may be implied that Boulez deliberately uses vague terminology in order to give the gist of his thinking without providing his fellow composers with too detailed an account of his procedures. Another reading would suggest that Boulez himself is not sufficiently in control of the language he uses, since he introduces completely new terms into musical discourse without providing precise definitions of their meaning, thus leaving them open to alternative interpretations. An even more extreme assessment would question whether or not Boulez was ever absolutely clear in his own mind about the meaning of his terms and that this is the real reason for their opaqueness. Bradshaw recalls Boulez's inability to successfully explain a problematic passage from the text. She remembers his eventual response to have been that while he could not explain the passage now, he knew what he meant at the time.[11] This is a question which cannot be definitively resolved here and which must, for the moment, remain a matter for conjecture. Whatever the reason for its obscurity, the text is clearly a product of its age and typifies the scientistic ethos of that period in Darmstadt, a moment in musical history which did not quite result in the kind of precision which it seemed to promise.

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[11] Bradshaw says that "the explanations are so intricate and detailed; even when challenged he refused to explain them. I believe it was willful secrecy on his part. He showed little interest in the book. He never looked at the copy of the typescript" (quoted in Peyser 1976, p.150). Claude Helffer similarly recalls that when he asks Boulez "to explain something, he says, 'I don't remember'" (quoted in Peyser 1976, p.153). Philippot accepts that Boulez had to employ new terminology because of the insufficiency of older vocabulary and that he frequently finds such vocabulary in the field of mathematics. Philippot does not agree, however, that Boulez is wilfully obscure but he acknowledges the problems facing Boulez in "adapting a thought to an appropriate terminology" (1966 p.159). He reproaches Boulez for a lack of "determination or rigour - in short, for not having behaved sufficiently like a mathematician or a logician" (p.160). He recognises that it would be desirable to have a "term by term" translation of the musical meaning of such borrowings in order to dispel ambiguity.

Looking back, within his *Collège de France* lectures in 1978, Boulez, while not referring explicitly to the Darmstadt lectures, sounds a more cautious note when he writes that:

> ideas on the perception of time are going to lead the composer to express himself, to define *musically* these categories which he experiences at first confusedly or partially; the realisation of a suspended time in relation to a measured and pulsed time; projections of different times; putting in touch large units of action in relation to subdivisions of a different order (1989a p.68).

Returning to the specifics of the vocabulary within *Boulez on Music Today*, the term *module* could refer to whatever durational value is accepted as standard and from which related durations can be derived. Alternatively, it could refer to whatever tempo is regarded as standard. *Partition* seems to denote the division of the temporal continuum within *striated time*. This is achieved in practice through the placing of either clearly perceptible durations or equally perceptible tempi, depending on whatever interpretation of the term *module* is preferred. Within the classification itself, only *striated time* is divided into a variety of types since *smooth time* has "neither partition nor module" (Boulez 1971, p.93). *Straight time* is defined, regardless of partition, as having a "constant module", which means that its initial values operate between two boundaries while the values which are derived from it will be placed accordingly "between the multiples of the relationship defined by these two limits." *Curved time* provides the opposite possibility in that the derived values will "depend upon a function of the relationship defined by these two limits". Boulez provides an example in which "all the values will ... be augmented or diminished according to the direction of the time-register which is followed." With *regular time* "whatever the module ... partition remains fixed" while with *irregular time* "partition varies (according to a defined numerical proportion or to the tempo)."

The terminological ambiguities which obscure understanding of the above categories should not have any bearing upon the basic thesis of this chapter since no further exploration of the various possibilities within *striated time* is necessary. Our present concern lies not with the technical aspects of each form of *striated time* but rather with the play of contrasting temporalities as expressed within the more general concepts of *smooth* and *striated time*. Nevertheless, it has been important to acknowledge all of the above categories in order to give as comprehensive a picture of Boulez's notion of time as possible. In the 1960 Darmstadt lecture *Time, Notation and Coding*, Boulez says:

> I regard the two categories - *smooth* and *striated* time - as capable of reciprocal interaction, since time cannot be *only* smooth or *only* striated. But I can say that my whole formal time system is based on these two categories and *on them alone* (1986 p.87).

Perhaps assuming the more familiar nature of *striated time* for the Western listener, Boulez defines *smooth time* as "that over which the performer has no control." He explains the meaning of this definition with the following example:

> suppose that a group of instruments is playing in striated time, under a conductor, and that two instruments have to play, within a global smooth time, structures whose time is partly smooth and partly striated, though differently from that of the group. By the very fact of this alternation, the two instrumentalists will lose all sense of the regular striated time which accompanies them and they are thus necessarily placed in a smooth global time (1971 p.94).

Boulez distinguishes *smooth* and *striated time* by defining them respectively as "filling time" and "counting time" since "in smooth time, time is filled without counting" while "in striated time, time is filled by counting" (p.94). Finally, Boulez introduces the concepts of *homogeneous time* and *non-homogeneous time*. Here, the time within a composition can be *homogeneously smooth* or *homogeneously striated*. A piece will be composed exclusively of either *smooth time* or *striated time*, but not both. Alternatively, the time within a composition may be *non-homogeneous*. In this case "striated and smooth time will alternate or be superposed" (p.93). It is this last mentioned possibility of *non-homogeneous time* which will be of most interest to us as we consider the alternation and superposition of *smooth* and *striated time* in a selection of scores. As we will see, Boulez uses temporality as an *envelope*, opposing the two temporalities as an effective means of articulating form and of playing with perception. This is Boulez's meaning in *Le système et l'idée* (1986), where he says that *striated time* and *smooth time* "correspond absolutely with the directionality or the absence of orientation within the segments of a work" (1989a p.389).

As we learned from Piencikowski, Boulez's first theoretical writings from 1948-53 were preoccupied with the technical problems involved in re-establishing rhythm as an independent and equal partner within the compositional process. We have similarly seen that in *Boulez on Music Today*, which summarises his thinking from the late 1950's and early 1960's, Boulez was intent on providing as scientific an account as possible of his musical treatment of tempo, duration and time. Before examining the working out of *smooth* and *striated time* within several compositions, we briefly consider how in the 1960's Boulez came to acknowledge more explicitly the influence of Eastern temporality as a factor within his thinking of time, in particular the production of *smooth, non-pulsed time*.

Boulez's interest in ethnomusicology surfaces in places within his writings and he valued his early contact with the musicologist André Schaeffner who provided him with recordings of ethnic musics from around the world. At an early stage in his career, Boulez even seems to have had ethnomusicological ambitions of his own.[12] This is an area which has received very little systematic scholarly attention to date but which could further influence our listening to Boulez's own compositions. In the 1967 essay on *Oriental Music* he tells of his interest in Peruvian music, Black African music and writes of having "studied and also transcribed Indian music" (Boulez 1986, p.421). He places the influence of these civilisations, in his own case, primarily on a personal level, saying that they provided "an ethics of existence rather than an aesthetics of enjoyment", the influence being on his "spirit" and not on his "work". He does, however, acknowledge that "the time structure, the conception of time being different" was one of its principal effects (p.421). In a similar way, he recognises an interest in "the precision in the organization of rhythmic structures" in the music of Bali and India (p.422). Boulez elsewhere acknowledges a longtime interest in Asian music as a common link with Stockhausen. Boulez says:

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[12] According to Aguila, Boulez was interested in joining a mission to Indochina in 1945-46, but did not go, however, because of the war there. Boulez says: "it is through Pierre Souvtchinsky that I knew Schaeffner. As he knew that I was very interested in non-European musics, he allowed me to hear many non-commercial recordings, from tapes which he had made himself" (Aguila 1992, p.44). See the correspondence between Boulez and Schaeffner edited by Pereira de Tugny (1998).

> I was always very interested in the culture of Asia and especially their notion of time, which seems so much more rich than our notion of time. In our Western civilization, we are always ready to go from A to B and when we get there through a straight line, we are always very happy because we think that that is the best solution. But I like to stop and listen to the sound only ... (quoted in Gable 1985-86, p.112).

The trace of Eastern music within Boulez's work goes beyond matters of time and temporality and has clearly influenced his choice and use of instruments, his love of timbre and his sometime interest in micro-intervals. The present study wishes only to acknowledge Boulez's awareness of the Eastern influence as an active factor within his development. It would be difficult to be more specific, to attempt to pinpoint the influence of Eastern temporality at any other level than the most general one. It is not clear, at the present moment, whether Boulez's experiments with rhythm and duration led him to Eastern temporality as a kind of confirmation of his thinking or whether it was a longtime interest, perhaps from the time of Messiaen's classes. Whatever the case, this affinity with Asian music and its static temporality provides a fascinating connection linking Boulez with both Debussy and Messiaen.

Smooth and Striated time - In Practice

Perhaps the most significant practical account of *smooth* and *striated time,* as the concepts have been developed within Boulez's compositions, is to be found in a short study by David Gable, who devotes ten pages to their consideration (1990 pp.435-444). What is clear from Boulez's scores, and is remarked upon by Gable and others, is that the two temporalities, the *striated* and the *smooth*, the pulsed and the non-pulsed, have been elements within Boulez's compositional practice from the earliest published pieces, albeit in a more elementary form.[13] Bradshaw has written of the play of regular and irregular pulses within the *Flute Sonatine* (1986 p.145), while several writers, including Boulez himself, have drawn attention to the existence of pulsed and non-pulsed writing within the *First Piano Sonata* (1946).[14] According to Boulez, each of the two movements of the sonata:

> is based on a duality: rhythm without perceptible pulsation, at slow or moderate speed; rhythm based totally on rapid pulsation in an irregular metre .... In the first movement, the thematic cells will be governed by a rhythm which is not based upon pulsation, whilst rapid rhythmic pulsation will show itself in pitches outside of all constraining contexts. In the second movement, on the contrary, rapid pulsation will be linked to the regrouping of characteristic intervals, non-pulsed rhythm applying itself to the free choice of intervals (Boulez 1989a, p.254).

While Boulez's later distinction of *smooth* and *striated time* may already be implicitly stated within the "rhythmic opposition" of the *First Sonata*, in Gable's view, time within the sonata is exclusively striated since he understands the concept of *striated time* to include not only regularly pulsed rhythms but also the marking of time with any kind of *fixed point,* whether it is regular or irregular (1990 pp.436-437).

Gable considers several practical means which Boulez uses to create smooth, non-pulsed time. These include the use of rubato, fermatas, indeterminacy, heterophony, the intrinsic characteristics of certain sonorities and occasional cues to the players from the conductor. Before considering the place of *smooth* and *striated time* within several compositions, we will briefly consider the devices listed by Gable.

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[13] Boulez tells us that the opposition of *smooth* and *striated time* was an indirect consequence of the generalised series in which pitch and duration were treated autonomously (1989a p.256).

[14] Claude Helffer writes of the rhythm in the *Beaucoup plus allant* sections of the first movement as exhibiting striated time. He says that "the other sections which concern 'smooth' time often imply temporal unity irregularly divided by 2, 3, 4 or 5" (1986 p.65).

