Post-tonal analytical techniques: Stravinsky's symphonies of wind instruments

Matthews, Jeremy

Post-tonal Analytical Techniques:

Stravinsky's *Symphonies of Wind Instruments*

Jeremy Matthews

May 1998

MA Thesis Supervisor: Dr. M. Spitzer

Abstract

The analysis of post-tonal music remains problematic. Analytical methodologies designed specifically for tonal or atonal music require substantial modification if they are to effectively analyse post-tonal works. Stravinsky's *Symphonies of Wind Instruments* is a fine model of post-tonal originality and is a difficult piece for analysis. Following a discussion of various analytical approaches, this paper presents a detailed analytical examination of *Symphonies of Wind Instruments*. The paper closes by developing conclusions and acknowledging the continuing advances of music analysis.

Jeremy Matthews
(M.A. thesis supervisor: Dr. M. Spitzer)

September 1997

Contents

Chapter 1

Analytical Methodology

The analysis of much early twentieth-century music remains challenging. The considerable novelty of music from the early post-tonal era is reflected in the continued search for suitable and effective analytical models. For the analyst, music such as Stravinsky's *Symphonies of Wind Instruments* poses particularly difficult questions. *Symphonies* may best be described as a 'post-tonal' work; it is certainly not tonal in the traditional sense of the word, yet it contains various tonal characteristics. It is also a highly original and innovative work. Any analysis of *Symphonies* must attempt to reveal and interpret the total content and the inventive complexities of the music.

In advance of my own analysis of *Symphonies*, this chapter will present a survey and critique of various mainstream analytical methods. These include quasi-Schenkerian approaches, set-theory methods and the Lerdahlian approach to prolongational analysis. Particular emphasis is given to the important analytical issue of segmentation. The discussion of each approach includes both general criticisms of the analytical methodology and an appraisal of the suitability of the method for the analysis of *Symphonies*. This reflects the dual purpose of this paper; to effectively analyse Stravinsky's *Symphonies*, and to establish the relative merits of various analytical models.

Quasi-Schenkerian Approaches

This section investigates the methods of various analysts who have used Schenkerian-style theories in the analysis of post-tonal music. Quite clearly, certain aspects of Schenker's

theories are made redundant by non-tonal music, whilst other aspects remain applicable. The analysts mentioned below who, to some extent, have attempted to use pseudo-Schenkerian methods are forced to adapt the approach to cope with non-tonal music. The central issue is whether quasi-Schenkerian techniques are a methodologically sound and practically effective way of analysing the music of Stravinsky's *Symphonies*.

In an attempt to create a clear distinction between music that can or cannot usefully be analysed with Schenkerian-style reduction, Straus centres on the issue of prolongation.[1] Prolongation is defined in a rigid, traditional fashion. Straus feels able to distinguish a clear boundary between centricity and prolongation. Centricity in music means that there are no inherent pitch hierarchies but pitches are given different weights by 'contextual reinforce[ments]'.[2] By this he claims that notes which are higher, louder and longer gain greater emphasis, while the system of pitch organisation does not influence the relative importance of pitches. Furthermore prolongation must entail more than 'departure and return'.[3] Music must be able to be stratified into related layers, as in the tiers of a Schenkerian analysis, if it is to be defined as prolongational.

Building upon these definitions, Straus devises a set of four conditions of prolongation .[4] These form the centrepiece of his discussion. The first, the consonance-dissonance condition explains that there must be clear distinction between consonance and dissonance. Second is the scale degree condition (closely allied to the first condition) according to which consonant harmonies must be hierarchically ordered. Thirdly, the embellishment condition is that the decoration of more structural notes by less structural notes must occur

---

[1]Straus, J. The problem of prolongation in post-tonal music, *Journal of Music Theory*, **31,** (1987), 1-21.
[2]Straus, J (1987), p. 4.
[3]Straus, J (1987), p. 4.
[4]Straus, J (1987), p. 7.

in consistent and identifiable ways. Fourth is the requirement of a distinction between voice-leading and harmony.

As, according to Straus, atonal music does not fit these conditions, he confidently considers that a prolongational interpretation of atonal music cannot follow. Instead he proposes that an 'associational'[5] model must be used to analyse non-tonal music. According to the associational approach, connections between separate passages of music are accepted at face value, irrespective of intervening material. Straus happily notes how easily this model can be justified by contextual means. As for the possible difficulties posed by 'transitional' music (i.e. music that is neither clearly tonal nor atonal) Straus presents a single argument in defence; post-tonal music can use an associational structure to 'allude to tonal practice'[6] but in fact this is no more than a composer's pun. He even warns of the lurking danger for the analyst; 'It is crucial not to be seduced'[7] presumably into believing that background tonal progressions play a structural, rather than referential, role.

Despite the apparent clarity and logic of each step, Lerdahl[8] is correct in his impression of a circularity to Straus' argument. Having discovered four important features of tonal music, he proceeds to show that they do not equally apply to non-tonal music. His conclusion that prolongation cannot occur in non-tonal music is unwisely premature, for this is an unresolved and contentious issue. The four conditions themselves are doubtful; they prove only that Straus' interpretation of prolongation is restricted to tonal music. Furthermore the conclusion that only the unambitious associational model can explain atonal music is indicative of Straus' inability to cope with the complexities of a pluralistic issue. His

---

[5]Straus, J (1987), p. 9.
[6]Straus, J (1987), p. 9.
[7]Straus, J (1987), p. 9.
[8]Lerdahl, F. Atonal prolongational structure, *Contemporary Music Review*, **4,** (1988), p. 67.

associational model appears to offer no more insight than saying that 'B follows A'. The idea of a system of musical grammar other than that of tonality seems remote; vague mention of the future possibilities of the octatonic scale within some non-triadic tonality ignores the real existence of music in which pitches are audibly organised by non-tonal means. In fact the simplistic approach is reflected in the 'either-or' nature of the arguments: music either satisfies the four conditions and is prolongational or it doesn't and it is associational.

Straus' argument seems counterintuitive. He refuses to accept the possibility of different degrees of prolongation occurring from non-tonal music to tonal music. Straus' methods separate tonal and non-tonal music and treats them differently; this separation is impossible in the analysis of Stravinsky's *Symphonies of Wind Instruments*. This approach is hard to reconcile with a work containing elements of modal, tonal and non-tonal language and, in particular, the collision of modal, tonal and non-tonal structures.

An attempt to analyse music containing both tonal and non-tonal elements is made by Baker.[9] His analysis of Skryabin's 'transitional' music is particularly revealing in that the analysis often indicates that foreground atonality is supported by background tonal motion. Baker's approach is inherently Schenkerian; he looks first for a tonal interpretation of the structure and only looks further if tonal options are eliminated. Baker's definition of tonal structure is notable broad. Quasi-Schenkerian background progressions are deemed acceptable structures even if they are 'incomplete'.[10] The criteria of these structures is not clarified, although stepwise motion and bass movement between tonic and dominant seem to be the basic elements. Additional background motion that is not adequately supported at

[9]Baker, J. *The Music of Alexander Scriabin* (New Haven: Yale University Press, 1986).
[10]Baker, J (1986), p. 58.

the foreground level by harmonic material is nevertheless accepted as 'structural'.[11] In summary Baker's Schenkerian approach is decidedly flexible.

Two problematic elements to this approach are located by Pople.[12] Explaining that the structure of a transitional work should be compared with conventional tonality, Baker omits to establish precisely how the transitional music's structure is determined in the first place. Without any clear methodology of how to reveal the structures, the inevitable danger is self-fulfilling analysis; searching for pseudo-tonal motion and then comparing it with 'authentic' tonal background progressions. The second theoretical problem identified by Pople is Baker's conventional view that a structure, in the traditional sense, exists in transitional music.[13] Pople questions Baker's assertions that structures are undeniable elements of the analysed music rather than the result of analytical interpretation.

The central focus of Baker's theory is that foreground atonality can be supported by a background tonal structure. These two elements are 'fused'[14] together: 'tonal and atonal procedures, traditionally considered mutually exclusive, function inseparably'.[15] His understanding is that neither atonality nor tonality is compromised by the appearance of the other, with each functioning simultaneously at different structural levels.

Furthermore, Baker asserts that it is not imperative to determine whether or not a work is atonal, ('The question 'is it atonal or not' is unimportant'[16]). His interest is in establishing the tonality or atonality of different structural levels. This however appears to be an unduly defensive argument, refusing to confirm the dominant system of organisation in a work.

---

[11]Baker, J (1986), p. 268.
[12]Pople presents a review of Baker, J.: *The Music of Alexander Scriabin* in Music Analysis, **7**, (1988), 2, pp 215-223.
[13]Pople, A (1990).
[14]Baker, J (1986), p. 268.
[15]Baker, J (1986), p. 268.
[16]Baker, J (1986), p. 270.

For non-tonal structures in the foreground of a work alone are insufficient to give rise to the description atonal, just as describing background structures as 'fundamentally tonal'[17] does not mean the whole work is tonal. Baker manages to treat foreground and background separately because of his flexible Schenkerian approach. In particular he undermines a central element of the connection between foreground and background. The integrity of the middleground is undermined by the 'loosening of the strictures of counterpoint' and 'vertical lines out of synchrony with the harmonic progression'.[18] Lerdahl comments that Baker's illuminating methods are theoretically unsatisfactory in that they 'do not establish any real connection between the two idioms',[19] (the two idioms being set theory in the foreground analysis and quasi-Schenkerian analysis in the background.) Thus Baker's tonal backgrounds cannot operate as structural in a Schenkerian sense if they are not represented in the foreground. A reduction of the atonal foreground does not necessarily lead to the background without serious 'fixing'.

The conclusion that must be reached is that Baker's initiative has proved valuable but that his approach is a dead-end. He is restricted to using the clumsy terms 'tonal' and 'atonal' in binary opposition, and then struggling to find a way to unite them. What is required is an approach that is sufficiently broad to treat elements of tonality and atonality as varying degrees of organisation rather than two wholly separate parts.

In responding to the particular problems attendant upon the use of triadic structures in serial music (in this example Berg), Pople[20] uses a unique analytical method to combine the effect

---

[17]Baker, J (1986), p. 268.
[18]Baker, J (1986), p. 268.
[19]Lerdahl, F (1988), p. 67.
[20]Pople's work is refered to by Ayrey, C. Tonality and the Series: Berg. In Dunsby, J (ed.), *Models of Musical Analysis* (Oxford: Alden Press, 1993), pp. 81-113.

of tonal and serial structures. He raises the concept of 'non-triadic tonality',[21] which has been used as a successful starting point for post-tonal analysis. This refers to music in which characteristic Schenkerian foreground, middleground and background are identifiable but in which they articulate a collection of pitches other than the triad of the tonal genre. This is akin to the possibility, raised by Straus, of pitch collections other than those of tonality creating the necessary 'deep structural properties'[22] similar to those found in tonal music. Admitting that in such cases, counterpoint could not be interpreted in a formal Schenkerian sense, Pople realises that the means of articulating any 'kernel sonority' in the music is subject only to 'self-referential regulation'.[23] In other words, the lack of general principles (as found in tonal music) means that non-triadic tonal music contains, within itself, its own set of regulations. Pople's conclusion is that theories of non-triadic harmony are, nevertheless, not suitable for the analysis of music such as Bergian repertoire; on the contrary, he believes that the analysed music contains a diatonic, tonal background, and no clear hierarchy of functional layers. Thus a new method is formulated by Pople.

The actual analysis presented by Pople (of part of Berg's *Lulu*) resembles a Schenkerian middleground. The resemblance is not accidental, although this middleground is not part of an integral set of Schenkerian layers. Instead it 'stands between a non-unified foreground and a non-unified background'.[24] By identifying the middleground as structurally the most important, Pople is perhaps identifying the solution to Baker's problem. Where Baker struggled to unite two seemingly contradictory organisational structures, the tonal background and the atonal foreground, Pople selects neither option. Pople does not view

[21] Ayrey, C. In Dunsby, J (ed.) (1993), p. 85.
[22] Straus, J (1987), p. 7.
[23] Ayrey, C. In Dunsby, J (ed.) (1993), p. 86.
[24] Ayrey, C. In Dunsby, J (ed.) (1993), p. 86.

the atonality of the foreground as coherent and its structural role is unclear. The background level, which remains mysteriously undisclosed, is presumed to show the tonal origins of the music; however this is described as a 'referential aspect of interpretation rather than a functional aspect of structure.'[25] Thus the functional structure is to be found at middleground level.

The analytical graph, composed of a progression of chords and a bass line, invites a 'double reading'[26] of the music. The chord progression, although largely chromatic, can easily be given traditional harmonic descriptions. The bass arpeggiation, with its Schenkerian overtones, reveals a C major triad. The assumption underlying this approach is that there is a relationship between the chord progression and the bass line. These reveal long range 'tonal' connections within a predominantly chromatic outline.

More than previous methodologies, Pople appears to have identified the manner in which tonal and non-tonal elements are fused together, without being susceptible to the contradictions of Baker's approach. The structural middleground is a valuable concept that offers many analytical possibilities. However, the method is both inconclusive and overspecialised. It is hardly satisfactory to build analysis on an undeterminable background, and discrimination between functional and referential aspects is ill-defined and problematic. The specialisation of the method means it is difficult to see how it could be used for predominantly modal music of Stravinsky's *Symphonies of Winds* where there is not such clarity of bass line.

Set-theoretical Approaches

[25]Ayrey, C. In Dunsby, J (ed.) (1993), p. 86.
[26]Ayrey, C. In Dunsby, J (ed.) (1993), p. 86.

The analysis of pitch resources in *Symphonies* will include pitch class set theory methods, building on the approach of Parks in his analysis of works by Debussy.[27] His method is not to rely solely on set theoretical tools to reveal the musical language. Similarly, Parks does not attempt to express every detail of the music in set terminology. Instead, set theory analysis is used selectively, with other methods used to reveal the tonal elements of the music. This approach is well suited to the repertoire covered by Parks, which includes music that may be described as 'transitional'; despite containing many tonal elements, the music falls sufficiently outside the bounds of tonality to resist more traditional analytical techniques. Parks draws attention to the intersection of two issues in the music: organisation according to the use of 'tonal...pitch resources' and organisation according to 'principles other than [those] of tonality'.[28] It is tacitly accepted that the true extent of tonal relationships is not adequately described by set-theory. Parks therefore adds to the set-theory analysis, so highlighting particular tonal relationships.

This is achieved, for example, by simultaneously describing motives in Debussy's *La Fille aux Cheveux de Lin* in terms of key area and tonal chord progressions, whilst revealing significant pitch sets.[29] Parks does not believe that one description of the pitch resources excludes the other. He does not however fall into the trap of claiming that both tonal and 'other'[30] (non-tonal) organisation are simultaneous and equal counterparts in the organisation of pitch. This dangerously simplistic viewpoint would lead to the inaccurate conclusion that there are two separate pitch hierarchies, one tonal and one non-tonal. Instead, analysis of tonal resources is absorbed into the broader theory of pitch class sets

---

[27]Parks, R. The Music of Claude Debussy (New Haven and London: Yale University Press, 1989).
[28]Parks, R (1989), p. 57.
[29]Parks, R (1989), p. 47.
[30]Parks, R (1989), p. 57.

whilst still being given special treatment. In this set theory context, Parks' use of terms such as 'C major' and 'C major scale'[31] may seem confusing and contradictory. By describing a passage with tonal vocabulary, the role of set theory appears to be temporarily suspended. This danger is largely overcome by a particular interpretation of the terminology. The term 'C major' is regarded as 'the specific manifestation of the general concept of the diatonic tonal collection'[32] and the term 'C major scale' denotes the constituent pitch classes of that collection. Thus tonal descriptions are not to be understood in a global context. This does not mean that higher structural levels are non-tonal, but that the traditional structural implications of functional tonality do not apply.

Parks presents a further reason for treating tonal resources within a set theory context. Although the musical surface of an analysed work such as *La Fille* may be tonal with identifying progressions and cadences, the music is still better analysed with set theory methods. This is because such progressions and cadences may reveal more connection in terms of pitch class and intervallic content than into tonal key relationships. The essential focus of pitch relationships is the 'characteristics of shapes and chords'[33] that exist in addition to any tonal role they may assume.

Lerdahl presents a series of difficulties that he finds with standard set theory analysis.[34] Certain of his criticisms relate more to theoretical elements of the analytical method. For instance, he comments on set theories general lack of success in describing tonal music, thus creating an artificial tonal/non-tonal division. Other more immediately pertinent issues are raised, and these may be used as a basis for testing Parks' methods.

---

[31]Parks, R (1989), p. 338.
[32]Parks, R (1989), p. 338.
[33]Parks, R (1989), p. 57.
[34]Lerdahl, F (1988), p. 66.

Parks' use of tonal vocabulary in analysis to some extent defends him from Lerdahl's comments about the criteria for set equivalence and similarity. When Parks is able to show consistent use of recognisable tonal pitch collections, he can claim that certain set relationships occur that may not appear significant outside the tonal context. Such 'tonal' connections give added weight to argument that sets are equivalent or similar. In summary, Parks' approach to set theory may show theoretical weaknesses but is carefully designed to reveal the particular characteristics of the analysed material.

One further criticism of set theory presented by Lerdahl is the nature of set segmentation. This issue is of significant and broad analytical importance. Therefore, in addition to Parks' analytical response, a brief survey and discussion of other theories of segmentation is presented.

Segmentation

The issue of the segmentation of the musical surface is central to pitch set theory analysis. Despite methodological difficulties, the success of a segmentation is surely in the balance achieved between the following two considerations. The 'musicality' of a segmentation (the extent to which it accords with intuition) must be offset with its analytical value (the extent to which significant set connections can be illustrated.) A highly musical segmentation revealing few or no significant set connections is analytically hardly valuable. A segmentation that shows many set relationships but ignores the surface musical structures is irrelevant. Parks' intuitive approach is successful despite not being fully explained. The correct balance can only be struck, it seems, on an individual, ad hoc basis; Lerdahl's focus on methodological considerations is justified but it lacks a straightforward and normative protocol required for successful segmentation.

The subject of segmentation is mentioned by Simms,[35] although his brief, enigmatic comments highlight difficulties not solutions. He explains that segmentation firstly must be 'musically objective' and yet must also 'aim towards the discovery of equivalent or closely related sets'.[36] These two conditions are clearly incompatible; the second condition implies a bias in the set segmentation towards creation of segments with significant set relationships that must disrupt the 'objectivity' of the first condition. The term 'musically objective' is itself somewhat deceptive and requires further clarification. Objectivity in segmentation is presumably based on decisions led by intuition about the nature of the surface of the music, and not formal analytical methods. The factors that condition an intuitive response to music are obviously complex (Lerdahl's list of salience conditions, which are explained in full below, include many of the main elements of such a response). But to presume that pitch and pitch relationships play no part in the intuitive response is surely unfeasible. The effects of pitch generally are amongst the most important of the features that affect the listener's response. It is this fact that creates the 'circularity' of the analytical method. The so-called 'objective' segmentation is itself tempered by pitch relationships that are then confirmed by the 'discovery' of closely related sets. Simms' approach is at once contradictory and circular.