In *Le Marteau sans maître* (1953-55) and the compositions which immediately followed it, rubato and fermatas are employed freely in order to produce non-pulsed time in what have become distinctively Boulezian gestures. Gable correctly finds evidence of rubato in all of the movements of *Le Marteau* except within the second movement, *Commentaire I* from the *Bourreaux de solitude* cycle, which has clearly perceptible pulsation (p.437). Rubato is more commonly associated with Chopin's piano music and Gable distinguishes Boulez's significant extension of rubato from that of Chopin. Where, in Chopin, rubato does not dispense with "an essentially stable underlying metre", Gable tells us that Boulez reverses the situation so that local rhythmic figures "must be relatively strictly respected while, paradoxically, the tempo remains in constant flux" (p.437). In a similar way, Boulez uses fermatas as a disruptive force within *Le Marteau*. Gable notes that fermatas have rarely been given a particularly important place in music before Boulez. With Boulez, however, they become a significant feature in shaping and controlling the sense of time within a composition. Citing *Commentaire II* from the *Bourreaux de solitude* cycle as an example, Gable notes the way in which "acceleration and deceleration" are constantly broken up through the unusually high frequency of fermatas (p.438).

In *Don* from *Pli selon pli* (1962), *Figures Doubles Prismes* (1963;1968) and *Rituel* (1975), Gable considers the role which heterophony plays "in decentralizing the temporal organisation" through having each line within the heterophony unfold indeterminately in relation to one another. The result is to blur all sense of pulse (p.440). Sonority itself, often an important consideration within the French tradition, is likewise recognised by Gable as assisting in the production of *smooth time* as Boulez contrasts the opposition of instruments producing sustained sounds such as "woodwind, brass, and bowed strings" with those which have resonant sounds such as "the struck or plucked sounds of piano, celeste, harp, glockenspiel, xylophone" (pp. 440-441). Gable finally highlights the role which a conductor can play in facilitating the opposition of *smooth* and *striated time*. In *Répons* (1981-84), for example, "the chamber orchestra plays in the strict time marked by the conductor's beat while the soloists are allowed considerable flexibility in pursuing their own tempi. Although receiving periodic cues from the conductor, the soloists are only loosely coordinated with the group at the center" (p.441). Many of the devices inventoried here will be considered more fully when we look at pulsed and non-pulsed time within several compositions.

It has been stated several times in the course of this study that as Boulez progressed as a composer, he became increasingly aware of a lack of differentiation within his material and a need for greater perceptibility in order to enable listeners to locate themselves more easily within a work. It was shown in Chapter Three that the athematic pitch material within some of Boulez's earlier pieces, while being highly organised, was nevertheless still rather amorphous and undifferentiated at times. It was also shown that as Boulez developed, he managed to maintain the concept of athematicism while providing material which was much less amorphous and, consequently, much more perceptible to the listener. We saw, analogously, in chapter four how Boulez again increasingly sought to articulate the musical pitch-space in a progressively perceptible way through such means as the manipulation of register and the organisation of musical sections around particular polar notes.

This tendency towards greater perceptibility is no less present in the case of temporal organisation. As we have seen already, the concepts of *smooth* and *striated time*, of pulsed and non-pulsed time, may be traced, in some shape or form, all the way back to Boulez's first works. In the earliest works, however, there is no question of *smooth* and *striated time* articulating the form of a work, as later became the case. While smooth, unpulsed time is clearly perceptible within *Le Marteau*, this temporality, as we have seen, is almost uniform throughout the entire work and may even be said to be rather amorphous. *Constellation-Miroir,* the central formant of *Piano Sonata no 3* (1956-57), provides a particularly impressive example of an extended piece which exists in homogenously *smooth time*. Rosen, who believes "the decentralized concept of time in Boulez's later work" to be "perhaps his most radical contribution to music" describes *Constellation-Miroir* as "the immovable, still centre of a larger work, which literally revolves around it." He tells us that "the metronomic indications must often be freely interpreted and the rhythm controlled by the levels of sonority achieved" (1986 p.96). Having brought temporality to the forefront of perception through the *smooth time* of pieces such as *Le Marteau* and *Constellation-Miroir*, Boulez now employed the much more obvious and perceptible opposition of *smooth* and *striated time* in pieces like *Eclat* (1965), using them to articulate the form of the piece.[15]

The tripartite form of *Eclat* is based around the opposition of *smooth* and *striated time*. It is perhaps the first of Boulez's works in which he successfully manages to make the opposition of the two *times* absolutely perceptible. Gable and Bradshaw have summarised many of the essential features of *Eclat* very effectively and provide a clear overview of the work. Gable notes that temporality within *Eclat* is, to a significant degree, established through the choice of instrumentation and timbral possibilities, since Boulez opposes resonating and non-resonating instruments. While the music played by the percussion instruments occupies time which is smooth and non-pulsed and whose "ordering and coordination can be improvised by the conductor", the music allotted to the sextet occupies pulsed, *striated time* (Griffiths 1995, pp.214-215). Bradshaw, meanwhile, identifies within *Eclat* an unfolding "argument" between pulsed time, "improvised durations, and time that is proportionately free within periods measured by surrounding pulsation." (1986 p.203).

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[15] For Bradshaw, *Figures Doubles Prismes* "with the exception of sections of the polyglot *Pli selon pli* ... is ... the last work to evolve against a 'classical' background of a chronometric pulse until ... *Rituel*" (1986 p.174). Bradshaw estimates that in the compositions of the late 1950's and early 1960's, "the sought-after formal contrasts between pulsed and amorphous time ... had become largely dependent on the smooth, one-dimensional continuity of a harmonic background that refused to reveal them" (1986 pp.225-226). For Bradshaw, these compositions failed to effectively express the two senses of time which were there in theory. Boulez himself, in *Automatisme et décision* (1981), acknowledges that his works have often used highly complex temporal relations which can be realised either by performers or through electronic means. He seems to acknowledge, in this passage, the limited success of his temporal experiments when he says that the resulting sensation of a "floating" unpulsed time could have been achieved with "simpler means." The problem, in Boulez's own assessment, lies with the difficulty of perceiving anything more defined than fasts or slows, regularity or irregularity. To really use the potential within the two temporalities, one must be able to distinguish between "two constant speeds, two tempos, one would have had to be able to hear the pulsation of each between them, to link them, moreover, to a periodic definition of pitches or densities, in short to a sound phenomenon which would have established the territory of each. From the moment that these territories are concretely defined and described, the confrontation then takes, and then only, all of its efficacy" (1989a pp.164-165)

A sketch in the *Paul Sacher Stiftung* reveals the plan of *Eclat* as follows (Ex. 5.1):

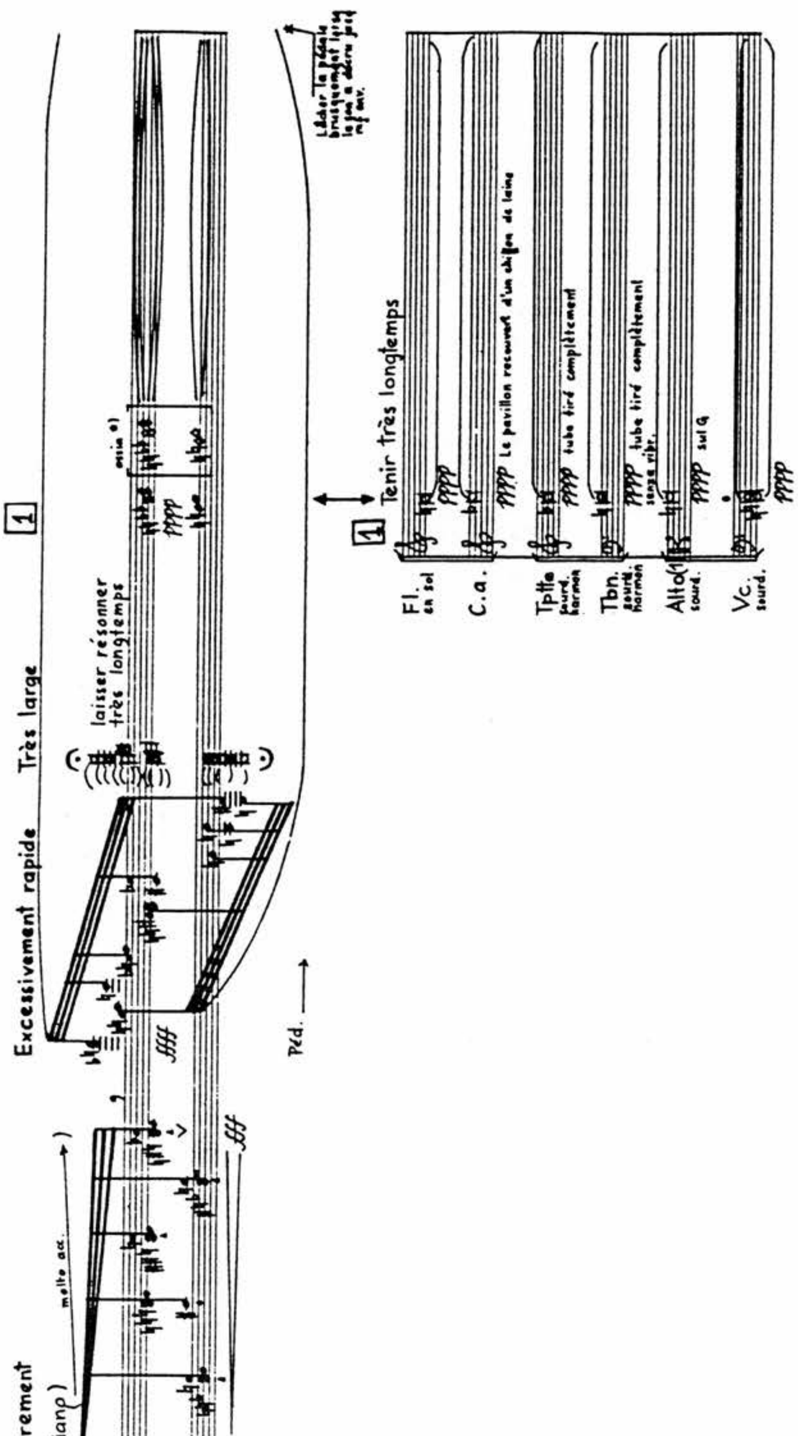
Ex. 5.1 Sacher Stiftung: microfilm 138, p.24

fig. [0]	Piano cadence	
fig. 2	Development 1	Presentation of the solo group and the ripieno group
fig. 14	Static cycle	
fig. 20	Development 2	
fig. 25	1st Instrumental cadence reprise (partial piano variation)	

Piencikowski, whose account of *Eclat* agrees with the ordering of Boulez's sketch, is responsible for the figure numbers, printed above, which do not appear in Boulez's sketch. A resumé of performance indications used within the piece gives an idea of the degree to which Boulez plays with pulse. Although there is pulsation within the first sections of the piece (up to fig. 14), it is not regular. The durational indeterminacy of the initial piano cadenza is reflected with instructions such as *Librement; Tenir très longtemps; Extrêmement flexible; Flexible; allonger les notes*. In development 1, instructions include *irregulier.* The central static section beginning at fig. 14 is prefaced - *Assez lent, suspendu, comme imprévisible (avec de brusques resserements et de brusques détentes)* and fig. 16 is marked *Vague, flottant, sans aucune orientation rythmique*. Development 2 is still *Libre, espacé* and *Tenir très longtemps*. Indeed it is only with the last section, (figs 25-30), that we encounter unambiguously pulsed music although the piece ends with the instruction *inégalement espacé.*