To be fair, Simms' brief mention of segmentation is meant as no more than an introduction; he indicates that the subject of pitch class set segmentation is more thoroughly discussed in Forte's article on 'Foreground Rhythm'.[37] Forte expands on Simms' concept of 'objective segmentation'. The process of segmentation is divided into two steps: the music is first

[35]Simms, B. The Theory of Pitch-Class Sets. In Dunsby, J (ed.) (1993), pp. 114-131.
[36]Simms, B. In Dunsby, J (ed.) (1993), p. 127.
[37]Forte, A. Foreground Rhythm in Early Twentieth-Century Music. In Dunsby, J (ed.) (1993), pp. 132-147.

segmented by 'taking surface configurations at face value' and second it is 'modif[ied] and refine[d]....on the basis of information about pitch and rhythmic structures....to reveal slightly concealed connections'.[38] Forte notes that that the surface configurations of the music do not reveal the true extent of significant pitch class set relationships. These relationships are located by 'linear analysis'[39]; Forte employs, in his own words, 'elementary reductive techniques'[40] to reveal underlying linear motion that affect the overall segmentation. In an example of this method, one of Bartok's *Fourteen Bagatelles* is shown to contain concealed background linear motion, which is paralleled later in the music. This insight necessarily alters the segmentation of the musical surface. However, serious questions must remain about the nature of the reductive process. Using elements of pitch organisation to influence the segmentation for pitch class analysis means that there is again a dangerous circularity to the methodology.

At a surface level, Forte's method bears little resemblance to that of Lerdahl's methods of atonal prolongation analysis[41] (which are summarised below). Forte presents a complex array of issues that must be considered in creating a segmentation, whereas Lerdahl formalises and explicates his conditions systematically. However, the individual components of Forte's analytical method shows notable similarities to Lerdahl's attempts to reveal atonal prolongational structures. Lerdahl's use of grouping and metrical analysis to produce a 'time-span segmentation' is reflected in Forte's modifications according to rhythm; their 'stability conditions' are not unlike Forte's modifications according to pitch. Forte's linear reduction, although not clearly explained, achieves a similar result to the

[38]Forte, A. In Dunsby, J (ed.) (1993), p. 133.
[39]Forte, A. In Dunsby, J (ed.) (1993), p. 133.
[40]Forte, A. In Dunsby, J (ed.) (1993), p. 133.
[41]Lerdahl, F (1988).

time-span reductions used by Lerdahl. The important difference between the methods is the end result: Forte segmenting the musical surface to reveal pitch class set relationships at various reductive tiers of the music, Lerdahl seeking the hierarchical structure. Accepting this, there is a further difference in the approaches. Forte criticises the tendency to separate rhythm and pitch which he believes interrelate to such a degree as to make any separation 'artificial'. Lerdahl prefers the theoretical 'cleanliness' of dividing the effect of pitch and rhythm into separate modules. As shall be now shown, Lerdahl's attempt to clarify the conditions of segmentation, for his own analytical purposes, is less complete than it may first appear.

Lerdahl's Atonal Prolongational Analysis[42]

Lerdahl's attempts to formulate a method of revealing prolongational structure in atonal music are prompted by the failings of other methods. The aim is to extend the analytical approach originally designed for tonal music so that it can incorporate non-tonal music. In a discussion of the inherent problems faced by other analytical approaches, Lerdahl particularly notes the artificiality of drawing a division between tonal and atonal genres. Belief that on the one hand, Schenkerian methods can explain tonal music and on the other that set theory can explain atonal music, assumes that 'we hear *Elektra* and *Erwartung* in completely different ways'.[43] This is clearly not the case, although Straus fell for the temptation of such black-and-white categories. Attempts to adapt the Schenkerian approach

[42]Lerdahl's methodology, designed for atonal music, is an adaptation of the approach first proposed in: Lerdahl, F & Jackendoff, R. *A Generative Theory of Tonal Music* (Cambridge: The MIT Press 1983).
[43]Lerdahl, F (1988), p. 67.

are dismissed as unsatisfactory; the strong tonal basis to the theory makes it unsuitable as a tool for revealing non-tonal connections.

Holding up Straus' approach as a model of over-simplistic divisions, Lerdahl looks to produce an analytical theory that is sufficiently broad to incorporate tonal and atonal prolongation. The benefit of this is that there is no need to completely divide traditional tonal prolongation from atonal association. Instead there is an acceptance that various degrees of prolongation can coexist, from strong, tonal prolongation to the much less clear case of atonal progression.

The original theoretical route[44] (designed primarily for tonal structures) was to combine a rhythmic reduction with pitch information to create a final reduction. Grouping and metrical structures are analysed and this information is used to divide the surface of the music into 'time spans'. Time spans are then successively reduced out according to certain 'stability conditions' which distinguish the hierarchical importance of time spans according to pitch content. The 'prolongational reduction' is an extension of the 'time span reduction'. Central to this is the concept of the 'pitch-event' as the unit of analysis; a pitch event is any group of pitches sharing a single attack point. Analysis from the level of pitch-event upwards is necessary so that rhythmic information (which is generally absent from other popular forms of analysis) can be used. This in turn has the effect of retaining a close link with the musical surface while still revealing abstract or concealed structures.

Certain alterations to this method are necessary for analysis of non-tonal music. Most importantly, the general lack of a consistent musical grammar makes the role of the 'stability conditions' uncertain, as these rely heavily on the generally accepted organisation within tonality. 'Stability conditions' are duly replaced by 'salience conditions'. These

[44]Lerdahl, F & Jackendoff, R (1983).

conditions aim to determine relative salience of any particular time-span. Lerdahl bravely lists those conditions that he believes affect the salience of time-spans, and even illustrates the relative importance of each condition on a scale of 1-3 (where 1 is least important and 3 is most important):

'Prefer an event that is

A. attacked within the region [3]

B. in a relatively strong metrical position [1]

C. relatively loud [2]

D. relatively prominent timbrally [3]

E. in an extreme (high or low) registral position [3]

F. relatively dense [2]

G. relatively long in duration [2]

H. relatively important motivically [2]

I. next to a relatively large grouping boundary [2]

J. parallel to a choice made elsewhere in the analysis [3]'[45]

Although these conditions appear comprehensive and well defined there are obvious dangers with this scheme. First is the difficulty of creating clear distinctions between the conditions. For example, condition F (relative density) is liable to overlap to some extent with conditions C, D and E. Second is the precise meaning of conditions, particularly condition J. Lerdahl himself accepts the difficulties with the as yet ill-defined understanding of this parallelism. He accepts that it is at present necessary to rely on intuition and common sense to determine the substance of parallel structures. Third is the

[45]Lerdahl, F (1988), p. 73-4

necessary relativism of the conditions. Lerdahl gives no clue as to how the relative strength of each condition is assessed in any particular work; it must be supposed that it is left to the individual analyst to determine the importance of any particular condition. Fourth and finally, the numbering of the salience conditions with an 'importance rating' is an admirable but speculative addition. These numbers could be dangerously misleading if they are used to calculate salience totals. In summary, these conditions are a useful attempt to codify the intuitive knowledge of musical salience. However, despite appearances, there is still nothing particularly scientific about these salience conditions; they can however do little more than to provide a framework upon which the analyst can hang intuitive understanding of a work.

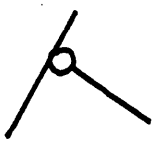
Prolongational structure, the goal of this analytical approach, is presented by means of a 'tree analysis' (reference may be made to Chapter 2 which contains an example of this type of analysis.) There are three separate elements to the tree analysis, branch type, branch level and branch direction (although this is not explicitly stated by Lerdahl.) Each element will be individually explained, with the understanding that they are closely interdependent.

Branch Level refers to the level at which a branch forks from the structure and is determined by the time-span salience analysis. The time spans which are more salient are preferred and given a higher level branch than a less salient time span. Thus the first and highest reaching branch is that of the most salient time span. According to this principle the analysis will show various levels of prolongational importance, the longest and highest reaching branches indicating relatively more important time spans and the smaller, low reaching branches indicating less important time spans. Some sort of analogy with Schenkerian levels of foreground, middleground and background is reasonable. Instead of the separate tiers of a Schenkerian graphic analysis, Lerdahl is able to show any number of

hierarchical differences via small differences of branch level; he is limited only by the extent of detail that can reasonably be seen and comprehended.

Branch Type uses original notation to indicate the type of prolongation occurring at forking branches. Building on the original tonal theory, Lerdahl defines three prolongational types:

1. strong prolongation



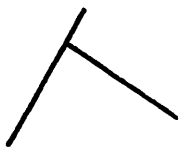
2. weak prolongation

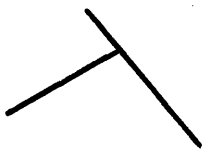
3. progression

Strong prolongation is defined as repetition of an event and progression as movement to a new event. Weak prolongation is more difficult to define. Repetition in an altered form or repetition of significant elements could constitute weak prolongation. This is, as Lerdahl makes clear, an unscientific 'fuzzy boundary'[46] between strong prolongation and progression. This is in many ways advantageous as it allows connections that are intuitively justified to be drawn. Furthermore it provides a point of access for pitch class information; Lerdahl accepts that a 'vertical rearrangement of the same....or a significant number of pitch classes'[47] could form a weak prolongation.

Branch direction refers to the way that a branch forks from the structure. There are two branch directions:

[46]Lerdahl, F (1988), p. 74.
[47]Lerdahl, F (1988), p. 74.

1. right branch (departure) 

2. left branch (return) 

Lerdahl is forced to abandon the 'tensing and relaxing' role that branch direction held in tonal music, in favour of the more simple 'departure and return'.[48]

At the outset of this explanation of the prolongational tree analysis, it was mentioned that there is a degree of inter-relatedness between the three elements. In particular, there appears to be a theoretical discrepancy that has so far passed unnoticed, caused by the effect of branch level on branch direction. Lerdahl introduces branch direction ('departure and return') as a decision left to the intuition of the analyst. In actual fact, branch direction has already been determined by the time-span salience results. For example the branch of the second most salient time-span can only be a left branch (return) if it occurs before the most salient time-span or a right branch (departure) if it occurs after the most salient time-span. The analyst actually has no input in this decision. It is the time-span salience conclusions which dominate the branch direction

A general feature of Lerdahl's analysis of atonal prolongational structure is its flexibility. Despite great attempts to rationalise and codify each step of the analytical process, the approach remains largely reliant on intuition; as we have seen, the judgement of the relative importance of the salience conditions, the discerning of weak prolongations and, to some extent, the selection of branch direction, is not covered by the theory. Lerdahl thus provides a model for illustrating connections in atonal music but does not manage to extend our understanding of how prolongational structures affect atonal music.

[48]Lerdahl, F (1988), p. 74.

A second feature of Lerdahl's approach is its ability to absorb and make use of various sorts of analytical information. Grouping and metrical structures provide rhythmic detail, textural features are included in the salience conditions. Pitch class set details may be usefully incorporated into the choice of prolongational types and may also be relevant to salience conditions H (relative motivic importance) and J (parallel structures). Lerdahl encapsulates the necessity of a broad pluralist approach to the analysis of atonal music when saying:

> listeners to atonal music do not have at their disposal a consistent psychologically relevant set of principles to organise pitches and the musical surface...as a result they grab on to what they can.[49]

Involved with this thinking is his impression that pitch class set analysis will still have an important role in the analysis of atonal music. When the 'associational space' of the surface of atonal music is distinguished by relative similarity of motive, including pitch, set theory is likely to be a most important tool. But this role of pitch organisation is only a foreground effect; Lerdahl argues that atonal pitch groupings can have a deeper structural role. Part of the understanding of atonal music is due to 'relative similarity of pitch and interval within pitch groupings'.[50] Lerdahl's prolongational structure tree analysis begins to illustrate the role of these atonal structures in broad terms, avoiding the unfortunate implications of linear motion encountered by a pseudo-Schenkerian approach. Perhaps the greatest surprise is

[49]Lerdahl, F (1988), p. 84.
[50]Lerdahl, F (1988), p. 84.

that Lerdahl does not appear to make greater use of pitch class information in the preparation of his analysis.

Chapter 2

Analysis of Stravinsky's *Symphonies of Wind Instruments*

Stravinsky's *Symphonies of Wind Instruments* is a highly original and complex work. It cannot be classified as tonal in any traditional sense and yet it contains many visible references to tonality. It therefore presents a difficult task for the analyst; a flexibility of approach and a degree of lateral thinking and originality is required. Furthermore the novel complexities of the music highlight weaknesses and insufficient broadness of the analytical methods used. *Symphonies* is also an important work in the historical context of Stravinsky's output. It contains diverse stylistic elements and shows both 'Russian' and 'neo-classical' traits. My analysis of *Symphonies* will aim to achieve two purposes; to reveal the nature of the music of *Symphonies* by analytical methods and, in the process, to put those analytical methods to the test.

The analysis itself is in two stages. Part 1 contains a survey and critique of two influential analysis of *Symphonies*. The first is by Kramer[1] and is part of a substantial discussion of music perception. The second is a brief analysis presented by Cone[2] including an original analytical sketch. The critique of Part 1 will also serve as an introduction to the music. Parts 2 and 3 contain my own analysis of *Symphonies*. Two separate analytical approaches are used. The Lerdahlian atonal prolongational method is used in Part 2 and includes a prolongational tree analysis. Part 3 contains a series of harmonic reductions of *Symphonies*, used to show voice-leading connections.

---

[1]Kramer, J. *The Time of Music* (New York: Macmillan, 1988).
[2]Cone, E. Stravinsky. The Progress of a Method. In R. Morgan (ed.), *Music: a View from Delft* (Chicago and London: University of Chicago Press, 1989).

Part 1. The Analytical approaches of Kramer and Cone

Kramer's 'Analytical Interlude'

In his extensive study of the importance of time in musical experience, Kramer presents an 'Analytical Interlude'[3] studying Stravinsky's *Symphonies*. The focus of this survey is the method and results of that analysis, not a critical account of the whole book; however a brief excursion into comments concerning the work as a whole must be excused, as they draw attention to important terminology and the general issues of Kramer's approach.

Kramer seeks to understand the different effects of music by describing and categorising the type of time that music can create. (He describes music as 'existing, unfolding, moving and extending' through these different times. His book opens with the unforgettable (!) pair of philosophical maxims 'Music unfolds in time. Time unfolds in music.'[4]) His musical categories are novel; they relate mainly to the perception of structure, continuity and discontinuity. In a criticism of Kramer's work, Walsh[5] presents a valuable, if somewhat pithy definition of three important temporal classifications: 'Gestural Multiply Directed Time' consists of 'logical events in illogical order': 'Moment Time' contains events in an arbitrary order: in 'Vertical Time,' apparently 'nothing happens.' To this list may be added the concepts of linearity and non-linearity, which are central to the discussion of *Symphonies*. Walsh's light-hearted definitions nevertheless indicate elementary difficulties in Kramer's approach. Firstly, the fitting of complex music in to neat categories is nearly always problematic. Often categorisation proves only that the variety of music is hard to

[3]Kramer, J (1988), pp. 221-285.
[4]Kramer, J (1988), p. 1. (with an apology to Kramer).
[5]Walsh presents a review of the 'Analytical Interlude' in Music Analysis, **8**, (1988).

classify. Secondly, Kramer enters deep and turbulent philosophical waters when he approaches the issues of the existence of time in relation to music, and the perception of time in music. These vast questions can not adequately be resolved in a few brief chapters. Kramer is over ambitious, and strays too far away from musical issues; the crux of the problem is that his types of musical time are not inherent aspects of the musical score, but are created by the mind as a result of the music. Kramer, perhaps, is a little under qualified to explain these matters.

In the event of the analysis of *Symphonies*, the impressive sounding time categories appear to have become more like straight forward musical descriptions. *Symphonies* is described as interweaving 'Moment Time and Directed Linear Time.'[6] As the concept of two simultaneous perceptions of time is beyond comprehension, it must be assumed that Kramer is using the terms as almost analogous to 'Moment form' and 'Directed Linear form.' These two elements of time or form are illustrated with two analytical approaches; a cellular analysis of the musical surface and a voice-leading type (although Kramer vehemently denies this) analytical reduction of the work.

Cellular Analysis

The cellular analysis reveals connections and permutations of 'cells' at the musical surface. Kramer defines a cell as a 'small configuration of pitches and durations'.[7] A cell is distinguished from a motive by its usage; cells are strung together by repetition and slight variation into larger groups called 'cell sequences'. By contrast motives are not systematically permuted and may appear more in isolation. Cell sequences are discerned by

[6]Kramer, J (1988), p. 222.
[7]Kramer, J (1988), p. 224.

organising cells into groups according to conditions reminiscent of Lerdahl and Jackendoff's grouping rules[8]; parallels and symmetrical divisions are largely used. Kramer identifies that cells are varied by Stravinsky by two related methods; variation of the ordering of cells and variation of cell content.

These divisions, into cells and cell sequences, point to the inevitable analytical difficulty of segmentation. Segmentation is required at cell and cell sequence level as has been established, but also at the higher moment and sub-moment levels. It is these higher level divisions which importantly determine the overall grouping of the local cell structures. Kramer presents a list of perameters that he uses to segment the work into individual moments.[9] Primary factors of tempo, harmony and cellular material are supported by other perameters such as orchestration. This is safe analytical territory. Although the reasons for sub-moment segmentation are not so clearly explained, the combination of the above factors is usually sufficient to make the segmentation self-evident.

The larger moment segmentation, created by the amalgamation of sub-moments leads, however, to more controversial results. Two features of the moment segmentation will be the focus of the criticism of the cellular analysis. The first important issue of Kramer's segmentation is that the division into cells, cell sequences and sub-moments assumes contiguity. In other words, each of these above segments can be found as a single, uninterrupted passage in the music. Often in *Symphonies*, cell, cell sequence and sub-moment segmentation is straightforward because of the contrasts between neighbouring motivic fragments. By contrast, moments can be non-contiguous; according to Kramer's theories of 'multiple linearity,' moments are not necessarily connected by linear contiguity,

[8]I will fully explain these in due course.
[9]Kramer, J (1988), p. 224.

but by the characteristics explained above. As a straightforward example, in a piece containing four sub-moments A B C and D, Kramer could theoretically group A and C as one moment and B and D as a second moment. This makes the moment segmentation the most difficult and the most analytically interesting, particularly because it occurs at the highest organisational level of all the segmentation. Surprisingly and in contradiction to his claims, Kramer's cellular analysis appears to show that linear contiguity is a factor of considerable importance in moment segmentation, as will be demonstrated below. There appears a clear preference for grouping contiguous sub-moments into a single moment.