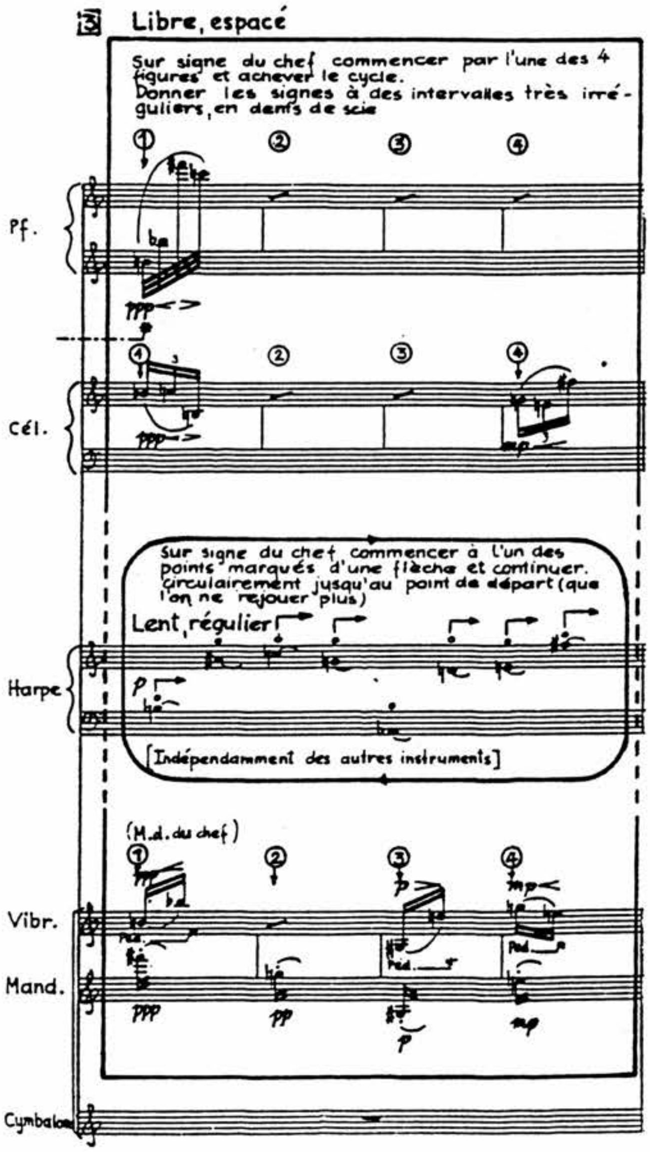
Boulez uses a great variety of means to create smooth non-pulsed time within *Eclat*. The opposition of degrees of pulsed and non-pulsed time which is fundamental to the form of the entire piece is, in a sense, anticipated within the opening piano cadenza. It begins with a six chord flourish which Boulez notates as a rhythmic glissando (Ex. 5.2) and is followed by nine regularly pulsed chords. This leads into a long non-pulsed piano chord which is taken up by the sextet. The cadenza concludes with a lengthy section for two pianos which is pulsed, but in a flexible way.

Ex. 5.2


Librement
(1er piano)
molto acc.
Pf.
pp
fff
ffff
Excessivement rapide
Très large
laisser résonner très longtemps
Ped.
1
ossia
Lâcher la pédale brusquement lorsque le son a décru jusqu'au mf env.
1
Tenir très longtemps
Fl. en sol
C.a.
Tptte sourd. harmon
Tbn. sourd. harmon
Alto sourd.
Vc. sourd.
pppp
Le pavillon recouvert d'un chiffon de laine
tube tiré complètement
tube tiré complètement senza vibr.
sul G

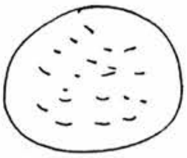
The *time-bubble* inserts within *Eclat* facilitate non-pulsed time through indeterminacy. There are eight inserts within development 1 (figs 3-14), four in the static central section (figs 14-20) and four in development 2 (figs 20-25). Again, Boulez uses a variety of means within the inserts which Jameux categorises as "optional", "instantaneous" and "controlled". In the insert at fig. 3 (Ex. 5.3), the simultaneously sounding blocks with different numbers of pitches (4, 3, 2 and 1 notes) ripple in arpeggios and blur all sense of pulse. At fig. 5 (II) (cf. Ex. 3.25) five instruments have one pitch each to play. The conductor signs rapidly and at unequal intervals to the players, making the resulting pulse unpredictable and irregular.

Ex. 5.3

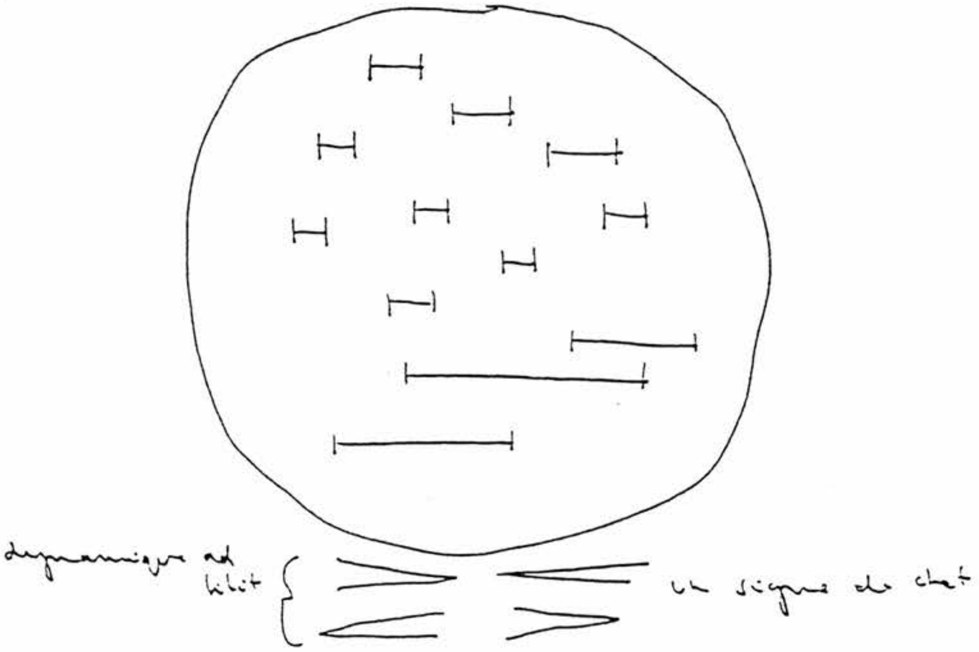

3
Libre, espacé
Sur signe du chef commencer par l'une des 4 figures et achever le cycle.
Donner les signes à des intervalles très irréguliers, en dents de scie
① ② ③ ④
Pf.
ppp
Cél.
Sur signe du chef commencer à l'un des points marqués d'une flèche et continuer circulairement jusqu'au point de départ (que l'on ne rejouer plus)
Lent, régulier
p
Harpe
[Indépendamment des autres instruments]
(M.d. du chef)
Vibr.
Ped.
Mand.
pp
p
mp
Cymbalom

A fuller account of the inserts, from the viewpoint of their indeterminacy, is provided in the discussion of *open form* in Chapter Three. On the question of *time bubbles*, there are two interesting examples in the sketches at the *Sacher Stiftung*. The first one, which can be seen in Example 5.4, presents a *time bubble* for *Une dentelle s'abolit* (microfilm 137, p.294). It is one of six drawings which illustrate Boulez's ideas in a way which is obviously derived from the work of Paul Klee. A second sketch (Ex 5.5) features a *time bubble* which is most likely from *A la nue accablante tu* (microfilm 137, p.326).

Ex. 5.4 - Sacher Stiftung: microfilm 137, p.294
(Author's tracing from Boulez's sketch)



Ex. 5.5 - Sacher Stiftung: microfilm 137, p.326
(Author's tracing from Boulez's sketch)



Returning to *Eclat*; the truly unpulsed section of the piece is the central static section from figs 14-20, where rhythmic pulse is prevented through a variety of means. There are no traditional bar lines, no time signatures, no conventional indications of duration, just pitch. Duration is instead decided metronomically. For this entire passage, the metronomic indications are said to be relative (fig. 14) and the conductor is given final control. In twelve separate places, Boulez offers a choice of two sets of alternative metronome marks to the conductor, as can be seen in Example 5.6 which shows the options at fig. 15.

Ex. 5.6

e.g. 1 = 80
240

At fig. 14 (Ex. 5.7) Boulez tells us that "in each rhythmic sequence indicated by [ ] , one [the conductor] will choose, in the case of two possibilities, either always the higher metronome mark or always the lower." Within this choice of metronome marks, most of the static middle section is organised notationally without traditional rhythmic values such as crotchets or quavers. Duration is instead provided through the use of a series of numbers which provide the number of counts to be given to each sound, relative to the metronome mark chosen. The following example shows the durational values of the first section at figure 14.

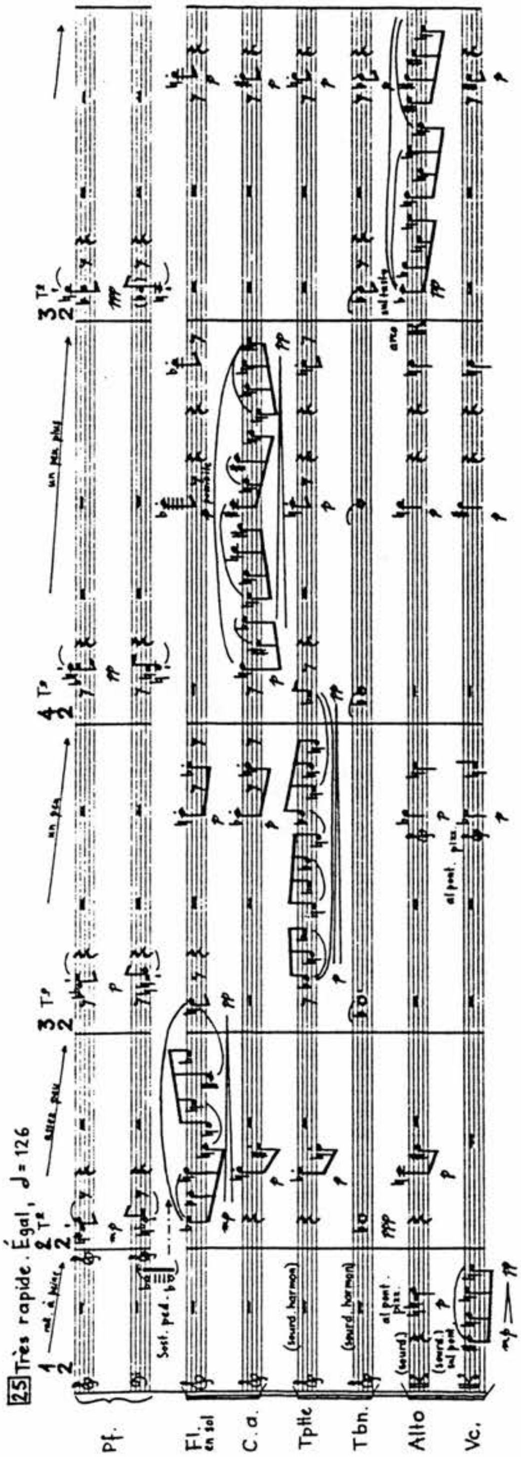
Ex. 5.7

1 = MM60

[3	1	2	4	4]
		4	2	

The inserts at fig. 15 (III); fig. 16; fig. 18 (III) and fig. 19 (II) all have the indication "with no rhythmic orientation; order of the instruments ad lib." The piano insert at fig. 16 also has the indication "Vague, floating." Through these means, the central section of *Eclat* gradually creates an increasing sense of stasis, especially from fig. 19.

Ex. 5.8


25 Très rapide. Égal, ♩ = 126
Pf.
Fl. en sol
C. a.
Tptte
Tbn.
Alto
Vc.
Sost. ped.
(sourd. harmon)
(sourd. harmon)
(sourd.) al pont. pizz.
(sourd.) sul pont.
assez peu
un peu
un peu plus
al pont. pizz.
arco
sul tasto
mp
p
pp
ppp

Development 2 (figs 20-25) marks the end of both the variable metronome marks and of the control of durations through numbers derived from the metronome marks. Instead, traditionally notated durations and conductor beats return as in development 1, although the piece is still unstable and irregular in pulsation at this point. It is only with Cadence 2 (fig. 25-end) that the piece becomes regularly pulsed for the first time. Here, the initial idea from cadence 1 returns, only in reverse, since this time the sustained chord leads into the flourish which is now performed by piano and sextet as opposed to the solo piano of the opening. At fig. 25 (Ex. 5.8), time signatures appear for the first time in the work and are maintained to the end of the piece except for the final system (fig. 30) where conductor indications by number are reintroduced. However, even here, pulsation is not entirely stable since Boulez subtly undermines it with a sequence of arrows which create a series of bar length glissandos, which are analogous to the rhythmic glissando of the opening. While *Eclat* essentially contrasts the macro-states of pulsed and non-pulsed time, the result is much more subtle and involves many intermediate states.

A play of *smooth* and *striated time* features prominently again in *cummings ist der dichter* which Boulez first composed in 1970 but rewrote in 1986. Bradshaw wrote of the 1970 version as being concerned with "the progressive transformation of pulse into the eventual 'polyphony' of variously characterized time measurements" (1986 p.209). One of the most interesting contrasts between the two versions of the piece arises from the differences in their notation. While the 1970 version is notated with many of the conventions which Boulez had established in compositions like *Eclat*, including performer cues, irregular pulses, non-fixed durations, sections without time-signatures and indeterminacy, the 1986 version is much more traditional in notation in that everything is subject to metronome markings, full durational indications and indeterminacy is dropped. In the 1986 version, the first section (up to fig. 15) is marked mostly *modéré* or *très modéré*. From fig. 15, which is at the halfway stage in the 1986 score, the static and previously unpulsed sections are now marked *Très lent suspendu régulier* with the time signature 2/1, and now alternate with several pulsed sections. The form of the piece, from fig. 15 to the end, can be seen in Example 5.9.

Ex. 5.9

fig. 15 (+1) to fig. 15 (+8)	2/1 Très Lent, suspendu, régulier
fig. 16 to fig. 16 (+10)	Rapide, incisif
fig. 17 to fig. 17 (+5)	2/1 Très lent suspendu
fig. 17 (+6) to fig. 17 (+9)	Rapide, incisif
fig. 18 to fig. 18 (+3)	2/1 Très lent suspendu
fig. 18 (+4) to fig. 18 (+9)	Rapide, incisif
fig. 19 to fig. 19 (+3)	2/1 Très Lent, suspendu
fig. 19 (+4) to fig. 19 (+13)	Rapide, incisif
fig. 20 to fig. 20 (+7)	2/1 Très lent, suspendu
fig. 20 (+8) to fig. 20 (+15)	Rapide, incisif
fig. 21 to fig. 21 (+3)	2/1 Très Lent, suspendu
fig. 21 (+4) to fig. 21 (+8)	Rapide, incisif
fig. 22 to fig. 22 (+4)	Très Lent, suspendu
fig. 23 to fig. 28 (+11)	[Mostly] Très modéré
fig. 29 to fig. 29 (+3)	Très lent suspendu

Dérive 1 (1984) for ensemble begins with the instruction *Très Lent, immuable*. Bars 1-26 form a static section made up almost completely of ornamental demisemiquaver flourishes and long held trills. This quasi-static section is followed in bs 27-33 by a contrasting, pointillistic, klangfarbenmelodie section which is pulsed in regular time, although a faint trill hanging over from the first section always remains present. In bs 33-46 the trills begin to reassert themselves and simple ornamentation returns as the texture begins to build once again. The close of the piece at bs 46-54 is marked *Rester dans le Tempo initial* and is slow and pointillistic.

The form of *Dérive 1,* with its still opening and close, contrasts with the form of *Transitoires VII and V* from *...explosante fixe...*which have pulsed outer sections and still centres. At fig. 20 of the *Très Modéré* section of *Transitoire VII* (1991) there are five bars of downward demisemiquaver runs which drop down to the still centre of the piece at fig. 21 which is marked *Très Lent*. This eight bar section is the still core of the piece and defines the form, at the most basic level, as pulsed - non-pulsed - pulsed, although pulse varies constantly throughout the piece because of the continuous succession of sections. In a similar way, *Transitoire V* (1991-93), which has less extreme contrasts than *Transitoire VII*, has a still centre in the *Lent* section between figs 19-22. *Sur Incises* (1998) is yet another composition which features the alternation of *smooth* and *striated time* with the pulsed time of the toccata sections contrasting with the non-pulsed time of the resonant sections. Once again, a score of this piece is not yet available to allow more specific comment at this point.

The play of *smooth* and *striated time* features in *Répons* (1981-84) as one of its most prominent formal and expressive characteristics and Boulez has written of the pulsed and non-pulsed time of the piece as follows:

> the principal image unfolds in regular or irregular pulsed time, and the derived image or images unfold in a free and independent time, not pulsed or pulsed in a different way ... (1989a p.419).

The orchestral introduction to *Répons* (opening-fig. 21) begins with a section marked *Rapide, Energique* (0-fig. 2). Here, the rhythms are pulsed and jagged as at the end of *Eclat*. The section between fig. 2-fig. 3 centres around a long F sharp polar note, as was highlighted in Chapter Four. The section is punctuated by short brass chords and woodwind and string flurries of variable density. The overall temporal effect lies between *smooth* and *striated time* since the trilled polar note, which provides a continuous thread throughout the section, inhabits *smooth time* while nevertheless being simultaneously *striated* by the instrumental interjections, but not in such a fundamental way as to completely destroy the continuously unpulsed feel of the held polar note.

The section from fig. 4-fig. 5, which is similarly centred around a polar B flat, has moments which are clearly striated through regularly pulsed melodic fragments and through the emphasis placed on the polar pitch from its regular reiteration on several different instruments, in a way which creates a clear sense of pulse. Even so, at some points, the trilled polar pitch is extended at length in unpulsed time and acts as the basic backdrop against which the pulsed entries are heard. Since the orchestral parts are all precisely notated in terms of duration, the sense of non-pulse is a purely perceptual phenomenon, given the precise time signatures which inform every bar. As Nattiez has shown, the entire orchestral introduction is articulated around a clear succession of polar notes (cf. Ex. 4.10). Despite the static, non-pulsed nature of the polar notes, each section of the orchestral introduction contrasts the unpulsedness of the polar notes with a variety of pulsed elements.

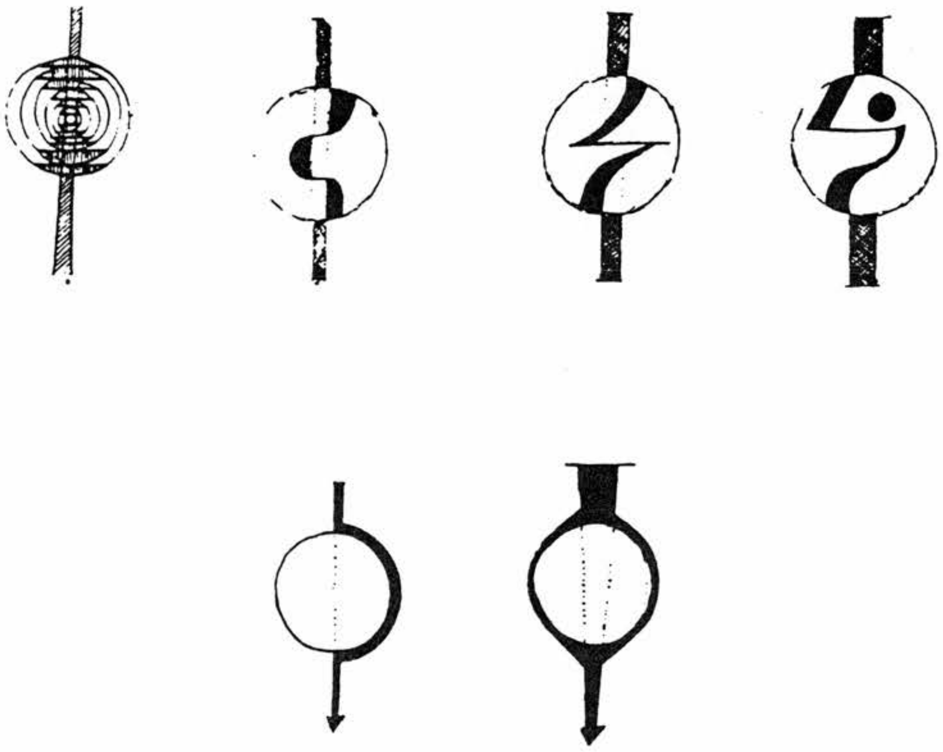
The six soloists enter for the first time at fig. 21 with the marking *Très Irrégulier*. Only the attacks of the clangourous chords are indicated and these resonant sounds are both electronically transformed and allowed to decay naturally. The section between fig. 21 and fig. 31 alternates smoothly timed passages for the six soloists with temporally striated passages for the main ensemble. This brief description is a simplification of what actually happens since Boulez articulates certain passages for the soloists with the use of square brackets [ ], which indicate that these passages are not allowed to resonate beyond their strictly notated duration. These short phrases occur within *striated time* and act as introductions to forceful chords in the ensemble which are paradoxically extended in time. In a sense, then, Boulez plays with the natural characteristics of the two groups only to then swap them. From fig. 27, a series of temporally striated short melodies are alternated with clangourous, electronically transformed heterophonies which obliterate all sense of pulse.

The section between fig. 32-fig. 42, marked *Rapide Energique*, is a temporally striated *perpetuum mobile* with eight *Libre* interjections from the soloists which are allowed to resonate in unpulsed time while, nevertheless, being subjugated by the relentless rhythms of the main ensemble.

In the Passacaglia-like section from fig. 42-fig. 47, the klangfarbenmelodie in the ensemble, which opens the section, sounds out a clear pulse which is at first reinforced by the soloists. Eventually, however, there is a smoothing of the pulse. Over the course of the section there is a quasi-duel between the pulsed ensemble and the heterophonic temporal smoothing of the elaborately ornamented soloist parts.

As the section climaxes, loud brass chords sound forcefully through the drowning density of *smooth time* to provide pulsed points of coherence but, in this case, within the context of a vast mesh of unpulsed heterophony. Eventually, the strident pulses which force themselves through the texture subside and are stilled within the sea of unpulsed rhythms which conclude the section. The section could therefore be summarised as the passage from pulsed to non-pulsed time with their mutual interpenetration along the way. This process calls to mind Boulez's description of certain procedures in Paul Klee where the artist effects the interpenetration of two distinct shapes, such as a line and a circle, in order to produce a great variety of results from seemingly simple means (Ex. 5.10).

Ex. 5.10 - (Samuel 1986, p.116)



Many of the examples which we have considered in this discussion involve the succession of *smooth* and *striated time* in such a way that clear formal divisions are demarcated within a composition. This is not the only strategy which Boulez employs. In passages such as between fig. 42-fig. 47 of *Répons,* Boulez relates pulsed and non-pulsed times also through their simultaneous application. One group of instruments may be playing in *striated time* while the other plays in *smooth time*. This is most often the case in *Répons* where the instrumental ensemble plays in pulsed time, while the six soloists simultaneously play in unpulsed time through the lingering decay of their resonant instruments and the electronic transformation of their sounds.