Secondly, particular attention is drawn to the claim that moments are characterised either by 'consistent pitch figurations, alternation of two harmonies or consistent use of particular notes at particular registers.'[10] Any immediate intuition that these characteristics of moments are rather too all-embracing will be later confirmed. These segmentation criteria, namely the supposed non-involvement of contiguity in the process, and the harmonic characteristic of moments are the main criticisms of Kramer's cellular analysis, as the following examples show.

Moment A contains three motivic elements, first presented at [0], [1] and [3] respectively. Also included in this moment are the reiterations of the opening passage that occur at [9] and [26]. Kramer points out the non-textural (i.e. harmonic) continuities that unify this moment: the pitches F and B flat appear at the bottom and F and D at the top of most of the harmonies within the moment. There is also a single, constant tempo. This moment segmentation raises a variety of questions. The passage at [3], accepted by Kramer as 'an intrusion,'[11] contains neither of his 'non-textural similarities'. Although it displays some

[10]Kramer, J (1988), p. 224.
[11]Kramer, J (1988), p. 228.

pitch and registral similarities to the opening passage, it is far more closely connected to material occurring much later in the music (see [46] for example.) Why then is it included in the opening moment group? It seems that linear proximity plays a major part in the decision, despite Kramer's protestations.

A further example of this trend occurs in moment B. This moment groups together the material [6-8] with [40-42]. This is surprising because the passage [41-42] is motivically identical to passages at [43], [45], [57] and [64], which are all members of moment F. Returning to Kramer's own segmentation conditions, [41-42] shares the tempo, harmony and cellular material, as well as the pitch figurations, of moment F, yet it is grouped as part of moment B. The reason for this is that Kramer is unable to divide the passage [40-42] into two individual sub-moments. He therefore is forced to temporarily abandon all his segmentation criteria, and accept that the contiguity of the passage is of greater importance. Analytically this is highly unsatisfactory; the passage [41-42] signals the end of the first part of the work, and in a near identical gesture at [64-65] the material is used again to indicate the arrival of the final section of the music. This insight is lost by Kramer's clumsy segmentation that groups these passages into separate moments.

The second problematic area of the cellular analysis relates to Kramer's claims concerning the pitch characteristics of moments. The material within each moment is supposed to show a specified degree of harmonic coherence such as 'consistent pitch figurations'. In particular, the relationship shown between the structurally important phrases is strained. In the second part of his analysis, a series of harmonic reductions, Kramer reveals that the sonorities found at [0-1], [42-43] and [71] to the end, dominate the work. As has been described, [0-1] is part of moment A. [42-43] and [71] to the end are both members of moment E. In itself, this segmentation reveals some valuable pitch information; both [42]

and [71] contain prominent G major triads. Additionally the passages show textural similarities and share the same tempo. In his accompanying written material, Kramer notes that the opening two sub-moments [0-1] and [1-2] also contain certain relevant pitch details, with [0-1] also containing the G triad, and [1-2] being a transposition of the material at [42].[12] Despite the validity of these connections, the cellular analysis places [0-2] in a separate moment to [42] and [71]. This is even more bemusing because the passages at [0-1], [1-2] and [42-43] all refer to a single octatonic collection, and share most of their pitches in common. [71] to the end however is drawn from a diatonic collection, and reveals notable differences in pitch especially the new bass note C that does not occur in the earlier passages. Kramer's 'consistent pitch figurations', that supposedly characterise individual moments, appear not to apply to the most important passages. The problem is most clearly expressed by Kramer's analytical comments concerning the relationship between the 'two parts'[13] of the work, namely [0-42] and [42] to the end. In addition to being a gross oversimplification of the structural organisation of the music, this description misrepresents the strength of connection between [0-2] and [42-43], and the vital differences between [42-3] and [71] to the end.

One final detail of Kramer's analytical comments is his wholly spurious claim that the final passages of the music, apparently from [65] onwards, cannot be divided into sub-moments but instead form a single continuous moment. This decision may have been overlooked, except for Kramer's 'chance' discovery that the end passage was originally an individual composition, therefore confirming his claimed analytical insight. This appears to be little

[12]Kramer, J (1988), p. 254.
[13]Kramer, J (1988), p. 254.

more than thinly veiled trickery; Kramer's analytical skills are surely substantial enough not to resort to this sort of manoeuvre.

Harmonic Reduction

The second element of Kramer's analysis is a series of harmonic reductions of *Symphonies* that reveal the 'underlying linearity'[14] of the work. Essentially, he aims to show progressions, largely as stepwise motion, that are structurally important in the music.

The resemblance of his reductions to Schenkerian graphs is described as 'superficial'.[15] Describing the methodology of this part of the analysis, Kramer is distinctly and deliberately vague about his understanding of prolongation. Having said that the voice-leading graphs indicate 'consistency and stasis of sonorities',[16] as opposed to prolongations in a Schenkerian sense, he also refers to Straus' theory of prolongation. Thus he concludes that *Symphonies* has none of the requisite conditions for prolongation. At this point, to be fair, his methodology is relatively consistent, if not somewhat simplistic. However, Kramer then casually adds that the graphs show how harmonies are 'decorated by intervening pitch structures'.[17] This statement requires careful consideration if some harmonies are described as 'intervening' and decorative, it follows that there must be hierarchically more important harmonies to decorate. Kramer alludes to this when explaining the notation of his voice-leading reduction; when solid beams connect pitches, it is to show that 'they return prominently, in register, extremity of harmony or in new register'.[18] In other words, certain

[14]Kramer, J (1988), p. 222.
[15]Kramer, J (1988), p. 222.
[16]Kramer, J (1988), p. 222.
[17]Kramer, J (1988), p. 222.
[18]Kramer, J (1988), p. 222.

conditions of prominence are used to distinguish more important pitches from the less important, so that these pitches may be connected in terms of voice-leading.

As no other information is given, it must be assumed that the successive levels of reduction (there are four voice-leading levels in total) must be based on these prominence conditions, allied to the value of voice-leading connections. At the lowest level, Kramer illustrates a number of simultaneous and overlapping voice-leading motions, as is allowed in his 'multiple time'; according to his theories, it is possible for various nonhierarchical connections to occur at the same time. When he then performs a reduction to reach a background harmonic structure that contains a single voice-leading level, it may be asked: why is this structure selected and how does it relate to the other levels, if not by prolongation?

To answer this question, it is interesting to refer to Lerdahl and Jackendoff's method of prolongation analysis.[19] They establish that the importance of a time span is determined by its relative salience, based on conditions such as register timbre or motivic connection. Kramer's conditions of prominence show distinct similarities to these salience conditions. Furthermore, if the final harmonic level is studied, the selected pitches are all from prominent passages. This result is not a surprise; Kramer has performed a reduction that predominantly takes account of relative prominence or salience of passages. Kramer does not merely seek voice-leading connections, but actively discriminates in favour of passages showing prominent characteristics. In analytical terms, this makes his series of reductions valuable, containing new insights. In methodological terms, Kramer has created a hierarchy of more and less prominent passages, which seems incongruent with the rest of his theory of 'multiple linearities'.

---

[19]Lerdahl, F. & Jackendoff, R. (1983).

When he does trust in his musical intuition in the voice-leading analysis, Kramer makes some interesting comments about the purpose of the final slow passage of the work, [65] to the end. Realising that this passage is different from the rest of the work in that tonal harmonic motion leads to a cadential goal, Kramer pinpoints the final chord as that goal. This chord embraces the G-triad, but has a new bass note C (and includes a C-major triad). Kramer describes this resolution between [65] and the end as only local and therefore feels the ending is not totally conclusive. Accepting the 'open ended' element of the structure is a valuable step for Kramer's analysis.

In summary of Kramer's approach and insight, he believes that there are simultaneous multiple linearities in the music revealed in voice-leading connections opposed by the essentially nonlinear moments groupings. The nonlinearity cuts across the linearity. The resulting interplay of these features is the main structural force of the music.

Apart from the inconsistencies and the missed analytical opportunities in the cellular and moment segmentation, and the apparent lack of clarity concerning the voice-leading levels of reduction, there are two more general issues raised by Kramer work.

First is the question of how linearity and non-linearity (here represented by voice-leading and cellular and moment segmentation respectively) interrelate with one another. This surely has potential as an illuminating issue for Kramer; strangely, he almost completely ignores it, treating the two analytical approaches as separate. For example, it is unclear whether the pitches at the highest level of harmonic reduction (which therefore must be assumed to be hierarchically most important) influence the cellular organisation. Similarly the moment groupings may favour certain pitches and pitch sets so that they are made more prominent for voice-leading connections. Kramer's claim to simply identify voice-leading is insubstantial; he must clarify how the useful intuitions revealed in his voice-leading

graphs and cellular analysis affect one another. To treat them as separate analysis without any relationship is rather simplistic and distinctly unilluminating. In the context of the interrelation of linear and nonlinear elements, it is a possible concern that pitch analysis, whether in pitch class set theory terms or otherwise, seems to play only a minor role. The pitches of the final reductive level show most remarkable pitch class connections, but Kramer neither highlights these nor admits that they played a part in the analytical process. The interrelationship between discontinuous and continuous elements is for more subtle and complex than Kramer would have us believe. Kramer's theory constructs an artificial opposition between discontinuous moments and continuous voice-leading. There are many motivic connections between separate moments which create unity in the music, there are foreground motivic occurrences that are reflected in background motion.

Secondly, to understand the apparently 'arbitrary succession' of moments in the music, creating middleground incoherence, Kramer proposes that coherence is maintained by durational proportion.[20] Basically, he discovers significant proportional relationships between the durations of separate submoments. Mainly these reveal a durational ratio of 2:3. Although it is interesting that the proportions of *Symphonies* bear this proportional characteristic, I do not believe that this proportion is a particularly significant element of coherence in the music.

The complexities of *Symphonies* are more adequately revealed by Edward Cone's analysis.

[20]Kramer, J. (1988), p. 281.

Cone's Analysis

To be fair to Cone, and as a preface to this survey of his article[21] relating to *Symphonies*, his analysis of the work is a brief part of a larger discussion. It is neither meant as an analytical methodology nor as a complete analysis of the music of *Symphonies*. Instead Cone focuses on the main structural aspects of the music that show 'obvious characteristics'[22] of Stravinskian technique. His analysis consists of a sketch and brief accompanying comments.

Stratification, interlock and synthesis

Cone's understanding of the technique used by Stravinsky in the composition of *Symphonies* is described in detail. He believes there is a process of 3 phases, 'stratification, interlock, and synthesis'[23]. 'Stratification' identifies the 'separation in musical space of musical areas'. Thus the 'layers of sound' which contrast to a greater or lesser degree are juxtaposed in time. Interlock refers to the tension created when one layer is interrupted by another, as consistently occurs in the 'often fragmentary' music of *Symphonies*.

Stratification sets upon tension between successive time fragments. When action in one area is suspended, the listener looks forward to its eventual resumption and completion. Meanwhile, action in another area has begun. Cone presents a simple example in which two musical ideas are alternated: A^1 B^1 A^2 B^2 A^3 B^3 and so on. One musical strata would be A^1 A^2 A^2 the other B^1 B^2 B^3. Importantly, he establishes that although heard in alternation each continues to exert its influence even when silent.

---

[21]Cone, E. (1989).
[22]Cone, E. (1989), p. 294.
[23]Cone, E. (1989), pp. 294-5.

The third stage, the 'synthesis' is, according to Cone, both the 'most interesting' and the most likely to be overlooked. In the motion towards a goal of some sort, it is necessary for some of the independent strata to be unified. This unification is less clear than the original stratification, and layers are reduced and transferred in their assimilation. Neither is the unification complete; original strata A, B, C, D, E and F do not reform into one great final strata; instead some are missed out, while others are preferred. Material at [11] provides a simple example of the synthesis of strata. Oboes, clarinets and trumpets introduce new material described as layer D, whilst almost simultaneously, trombones and trumpets perform material previously heard in layer B. Thus Cone illustrates this passage as a synthesis, aligning material with both D and B strata. He shows that the ear hears the new D strata material and also associates the trombone material with earlier B passage.

At this point it may be useful to present three methodological difficulties that this highly original theory raises, one referring to each stage of the process. Stratification requires the grouping of the music into individual strata, supposedly according to certain surface characteristics. No explanation of the reasons for particular strata segmentation is presented. A clue to possible criteria is found in Cone's emphasis on 'the listeners' role of looking forward to resumption of a musical area. It must be assumed that intuitive conditions affect the strata segmentation; clearly audible registral and voice-leading connections, along with more obvious motivic connections play important parts. Interlock, in which strata continues to exert an influence over one another even when silent, raises a question of hierarchy. If all strata have equal effect at all times then the result is not dissimilar to Kramer's multiple time approach. Two features of the analysis show their interpretation is unlikely. Firstly his analytical sketch does not show the layer A-F alphabetically, although there is no technical reason why it cannot. Instead, Cone

emphasises the contrast of the opening two strata A (from the passage at [0]) and B (from the passage at [1] by separating them in physical space in the analytical sketch. Importantly this also aligns the final passage as a 'middle' strata, emphasising that it contains, via synthesis, essences of various strata. Secondly, the synthesis aspect means that strata are not individual and independent, as Kramer's 'moments' may be. Instead they closely relate and refer to one another, creating natural hierarchies.

Synthesis again raises the issue of hierarchy; original strata of material may be understood as being varied (even developed) in synthesis, or alternatively the 'synthetic' strata may be seen as the goal. Determining whether original strata or synthesis strata are structurally dominant is central analytical decision. This issue illuminates whether *Symphonies* is essentially developmental, and whether it contains an 'open' or 'closed' structure.

Unlike Kramer, Cone hears various elements of continuity and links between strata as also occurring. He identifies that voice-leading plays a role in the surface continuity, drawing particular attention to bridge passages such as occurs before [6]. This links two separate strata by voice-leading, and provides a textural point between the two strata. Additionally, Cone refers to 'divergence'; this is when the material of a single layer becomes separated into two separate layers.

Harmonic segmentation and reduction

Study of Cone's analytical sketch reveals a wealth of information and different elements to the analysis. Unexplained in his accompanying text is his reduction of the musical surface that is used in the sketch. The reduction largely eliminates rhythm to present music as vertical pitch collections. These collections are either the total pitches used in any passage, or a reduction to the structural most important pitches. For example, the opening 6-bar

passage is reduced to a single vertical chord, containing all the pitches of the passage. This is a reductive 'summary' because at no point in the opening do all 5 pitches occur together. This reduction therefore differs from a Lerdahlian time span style reduction. A second example of the reduction is the extended contrapuntal passage [15-21] which is summarised into 2 important pitches, E and B. Cone eliminates other material as of only foreground importance. Certain passages are presented nearer this original form. The motive first heard two bars before [2] is illustrated in full, as are its subsequent repeats.

This reduction is illustrative for two reasons. Firstly, it shows that durational length cannot be interpreted as structural importance and that some brief passages are structural far more important than other more extensive passages. Returning to the previous examples, a single chord representing the important opening 6-bar passage, begins strata A, whereas [15-21], a far larger 29-bar passage, is again represented in one chord.

Secondly, Cone's reduction occurs on the basis of a segmentation of the music (separation of segments is represented in the sketch by bar lines). Although the process of this segmentation is not explored, it may be speculated that the obvious element of motivic unity and tempo markings are the major influence. Additionally, any significant change or addition of motivic material affords a new segment. For example, the passage [15-26] shows such motivic continuity that it may be considered a single segment; the appearance of new, contrasting material at [21] and [23] means that the passage is divided into smaller segment by Cone.

The horizontal alignment of material in the sketch gives a clear visual illustration of organisation of the music. Most notable is that Cone aligns early slow 'chorale' material (from [1-2] and [4-6]) as the B strata with the final passages [42] and [65] to the end). Cone believes that the predominant connections heard between the slow 'chorale' material

throughout the music, and that the opening passage [0-1] is not part of the dominant motivic layer. This material [1-2] and [4-6] is preferred by Cone as part of the central B layer despite its relatively low prominence in context of its immediate surroundings. Cone's analysis strongly shows the opening opposition of [0-1] and [1-2] which continues throughout the first part of the work. He illustrate that the A strata dominate the first part of the music with transpositions and reiterations of the opening passage [0-1] occurring at [9], [26], [37] and [39]. From [42], the B strata dominates, despite an extensive intrusion from the F strata, including the climactic passage [46-54]. The passage [65] to the end is poetically described by Cone as a 'late flowering'[24] of the B strata. This part of his analysis is perhaps the most original, revealing new insights relating to the function of the final passage. Cone believes the final chord is a resolution of various elements of different strata. One element is the dominant-tonic relationship (the nature of which is not explained in any detail) between the G major triad of the opening, and the C major triad of the end. A second element is the return of the G major triad of the opening passage in its original registral position in the final chord. A third is that the descent of a third in the transposition of the opening passage at [9] and [26], from the fifth G-D to E-B is completed in a final bass descent of a third from E-B to C-G (this will shortly be explained in detail). In summary, Cone's analysis attempt to reveal the complex construction of the music.

Additional voice-leading connections

Cone also illustrates voice-leading connections, joining steps in voices by dotted lines. His connections on occasions are problematic and inconsistent. Between the two passages [8-9] and [9-11], Cone shows that an F sharp is reinterpreted to G flat, and a G steps to G flat,

[24]Cone, E. (1989), p. 297.

but omits reference to the equally important C sharp which is translated into D flat a fifth above the G flat. Certain long range voice connections are ambitious to say the least. I do not hear any realistic connection between the high B flat before [65] and the high B natural at [74].

Rather confusingly, dotted lines also indicate interesting motivic connections as well as voice-leading. A valuable detail, for instance, is the interval of a fourth, from F to B flat, that is in the bass of both passages at the opening of the music.

Cone, in his written material, adds various insights not shown on this sketch. The most important of these are similar to Kramer's 'background reduction'; the presence of the descent of a minor third expressed in the line indicated in the opening passage G-D, continued at [9] G flat-D flat and after [26] E-B. He also identifies the neighbour role of the passage at [54], emphasising the fourth A-E as a neighbour to G-D fifths. He shows that the 'little passage' at 3 foreshadows this.

Cone hears the final sonority, and particularly the bass note of C, as a tonic that is foreshadowed by dominant-like chords at [42], [56] and [65]. (Kramer points out that [69] is omitted from this list, presumably accidentally; however, Kramer's eyes deceive him when he claims that the passage at [69] is also omitted from the sketch. It is not; it is both clearly marked and fulfills an important analytical role.[25]) This is a difficult analytical decision. Retrospectively, the progression from chords exhibiting G triad to a chord rooted by C may be heard in terms of dominant-tonic relationship. However, the chords at [42], [56] and [65] do not, in themselves, indicate an inevitable progression to the final C. Cone indicates that the final passage is not wholly conclusive, explaining that it contains only

[25]Kramer, J. (1989), p. 281. Perhaps Kramer's criticism of Cone becomes a little too fervent, hence Kramer 'discovers' errors that do not actually exist.

some elements of various strata, unified via his syntheses. But he also seems to see the final passage as conclusive, a point of definite arrival; this is almost the opposite of Kramer's open-ended moment form.

A summary of Cone's insights illustrates the wide compass of his analysis and the ability of his sketch to cope with the complexities of *Symphonies*. A segmented reduction of the work reveals the prominent pitches in each motivic fragment. Horizontal alignment of strata shows connections between passages separated by time, and shows when new material is introduced. Synthesis is understood as the unification of separate strata, and illustrating close relationships between strata. Links between strata are enhanced by 'divergence' and the voice-leading steps shown. Additionally motivic connections are highlighted. Therefore Cone shows the multiple-faceted structure of *Symphonies*, the discontinuity bound by strong continuous elements. Kramer seems disappointed that Cone's strata divisions are unlike his moments. He is correct in this at least. Where Kramer separated the music into discontinuity of cellular and moment segments, and continuity of voice-leading, Cone shows that this approach is simplistic and seriously flawed.

Understanding that the complexity of *Symphonies* is not adequately represented by his analytical sketch, Cone appears to accept that his horizontal alignment of separate strata cannot truly reflect the music. He constantly violates the separation of the strata; by showing unification of two strata, such as was described at 11, voice-leading connections between strata and more subtle synthesis as occurs at the end of the music Cone implies that the elements of coherence in *Symphonies* are complex and substantial.

Part 2. Lerdahlian Prolongational Analysis

The analysis of the prolongational structure of *Symphonies of Wind Instruments* is based on the methods proposed by Lerdahl and Jackendoff,[26] taking into account the adaptations made by Lerdahl for the special case of atonal music,[27] as have previously been described. The constituent parts of the analysis include an adaptation of Cone's analytical reduction of *Symphonies* which is subjected to various degrees of time span and prolongational reduction, and is presented in a prolongational 'tree' diagram. Throughout the analytical process, attempts have been made to remain within the methodological boundaries laid down by Lerdahl. Where this has proved impossible, innovations and adaptations to the analytical approach are explained in full.

Cone's Reduction; the X-level

Cone's reductive analysis[28] forms the basis of the global analysis (in this context, the term 'global' is used when referring to the work as a whole, rather than individual portions of it). It firstly has been used as it provides a convenient segmentation of the musical surface. In his analysis, Cone's individual segments are separated by bar-lines. The criteria for his segmentation are not made explicit, but appear to be based on motivic continuity. Passages exhibiting consistent and distinct motivic characteristics are assumed to be a single segment or group. The term 'group' here is used deliberately; each of Cone's segments (with a small

[26]Lerdahl, F. & Jackendoff, R. *A Generative Theory of Tonal Music* (Cambridge: The MIT Press 1983).
[27]Lerdahl, F. (1988).
[28]Cone, E. (1989).

number of exceptions) can be used to represent a single group in a layer of Lerdahlian grouping structure.

Secondly, Cone has performed a reduction on the musical surface. The result is that each segment contains either a set, or a small number of sets of vertically aligned pitches. Again the precise nature of the procedure of reduction is not explained; however, in many cases in *Symphonies,* consistent motivic repetition means that only one or two chords are used within a segment, and therefore it is a relatively simple task to reduce the segment to a few chords.

Cone's segmentation and reduction analysis is therefore of twofold value. Firstly, it provides an analysis that is brief and concise enough to reveal the total global prolongational structure of *Symphonies*. The length and complexity of *Symphonies* is such that a global prolongational analysis revealing every prolongational detail from the musical surface to the highest structural level would be exceedingly cumbersome, and technically difficult to present. By utilising Cone's reduction, the lower order of prolongational structures are removed from analytical diagrams. Importantly, the reduction performed by Cone largely results in material that is the prolongational head of the individual fragment. Secondly, and the reason that this convenient step is possible, the reduction matches closely with a time span reduction of the lower levels of the work. In other words, a Lerdahlian analysis of the musical surface in terms of time span reduction leads approximately to Cone's segmented reduction. This occurs because of the unusual construction of *Symphonies*. It was identified by Cone that the surface of the music is broken into short and coherent fragments. Each fragment is motivically tightly constructed, generally formed from limited pitch and motivic material. Furthermore, each fragment is clearly separated from previous and subsequent fragments on the basis not only of motive but also textural

contrasts. In summary, each fragment is a clear, distinct and individual unit, as indicated by Cone's segmentation; at this level, each fragment or segment may also be interpreted as a single Lerdahlian group. The level of reduction of Cone's analysis is to be referred to as the 'X-level'.

Cone's analysis however requires a series of adaptations in preparation for global prolongational analysis. Most notable of these adaptation is the need to eliminate the element of stratification which does not play a part in the Lerdahlian analysis. This is easily achieved; the separate layers of music are simply compressed into one single layer. More important is the alteration of the harmonic content of certain of Cone's segments. Firstly the melodic material occurring two bars before [2], Cone's 'X motive', and the subsequent appearances of the motive in his sketch are not relevant to the my analysis and are also eliminated. The passage at [46-56] undergoes a considerable transformation. Cone divides this passage into a number of smaller segments on the basis that new motives are used. For prolongational purposes, this passage contains relatively consistent harmonic and motivic contents. Despite its considerable length, [46-56] is a single X-level group.

Accepting these alterations, the following analytical assumptions must be acknowledged. Cone's analysis is to be treated as representative of a time span reduction level that has already reduced away lower order time spans. It will be referred to as time span reduction level X. It will also be assumed that the contents of each X-level time span segment are the most salient within that time span. Finally it will be assumed that grouping structure reveals that each X-level time span forms a single group.

The Analytical Process

The aim of the analytical process is to adhere as closely as possible to the approach presented by Lerdahl. The first step in the creation of a prolongational structure is the establishment of a grouping structure. In a work such as *Symphonies* that consists of reiterated musical fragments in a somewhat irregular order, it is difficult to see how the grouping rules apply. Lerdahl and Jackendoff specify three grouping 'Preference rules' that apply particularly to larger groupings.[29] Preference rule 4 states that when textural contrasts, such as of register, dynamic or articulation, are pronounced, then larger boundaries can be formed. In *Symphonies*, this rule is of little use because from X-level grouping and above, virtually all boundaries involve pronounced textural contrast. With two notable exceptions (the first and last X-level time spans) each X-level time span is surrounded by strongly contrasting material. It would be a spurious exercise to attempt to group the work further on the basis of this information. Preference rule 5 states that groupings close to symmetry are preferred. Two immediate problems occur with the use of this rule in relation to *Symphonies*. The music, in the X-level time span reduction, actually consists of passages of very different durations. This makes symmetrical relationships difficult to establish. Additionally, as the X-level time span reduction illustrates, the fragments of *Symphonies* are organised in an irregular manner that does not lend itself to symmetrical division. Finally Preference rule 6 prefers parallel structures to be organised into parallel groups. This at face value appears to offer hope in creating a grouping structure, because there are various parallel structures in the X-level time span reduction of *Symphonies*. Once again however the fragmentation of the material and the apparently arbitrary ordering of the fragments

[29]Lerdahl, F & Jackendoff, R. *A Generative Theory of Tonal Music* (Cambridge: The MIT Press 1983).

renders the rule almost meaningless. There are many possible parallel structures, but at this point there is no way to distinguish which should be given priority in defining grouping structure.

The conclusion reached is that particular characteristics of *Symphonies* make it resistant to Lerdahlian grouping rules above the X-level. More information is required before judgements concerning grouping based on textural contrast and parallel structures can be made. However it is possible to determine certain grouping structures at the highest levels. The following discussion explains that the presence of exceptionally strong parallel structures and pronounced contrasts of texture allows the formationof grouping levels A-D.

Grouping Structure Levels A-D

The grouping structure divides the X-level reduction into five groups at level D. The first three groups were defined on the strength of the parallel between the opening motive of each group. The second and third groups begin with the successive transpositions (respectively X time spans 9 and 26+) of the opening phrase. The fourth D-level group is selected both because of clear contextual boundaries and parallels of structure. The textural boundaries are created by the material that ends the third D-level group, which emphasises material in a high register (containing the highest pitch in the whole work), and the opening of the fourth group which is in a relatively low register. In agreement with Preference rule 4, this pronounced textural distinction allows the formation of a larger grouping boundary. Furthermore, the contents of X time span 42 are motivically similar to the opening X time span of the first group. The fifth group is distinguished by parallels with the fourth group. The boundary between the fourth and fifth groups exhibits the same contrasting motivic

fragments as the boundary between the third and fourth groups. The strength of this parallel, along with the registral contrast defines the fourth and fifth grouping boundaries.

The C level grouping divides the work into three segments. This grouping is chosen as it presents X time spans 0 and 42 in parallel positions at the opening of each group. Furthermore, it identifies the most pronounced textural boundaries. B and A level groupings complete the structure.

Despite the four high level grouping layers, the lack of any grouping structures to link level D with level X creates difficulties in the reductional process. Because of the lack of grouping structures between level X and the level A-D, it is not possible to perform a step-by-step time span reduction, in which the less salient material within a time span (defined by the successive layers of grouping structure) is reduced away. Instead it is necessary to establish the relative salience of the X-level time spans in a single step. The lack of grouping structure does not however mean that a 'salience free-for-all' must necessarily ensue. Each salience condition is described by Lerdahl as relative; this means relative to adjacent time spans at any reductive level. Without the boundaries provided by grouping structure, the rules concerning reduction must be relaxed so that, according to salience conditions, time-spans are compared to either adjacent time span. This rule is necessary to avoid neighbouring X-level time spans, all of which may be salient relative to other time spans in general, from progressing too far in the prolongational reduction. This would cause problems of 'crossing branches' which are strictly forbidden. A real example of this problem, concerning the opening two X-level time spans of the work, will be described later. So a more intuitive approach to the time span reduction is required because of the lack of grouping structure. Furthermore, the reduction deliberately takes account of prolongational issues, and is therefore translated directly into a prolongational tree analysis.

In summary, a collapsed version of the Lerdahlian process is used; without a clear grouping structure, time span reduction and prolongational reduction are compressed into a single action. Analytical decisions take account of both relative salience but also pitch information. Therefore layers of progressive reduction are omitted from the analytical sketch; the prolongational tree analysis is used to reveal the results of this single analytical leap.

Prolongational Tree Analysis

Using the X-level time-span segmentation, a reduction is achieved in accordance with Lerdahl's salience conditions.[30] At a global level, conditions H, I and J are highlighted as being of greatest importance. Condition I, which relates to proximity to large grouping boundaries, is valuable only when the grouping levels A-D are involved. Conditions H and J, referring to motivic content and parallel structures are therefore particularly important. This aspect of the reduction fulfils the methodological requirements of the time span reduction specified by Lerdahl.

In addition to the relative salience of each time span, various pitch connections influence the reductive process and the formation of the prolongational tree. Pitch connections are identified by Lerdahl as an important consideration in the prolongational reduction. Because of the collapsing of the analytical method into this single reductive step, it is necessary to incorporate both the elements of time span and prolongational reduction in to the reductive process.

The prolongational tree analysis contains a large quantity of information about the structure of *Symphonies*, and it is not the aim of this discussion to explain every detail. However, the

[30]Lerdahl, F. (1988), p. 73.

lack of time span reduction means there is no visible explanation for how the analytical process progressed from the X-level time span reduction to the final prolongational tree. Therefore the deliberation of the analysis includes explanations and evidence of the reasons behind major analytical decisions. For convenience, this material will be divided into three sections, successively covering the large prolongational areas of time spans 0 to 42, 42 to 71 and 71 to 75. Prior to this, the reasoning behind the highest, global prolongational decisions made will be given, and the analytical insights they contain are revealed.

Global prolongational decisions

At the higher levels of the prolongational analysis, time spans are all notably salient. Hierarchy amongst them is therefore distinguished more on the basis of pitch content; such evidence is presented here. The two most important X time spans in the prolongational tree are the first and the last. Despite certain similarities between these X time spans (namely the triad G-B-D presented at identical register) there are significant differences in pitch content which identify the prolongational connection between the two time spans as a progression. These include an alteration in the bass, and a change from the octatonic sonority of the opening to a diatonic sonority at the close (the exact details of these harmonic features are not, at this point, necessary, but will be developed elsewhere in the analysis). Although the interpretation of progression is correct, the motivic importance of the final time span is inadequately represented by the prolongational tree; there are more substantial motivic connections than are represented by a mere progression. The selection of the final X time span as the prolongational head seems intuitively correct. Its position at the end of the work (and therefore at the boundary of the final group) accentuates its

salience. It embraces the sonority of the final passage and contains the lowest stable bass part.

X time span 42 is heard as a weak prolongation of the opening time span. Prolongational type is decided by pitch and pitch sets. X time span 42 is headed by the same G B D triad as the opening time span and also four of its five pitch classes with the opening time span. The branch to X time span 26 indicates that the opening time span is strongly prolonged by direct repetition (although in transposition as is shown by the parentheses). The step between these time spans is filled by a further transposition of the opening in X time span 9. The relative salience of these transpositions at [9] and [26] is an important distinction for the prolongational analysis. Their identical motivic content (and therefore similar register, dynamics and durations) makes such a distinction difficult. X time span 26 is however a strong prolongation of the opening X time span. It contains three pitches in common with the opening X time span and it refers to the same octatonic collection. Additionally, X time span 26 is relatively close to the large grouping structure boundary at rehearsal number 42. Therefore X time span 9, which shares few common pitches with the opening time span, is less important in prolongational terms than X time span 26.

A questionable decision concerning branch direction must be made in respect to time span 9. This time span could be viewed either as right branching departure from X time span 0 or as a left branching return to X time span 26. The prolongational tree shows X time span 9 as a left branching strong prolongation of X time span 26 branch. This branch direction is selected because of the brevity of X time span 9 and connected prolongational material. Intuitively, X time span 9 is heard as a brief step en route to X time span 26.

Retrospective Reinterpretation[31]

One particular difficulty with the Lerdahlian prolongational tree analysis has arisen that has previously escaped criticism. Despite Lerdahl's aim to produce a flexible and abstract analytical method able to embrace the diversity of non-tonal music, he still clings tightly to a 'traditional' understanding of musical structure; that of structural closure. Prolongational trees can only reveal a single hierarchical understanding of the music. This does not sufficiently take into account the complexities of understanding the musical surface of *Symphonies*. (It is vital to note that these complexities of understanding the music are not to be equated simply with the different analytical readings of the work that may be achieved by separate individuals.) Lerdahl's trees are unable to show any more than a single hierarchical structure because of the rule that prevents crossing branches. Furthermore, Lerdahl's analytical approach strongly favours immediate effect of the musical surface, often at the expense of what may be termed as 'retrospective understanding'. This bias is seen in all levels of the methodology. For example, grouping preference rules allow a single grouping structure, not allowing for dual interpretation (this possibility is allowed in Cooper and Meyer's rhythmic analysis in which both immediate and retrospective interpretations are shown as interlocking parts of a single grouping structure.[32]) Grouping preference rules are largely weighted in favour of immediate surface level interpretation. The salience conditions, integral to the reductive process, show a similar trend; conditions A-G are wholly concerned with comparison of immediately neighbouring time spans. The conditions that redeem Lerdahl from a dangerously short term analytical understanding are

[31] 'Retrospective reinterpretation' of prolongational structure is not a formal part of the Lerdahlian approach. Additionally, the term 'retrospective reinterpretation' is not Lerdahlian jargon.

[32] Cooper, G. & Meyer, L. *The Rhythmic Structure of Music* (Chicago: University of Chicago Press, 1960).

those concerning parallelism. Unlike others, the condition of parallelism is not defined as relative to neighbouring time spans. Instead parallel connections can operate over the length of a work. Prolongational trees are able to illustrate such long range connections as long as they are largely in accordance with time span reduction. If parallel structures are either at odds with the salience results, or if there is more than one set of parallel structures, one type of prolongational feature must be preferred at the expense of the others. In the case of *Symphonies*, this strict hierarchical approach leads to important structural connections being lost or relegated. It is not, however, being advocated that a 'Krameresque' moment form, in which various parallel structures occur side by side, is to be represented. Instead an extra prolongational branch has been added to the analytical tree. The analytical insights of this additional branch should not be considered as an alternative analysis of *Symphonies*. It shows parallel connections which simultaneously occur at a high structural level in *Symphonies*, but the importance of which, as I will demonstrate, is only understood retrospectively. Additionally, although this branch indicates an alternative reading of the high structural levels of the music, it is not a complete analysis of prolongation. Prolongational connections to this retrospective analysis do not always make sense, and thus should be avoided

The 'added' dotted branch from X time span 1 connects to X time span 42 and from there to the final time span. It should be noted that the retrospective interpretation branch, from time spans 42 and 1, bypasses the branch from time span 0; the opening time span does not form part of this alternative reading of the structure of *Symphonies*. This is why the branch from time span 42 deviates from a straight path, so that it is directly connected to the final time span. This analytical interpretation again shows the final time span as the

prolongational head of the work. However, time span 42 is selected as the prolongationally next most important time span, and time span 1 as the following.

X time span 42 is connected to the final time span as a specific case of a left branching weak prolongation, although this was a most difficult decision. On one hand, the argument in favour of connecting time span 42 to the final time span as a progression is that substantial pitch differences occur between the two time spans. Notably X time span 42 is drawn from an octatonic collection whereas the final time span is drawn from a diatonic collection. On the other hand the existence of the triad G-B-D in both time spans emphasises a weak prolongational connection. Perhaps of greater importance of motivic and textural connections between the time spans. X time spans 1, 42 and 75 (the final time span) show clear and distinguishing similarities. All are chordal and largely homorhythmic (X time span 42 contains a minor exception to this). All three display slow harmonic motion, via chords mainly consisting of five pitch classes. The conclusion reached is that time span 42 is a retrospective weak prolongation.