Sometimes the number of simultaneous events is enough to erase all sense of pulse. Heterophonous lines, for example, each of which may be pulsed in their own right, can, when played simultaneously, create such a complex web of sound that all sense of pulse disappears. In a sense, pulse is cancelled out with the stockpiling of disparate pulses which together become too infinitesimally small to perceive individually. Boulez says that providing sections which cannot be followed by perception is a deliberate technique which he likes to employ from time to time. The section of *Répons* between fig. 42-fig. 47 is an example of this. It begins with an extremely regular pulse in the ensemble but as the section builds the flourishes and trills played by the soloists, despite being absolutely dependent upon the beat, are not perceived as pulsed (Interview 28.8.98).

In the section from fig. 47-fig. 53 the juxtaposition of *Rapide* soloist heterophonies creates a non-pulsed time with lightly pulsed interpolations from the mainly string ensemble in a kind of Bartok-like "night music." The *Rapide* section from fig. 54-fig. 69 alternates *martellato staccato* sections with heterophonous scalar passages. The soloists' parts are "independent of the conductor" and "non-synchronised" in the purely martellato sections but are synchronised with the conductor for the duration of the roller coaster-like heterophonies in which synchronous demisemiquaver runs of varying lengths are superposed. Example 5.11 shows the number of successive heterophonies within a section (a quasi-bar) while Examples 5.12 and 5.13 show the number of notes within each heterophony at fig. 57 and at fig. 67. Each heterophony has the duration of one crotchet beat. At fig. 67, for example, it can be seen that these demisemiquaver heterophonies consist of up to 52 pitches which are played against heterophonies with varying numbers of pitches, in this case, 40, 25, 37 and so on.

Ex. 5.11

fig. 55 - 2 heterophonies
fig. 56 - 2 heterophonies
fig. 57 - 3 heterophonies
fig. 58 - 3 heterophonies
fig. 59 - 3 heterophonies
fig. 60 - 4 heterophonies
fig. 61 - 4 heterophonies
fig. 62 - 4 heterophonies
fig. 63 - 4 heterophonies
fig. 64 - 5 heterophonies
fig. 65 - 5 heterophonies
fig. 66 - 5 heterophonies
fig. 67 - 5 heterophonies
fig. 68 - 5 heterophonies

Ex. 5.12 - Répons: fig. 57

1	2	3
15	13	22
13	13	20
15	16	20
15	14	21
12	16	22
	13	17
		17
		22
		17

Ex. 5.13 - Répons: fig. 67

1	2	3	4	5
34	4	30	33	52
11	9	30	33	15/22
34	9	13	33	22/14
34	31	30	33	12/25
9	10	30	33	52
34	31	15	33	40
34	31	30	33	25
34	31	8	33	14
	31	30	33	52
	10	30	33	9/18
	31	30	33	52
	7	30		37
	31	30		10/10
	31			5
				4
				52

It is interesting to note that there are two incidences of two heterophonies, three of three, four of four and five of five heterophonies. At fig. 55, where the heterophonies begin, Boulez intimates that while the beats and the metronome markings are all indicated, "the internal speed of these groups can be very free in relation to the beats." Boulez further tells us that the ensemble players are to follow crotchet beats in the non-heterophonous sections. At fig. 57, the third of the heterophonous sections, Boulez indicates that "the synchronisation of the groups will become more and more approximate as they grow."

Fig. 54-fig. 69 of *Répons* provides an example of music which appears to be very steadily pulsed but which approaches the unpulsed because of the sheer complexity of events and the speed of its unfolding, although both criteria need not be present in order to create the effect. Boulez has spoken of sections within his compositions where a simple rhythm is played by the instrumental ensemble in unison and then one or two instruments make variations from it. These are cued by the conductor and allotted durations which are calculated to be "approximately the same". In such passages, the instrumentalists are so busy with their own parts that they cannot really perceive an overriding pulse. Indeed, even the conductor must wait while "things happen by themselves" (Interview 28.8.98). Presumably referring to fig. 54-fig. 69 of *Répons,* Boulez has spoken of the demisemiquavers (described here as heterophonies) which unfold in a very quick tempo. Boulez says that the soloists also play in a quick tempo, in four. He says that this produces a "stroboscopic effect" in which "at one point you never know if they are with you or independent of you because the time is so quick and the subdivision is so quick that you cannot make the difference any more" (Interview 28.8.98). In other words, although the music is clearly pulsed in four, the extremely fast rate of unfolding is enough to blur the pulse and make it impossible to perceive.

Since the only recording of *Répons* which was available, until recently, was of the 1982 version, performed at the Royal Horticultural Hall in London, my comments have been limited to this version, known as *Répons II.*[16] The short section which ends the 1982 version of *Répons* consists in the electronically modified sounds of the soloists. Consistent with the rest of the piece, it can be interpreted as involving an exploration of both *smooth* and *striated times*. Consequently, it can be said that almost every section of *Répons* seems to explore the relationship between *smooth* and *striated time* in one way or another, and in a manner which again makes a striking parallel with Klee's multifarious interpenetrations of two simple figures.

It is interesting to note the difference between pulsed and non-pulsed time in works for resonant instruments such as bells and glockenspiel, as opposed to works for sustaining instruments such as strings or wind instruments. In *Improvisation II* from *Pli selon pli*, *Eclat* and the music for the six soloists within *Répons*, absence of pulse is achieved through the decay of the sounds of the resonant instruments which are used. In works such as *cummings ist der dichter* which use sustaining instruments, absence of pulse is achieved through long held notes, which despite their conventional notation, are without pulse. In works for resonant instruments, Boulez has spoken of the need to "maintain the tension", working within the natural rates of decay of the sounds. With such decaying sounds, time can only be suspended and non-pulsed up to the limit of our perception of the decay, at which point another sound must be produced to begin its own pulseless decay. This is not a problem with sustaining instruments such as strings with which long non-pulsed passages are possible. With woodwind instruments, however, non-pulsed time is produced, in one way or the other, depending upon whether or not circular breathing is a possibility (Interview 28.8.98).

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[16] A CD recording of Répons was released in 1998: Deutsche Grammophon 457 605-2.

Having considered Boulez's development of *smooth, unpulsed time* and its formal opposition to *striated, pulsed time*, we look briefly now to the place which related conceptions of time have assumed within the music of two of Boulez's near-contemporaries within the post-war avant-garde. It was established earlier within the chapter that an interest in a static conception of time was an important element within the music of both Debussy and Messiaen. It is important to acknowledge that Boulez was by no means the only composer within the post-war period to have created a smooth non-pulsed time.

Static Temporality within Post-War Music

It seems to be the case that much of the rethinking of musical time in both Europe and America occurred in the late 1950's and early 1960's.[17] Among American composers, a sense of stasis is often to be found in the music of Cage and Feldman. In European terms, Goeyvaerts referred to his early compositions as "static music" (Maconie 1976, p.7; Kurtz 1992, p.35) but in terms of a sustained theoretical effort to rethink the place of time within European music we must look mainly to Stockhausen. According to Metzger's on-the-spot assessment of the situation in 1958, it is "Stockhausen, to whom we are more or less indebted for our present knowledge of musical time". Referring to Stockhausen's article *Structure and Experiential Time* (1958), Metzger says that "'experiential time' ... up till then had hardly been seriously regarded by musical theory" (Metzger 1960, p.72).[18]

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[17] Static temporalities can also be found in the music of Cage, Feldman, Nono, Ligeti and others, but their works are not discussed within the present study.

Stockhausen's music is strongly characterised in its treatment of time. In *Gruppen* (1955-57), for example, there is a separate conductor for each of the three orchestral groups because their tempi are different from one another, yet superimposed in such a way that the piece would be an impossible undertaking for merely one conductor and one ensemble (Stockhausen 1988b, p.41). In *Zeitmasse* (1955-56) ("Time Measures") for five woodwinds, Stockhausen has the instruments performing at various rates of unfolding. He says:

> the oboe, for instance, is playing a given number of notes as fast as possible, the bassoon is playing as slow as possible, in an unrelated tempo; the English horn is playing an accelerando from as slow as possible to as fast as possible.... Sometimes one instrument is out of time with the others; there are sections where all five have individual tempos. There is a continuum between complete determination and extreme variability. And when we listen, we can feel when the music is very determinate because we know exactly where we are: on a certain beat, in a certain sequence of timbres, in a certain rhythm, but when we are in a region of high variability, the music is floating (Stockhausen 1988b, pp.49-50).

Perhaps Stockhausen's most significant contribution to the creation of a static temporality is his notion of *Moment Form* which Griffiths defines as "a kind of musical structure in which the 'moments', each with its distinctive character and way, are to be heard as individual, as implicit eternities" instead of as stages in a development (Griffiths 1995, p.145). Each moment is to reveal a powerful present without allusion to what has gone before or what will follow.

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[18] Stockhausen's 1955 article *Structure and Experiential Time* refers to the first section of the second movement of Webern's *String Quartet* as *"time experienced through sound"* (1958 p.74). In 1960, Pousseur wrote that "above all the concept of time, the relationship of the consciousness to it, were definitely altered by Webern" (Pousseur 1964, p.80). Pousseur believes that "Webern's musical successors" have capitalised on his conception of time and that "he is responsible for any possible originality of theirs in the new conception of time." Pousseur writes that "every time a new work of Webern's is played, you bring your own message to it .... this message ... concerns the relative emptiness of time" (p.81).

Stockhausen compares *moment form* with Eastern traditions, such as the Japanese *Noh* theatre or *haiku* verse, forms which in contrast to the developmental tendencies within most Western art forms, concentrate for extended spans of time upon the immediately present moment with "no thought for the past or future" (Stockhausen 1988b, pp.59-60). Stockhausen tells us that he first used *moment form* in *Carré* (1959-60) for four choirs and four orchestras while, according to Kurtz, *moment form* was responsible for the "formal structure" of most of Stockhausen's compositions from the 1960's (1992 p.100). Stockhausen describes its use in *Kontakte* (1959-60) in terms of a:

> concentration on thc NOW - on every NOW - as if it were a vertical slice dominating over any horizontal conception of time and reaching into timelessness which I call eternity: an eternity which does not begin at the end of time, but is attainable at every *moment* (quoted in Griffiths 1995, pp.144-145).

The play of temporalities, of time which is perceived as *smooth* and time perceived as *striated*, is also an important element within the work of Harrison Birtwistle in a way which is more similar to Boulez than to Stockhausen. Birtwistle has said that "new concepts of time" are his "main compositional preoccupation" (Hall 1984, p.74). Michael Hall tells us that Birtwistle's ideas of time rely upon Bergson's distinction of clock time and duration, which we have already touched upon with reference to Messiaen (p.88). In Hall's opinion, Birtwistle's alternation of fast, progressive music and floating, motionless music within *Précis* (1960) is very close to Boulez's own, despite the fact that Birtwistle's nominal model was a piece by the Swedish composer Bo Nilsson (pp.28-29). Hall tells us that in his later pieces, Birtwistle sets regular pulsation against "irregular, highly differentiated and organic additive rhythm" (p.29). *Tragoedia* (1965), for example, is described as ranging "from hectic bustle to absolute stillness" (p.31). The opposition of "stasis and progress" is likewise exploited within *Melancolia I* (1976) (p.93). Surveying Birtwistle's considerable output, Hall surmises that the role of pulse has changed throughout Birtwistle's work since *Ring a Dumb Carillon* (1964-65) but has been given specific attention within *Chronometer* (1971-72), *Silbury Air* (1977), *Pulse Field* (1977) and *Pulse Sampler* (1981) (p.104).

This brief consideration of the importance of new conceptions of time within the work of Stockhausen and Birtwistle is in no way intended to be an exhaustive account. Its purpose is simply to affirm that new temporalities have been a primary concern for post-war composers other than Boulez. In the case of Stockhausen, the preceding remarks are especially inadequate. There is yet much work to be done in disentangling the strands linking the work of Boulez, Stockhausen and other composers working within the same period. It was said, earlier in the chapter, that it was only with Boulez's *Eclat* written in 1965 that we find a composition in which *smooth* and *striated*, non-pulsed and pulsed times are successfully set in perceptible opposition to one another, yet we find Stockhausen perhaps aspiring to create temporal oppositions in *Zeitmasse* (1955-56). The relationship between Boulez's concepts of *smooth* and *striated*, of pulsed and non-pulsed time with Stockhausen's *moment form* and other concepts of time is not absolutely clear. Perhaps the most we can say at the moment on the question of their commonality, and this may well be enough for present purposes, is that both compositional frameworks are clearly focused upon the creative opposition of two conceptions of time, a time which is pulsed, striated, developing and progressive and a time which is non-pulsed, smooth and static. In a sense, the divergence in their views of time may be likened to the variations in the new conceptions of time found in Bergson, Proust and the other literary figures cited earlier in the chapter. The extent of their differences is perhaps less significant than the fact of their shared interest in forging such temporalities and in giving them such centrally expressive purpose within their works.

A Deleuzoguattarian View

As with smooth and striated musical pitch space, Deleuze and Guattari are again interested in Boulez's two temporal modes and they write of "the 'pulsed time' of a formal and functional music based on values versus the 'nonpulsed time' of a floating music, both floating *and* machinic, which has nothing but speeds or differences in dynamic" (1987 p.262). They speak of Boulez's:

> proliferations of little motifs, accumulations of little notes that proceed kinematically and affectively, sweeping away a simple form by adding indications of speed to it; this allows one to produce extremely complex dynamic relations on the basis of intrinsically simple formal relations .... A clock keeping a whole assortment of times (1987 p.271).

This musical process with its distinctions of pulse seems to describe very well the perpetual movement which Deleuze and Guattari believe to be at work within their new *image of thought* with its flows and forces. This is why they say that "the difference is not at all between the ephemeral and the durable, nor even between the regular and the irregular, but between two modes of individuation, two modes of temporality" (p.262). They are not really writing about music at all. They are rather using Boulez's musical categories, in this case temporal ones, to communicate the operations taking place within their *image of thought*, since Boulez's two temporalities seem to correspond well to the two planes of consistency (immanence) and organisation (transcendence) within Deleuzoguattarian thought. These ideas of pulse are, as we have said, related by them to the *plane of consistency* on which, we are told, "there are only relations of movement and rest, speed and slowness between unformed elements, or at least between elements that are relatively unformed, molecules and particles of all kinds" (1987 p.266).

More specifically, Boulez's distinction of *pulsed* and *non-pulsed* time is related by Deleuze and Guattari to the distinction of *Chronos* and *Aion*, two distinct, yet complementary conceptions of time which Deleuze discovered within Stoic philosophy and which he had, to some extent, already expounded in *The Logic of Sense* without, at that time, connecting them to the music of Boulez. In the following exposition, I have chosen to preserve Deleuze's own words as far as possible.[19]

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[19] In *The Logic of Sense* the spelling *Aion* is used, whereas in *A Thousand Plateaus* it has become *Aeon*. While all quotations reproduce Deleuze's spellings, I have opted for the spelling *Aion* in general use.

Like Boulez's *non-pulsed* and *pulsed time*, Deleuze conceptualises two distinct temporal modes, a "measureless or dislocated present" which he refers to as *Aion* and a "variable and measured present" entitled *Chronos*. Where *Chronos* "*is composed only of interlocking presents*", *Aion* "*is constantly decomposed into elongated pasts and futures*." Deleuze defines *Aion* as time which is "infinitely subdivisible" in a situation where "each present is divided into past and future ad infinitum" (1990 p.62). This "event ... has no present. It rather retreats and advances in two directions at once, being the perpetual object of a double question: What is going to happen? What has just happened?" Deleuze speaks of it as being "unfolded" and becoming "autonomous" as it "flees in both directions at once, toward the future and toward the past" (p.62). It "is the past-future, which in an infinite subdivision of the abstract moment endlessly decomposes itself in both directions at once and forever sidesteps the present" (p.77). Deleuze illustrates this simultaneous exercise of past and future with the amusing example of Lewis Carroll's Mad Hatter and March Hare from *Alice in Wonderland.* As Deleuze says:

> The Hatter and the Hare went mad together the day they 'murdered time,' that is, the day they destroyed the measure, suppressed the pauses and the rests which relate quality to something fixed. The Hatter and the Hare killed the present which no longer survives between them except in the sleepy image of the Dormouse, their tortured companion. But also this present no longer subsists except in the abstract moment, at tea time, being indefinitely subdivisible into past and future. The result is that they now change places endlessly, they are always late and early, in both directions at once, but never on time (1990 p.79).

One is always late, the other eternally early as each lives in opposing, but inseparable directions (p.79). The paradox, for Deleuze, lies in the idea of sense following "two directions at the same time" (p.77). He says that "sense always goes to both directions at once, in the infinitely subdivided and elongated past-future." He seeks further corroboration from the physicist, Boltzmann, who:

> explained that the arrow of time, moving from past to future, functions only in individual worlds or systems, and in relation to a present determined within

> such systems: 'For the entire universe, the two directions of time are thus impossible to distinguish ...' (1990 p.77).

The "existing present" is therefore no longer subverted by future and past. It is now divided "into inhering future and past" by "the instant which perverts the present" (p.165). *Aion* is therefore a "fundamental disturbance of the present" overthrowing and subverting "all measure" and "the good present" of *Chronos* itself (pp.163-164). If *Aion* divides past and future in relation to a "particular segment" of time, *Chronos*, in contrast, is said to be like God's view of time where time is an "eternal present." As Deleuze says, "what men grasp as past and future, God lives it in its eternal present" (p.150). *Chronos* is, therefore, "the always limited" and "variable living present" (pp.61-62) or "the present which alone exists" (p.77). With *Chronos*:

> only the present exists in time .... whatever is future or past in relation to a certain present (a certain extension or duration) belongs to a more vast present which has a greater extension or duration. There is always a more vast present which absorbs the past and the future. Thus, the relativity of past and future with respect to the present entails a relativity of presents themselves, in relation to each other. God experiences as present that which for me is future or past, since I live inside more limited presents. Chronos is an encasement, a coiling-up of relative presents ... (1990 p.162).

Further:

> It makes of the past and future its two oriented dimensions, so that one goes always from the past to the future - but only to the degree that presents follow one another inside partial worlds or partial systems (1990 p.77).

Deleuze acknowledges drawing upon Victor Goldschmidt's 1953 study *Le Système stoïcien et l'idée de temps,* for the concepts of *Chronos* and *Aion* (Deleuze 1990, p.340). Goldschmidt's study, in turn, reassembles Stoic notions of time from the writings of several important Stoic teachers beginning with Diogenes who believed that "the past and the future are infinite, but the present is limited." For Diogenes "no time is entirely present .... only the present exists; the past and the future subsist but certainly do not exist" (Goldschmidt 1953, p.37).

The Stoics, in opposition to the atomism of Epicurus (the belief that reality is made up of indivisible atoms), wanted to prove that the division of the body does not stop at the microlevel of atoms but rather that this division can be continued to infinity (p.37). The Stoic philosopher, Chrysippus, taught that not only bodies but also elements "which resemble bodies such as surface, line, place, void, time" and so on can likewise be divided to infinity. In teaching the "infinite divisibility of time", Chrysippus "wanted to demonstrate the unreality of time" (p.38). Despite this clear Stoic affirmation of the unreality of time, Goldschmidt invokes the teaching of Proclus, who held that only the past and future are not real. The present, in contrast, is said to exist and to be actual (p. 39). This distinction of an actual present from an unreal past and future leads to the positing of the two temporalities: (1) "Time (infinite in each direction: past and future)" and (2) "Time (limited: present)." Goldschmidt acknowledges the lack of absolute clarity in Stoic teaching here, saying that if there had been better understanding of this theory, "Chrysippus would have used two different terms to distinguish these two times." It appears, however, that the "distinction between the present, on the one hand, and the past and future, on the other, seemed sufficient to him without taking precision into account." Goldschmidt believes that any terminological inadequacy in the philosophy of Chrysippus is made good by Marcus Aurelius "for whom infinite time, corresponding to the void, has a precise name, which one has become accustomed to translating as: eternity (Aion)" (p.39). Nevertheless, for the limited purposes of the present study, it is clear that Goldschmidt, sifting through the sources, identifies *Aion* as "time infinite in past and future, the mathematical instant which divides past and future infinitely" while simultaneously acknowledging "the present, extended and seized by sensation", which Deleuze refers to as *Chronos* (p.40).

In *A Thousand Plateaus*, *Chronos* and *Aion* are connected by Deleuze and Guattari with Boulez's twin conceptions of musical time. *Chronos*, as "the time of measure that situates things" and "develops a form", is said to correspond to Boulez's *striated* or *pulsed time* (1987 p.262). *Aion*, corresponding to Boulez's *smooth* or *non-pulsed time,* is said to be:

> the indefinite time of the event, the floating time that knows only speeds and continually divides that which transpires into an already-there that is at the same time not-yet-here, a simultaneous too-late and too-early, a something that is both going to happen and has just happened (Deleuze and Guattari 1987, p.262).

Here "it is a question of a freeing of time, Aeon, a nonpulsed time for a floating music" (p.267). *Aion* is further defined and developed through the concept of *haecceity* which Deleuze and Guattari define as "the entire assemblage in its individuated aggregate" (p.262). They perhaps best capture the flavour of this concept with the phrase "we are all five o'clock in the evening" (p.263) which evokes the sense of an instant, an event, a snapshot in which we are no longer you, me or it but rather together form a slice of time, a connected instant, an aggregate. Briefly stated, *Aion* as *haecceity* refers to the *plane of immanence* of thought which is peopled with innumerable flows of forces which can be imagined as lines. A *haecceity* occurs in the meeting of these lines in a consistent *assemblage*. In Deleuzoguattarian thought this *haecceity* has the unpulsed time of *Aion*.

In the article *Boulez, Proust et le temps* (1986), Deleuze further considers Boulezian time in relation to Proust's *A la recherche du temps perdu*. In Boulez's concepts of *smooth* and *striated time*, Deleuze finds tools with which to read Proust's novel. According to Deleuze "all of *la Recherche* must be read through the smooth and the striated, a double reading following on from Boulez's distinction" (Deleuze 1986, p.99). For Deleuze, Proust's *la Recherche*, as Boulez's music, contrasts a *striated, pulsed time* with a *smooth, non-pulsed time* "which no longer refers to chronometry in a global way" and in which "breaks are undetermined" and of "an irrational type". Deleuze defines non-pulsed time, in Boulezian terms, as occupying time without counting, while pulsed time involves "counting in order to occupy" (p.99). While pulsed time is characterised as a block, non-pulsed time is thought of as a Boulezian "time bubble" which is "independent of metric and chronometric relations".