In the immediate context of X time spans 0 and 2, X time span 1 is relatively less salient (as was discovered in the original analysis). Despite this, it is still notably salient because of its low registral position and high density. Most importantly for this retrospective analysis, X time span 1 displays extremely strong motivic connections to X time span 42 in terms of pitch content and chord shape (X time span 42 is a direct transposition of the chord shape of X time span 1). Viewed retrospectively, this strong motivic connection proves the salience of X time span 1. This time span is however shown as less salient than X time span 42 and is connected as a strong left prolongation. This is for two reasons. Firstly, the immediate salience must still be considered; X time span 42 is more salient within its context than X

time span 1. Secondly, the connection of X time span 42 to the final time span of the work is most important.

In summary, there is a second element to the prolongational structure whose importance can only be understood in retrospect. As indicated by the analysis, this reinterprets elements of the highest structural levels of *Symphonies*. One feature of this retrospective interpretation and its relationship to the original analysis of the music deserves further comment. The original analysis highlights the immediate importance of the opening time span in the prolongational structure. The retrospective analysis highlights that the second time span, time span 1, is of prolongational importance. Thus a further element of opposition between the opening two time spans is discerned. The balance of their prolongational importance is altered over the course of the work. The immediate salience of the opening time span identifies it as prolongationally important, and this is reinforced by its subsequent transpositions. However, at [42], motivic connections begin to reveal the structural function of time span 1. At the end of the music, the motivic importance of time span 1 is confirmed, whereas the opening time span is largely unimportant. This complex element of the structure is analytically fascinating

Prolongational Analysis: time spans 0-42

Having established the salience of the opening X time span on grounds of dynamics, timbral prominence, high register and proximity to a large grouping boundary (namely the beginning of the work) X time span 1 is necessarily treated as less salient. This is in spite of, rather than because of, its individual salience characteristics. Although notably dense, in a low registral position, and containing motivic connections to the opening (of pitch class and chord shape), X time span 1 is less salient than the opening X time span, and is

therefore reduced away and is given a lower order of prolongational branch. X time span 3, although prominent because of unusual timbre and high registral position, is neither long enough in duration or, at this point, motivically significant enough to be treated as important in prolongational terms. Pitch similarities connect X time span 3 as a right branching weak prolongation of X time span 2 (both contain the fifth G-D at the same relatively high register). Therefore, the opening prolongational region, covering time-spans 0 to 5, is valuable in revealing a parallel relationship; X time span 1 branches from X time span 0 as a strong prolongation, and X time span 4 similarly branches from X time span 2. X time span 3 is a minor insertion into the parallels of this structure.

Having established the salience of time span 9 on the grounds of motivic parallel, neighbouring material is necessarily heard as less salient. X time span 6 and X time span 8 prepare for X time span 9 by exhibiting significant pitch connections and are therefore branched as left prolongations. X time span 6 as shown in the reduction, centres around the fourth D flat-G flat whereas X time span 8 contains their enharmonic equivalents C sharp and F sharp. This fourth becomes the fifth G flat-D flat in X time span 9 on the strength of these pitch connections, the weak prolongational branch type is chosen. X time span 6 is more salient than X time span 8; it is relatively longer in duration, contains pitches of a more extreme register (X time span 8 pitches exist within the narrow register of a fifth except for the lowest accompaniment voice). X time span 6 also reaches up to the D flat in the same high register as is heard in X time span 9. These are considered sufficient salience features to override the importance of X time span 8's proximity to the level D grouping boundary.

The salience of X time span 26 is created by strong motivic connections with the opening time-span. Similarly to X time span 9, it is preceded by left branching connections which

introduce key pitch classes in advance of X time span 26. X time span 15 is selected as salient although, perhaps surprisingly, not because of the long duration of the passage represented by the time span. Although X time span 15 represents a passage of approximately 54 bars in length, the general lack of motivic or harmonic change diminishes the impact of its duration. Salience is established by the motivic importance of the triadic content (E-G-B and E-G sharp-B) presented at the opening of the time span, and by the proximity to a D-level grouping boundary. A weak prolongational connection to X time span 26 is selected because of the prominent use of the fifth E-B in X time span 15 ; these pitches are also prominent the opening of X time span 26. X time span 11 is less salient than X time span 15 because it lacks the motivic connection of triadic content and is further from a grouping boundary. The use of the pitch B in the high register (as is heard in X time span 26) is significant, but pitch similarities are not enough for any branch connection other than progression to be shown.

This reading of the prolongational areas surrounding X time span 9 and X time span 26 is particularly valuable because it reveals further structural parallels. Both display left branching weak prolongations (to X time span 6 and X time span 15 respectively) to time spans containing significant pitches used at the opening of X time span 9 and X time span 26. Both of these left branching prolongations are themselves prolonged; notably both prolongational regions begin (at X time span 6-2 and 11-1) with similar motivic material containing a stepwise descent. Thus the prolongational tree reveals that although the motivic content of the time spans surrounding X time span 9 and X time span 26 differ significantly, there are clear parallels in their prolongational structure.

X time span 26 is prolonged by two repeats at X time span 38- and 39. Of these, the second is adjudged more salient because of its proximity to a C-level grouping boundary. Also it is

of longer duration than the particularly brief X time span 38-; it may be noted that, in duration and motive, X time span 39 is identical to the opening time span of the work. Therefore X time span 39 branches as a strong right prolongation from X time span 26; X time span 38- is a strong left prolongation of X time span 39. The effect of this analysis is to show significant, strong prolongational connections and therefore to treat intervening time spans as less salient.

X time span 40 is a weak right prolongation of X time span 39; the salience of X time span 40 is reflected in its raised branch level. Proximity to the C-level grouping boundary and a parallel with the prolongationally important X time span 6 enhance the salience of the time span. In particular the parallel with X time span 6 encourages a parallel of branch level.

Prolongational Analysis: time spans 42-71

Having established the salience of X time span 42 in terms of motivic connection, proximity to C-level grouping boundaries and parallel structures, strong prolongational branches to X time spans 56 and 65, and from there to X time span 69, reveal direct repetitions. X time span 65 is more salient than X time span 56 and X time span 69 for three reasons. It is firstly relatively long in duration compared with X time span 56 and X time span 69; in fact, it is the longest version of this motive in the whole work. Secondly, it contains a stronger motivic link with X time span 42, as it includes a second motivic element present at X time span 42 but notably absent from X time span 56 and X time span 69. Thirdly, there is a notable parallel between the material preceding X time span 42 and X time span 65. The same motivic material occurs before both these time spans, emphasising that X time span 65 also has a structural role. This allows a retrospectively revealed parallel grouping to be formed thus strengthening the salience of X time span 65.

The important passage represented by X time span 46 is a right branching progression from X time span 42. Despite an almost complete lack of motivic connection (including pitch class connections) X time span 46 is given a relatively high branch level. This is because the passage contains unusually salient material, at a local level. X time span 46 is relatively loud; with full orchestral scoring and fortissimo dynamic markings, it is the loudest passage of the work. It is relatively prominent timbrally (notably influenced by tuba and bassoon in a low register and powerful brass at [54-56]). Both extremes of register and density, enhanced by a high tempo marking, affect the salience. Finally, the long duration of this time span, 51 bars, is not insignificant. However, strong prolongational connections between X time span 42 and its subsequent repeats force X time span 46 to remain only of middle order prolongational importance.

This analysis is unsatisfactory in certain respects for it under-represents the importance of the salient and long X time span 46. Furthermore, certain localised prolongations of X time span 46 are not suitably revealed in the global analysis; the strong prolongations of X time span 42 'hem in' X time span 46, and any such localised prolongations of it would result in crossing branches (which are, of course, strictly prohibited).

This prompts an alternative local analysis, revealing the importance of X time span 46, as follows; X time span 46 is sufficiently salient for it to be considered locally more important than the reiteration of X time span 42 that occurs at [56]. With X time span 56 given lower prolongational importance, the analysis is able to reveal strong, although localised, prolongational connections. Thus, X time span 46 is a progression from 42. X time span 46 is prolonged by X time span 58, a right weak prolongation that displays considerable motivic connections. These motivic connections are almost sufficient for consideration to be given to a strong prolongational connection; however, some motivic alterations and a

lack of clear pitch connection clarifies the selection of a weak branch connection. A left branching weak prolongation is similarly selected for X time span 44. The effect of these prolongational branches is that X time span 56 is shown as a local progression. In turn this affects the analysis of the final section of the work as I will explain.

Prolongational Analysis: time spans 71-75

The final prolongational region is dominated by X time span 74, the prolongational head of the tree analysis. The prolongational region begins with X time span 71. Motivic elements including pitch (it is headed by the triad G-B-D) and the chordal texture and slow harmonic motion make X time span 71 relatively salient; but they do not explain why it is a left prolongation of X time span 74 rather than a right prolongation of X time span 42. This decision is based on pitch content; not only does X time span 71 have most of its pitches in common with X time span 74, but it is also drawn from the same diatonic collection. X time span 42, as has been established is drawn from an octatonic collection. The branch type of X time span 71 is a strong prolongation although this requires further explanation. Although X time span 71 is not a direct repetition of X time span 74, it contains substantial pitch connections, close similarities of chord shape and relationships of slow harmonic motion of a chordal motive. Therefore X time span 71 is shown as a special case of a 'weakened' strong prolongation, as is indicted in the tree analysis by parentheses. Retrospectively, it is now possible to show a grouping structure for this prolongational region, with the final D-level group beginning at X time span 71.

The alternative analysis of the prolongational region surrounding X time span 46 greatly affects the understanding of the final prolongational area. The comparative weakness of X time span 56, a local progression, allows the local prolongation to be dominated by X time

span 46. An additional value of this alternative analysis is that it is concordant with the grouping structure. From time span 65 to the end is identified as a single prolongational region. This passage is also a single C-level group. Furthermore, the passage [65] to the end is the section of *Symphonies* that Stravinsky composed prior to the rest of the work, as a discrete coherent composition. In summary, the alternative analysis successfully reveals local prolongational connections supported by the grouping structure, but this local approach is at the expense of strong motivic and parallel connections that occur at the global level.

To conclude this discussion of the prolongational analysis of *Symphonies*, I will reveal two characteristics of the work by comparing the analytical tree with Lerdahl and Jackendoff's examples of normative tonal trees.[33] It is worth clarifying that these normative analysis cannot be equated with a Schenkerian Ursatz; the Lerdahlian approach does not aim to reveal any particular prolongational structure. By comparing the *Symphonies* analysis with normative models, it is however possible to highlight the structural originality of the work.

The two characteristics to be revealed have a complementary relationship. The first is that there is no hierarchically significant right branching progression away from the opening time span. The two most important right branches are to X time span 42 (weak prolongation) and to X time span 26 (strong prolongation). There is, for instance, no passage analogous to the 'development' branch of a normative tonal sonata form tree. Secondly, the highest branch connection, between the first and last time spans, is a progression. These two characteristics illustrate a reversal of a standard structural organisation; instead of departure and return, *Symphonies* follows a course of progression

[33]Lerdahl, F & Jackendoff, R. *A Generative Theory of Tonal Music* (Cambridge: The MIT Press 1983).

across the work as a whole. This progression across the whole work also reflects the motion from the predominantly octatonic fragments to a wholly diatonic passage at the end of the work. This element of the structure may be interpreted as a resolution; the music 'resolves' from the octatonic areas to a diatonic conclusion. This important conclusion will be dealt with in greater detail in the harmonic reduction analysis.

However, the structure of *Symphonies* has also been shown to contain a structure of continuity across the whole work. The retrospective reinterpretation of the music revealed a strong prolongational connection between time span 1 and the final time span. This structural feature is a complex element of the music. It has been established that there is a progression over the course of the work; the retrospective analysis indicates a strong prolongation across the length of the work. Therefore the final time span is, paradoxically, a resolution for two seemingly contradictory reasons. It is the point of arrival in a progression from the material of the opening time span, but also the resolution, retrospectively, by prolongation of time span 1. It is analytically most interesting to discover that these two paradoxical structures stem from the opening conflict of the first two passages of *Symphonies*. Stravinsky's 'structural engineering' in *Symphonies* is clearly of the highest standard.

Part 3. Harmonic Reduction to Reveal Voice-leading Connections

In common with both Cone and Kramer, I find it necessary to include an analytical graph showing harmonic reduction allied to voice-leading connections in *Symphonies*. Unlike Cone, I will dedicate more space than a few brief comments and some sketched voice-leading steps. Unlike Kramer, I will show substantial connections between different 'moments' and some sort of voice-leading hierarchy. Following a discussion of my analytical approach, the discussion will focus on referential harmony, then on the main features of the graphs, dealing with each layer of reduction in turn.

Methodology and analytical technique

Resemblance of the layers of reduction to Schenkerian graphic analysis is superficial. Many of the illustrative tools of a Schenkerian analysis are used, but on the whole, the theories are adapted. This point is made to avoid the danger of reading Schenkerian 'insights' into a graph when they are not intended. In particular the graph does not intend to show prolongation in a Schenkerian sense for two clear reasons. Firstly, such revelations would be misleading; prolongation in *Symphonies* cannot easily be equated with prolongation in the traditional tonal sense, because of the non-tonal content and fragmented surface of the music. Secondly, the Lerdahlian prolongational tree analysis dealt largely with the questions of prolongation, and it is more valuable to touch upon new facets of the music. However, the analysis does not therefore follow Kramer's 'free-for-all' approach, in which any voice-leading connection is valid, even if overlapping and with no sense of hierarchy, and in which background harmonic reductions are realised purely because they

show valuable voice-leading, without any regard to the intuitive response to the musical surface.

A compromise between the Schenkerian and 'Krameresque' extremes has been chosen. The connections revealed balance the value of showing meaningful voice-leading with realistic intuitive response. In particular, pitches which are relatively prominent (in terms of register, instrumentation etc.) are generally selected; non-pitch connections such as clear motivic reference and textural (especially timbral connection) are central to such decisions. Additionally, the prominence of pitches in terms of pitch-class and set connections is considered. So although a hierarchy of selected pitches is created (which makes the tiers of reduction theoretically more plausible) they do not show prolongation so much as voice-leading dominance.

The first reductive level of the analytical sketch contains Roman numerals showing tonal progressions in the music. These must not be understood to simply show 'keys' or 'tonal chord progressions'.[34] The language of *Symphonies* is too advanced for it to be believed that a simplistic tonal interpretation can alone explain the music. Furthermore, the modality of many passages, in which definitive bass notes are often absent, makes a purely tonal view of the work difficult to substantiate. However, diatonic pitch-sets and tonal chord shapes abound in the music and they reveal new insights into the music. It is these pitch sets and chords to which the 'tonal' numerals refer. The criteria for showing such connections is comparable to the criteria for voice-leading connections. 'Tonal' connections must be analytically valuable, showing close connection rather than weak distant relationships. Furthermore, they must not compromise intuitive understanding of the music.

[34]Reference to the critique of Parks' analysis in Chapter 1, and his use of such vocabulary will reveal the approach used here.

In *Symphonies*, this generally means that when motivic connections, and parallels (which notably are both Lerdahlian salience conditions specified for global use) highlight a relationship between two passages, any underlying 'tonal' connections are revealed. The tonal relationships are also chosen for their strength and effect (namely dominant relations), and weak, distant tonal connections are dismissed.

Referential Harmonies

It is to be argued that the harmonic content of Symphonies is dominated by referential harmonies. Although the process of revealing harmonic and voice-leading layers in this analysis is largely reductive, rather than generative, the importance and clarity of these primary harmonies is significant enough for their position to be determined in a 'top-down' fashion. Originally, referential harmonies were determined on their own merits, independently of the harmonic reduction. However, these referential harmonies proved almost identical to the contents of the fourth and final layer of harmonic reduction. This discussion, taking account of the original top-down approach, will present reasons for the selection of referential harmonies and additionally some of the most significant relationships between them.

Thus this discussion is in two parts, the first showing why harmonies are deemed referential, the second revealing relationships connecting the harmonies. Harmonies described as referential must show a combination of characteristics. As a starting point, the conditions of relative salience revealed by Lerdahl identify immediately prominent material. Added to this is the factor of repetition of the harmony that reinforces its effect. (It may be noted at this point that repetition, an important strength of a referential harmony, is not one of Lerdahl's salience conditions. This is because Lerdahl dealt with time spans, individual

moments of time; here it is the general effect of harmonies over a period of time that are considered.) The relative 'quality' of the presentation of the harmony is also taken into account; it will be found that all but one of the referential harmonies is heard clearly and distinct from other harmonies. The referential harmonies are heard in 'clean' passages that do not contain any extraneous notes. In addition to these characteristics, it will be shown that the close relationships occurring between the referential harmonies confirms their selection. In total, seven harmonies have been selected. They will be referred to by the rehearsal number of the passage in which they are first heard.

Referential harmony 0 is first heard between [0-1]. Its salience is gained from being the opening material of the work and is strengthened by direct repetition at [2]. Harmony 0 does not include the high E found in bar 6 of the clarinet part. It is notable that there is no E in the original motivic statement in bars [1-3] of the passage; the E is heard as an upper neighbour-note of the clarinet D and therefore is not included in the referential harmony. Harmony 1 is first heard between [1-2] (the short motive in bars 5 and 6 of [1] is a separate phrase and is not included in this harmony). Harmony 1 is repeated at [4]. The passage gains salience because of its low register and density. All the pitches of the chord at 1 are included in the referential harmony. Harmonies 9 and 26 are the successive transpositions of harmony 0. They therefore share its salience and also serve to reinforce the importance of one another. It is valuable to note that referential harmony 9 itself is not repeated whereas referential harmony 26 is repeated on three occasions.

Referential harmony 42 is first heard in the first three bars of [42]. The C and A flat lower neighbour notes of the motive are not included in the referential harmony, as they are brief and always resolve back to the fundamental harmony. Harmony 75 is the final chord of the whole work and contains no pitches other than those seen in the harmony.

The connections between these referential harmonies are shown in terms of sonority (taking account predominantly of chord shape), pitch similarity and membership of octatonic and diatonic pitch collections.

The sonority of referential harmony 0 is shared by harmonies 9 and 26, but the three harmonies are differentiated by pitch (referential harmony 0 is transposed down a semitone at 9 and a further tone at 26.) These closely related harmonies are taken from octatonic collections; 0 and 26 both refer to a single octatonic collection, 9 referring to a wholly separate collection. In a desperate bid to 'discover' the unifying force of *Symphonies* (which apparently is an octatonic collection) Taruskin[35] emphasises that the 'structural tones' of harmony 9 also refer to the same octatonic collection as harmonies 0 and 26. This unhelpful interpretation of the music misses the importance of the transposition; harmony 9 departs from the octatonic collection referred to at the opening, whereas harmony 26 returns to it. In total, the transposition from harmony 0 to 26 is a minor third.