Deleuze's reading of *la Recherche* centres on Proust's treatment of motifs and it is this aspect of Proust's writing which he believes to be variably *smooth* or *striated*.

Proust's motifs are said to have become "autonomous" and to constantly "transform themselves in time, diminishing or augmenting, adding or subtracting, varying their speed and their slowness" (p.98). Deleuze cites characteristic motifs in Proust such as *love*, *jealousy*, *sleep* and so on, explaining that these are no longer infinitives or generalities. Instead, each particular love, jealousy or sleep possesses a new individuality which is irreducible to a general concept (pp.98-99). Applying Boulez's concepts of *smooth* and *striated time*, Deleuze infers that all of the "themes" and characters within *la Recherche* exist variably in both *smooth* and *striated time*. The character of Albertine, for example, is said to be "at once, sometimes striated and sometimes smooth ... following two distinct temporalisations."[20]

Deleuze's application of Boulezian *smooth* and *striated* time to *la Recherche* is an ingenious move worthy of the flexible temporality within Proust's novel. *La Recherche* teems with passages which are temporally *smooth* or *striated* to varying degrees and Deleuze is surely correct in saying that Boulez's distinction of "the striated and the smooth is of less value as a division than as a continuum" since they can be alternated or superposed, a phenomenon we witnessed already, for example, in sections of *Répons*. Malcolm Bowie comes very close to Deleuze's reading of *la Recherche* without using Boulezian terminology. Discussing the narrator's conversation with the artist, Elstir (In a Budding Grove), Bowie notes that:

> Four stories are being told simultaneously in this episode, which is a tour de force of polyphonic invention, and any one of them may suddenly gather bulk at the expense of the others. Slowness in one narrative may permit a new access of speed in another; opening up a gap in one causal sequence may permit a gap in another to be closed (1998 p.45).

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[20] Kristeva writes that "the narrator's perception of Albertine had always appeared rather incoherent and disparate in the cubist mirror his love held up to her, as if it were framed by different points of view or determined by various sensory organs offering divergent impressions .... 'But it was above all that fragmentation of Albertine into many parts, into many Albertines, that was her sole mode of existence in me'" (Kristeva 1996, p.187). She tells us that "Samuel Beckett, along with other authors, has drawn attention to this fragmentation of Albertine, which operates throughout the entire book and leads to the narrator's incoherent image of her" (p.374).

The most insistent of the four elements within this conversation involves the narrator's desire to make the acquaintance of a "little band" of girls with Elstir's assistance. On the one hand, Proust has the artist delay in helping the narrator through concentrating on his painting. On the other hand, at the very point when the reader expects help to be forthcoming, the narrator embarks upon a "delaying manoeuvre of his own: a long excursus on self-love and altruism, and on the little heroisms of ordinary life, intervenes between Elstir's last brush-stroke and the beginning of their walk together. (II, 208-9; II 499-501)" (1998 pp.45-46). Translating Bowie's analysis of the passage into very basic Boulezian terms, it could be said that the conversation between Elstir and the narrator is made up of four separate strands in pulsed, *striated time*, while the narrator's excursus introduces a smooth non-pulsed static element resulting in the quasi-suspension of time. Pulse resumes when the narrator returns to recount the details of his walk with Elstir. Proust's text is replete with such passages which show why Deleuze finds Boulez's concepts to be so helpful. For Bowie, temporality in *la Recherche* is mostly linear and "unidirectional", or as Boulez and Deleuze would say, is mostly pulsed or striated. Nevertheless Bowie, like Deleuze, recognises that there are also places where "the flow of time may almost congeal during a protracted *soirée*, or be accelerated mercilessly" (p.63) as "Proust moves ... from one system of measurement to another" (p.46).

Summary and Conclusion

The quest to elaborate the possible "meaning" of Boulez's *smooth* and *striated* notions of time has led us to distinguish the concept of *time* from that of *temporality*. It has been argued that time in music becomes *temporality,* since music is capable of rendering various conceptions of time sensible and audible. Boulez's interest in varied notions of time has been examined in relation to chronometry, the dominant Western idea of time, and to the alternative Modernist temporalities formulated by Bergson and Proust. The post-war fascination with alternative musical conceptions of time has been traced back to static elements within the music of Debussy, to Messiaen's opposition of *structured time* and *duration* as well as to aspects of the thinking of Stravinsky, Cage and Stockhausen. Having considered Boulez's writings on tempo, duration and his definition of the concepts of *smooth* and *striated time*, we followed the way in which Boulez has treated *smooth* and *striated*, non-pulsed and pulsed time in a number of compositions, with particular attention being given to *Eclat* and *Répons*.

While Boulez explores musical duration, tempo, rhythm as well as *smooth* and *striated time*, he does so from a purely technical point of view and does not explicitly address the possibility of there being aesthetic questions concerning temporality correlative with *smooth* and *striated time.* In other words, he considers the theoretical possibility of two such times and some of the practical questions involved in their actualisation within music. Concomitant aesthetic questions linking pulsed and non-pulsed time to related areas such as the philosophy of time, the psychology of perception, temporality in Eastern musics, the significance of time within literary and artistic Modernism generally or even the temporal theory and experiments of composers after Stravinsky and Messiaen are avoided.

Deleuze and Guattari are not so reticent and, with a bold stroke, connect Boulez's temporal practice with Stoic temporality which may at first seem to be a rather strange partner. Their connection of pulsed time with *Chronos* and non-pulsed time with *Aion*, however, is not in the first instance a musicological one. As has been acknowledged elsewhere, Deleuzoguattarian philosophy is not primarily concerned with the faithful transmission of other people's ideas. Whatever interest Deleuze and Guattari share in pulsed and non-pulsed time as actually used in Boulez's compositions is not communicated in their texts. They do not attempt to describe Boulez's musical practice within itself or to provide a historical presentation of Stoic thought. Instead, Deleuze and Guattari use these materials, and much else besides, to create their own *assemblages* and to describe a new *image of thought* which, among its heterogeneous components, includes the pulsed/unpulsed distinctions of Boulez's music theory and the *Chronos/Aion* distinction of the Stoic philosophers.

Deleuze and Guattari are writing primarily about their new *image of thought, the plane of consistency*. Boulez's concepts of pulsed and non-pulsed time are adopted by them because they are useful to them in their attempt to articulate this *image of thought.* Their desire is to render thinkable the unthought *image of thought*, the *plane of consistency* which, for them, is the basis for thinking. This attempt to find a way of thinking the unthought within thought itself or to distinguish thinking from its complex, unthinkable basis (noological difference) is perhaps the central concern arising from Deleuzian philosophy. Their adaptation of Boulezian theory should not be simply dismissed, as many commentators more at home with Anglo-American traditions of thought are prone to do. While musical references abound within the work of Deleuze and Guattari, it must be acknowledged that they are not doing musicology and it would be a mistake to read their texts literally as such. At the same time, however, the theory of expression which they have produced enables us to connect Boulez's music and the Deleuzoguattarian *image of thought* on the basis that they are linked in a way which may be said to be mutually expressive. Something absolutely central to Boulez's music, the sensible opposition of *smooth* and *striated*, of pulsed and non-pulsed time, is recognised by Deleuze and Guattari to, in a certain sense, map at once onto both the ancient Stoic conceptions of time as *Chronos* and *Aion* and onto their new *image of thought.*

Deleuze and Guattari believe that all of the arts, literature, visual art and music have the capacity to render imperceptible forces sensible. Just as Klee envisaged a rendering sensible in the sphere of visual art, they perceive Proust's *la Recherche* and Boulez's compositions as being capable of rendering *time* sensible (Deleuze 1986, p.99). In Deleuze's view, such artworks enable us to experience "time which is not usually visible...". While Deleuze believes chronometry to be easily perceived, he acknowledges the existence of a less perceptible aspect of time, "time as force, time itself ... 'time in its pure state'", which is much more difficult to capture (p.100). This is precisely the experience of time, the *temporality*, which Deleuze finds expressed both in Proust and in Boulez. "Boulez's musical conditions" are said to "echo the literary conditions of Proust in certain ways" thus rendering sensible this normally inaccessible aspect of time which Deleuze describes as its' "muted force".

Their works are said to make time itself perceptible, sensible, and in Boulez's case, sonorous.

Analogous with the rhizomatic connections provided in previous chapters, we should not reduce all of this to the point of saying that Boulez's temporalities are simply translations of or direct equivalences to Stoic philosophy, Proust's *la Recherche* or the new Deleuzoguattarian *image of thought*. Boulez's knowledge or ignorance of Stoic philosophy, the deliberate nature or otherwise of his connection with Proust and the obvious fact that Boulez's temporal thinking preceded the new *image of thought* of Deleuze and Guattari are not really what is most significant here. What matters is simply that we are dealing with music, literature and philosophy which are linked in some ultimately irreducible way through the expression of certain concepts of time which, in Boulez's music, become an experience contrasting a more familiar pulsed time with an alternative conception of time as smooth and non-pulsed. It may be said that Boulez creates a new *image of music* which is formed in part from the opposition of alternative temporal conceptions.

Boulez recalls that one of his first real connections with Deleuze was an IRCAM seminar on the subject of *time* in which Deleuze requested to be included. Boulez found Deleuze's contribution to be genuinely insightful and had it published after Deleuze's death when it emerged among his papers. Boulez gives the impression of having been genuinely interested in Deleuze's application of his ideas. He says:

> He listened to my music but he read also what I wrote about music and especially about time, smooth time and striated time. That was very striking to me because he came back to this notion quite a number of times (Interview 28.8.98).

From a Deleuzoguattarian viewpoint, Boulez's pulsed and non-pulsed times are experienced within his compositions as *percepts*. Musical time is no longer perceived as simply a rhythmic mould into which pitch material is poured. The *percepts* of pulsed and non-pulsed time no longer make music audible in time, but rather make time audible in music. In this music we become conscious of time and of the contingent nature of temporality, recognising that temporality is not a unitary phenomenon. Modernist music no longer conveys the topoi of Classical music or the mythic semes of the Romantic era but makes musical time itself the object of its expression. This notion is also found in Susanne Langer who has written that music "makes time audible" and is taken up by Kramer who says that "music becomes meaningful in and through time", an insight which he deems to be most appropriate in the context of a contemporary "time-obsessed sensibility" (Kramer 1988, p.1; p.167).

Boulez is the inheritor of a rich legacy of reflection on time in Western and Eastern culture, in philosophy, in Modernist literature and in earlier twentieth century music. Unfortunately, what is considered valid within philosophy and literature is not always valued in music. Not all writers are convinced that to express alternative temporalities within music is a sufficiently worthy purpose. Boulez's music, along with the music of Messiaen, Stockhausen, Birtwistle and many others, is often denigrated for its technical complexity. Paradoxically it is also attacked for what is sometimes taken to be expressive vacuousness. Without in any way denying the pleasure which avant-garde compositions provide for those who love them, this music also draws upon another level of expression, one which should be no less valued. This music stops us in our tracks and makes us know that music is the medium which is more capable than any other of producing alternative experiences of time in sound and silence, of temporalities.