A similar connection emerges between harmonies 1 and 42. Except for the two bassoon bass notes B flat and F at 1, these harmonies share the same harmony again separated by a minor third. Harmonies 0 and 1 share an interesting motivic element identified by Cone's analysis. Each contains the fourth F-B flat in the bass.

Within the referential harmonies a hierarchy exists. Harmonies 9 and 26 are straightforward transpositions of harmony 1, and are therefore deemed as less significant than the original. Referential harmony 54 is, as has been mentioned, of minor importance. Although 42 is a partial transposition of 1, both are significant at this level because they originate from different motivic material. The four basic harmonies are 0, 1, 42 and 75 show various

[35]Taruskin, R. *Stravinsky And The Russian Traditions* (California and Oxford: University of California Press, 1996), p. 1496.

significant relationships. Each is headed by a major triad. In harmonies 0, 42 and 75 the triad G-B-D is present. The first and last harmonies present this triad at the same octave register; 42 contains a triad an octave lower. This means that there is a resolution of sorts, in that the triad G-B-D is restored to its original position at 75 having been displaced by an octave at 42. Harmony 1 contains the triad B flat-D-F.

The first three basic harmonies all refer to a single octatonic collection. In fact their relationship is still closer than this; the three harmonies together share a total of only six pitches. Three pitches, D, F and B are present on all three occasions. Three pitches, G, A flat and B flat occur in a neat rotation in two out of three harmonies; namely there is no A flat in harmony 0, no G in 1 and no B flat in 42. By contrast, harmony 75 is drawn from a diatonic collection.

The relationship of the first and last harmonies, notably the G triad at the same register indicates a degree of resolution occurring over the course of the work. The descending transpositions of harmony 0 at [9] and [26], and the change from the octatonic based harmonies of [0], [1] and [42] to the diatonic of [75] reveals harmonic progression. These two effects are conflicting in that *Symphonies* is partially open-ended and partially concluded. Subtleties of this sort show the complexities of the music, and will also be seen at lower levels of the harmonic reduction.

Two features revealed in the music saturate the analysis; the relationship of a third, and the interval of a fifth (and its inversion of a fourth). Each feature relates primarily to one aspect of the music. Third relationships are generally linear, melodic and revealed in voice-leading. Fifths (and fourths) are predominantly vertical, harmonic and revealed by harmonic reduction. These two issues are central to the discussion of the reductive graphs.

i. Harmonic Tension and Resolution

The analysis reveals a relatively clear relationship between the role of the intervals of a fifth and of a fourth. Fifths, whether in the treble or bass register are relatively more consonant than fourths. The opening passage [0] contains both a fifth G-D in the treble and fourth F-B flat in the bass. The G-D fifth is stable and the F-B flat fourth relatively less stable. This is also the traditional tonal interpretation, which also understands fifth as a more consonant interval than the fourth. Whether or not this distinction is immediately clear in the music is difficult to establish. However the music quickly establishes its own rules of grammar, this being one of the most important.

It was discussed in the prolongational analysis that the passage at [1] is of importance, particularly in the later stages of the work. Such an interpretation is underpinned by the fact that it contains a fifth B-F and fourth in the bass F flat-B flat. Purely in terms of these two intervals, the passage is as stable as the opening passage at [0].

Both Kramer and Cone noted that [3] is motivically significant. Cone mentions that it encapsulates the background progression in the work (which occurs in parallel fifths) and also points to foreground motivic connections in later passages. The significance of this tiny fragment is underpinned by its harmonic intervals; consisting of a series of parallel fifths, it is particularly stable.

The most impressive use of this comparative intervallic stability occurs before each transposition of the opening passage. In the first transposition, at [9], the fifth G flat-D flat in the treble is relative stability. [9] is prepared by the passage [6-9] which is dominated by the less stable D flat-G flat fourth (reinterpreted at 8 as C sharp-F sharp). There is therefore a resolution effect from the relatively unstable fourth, inverted into a more stable fifth at [9]. The short passage before [6], described by Cone correctly as a join in the voice-leading

now reveals a far more important purpose than previously understood. The descent of the fifths F-C and E flat-B flat before [6] is altered, so that the voice-leading ends on the fourth D flat-G flat' bypassing the melodic step to A flat. In this short passage, the music moves from the consonant interval of a fifth (which has dominated the treble register up to this point) to a less stable fourth. The passage therefore links not only voice-leading but also is a point of transition, preparing the interval of a fourth for the passage [6-9].

This voice-leading method is used again between [11-26]. At [26], the opening motive is transposed for the second and final time, with the stable fifth E-B in the treble register. This is prepared by the less stable fourth F sharp-B at [11], which is itself decorated by double upper neighbour note G sharp-C sharp at [14]. At [15], it appears that the E-B fifth has arrived, but the fifth is presented melodically in the passage, in a contrapuntal passage. It is therefore not stabilised as a vertical, harmonic interval. This is reflected in the descending passage immediately before the return of the opening sonority, at [26]. This re-inverts the E-B fifth, temporarily heard at [15], into a fourth. The B-E fourth is then inverted back to a stable E-B fifth in the reiteration of the opening motive. Once more it may be noted that the original voice-leading progression to a fourth occurs in a brief passage (just before 11) which connects the F sharp-C sharp fifth (an enharmonic equivalent of G flat-D flat fifth heard at [9]) to the F sharp-B fourth at [11].

The resolution effect in the treble register, from fourth to fifth, is accentuated by two further harmonic features in these examples. Firstly there is a 'resolution' from diatonic pitch collections to octatonic collections. The referential sonorities of [0, 9, and 26] are drawn from octatonic collections as has been established. Octatonic collections are therefore locally 'tonicised'. Before the transposition of the opening passage at [9], the pitches of [6-8] are drawn largely from diatonic collections. Similarly, prior to [26] the passages at [11]

and [15] show strong diatonic content. Because of the local tonicisation of octatonic collections, diatonic material [6-8] and [15-26] is less stable, and so a resolution of sorts occurs at [9] and [26].

Secondly, there are referential tonal V-I cadences marked on the sketch in this area, indicating that there are also resolutions of 'tonal' structures here. The triad at [9] (in the treble register) establishes a local G flat major sonority. In preparing this, the brief voice-leading link passage before (6) contains almost exclusively pitches of a D flat major scale, the dominant of G flat. This is reinforced by the D flat-A flat fifth that begins the passage at [6]. From [6-9], although the predominant diatonic collection is G flat major, the numeral V indicates that resolution has not yet occurred because of the presence of the unstable fourth in the treble register.

The E major triad at [26] establishes this sonority as the local tonal area. The G flat triad of [9] is connected to the E major sonority of [26] by reinterpreting it as an F sharp harmony, as occurs before [11]. It therefore acts as the dominant of the B major sonority heard in [11-14] which itself is the dominant of E sonority at [26]. The G flat sonority of [9] may therefore be interpreted as a secondary dominant, a V of V in the resolution to E major at [26]. Again the V area stretches across material containing E major material (15-26), indicating that the sonority has not yet resolved; only in the reiteration of the opening passage at [26] is the fifth presented in the treble register as a stable, verticalised interval.

A particularly clear example of the degrees of consonance of the harmonic fourth and fifth occurs between [37-39]. Both [37] and [39] contain the stable fifth E-B. The passage at [38] is motivically almost identical to the material heard between [8-9], but is transposed down one tone. This gives it the particular voice-leading properties, inverting the E-B fifth

to create less stability with the B-E fourth, which can then be resolved at back to a fifth at [39].

The final example is initiated by the brief passage before [40]. The sketch shows that the stable E-B fifth of [39] is linked with voice-leading steps to the fourth F-B flat which is transposed up an octave at [40] and again at [41]. This progression, from the relative stability of [39] to the unstable fourth at [40-42], is of structural significance; the passage prepares for the arrival of an important sonority at [42].

At [42], the second 'major referential sonority', a G major triad present in the treble register includes the fifth G-D. This provides the resolution of the fourth F-B flat that was built up across three octaves between [39-42]. This means there is strong resolution effect at [42].

The main harmonic motion of the second half occurs because of the passage [46-56]. Within this passage, the D-A fifth is strongly tonicised, at the local level. This fifth is most clearly heard in the treble register at [54] in the most climactic passage of the whole work, a point of local stability. This stable fifth is prepared by its inversion; the fourth A-D is prominently heard in the motive at [46]. Within the sonority used at [51-54] there is both a fourth E-A and fifth A-E within the treble register. The fourth, in the extreme upper register, is most prominent, and this passage is therefore not a resolution to a fifth but a further preparation for [54-56].

In an earlier reference to [9] and [26], two harmonic features were seen to enhance the resolutions of the music. These were the use of diatonic and octatonic contrast, and tonal reference to dominant relationships. These apply equally in this passage. From the first occurrence of the motive at [42] to its reiteration at [56] (which are octatonic), there is a largely diatonic passage. This is then continued at [57-65] before it is truly resolved with a strong return to the octatonic motive at [65]. Once more then, there is a sense of 'departure'

from the predominant referential octatonic sonorities to diatonic areas, followed by a return to the octatonic area. Within this framework, there is also a network of 'tonal sonorities'. [42] contains the fifth G-D in the treble, as part of a G major triad. The most climactic passage of the diatonic passages, at [54-56] is dominated in the treble register by the fifth [D-A] which, in the local diatonic context, may be heard as part of a D sonority. This sonority is introduced just after [46] in a clear statement of the motivic fragment. The bass register of this passage shows a clear D natural bass (supporting the D sonority) that is set off against a D flat-A flat fifth. At [48] the fifth A-E becomes increasingly important and this is confirmed at [51]. The A-E sonority is strong in the upper register, and is itself set off against a A flat-E flat fifth in the bass register. The following passage, [54], reaffirms the D sonority. The sense of harmonic departure is clearly established by the pitch content at [46]; the departure from G sonority to the 'dominant' D sonority is reinforced by the pitch content of the melodic voice (oboe and cor anglais). They contain a six note diatonic set, the only note of the scale missing being G. Similarly at [48], the departure from the D area to its own 'dominant' A sonority is marked by a six note diatonic pitch set that lacks the note D. In other words, the local 'dominant' sonorities exclude the 'tonic' pitch from their harmonies': as a dominant to G, the D sonority excludes the pitch G: as a dominant to D, the A sonority excludes the pitch D. This use of pitch exclusion strengthens the sense of tonal 'departure' and therefore increases the effectiveness of return to these tonal areas.

In summary of these tonal relationships, the passage [42-56] contains a departure from the G major sonority of [42] to a D sonority at [46], a dominant relationship. This D sonority has its own dominant, the fifth A-E at [51]. The sense of return to D at [54] is reinforced by the climactic textural effect. The resolution from D sonority to G at 56 is temporary and

brief, only 4 bars in length. The following area lasts until [65], at which point the dominant D sonority is finally and conclusively resolved to a G sonority.

The final passage of the work, particularly from [71] to the end differs from the rest of the work and must be described in different terms. Most obviously, fragments are less starkly differentiated by textural contrasts. There is thus a greater sense of continuity. From [71] to the end, the music follows a course of harmonic motion towards a cadence (the final chord of the work). There is clear voice-leading which notably is uninterrupted by any contrasting motivic fragments. The harmony is diatonic, creating the characteristic Stravinskian 'white-note' sonority. There is also a notable saturation with fifths, the more stable interval Correspondingly, there is a distinct lack of fourths. The prevalence of fifths emphasises the great stability of this final passage.

The diatonic content of the final passage is reflected in 'tonal' harmonic structures. After the re-establishment of G major harmony in the treble at [65] and at [66], a 2-bar fragment concludes on a D-A fifth, hinting at a 'dominant' sonority. As occurred in previous dominant sonorities, the sound of the harmony is deliberately confused by Stravinsky. The D sonority is set against a chromatically 'shifted' bass note, C sharp. This similarity is particularly noteworthy. On each occasion that Stravinsky uses the very tonal characteristic of secondary dominant relationships, he obscures the tonal element of the sonority by adding pitches that are shifted by a semitone. It is as if the tonal relationship is hidden from view, yet still remains a structural feature. At [67], an A-E fifth emerges as a brief 'dominant', only to resolve back to D sonority. At [69] G triad returns and remains central until the end of the work. Thus there is an echo of the earlier 'dominant' and 'V of V' relationships that occurred in the first part of the piece and from [46].

Resolution of Referential Harmonies

It may have been noted that the content of the final chords has not been discussed in any great depth up to this point. They are to be discussed as part of the relationships between major referential sonorities, revealed in the final layer of harmonic reduction.

It has previously been stated that the referential harmony [0] contains both a relatively stable fifth (as part of a G triad) and a fourth (F-B flat). It can therefore be described as a partially stable sonority. As has been shown, this harmony is used repeatedly throughout the first part of the music, twice transposed. Harmony [42] again contains a fifth in the G triad. The bass register contains a diminished seventh chord, containing two diminished fifths. The diminished fifth is considered even less consonant and less stable than a fourth (and therefore also a perfect fifth). This again conforms to a 'tonal' understanding but also is revealed in the work. [42] is again only partially stable, and audibly less stable than [0] because of the diminished fifth content.

Resolution of these relatively unstable harmonies occurs at [71]; here the stable fifth of G triad is retained, but the unstable diminished fifth resolves to the fifth E-B. Eventually this harmony is extended downwards, at [75], to incorporate a C-G fifth. Thus the final chord contains three fifths, a clear symbolic gesture of stability and effective audible gesture of conclusion.

This interpretation is illuminating in that it indicates an increase in harmonic instability throughout the earlier part of the work; [0] is only partially stable, [42] is even less stable. The growth of instability, or in 'tonal' terminology, of tension, increases the effect of resolution at [71] and [75].

Previous explanations of this sense of resolution have highlighted the effect of tonal structures and the alternation between referential octatonic and diatonic areas. These two features continue to influence the music at the high reductive level.

The relationship between the first and last harmonies (notably the G major sonority of the first and the C major sonority of the last) has already proved the focus for discussion. Van den Toorn describes the final chord as a 'culminating tonic-like resolution on C'[36]. It may be noted that the resolution is on, not in, C. However Van den Toorn does not hear a dominant - tonic relationship between the sonorities. He notes that the sonorities are 'self enclosed'; by this he means that the opening sonority does not require resolution, but only retrospectively does this occur.

Confirming this view, I do not show a dominant-tonic relationship over the length of the work in the analytical sketch. However, although a traditional tonal relationship is not heard, (in retrospect, the relationship is stronger), the relative stability of the intervals of fifths, fourths and diminished fifth, which is established over the course of the music, may give indication of forthcoming resolution within the final section [65] to the end. The importance of the bass note C as a tonic is emphasised by the local tonal material; over the course of Symphonies, it is not inevitable that the music will resolve to a C sonority.

The second factor, the octatonic and diatonic opposition is a fundamental feature of the final reductive level. The referential harmonies [0] and [42], which dominate the music are both derived from an octatonic collection. Throughout the earlier parts of the music, one octatonic collection provides the predominant referential material. This is replaced in the final passage, [71] to the end, by diatonic material, culminating in the final diatonic sonority. I propose that the true resolution in the work is the resolution of octatonic

[36] Van den Toorn, P. (1988)

material to diatonic material. Such a conclusion is not reached by Cone or Kramer, because they concentrate more on the extent of the V-I connection. The octatonic to diatonic resolution cannot be interpreted as analogous to a V-I resolution.

It is important to ascertain why the diatonic area is more stable than the octatonic area, and hence why the work, to some extent, 'resolves'. A difficulty certainly arises in assessing whether the octatonic material implies or requires resolution. One argument is that the relative unfamiliarity of octatonic collections resolves to the familiar diatonic collections, which are therefore heard as more stable harmonies. The argument is particularly valuable in that octatonic and diatonic collections incorporate two important features of resolution as identified in the earlier discussion; the relative stability of fifths, diminished fifths and fourths and the tonal dominant relationships. Diatonic collections generally favour more consonant intervals in the music, and contain tonal chord shapes. Octatonic collections contain a diminished fifth or tritone partner for every note of the collection, and therefore do not contain the same degree of tonal chord shape. Therefore it is no surprise that the resolution of octatonic to diatonic areas is accompanied by the other simultaneous resolutions. I argue that these resolutions of fourths and diminished fifths into 'perfect' are the result of the higher structural resolution from octatonic to diatonic.

A second piece of evidence demonstrating the resolution achieved in the final passage is its harmonic 'cleanliness'. Almost without exception, the pitches used are from a C major scale without the addition of any 'chromatic' additions; truly a 'white note' collection. This is a rarity in the work. The only other important occasions in which such harmonic cleanliness (i.e. absence of any 'extra' notes, and the use of only a single identifiable and recognisable pitch collection) are in referential harmonies [0] (and its transpositions) and

[42] (and its reiterations). However, the final passage is easily the longest passage of such characteristic harmonic content.

In summary, there is a resolution of sorts in the passage [71] to the end; this is effected by the move from octatonic areas to diatonic, by moving from less stable intervals of fourths and diminished fifths to a sonority dominated by fifths, from some rich sonorities to a 'clean' sonority. Of course, the tonal relationships of V-I, from G to C over the whole work is also a contributory factor. All of these features play a role in the resolution at the end of the work.

However, there are further elements to the resolution, as identified by Cone. He hears the final descent in the bass from E to C as a completion of an earlier step of the opening passage from G triad to E triad. This relationship in terms of relationships of thirds forms the second section of this discussion.

ii. Relationships of Thirds

'Third relationships' saturate the music, at all levels of harmonic reduction. At the background level, Cone identifies the transposition of the opening sonority at [9] and subsequently [26] spanning a minor third (the reduction shows the triad G-B-D descending to G flat-B flat-D flat and concluding at E-G-B, with bass notes stepping from F to E to D (this is illustrated in the fourth layer of my harmonic reduction). Kramer adds that the chord at [42] is, in fact, a transposition down a minor third of the chord first heard at [1]. The importance of these revelations will be discussed in due course. Lower reductive levels also contain relationships of thirds. This discussion will identify some of the fundamental and also more subtle connections.

The opening passage of any composition may be used as an opportunity to present certain central ideas of the music. This undoubtedly is the case in *Symphonies*, as the opening 6-bar passage reveals a complex system of thirds. The high D of the clarinet motives is encircled by minor thirds; it descends in bar 3 to B, and ascends in bar 5 to F. Bar 3 also contains a B flat from the trumpet, adding a major third interval from D (compounded with an octave). The lower note of the triad, G (in clarinet III part) also has third relations; it is the only pitch sounding in bar 3 along with B natural and B flat, thus adding two more third relationships. A third relationship between treble and bass parts also occurs. The G major triad of the treble is heard against the fourth F-B flat, part of a B flat element in the sonority ; in fact the total pitch content of the opening passage can be interpreted as G major triad and B flat major triad. This is an example of third relationships in the harmonic construction of the music.