Conclusion

The main work of the study is now accomplished. In its course we have surveyed the principal trends within Boulez studies, set out the Deleuzoguattarian theory of expression as rhizomatic connectivity as a methodology and presented three rhizomatic studies of *difference*, *spatiality* and *time* and *temporality* within Boulez's music. These three chosen concepts, operative both within Boulez's music and within a wider Modernist culture, were explored in three "cultural histories" with a view to revealing some of the *lines of force* or cultural strands which contribute to their working within Boulez's work. They have been viewed, on the one hand, in the light of those elements which would seem to have had the most significant impact upon Boulez's music and theory and, on the other hand, in terms of the philosophical uses which Deleuze and Guattari have made of Boulez's concepts. Connections linking Boulez's music and ideas with the writings and thoughts of Deleuze and Guattari have consequently been introduced at suitable points throughout. It now remains to highlight a number of questions which arise from the study and to indicate possible directions for further development.

The adoption of the Deleuzoguattarian theory of *expression* and *content* has enabled us to consider Boulez's music in terms of both structure and expression. It provides one way of avoiding some of the problems which were identified in the first chapter survey of the literature. There is no one-sided emphasis upon the poietic or esthesic aspects of a musical work, no enforced dichotomy between structure and expression. Nor is there a sense of approaching the work from the two extremes (poietic and esthesic) and trying to locate the work somewhere between the two. The Deleuzoguattarian rhizomatic theory of expression, in contrast, allows us to think of the work as a heterogeneous assemblage of structural and expressive elements. While references to *difference* and *repetition*, *spatiality* and *temporality* can be found throughout the literature, what is hopefully new in the present study is the rhizomatic network of relations which is allowed to proliferate around each of these concepts.

Those readers who believe that music can only be understood in purely musical terms (in a narrow sense) may find the numerous connections linking Boulez's music with philosophy, literature and art to be an unacceptable move. Others, while acknowledging the validity of an interdisciplinary approach, may not, however, be well-disposed to the philosophy of Deleuze and Guattari or may have reservations regarding some of the multiple connections which result from this linking of Deleuzoguattarian philosophy and Boulez's music and theory.[1] While I have attempted to provide the necessary background for this theory, it would be interesting to continue this line of enquiry and to trace its formulation more rigorously to its origins within the work of Hjelmslev.

In connecting Boulezian athematicism, open form, accumulative development and heterophony with Deleuzian *difference*, we have been able to consider each device in purely musical, structural terms while, at the same time, recognising the expressive value of variation as *difference* within Boulez's work. While Stoïanova and others have, to varying degrees, drawn attention to the Deleuzian notions of *difference* and *repetition*, the concepts have not before been as fully elaborated in theory and practice as they have within the present study. Nevertheless, the work which has been done here again suggests several directions for further investigation.

To research the topic of *difference* and variation in relation to Boulez and the post-war avant-garde would be the subject of an entire thesis on its own. Much more philosophical and musicological work remains to be done. It would be interesting, for example, to follow the *lines of force* which led Deleuze to formulate his philosophy of *difference* and his "overturning of Platonism". Such a study, beginning with Nietzsche's anti-Platonism could consider the introduction of Nietzsche's thought into France by Gide, Bataille, Klossowski and Blanchot plus the interest in Nietzsche found in the 1960's work of Foucault and Derrida (Best and Kellner 1991, p.80). Best and Kellner, however, acknowledge that it was Deleuze's *Nietzsche and Philosophy* (1983) "that promoted Nietzsche as a coherent philosopher and new figurehead of French theory during the 1960's and 1970's" (p.80). To assess the soundness of Deleuze's "overturning of Platonism" at the root, so to speak, it would be necessary to return to Plato's *Sophist* (1993) in order to appraise the validity of Deleuze's reading of Plato's philosophy of identity and simulacra as found in *Plato and the Simulacrum* (1990 pp.253-266).

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[1] Deleuze's philosophy, as with much continental philosophical work, is unfortunately not considered worthy of serious study by many British philosophers of a more positivist frame of mind. Iris Murdoch, for example, maintains that "we are now being told (for instance by Nietzsche, Heidegger, Derrida) that this horizon has been, to use Nietzsche's phrase, 'sponged away', and that the era ... of Plato, has ended and some entirely new *mode of thinking* is coming to be" (Murdoch 1992, p.2). She writes of "Kierkegaard and Nietzsche" saying that "neither ... is usually regarded as a philosopher" (p.351). For Murdoch, "both Plato and Kant use an image of referring to an ideal or some original pattern, not as imitation either of the model itself or of some chosen instantiation (example) of it, but as an inspired interpretation into the realm of practical life of a deep and certain moral insight. The notion of copying the model itself would be a 'category mistake', since the model is not a particular thing, like a particular command or picture ..." (p.11).

To understand Boulez's variational devices in terms of Deleuzian *difference* is to suggest that Boulez's music and all music which does not relate its material to originary identities such as themes is caught up, whether wittingly or unwittingly, in the overturning of identity which Deleuze describes as the overturning of Platonism. This overturning is a highly significant phenomenon. It suggests a radical change in Western thinking at the most basic level, not so much a change in practice as a change in possibility. Viewed in the light of Deleuze's work, Modernist athematicism, aleatoricism, accumulative development, heterophony and, I am sure, a variety of other possibilities, become more than simply the means by which late twentieth century composers choose to construct music. They become indicators to and examples of a changing *image of thought* in which *difference,* not identity, is privileged.

Within the notions of *difference* and the "overturning of Platonism" it may be possible to review, not only the work of Boulez but more generally the work of a number of Modernist composers including the Second Viennese School composers, as well as composers of the post-war generation including Stockhausen and Nono. While the writings and practices of a number of composers have been introduced into the text where appropriate, there is much more to be said on this subject, since if Deleuze's Nietzschean reading is correct, then the existence of a music of *difference*, no longer subjugated to a principle of identity, becomes the expression in sound of a new *image of thought*.

Webern has been a highly significant figure in the production of Boulez's music. As we have seen, however, several writers have questioned the faithfulness of Boulez's presentation of Webern's ideas, suggesting that Boulez has created a Webern to suit his own preoccupations.[2] Since Webern plays such an important part in Boulez's retrospective account of his own development, there is a need for a study which appraises the authenticity of the ideas which Boulez attributes to Webern, such as the *virtual theme*.

The study has drawn to a significant degree upon Boulez's published writings. While I have not presented an uncritical reading of Boulez's work, I acknowledge that it would clearly have been possible to have adopted a much more critical tone throughout. The decision to use Boulez's writings in this way was taken in the conviction that it seemed to offer more fruitful possibilities, given the rhizomatic nature of the enterprise. The resulting account, which often simply enumerates Boulez's statements on the relevant topics in a chronological way, has made no serious effort to subject every utterance to the full force of a critique and has not expended energy and space on questions concerning the "truth" or the "authenticity" of Boulez's statements or the accuracy of his memory. A proper critique of Boulez's account of his own development remains to be written.

The concept of internal musical spatiality is one of which much more remains to be said. It would be interesting to view Boulez's treatment of internal pitch-space in relation to the practice of Debussy, Varèse, Webern, Stockhausen and others to a more significant degree. A more detailed study could afford to trace the development of Boulez's internal spatial practices in a much closer way. While Koblyakov's study of *Le Marteau* does reveal the poietic derivation of Boulez's diagonal harmony, it remains to be seen how this works out in practice in terms of harmonic relationships and how exactly the harmony is distributed as a *diagonal* "between" the horizontal and vertical dimensions, as in something that is neither one nor the other. In several places throughout the study we have encountered Boulez's taxonomies, for example his classification of musical spaces in terms of variable *smooth* and *striated* spaces. It would be interesting to determine the extent to which Boulez has turned the theoretical possibilities of the Darmstadt lectures into compositional reality. The development of Boulez's registral practice could be pursued more thoroughly throughout his works, exploring the play of fixed and mobile pitch registers and providing full registral analyses of pieces such as *Constellation-Miroir,* showing how register is articulated over the span of the piece but also establishing its changing function for Boulez. A much fuller account could similarly be given of the workings of the polar principle and its extension from merely local fragments to much longer spans within compositions.

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[2] Bailey questions the view of Webern disseminated by the Darmstadt composers including Boulez (Bailey 1991, p.1; p.3; pp.332-333; Bailey 1996 pp.xii-xiv). Nattiez also suggests that Boulez has created a Webern to suit his own preoccupations (Nattiez 1993, p.170).

Likewise, the treatment of musical time and temporality in the writings and compositions of Boulez's post-war colleagues could be studied more systematically and in greater detail. Monelle has drawn attention to the inconsistencies in much theoretical discussion of time and temporality within a musical context. It would be interesting to trace the *lines of flight* more clearly linking Boulez, for example, with Messiaen, with Eastern music and with the literary and philosophical strands which have been called upon within the course of the study, albeit in a rather summary way. At different points within the study we have recognised difficulties in understanding some of Boulez's theoretical terms as found in *Boulez on Music Today*. While it may be that such problems are no longer soluble, further investigation just might result in greater clarity.

There is undoubtedly something artificial about considering compositions from the point of view of so many discrete concepts. What becomes increasingly clearer is that any such analytical division is merely a construct which can only hold good on its own to a limited degree. At some point or other it becomes obvious that consideration of *variation/difference*, *spatiality* and *temporality* can only be considered in a discrete way from an analytical viewpoint and that they are often, in practice, revealed together within a composition.

The analysis of individual compositions within the study is inevitably partial and leaves room for significant development in many cases. Nevertheless, the analysis which has been achieved under the headings of *difference*, *spatiality* and *temporality* helps to build up a composite picture of several works. While more can be said of these works in relation to these three concepts, it would be desirable to broaden the account with the addition of further expressive concepts such as the ideas of "memorial" or of "ritual", which are prominent in several pieces.

While many scores have been discussed to varying degrees within the study, there has been no attempt to trace the working of the chosen concepts through all of Boulez's works. Reference and analysis have obviously been partial. This is, at times, the product of deliberate choices which have been made for a number of reasons. At other times reference and illustration has been limited through the unavailability of scores including *Figures Doubles Prismes*, *Multiples*, *Dérive 2, Incises, Sur Incises and Anthèmes 2*. Without harbouring organicist pretensions, it is obviously the case that a much more detailed consideration of all of Boulez's sketches and scores could nuance our understanding of the concepts under discussion in innumerable ways.

While the study has primarily been focused upon Boulez's music and theory, it has been necessary to introduce ideas from many other musicians, artists, writers and philosophers along the way in the consideration of the three chosen concepts. While we have examined these concepts primarily in relation to Boulez, the impression should not be given that Boulez is alone in working with them. *Difference* and a particular interest in interior and exterior spatiality, as well as in pulsed and non-pulsed times, have been acknowledged throughout as more general concerns to be found in the work of several post-war composers. It is again beyond the scope of the study to give equal treatment to the developments and insights of several composers, since it has been primarily focused on Boulez's work. Similarly, the impression should not be given that Boulez is being accredited with developing every innovation in these areas since the war. The ideas which are discussed are considered purely because they are important for an understanding of Boulez's work, not because he has been the first to discover them or to use them.

In the course of this study, Boulez is seen as a truly Proustian artist. Just as Proust uses the fictional figures of Elstir, Bergotte and Vinteuil to communicate Proustian artistic values, we have viewed Boulezian artistic values through creative figures such as Klee, Mallarmé, Proust, Joyce, Artaud, Schoenberg, Berg, Webern, Debussy, Messiaen, Stravinsky and Varèse, whose real works replace the fictional art, music and literature, in terms of which Proust defined his own production. This is not to reduce Boulez's compositions or ideas to the work of others but, hopefully, rather to view his work more profitably through recognising the prismatic or rhizomatic meanings which it shares, in part, with the work of so many others.

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