It may be noted through the discussion that the term 'third' will be used to cover major and minor thirds, without particular discrimination. As this above passage shows, the well known Stravinskian major-minor mix of thirds occurs frequently in the work. [37]

The opening two passages, at [0-1] and [1-2] have already been frequently highlighted as providing an important contrast of textures, and motives that dominate the main body of *Symphonies*. Also they present a crucial third relationship that has repercussions throughout the music. The opening G triad of [0-1] is replaced at [1-2] by a B flat major triad, a major sixth below. This may reasonably be interpreted as an inverted third relationship. This is an interesting example of third connections between neighbouring motivic fragments.

Thus the opening two passages establish the opposing forces of the dyad G to B flat. The second layer of harmonic reduction shows the continuing importance of this opposition, as

[37] The music frequently combines these intervals: therefore so does my terminology .

it appears at both the consequent important structural divisions. At [42] the G triad is re-established in the treble register; notably, in the final passage before [42], the fourth F-B flat, implying the B flat sonority, is heard at three different octaves, culminating in the highest registral passage of the whole work. The opposition of the dyad is used as a type of cadence, from B flat resolving to G. It is notable that voice-leading in the following passage emphasises the pitches B flat and F once again.

The passage at [65] has been determined as the beginning of the final area of the music, and it once more presents the G major triad. Immediately before [65], the F-B flat fourth is again used, as a melodic interval in the flute part. The presentation of this particular motive at this particular pitch is not accidental; the motive has previously just been used at [57] at a different pitch, but is deliberately transposed to create the B flat-G opposition around the important division of [65].

Given particular attention by Cone, the short passage at [3] has been seen to contain a third relationship that refers to the background voice-leading. The descent of a third, expressed in fifths, from G-D via F sharp-C sharp to E-B reflects the transposition of the opening passage [0] at [9] and [26]. With the attention and comments Cone allows for this passage it is perhaps surprising that he does not mention a contrasting counterpart to this motive, occurring at [68]. [68] shows remarkable 'circumstantial' similarities to [3]; each is in a high registral position, utilizes the prominent timbre of oboe and cor anglais, but most importantly, each contains a melodic progression of a minor third by step, expressed in parallel fifths. A less obvious but fundamental clue to this connection is that each passage is situated within the local boundaries of the two most important passages of the music, the opening passage and the final passage. (The opening passage repeats material until two before [6]; the final passage of the work has been identified as starting at [65].) These clear

similarities point to some connection between the passages, but it is the differences which are most illustrative. In particular, the slow tempo and sustained notes of [68] is indicative of the final passage as a whole, whereas [3] shows contrasting high tempo. Additionally the motion at [3] begins from the G-D fifth, whereas at [68] it begins at D-A fifth, a fifth away. Most important is the direction of the motion of a third. As has been established, at [3], the descent of the parallel fifths indicates the forthcoming descent of the material at [9] and [26]. Similarly the ascent of a third at [68] may be seen to indicate the forthcoming ascent of a third that concludes the work, from [74] to the end. In both passages, the thirds motivically indicate an essence of forthcoming material.

Two further points must be made concerning these passages. Firstly, the connection between these must not be over exaggerated: Stravinsky rarely uses simple structures such as a 'pair of motives'. Although they show enough similarities to connect them, they cannot be 'twinned' as such. In particular, the descent of a third at [3] indicates the precise pitches of the structural descent of the opening motive at [0], [9] and [26]. The ascent of a third at [68] from A to C does not indicate the actual pitches of the final ascent, from B to D.

Secondly, as has been established here, the passages predominantly have a motivic function. Their effects in the voice-leading should reflect this and their importance in voice-leading terms not overestimated. I believe that both Cone and Kramer (although in very different ways) are mistaken in there voice-leading connections of the passages at [3] and [68]. Both seem to ignore the foreground descent of the motive at [3] which is clearly audible. But it is also overshadowed by the subsequent material at [4]; the descent at [3] is therefore not important in the subsequent reductional levels. Both Kramer and Cone connect the registrally high fifth at [68] to the final ascent at [74]. In Kramer's voice-leading such a

connection can easily and lightly be dismissed: he shows so many simultaneous voice-leading connections (some of which are spurious) without claiming that any dominate the music. Therefore his analysis may be seen as just one more possible connection. Cone's more discerning voice-leading choice is problematic. His graph is, however, designed as an illuminating guide to the work. It must be assumed that he shows this voice connection as an interesting feature; for surely it cannot be argued that a five-bar passage of relatively new material can dominate the voice-leading until [74], despite the register and timbre. The passage at [68] is quickly followed by the final reiteration of material originally heard at [42], containing the G triad. It is this material that really dominates the voice-leading. Following this at [71] is the fundamental harmonic change to the diatonic harmony and final sonorities. Cone and Kramer have been seduced by the prominence of the passage at [68] into making important voice-leading connections, forgetting the deep, structural harmonic strength of [69] and [71]. [68], in voice-leading terms, is no more than a local diversion that indicates the final harmonic motion.

In the discussion concerning the final passage, it was established that the point of the resolution to

the final diatonic area is at [71]. Yet it is the sonority at the very end of the work that is shown as the true resolution. This is because of voice-leading within the last passage, and most obviously, at [74] to the end. There is a descent of a third in the bass, once more expressed in parallel fifths. Extending down from the E-D fifth via D-A it ends on C-G fifth. This final descent is reinforced by the contrary motion of the ascending third B to D in the upper voice. It is these final third progressions in the voice-leading which confirm the status of the last chord as a point of arrival.

Cone proposes an interesting interpretation of the third relations seen in the higher reductive layer.[38] He believes that the descent of the treble material through [0],[9] and [26] to the E-B fifth is unresolved until the end; it is passed to the bass register and descends a further third from the fifth E-B to C-G. Whether the E-B fifth is suspended during the later part of the work is unclear; Cone's view is methodologically incomplete but highly appealing.

Kramer interpretation is somewhat different; he connects the opening F in the bass to the E at [9], and a [D] at 26 (which he feels operates throughout the main body of the work) until the end of the work, finally stepping down to C. He therefore proposes a single coherent bass progression down a fourth from F to C. Although this analysis is coherent, I find various difficulties within this interpretation. An progression of a fourth, F to C, is motivically insignificant. It would be strange if Stravinsky, amongst the tight network of motivic relationships used a motivically irrelevant fourth for the bass progression (it may be noted that the fourths used harmonically in the music were deemed unstable). Secondly, voice-leading steps to D at [26] mean that the whole of the second half, from [26] to [75] is interpreted as being an embellishment or decoration of this bass D. Unfortunately, this ignores the vital changes at [42] and [71]. Finally it relegates the final descent of E-B via D-A to C-G, motivically most significant and importantly in stable fifths to a middle-ground level. In fact, this progression is vital in giving the sense of finality to the last sonority.

[38]Cone, E. (1989), p. 297.

Chapter 3

Textural Analysis;

A Comparative Study of the 1920 and 1947 Versions of

Symphonies of Wind Instruments

In the light of the analysis of *Symphonies of Wind Instruments* in the previous chapter, it is possible to study the effect of instrumentation and scoring on the music. With the luxury of having available not only the score of 1947 as used in the analysis of chapter 2 but also the earlier 1920 version of the score, the effect of instrumentation and scoring can be illustrated in a comparison of the two scores. Accepting the danger of indulging in a comparison of the scores purely for its own sake, the comparison will closely adhere to the following single aim; to reveal the effect of instrumentation and scoring on the features of analytical insight presented in the previous chapter. In particular the discussion will identify the ways in which the instrumentation and scoring of the two versions of the score reinforce and agree with the analytical insights, and the ways in which they contradict and interfere with those insights.

There is little need to present an extensive description of the complex history of the drafting of the two versions of the score and the confusion that remains about the status of the different editions.[1] Certain brief remarks will reveal the important issues of the creation of the scores pertinent to the comparison.

[1]See Walsh, S. (1988), p. 105.

The early score is dated 1920. Although various versions of this score were produced from 1920 onwards (such as a piano reduction and parts for a orchestral use), and proofs of the full score were created in the early 1930's, the 1920 score was not widely published. It is unclear precisely why the 1920 score was not distributed. Evidence that the composer was not wholly satisfied by the 1920 version should not be used to conclude that the later 1947 revision is the corrected score neither the 1920 nor the 1947 score is the definitive version.[2] There are significant differences in the instrumental ensemble required for the two versions. The 1920 version requires three flutes and alto flute, two oboes and cor anglais, two clarinets and alto clarinet, three bassoons, four horns two trumpets, three trombones and a tuba. The 1947 score replaces alto flute with a flute, and alto clarinet with a clarinet.

I will undertake a comparative study of the two versions of *Symphonies* by focusing on four short passages of particular interest, rather than attempting a comprehensive comparison. The passages selected for study are as follows:

i. [0-1] in the 1947 score, [0-1] in the 1920 score.

ii. [1-2] in the 1947 score, [1-2] the 1920 score.

iii. [6-7] in 1947 score, and [4-5] in 1920 score.

iv. [68] in the 1947 score, and [41] in the 1920 score.

In section v., I shall also explore issues of instrumentation in the bass-lines of throughout the whole of *Symphonies*, illustrated with an analytical sketch.

[2]Walsh, S. (1988), p. 108.

Since questions of instrumentation bear upon principles of grouping and meter, I will draw upon the theories of Lerdahl and Jackendoff.[3] Lerdahl and Jackendoff identify two elements of rhythmic analysis, the grouping structure and the metrical structure. Grouping structure segments the musical surface. A group can exist at any level; a motive, a theme, a phrase, a movement and a piece are all groups. A group is defined by a set of conditions referring to motivic content, symmetry and other factors. In the following, each grouping condition will be explained if it is used. The analysis also refers to metrical structure. This discussion will explain the importance of certain 'phenomenal accents' in *Symphonies*. Phenomenal accents, as their name implies, are accents created by specific phenomena, other than those accents caused by pitch structures. Unusual instrumental timbre and strong dynamics are two examples of possible phenomenal accents.

It may be noted that the influential theories of Cogan[4] are not used within the textural analysis. Cogan persuasively argues that sonorities can be analysed according to their sonic properties, which he expresses as a set of opposites (i.e. soft/loud, sparse/rich, compact/diffuse). Sonorities are analysed according to their content of 'negative' properties (i.e. being soft, sparse or compact) and their positive properties (i.e. being loud, rich or diffuse), and the sum of the textural characteristics is added up. In its favour, this method appears to work well with *Symphonies* as it can analyse each fragmented block of music largely as of singular textural content. Bearing in mind that the purpose of this chapter is to compare versions of the score, it is clear that Cogan's methods often do not sufficiently distinguish between the finer details of instrumental and textural alteration that occur, and thus various smaller, but no less important insights are lost.

---

[3]Lerdahl, F & Jackendoff, R. (1983).

[4]Cogan, R. *New Images of Musical Sound* (London: Harvard University Press, 1984).

i. Passage at [0-1]

Grouping Structures in the 1947 Score

The barring of the passage in the 1947 score divides the music in a regular, alternating pattern of time signatures. The opening 2/8 bar is followed by a 3/8 bar, then a 2/8 bar and so on for a total of six bars. This barring points to a division of the passage into two groups each of three bars. The opening three-bar phrase consists of 2/8 plus 3/8 plus 2/8 bars, and the second phrase consists of 3/8 plus 2/8 plus 3/8 bars, (plus a crotchet tied over into the following bar). If the clarity of the barring indicates a grouping of two three-bar phrases dividing the passage into two roughly equal parts, this is confirmed in the musical motives. The clarinet 1 part of the opening of bar 4 returns to the motive of bar 1, and can therefore be understood as the beginning of the second phrase. This grouping structure is illustrated in figure 1.

Grouping Structure in the 1920 Score

This grouping is not implied in the barring of the passage in the 1920 score as is illustrated in figure 2. The music is divided into two bars of 5/8 followed by a single bar of 3/4. Identifying the two groups seen in the 1947 version, it can be seen that they are bisected by the bar-lines of the 1920 score. The first phrase begins in the opening bar, continues over the bar line and ends midway into bar 2. The second phrase commences in bar 2, continues over the bar line and change of time signature into bar 3. The division of the material into the two groups found in the 1947 score is contradicted by the barring of the 1920 score. In fact the barring suggest a different grouping altogether. The two 3/8 bars may be seen as

Grouping Structure [0-1]

Figure 1 (1947)

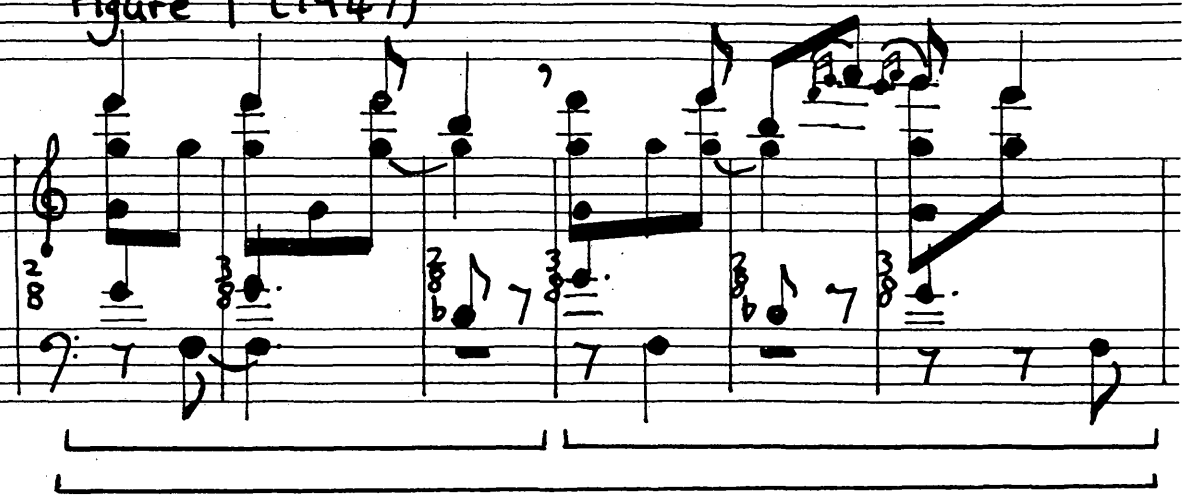
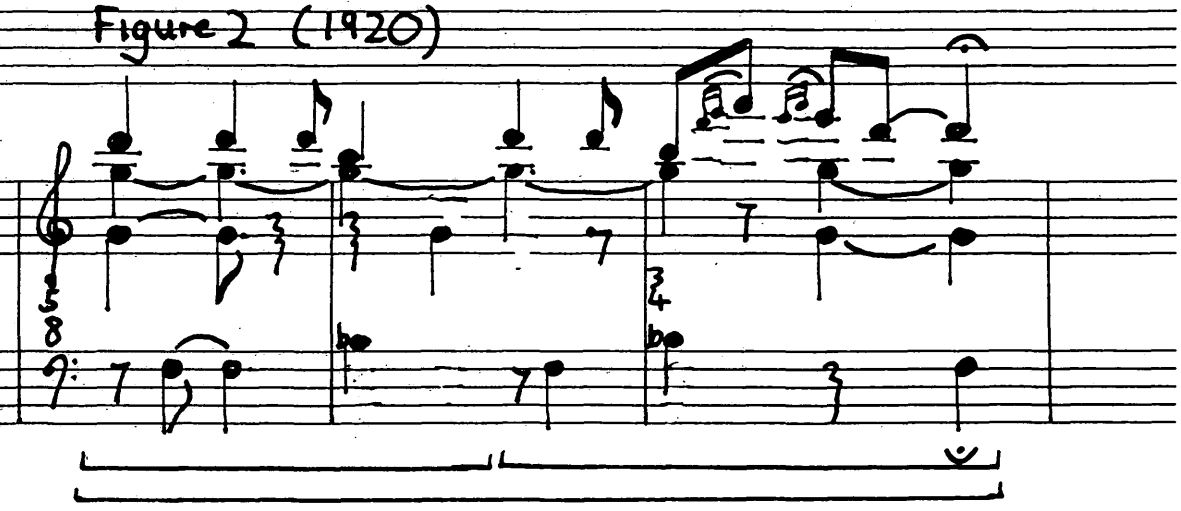


Figure 2 (1920)



the first group, containing the repeated clarinet D and the fall to B. The 3/4 bar may be seen as the second group, containing contrasting decorative material, ending on the pause. This is also the interpretation illustrated by Taruskin,[4] who divides the passage according to the structures and terminology of chant. He describes the two 5/8 bars as containing a 'reciting tone' (the repeated clarinet D) and a 'flex' (the descent to the clarinet B). Bar 3 contains the contrasting but complementary 'cadential formula'. The 1920 score, by its barring, divides the opening passage into two unequal groups, wholly unlike the two equal groups found in the 1947 score. It must be made clear however that, despite the barring, the motivic content of the 1920 passage indicates the same grouping as the 1947 score. In other words, the grouping and barring of the 1920 passage are non-congruent.

Phenomenal Accents

In addition to structures of grouping, there are clear differences between the scores in terms of phenomenal accents. In this context, the term phenomenal accent is used in reference to two areas of accenting, which will be discussed separately. First is the 'attack accent', that is the accent created by the attack point of any note within the music.[5] Second is the instrumental accent, a type of phenomenal accent relating to instrumental timbre and instrumentation.

Figures 3 and 4 present a complete survey of the attack-accents in the opening passage of the 1947 and 1920 scores. The accents are represented as follows; instrumental attacks are represented by quavers; where there is no accent, a quaver is written. For example, if the

[4]Taruskin, R. (1996), p. 1491.

[5] The term 'attack-accent' is not taken from Lerdahl and Jackendoff's theory, but its use in this context is not out of place because Lerdahl and Jackendoff refer indirectly to this type of accent

clarinet I and II part from the 1947 version is considered, the music opens with a crotchet in bar one. This is represented in figure 3 as a quaver (the moment of the attack accent) and a quaver rest (during the sustaining of the crotchet there is no new attack accent). The crotchet plus quaver of bar two is represented by a quaver (the attack accent of the crotchet) a quaver rest (the sustained crotchet introduces no new attack accent) and a further quaver (the attack accent of the quaver). The table has been represented in terms of quaver beats as these are the lowest denominator of the passage; if the tables were calculated in terms of either crotchets or semiquavers, for example, the results would be unclear and inaccurate.

The survey of attack accents for the 1947 score (figure 3) is calculated according to the above methods, although the clarinet III part requires further explanation. The regular quavers of this part complicate the table and so have been seen as sustained notes, represented by rests on the table. The clarinet III notes written with an accent worked have, for the sake of clarity been considered as those worthy of an 'attack accent'.

The line of numbers beneath the table indicates the total quantity of accents on any particular quaver beat. For example, the first quaver beat of bar one is marked with attack accents from flutes, two clarinet parts, and trumpets making a total of four accents at that point. The line of bracketed numbers beneath this refer to the total number of instruments playing an attack accent at any point. For example, the first beat of bar one is marked with attack accents for three flutes, two clarinets, a further clarinet and two trumpets, a total of eight instruments.

These attack accent totals reveal the clear differences between strongly accented and weakly accented beats. Studying the upper line of figures, it can be seen that the first bar, the music opens with a strongly accented beat of 4 accents followed by a weak beat of accent. The clarity of the difference between the strong beat and the weak beat is obvious. Bar two

Attack-Accents [0-1]

Figure 3 (1947)

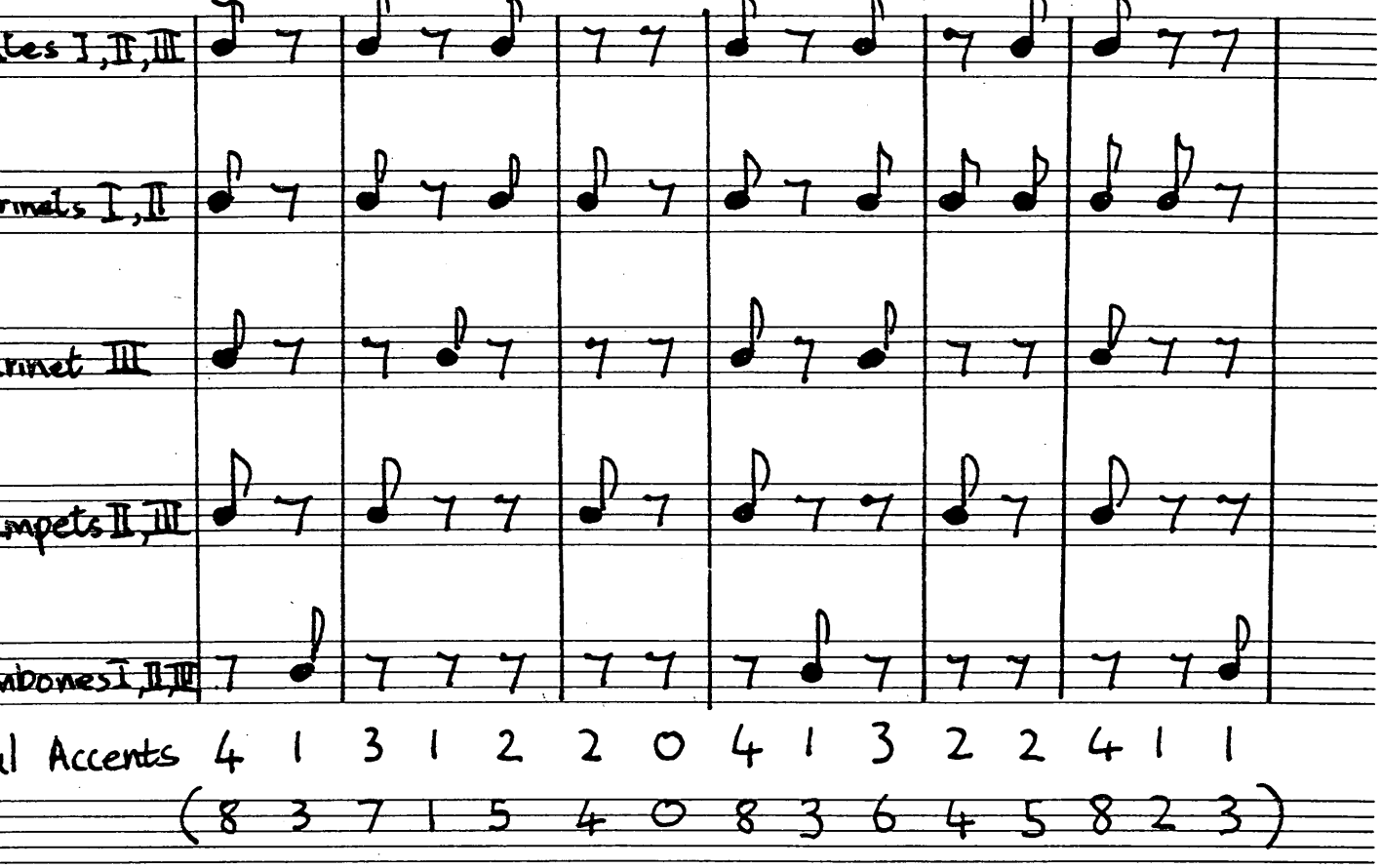
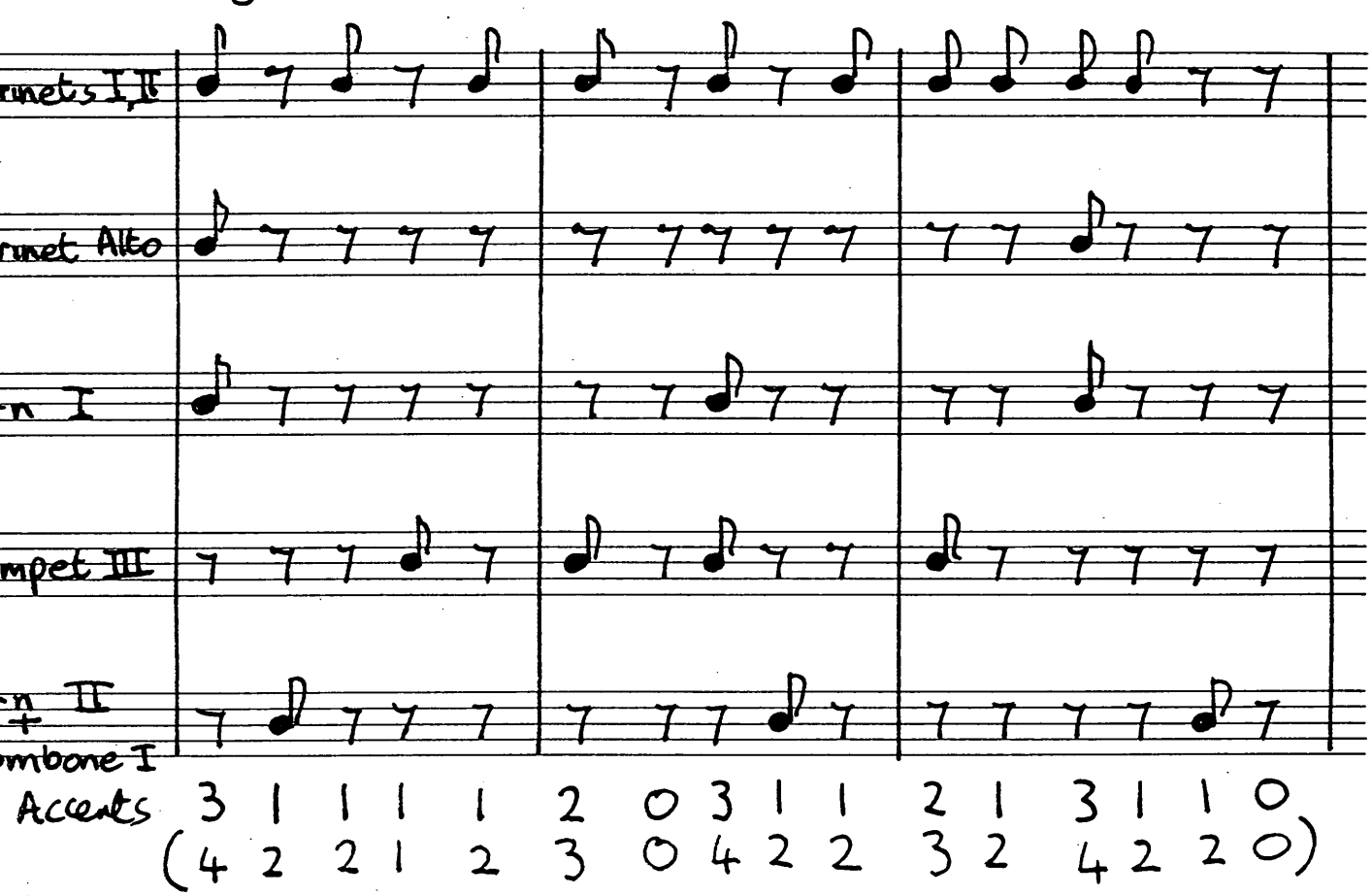


Figure 4 (1920)



opens with a strongly accented beat followed by a weak beat followed by a moderate third beat. Bar three again follows the pattern, opening with a moderate beat and ending with a weak unaccented beat. The beginning of bar four bring a return to the opening pattern of accents, coinciding with the return of the original motive in the clarinet part.

The survey of total accents may be arranged in tabular fashion to reveal the following results:

Table 1. Total attack-accents (1947 score)

4, 1, 3, 1, 2, 2, 0,

4, 1, 3, 2, 2,

4, 1, 1,

Reading left to right, top to bottom, this table shows the total accents from the passage of the 1947 score. This table illustrates that there are three strongly accented beats (of 4 accents in total) occurring at the opening of bars one, four and six. Also of interest is the weakness of the beats occurring at the end of each horizontal line. The first line ends in an unaccented 0 beat, the second with a moderately accented 2, and the third line with a weakly accented 1 beat. The importance of these weak accents is that they provide clear contrast with the strong accents at the beginning of each line. The effect is of the music moving from a strong 4 accented beat to a weaker accent, before returning to the strong 4 accent once again.

If the above table of accents is compared to the phrase groupings of the 1947 score previously discussed, it can be seen that the two approaches are largely in agreement with

each other. If the interpretation of the division of the passage into two phrases is superimposed upon the above table of attack accents then the following is produced:

Table 2. Total attack-accents and grouping structure (1947 score)

4, 1, 3, 1, 2, 2, 0, (first phrase)

4, 1, 3, 2, 2, (second phrase)

4, 1, 1, (second phrase)

The attack accent analysis clearly reinforces the conclusions of the grouping of the passage into two phrases: the first phrase is composed of a single horizontal line of the accent table, and the second phrase is composed of the two final lines. By reinforcing each other, the grouping and accenting give the passage clarity.

The attack accents of the 1920 score are illustrated in figure 4. It will be noted that the Horn II and Trombone I parts have been combined. This is because they share the same attack accents and a false impression of the accenting of the passage would be given if they were considered separately. Additionally, by combining them, the table contains five instrument groups, in common with figure 3.

Studying the total accent figures reveals some contrast between quaver beats. The first beat of bar one is fairly strongly accented, a 3 accent beat, and is followed by weak accents and eventually an unaccented beat. Two more 3 accent beats are heard later, the passage ending on an unaccented beat. In a similar tabular form as used before, these figures are as follows:

Table 3. Total attack-accents (1920 score)

3, 1, 1, 1, 1, 1, 2, 0,

3, 1, 1, 2, 1

3, 1, 1, 0.

The pattern of these accents is clearest at the beginning and end of each horizontal row. Each row opens with a 3 accent beat and ends with either an unaccented or weakly accented beat. It is notable that the opening of each line is only a fairly strong 3 accent, (rather than the 4 accent beat seen in the 1947 score). This difference is even clearer in comparing the total instruments figures, presented in figures 1 and 2 in brackets. In the opening bar of the 1920 version the first two beats are accented by 4 and 2 instruments respectively showing a difference between strong and weak beats, but only a small difference. The 1947 version by comparison reveals total instrumental accents of 8 and 3 on the first two beats, an obvious strong to weak difference.

Apart from the beginning and end of the horizontal lines of the above table, there is little change in the attack accents within the passage.

If the grouping structure proposed for the 1920 score is superimposed upon this table, the following results:

Table 4. Total attack-accents and grouping structure (1920 score)

3, 1, 1, 1, 1, 2, 0, (first group)

3, 1, 1, 2, 1, (second group)

3, 1, 1, (second group)

To some extent agree, the accent table is congruent with this grouping, in that the second group starts on a moderately strong 2 accent beat. However, the two approaches of grouping and accenting are each individually inconclusive as to the phrasing of the passage, and in combination leave an ambiguous result.

In summary, the 1920 version of the passage contains unclear grouping and relatively unclear accenting. The incongruence of these features causes the passage to be rhythmically complex and 'linear'. The music does not clearly present individual motives or rhythms. instead motives overlap creating an ambiguous effect. By contrast, the 1947 version underlines motives with accent and grouping, leaving little doubt about the important content of the passage.

Instrumental Timbral Accent

Having discussed quantities of accents within the passage, the qualities of phenomenal accents in terms of instrumental timbre can be studied can be studied.

The large instrumentation of the 1947 score consists of three flutes, three clarinets, three trumpets and three trombones in the passage [0-1]. An example of the type of accent produced by these instruments can be seen on the first beat of bar one. The chord consists of three flutes, three clarinets and two trumpets. The lively attack of this chord is created

particularly in the accented flutes and sforzando trumpet. The bright sound of accented fortissimo flutes enhances the motives of the clarinet part throughout the passage. The sense of motion is enhanced by the octave rocking of the clarinet three part, clarifying the pulse of the passage. Finally the trumpets serve to reinforce the timbre of important chords from the clarinet motive.

The 1920 instrumentation (three clarinets, two horns, trumpet and trombone) produces very different qualities. The timbre of the opening chord is created by three clarinets and the horn. Although parts are accented and marked at forte and above, the timbre of the chord is less poignant than the 1947 version; the horn in particular contributes a gentle attack to the chord. The trumpet part entering on the fourth beat of bar one is of particular interest because of the prominent timbre of the instrument. Clearly heard against the background of clarinets interspersed by horns and trombone, the trumpet part cuts across the obvious phrasing of the passage, as previously revealed in the 1947 score. Not only does the trumpet not start with the main motive, but it continues through the end of the first phrase midway through bar two. Eventually the trumpet ends at the beginning of bar three. The trumpet therefore patches over the break between the two phrases in bar two, disguising the join and rendering the phrasing more ambiguous. It is able to do this because of the prominence of its timbre in the texture, giving its part 'linear' qualities rather than being a number of individual notes interspersing the clarinet motive.

Conclusions

Having studied grouping structures, and phenomenal accents of attack and instrumental timbre, various conclusion about the two versions of the score and their effect on this passage can be reached.

Grouping structure of the 1947 score is clear and is supported by the barring of the passage. The 1947 score uses contrasts of attack-accents that provide contrast between strong and weak beats, which are further supported by the clarity of timbral contrasts. The agreement between the grouping structure and the phenomenal accents heightens the clarity. As a result, the score emphasises the vertical chords of the passage above the linear motives because of the contrast between each beat of the passage; this means the notes of the opening pitch-class set are heard particularly clearly and are therefore established at the outset of the piece.

The grouping structure of the 1920 passage is less clear and is contradicted by the barring. Less contrasting accents serve only to blur the already ambiguous interpretation of the grouping of the material. The linear continuity is enhanced by the trumpet part disguising joins as previously mentioned and the sustained alto clarinet part. The effect of this is ambiguity; individual momentary accents are not so strongly pronounced, thus laying greater emphasis on the linear and melodic motives. The emphasis on linear aspects of the passage means that the pitch-class set is not the central feature, whereas the melodic descent of a minor third in the clarinets is more clearly noted. Without such melodic linearity, the 1947 version does not have the same the melodic connection between the notes of the descent of a third.

ii. **Passage at [1-2]**

Throughout this comparison, the material between [1-2] will be referred to as two individual entities. The 'tutti chord' refers to material in the first five bars of [1] and the bar before [2]. The 'X-motive'[6] refers the 4-note phrase at the end of the third bar before [2] and finishing at the end of the second bar before [2].

Instrumentation

The tutti chord of the 1947 version is scored for all the available instruments. The highest voice of the chord is given to oboe, while the bass in dominated by bassoons counter-bassoons and the tuba. Of greater interest is the scoring of the X-motive. This is written for two oboes, cor anglais, three horns and the tuba. Within the phrase, the oboes are given the upper voices of the harmony, with cor anglais and first and third horns taking the middle voices of harmony. Second horn is doubled by the tuba to play the bass of the phrase. The distinctive instrumentation of the X-motive is of interest because of the unusual combination of sonorities. The piercing sonority of the soloistic double-reed instruments is starkly contrasted with the soft blend of horns. The tuba, more traditionally used as a fourth trombone in full orchestral scoring, is given unusual prominence. Its own particular sonority adds to the individuality of the scoring of the X-motive.

This scoring is however by no means an arbitrary colouristic choice. The X-motive establishes the roles of the instrumental parts; oboes as the melodic voice, horns as harmonic 'padding' and the tuba as the bass. In the context of the whole passage between [1-2], the X-motive may be understood as a 'thinning out' of the instrumentation of the tutti

[6] Cone first described this 4-note fragment as the 'X-motive'.

chord. In straightforward terms, the X-motive is an instrumentally reduced version of the tutti chord, while still retaining a basic outline of the tutti chord. For example, it has been established that the upper voice of the tutti chord (the oboe) is continued in the X-motive. The middle voices of harmony are 'summarised' by cor anglais and horns. The tuba is the representative of the bass of the chord, continuing its function of the tutti chord. (It will have been noted that the tuba is not the lowest part of the tutti chord, as bassoon and counter bassoon play lower notes. This apparent discrepancy will now be dealt with in detail.)

In the 1947 score, the tuba functions as the true bass part of the tutti chord rather than the bassoons, despite the fact that bassoon actually player lower notes. This is because of scoring and timbre. The tuba is scored at the bass of the brass section, consisting of a total of 7 instruments. Scoring in the brass section is relatively close creating a massed effect. In addition, horns, which blend closely with the brass sound strengthen the tuba by doubling the bass note and elements of the brass harmony. Therefore, as bass, tuba is supported by substantial brass sonorities.

By contrast the bassoons although playing lower pitches than the tuba do not function as a bass. They are isolated from the woodwind as a whole and therefore sound weak. In terms of quantity, the three bassoons have substantially less power than the group of 7 brass and 4 horns. Unlike the tuba, the bassoons are not supported by the timbre of instruments from their own family. Their closest relations oboe and cor anglais are distant, over two octaves higher. Even the lowest clarinet is near 2 octaves away. Furthermore, the bassoons are not supported by any doubling. Additionally the sonority of double reeds is thinner, less rich and less sonorous than the tuba.

This interpretation is supported by the evidence of the 1920 score. Missing from the tutti chord of 1920 version are the two bass notes F and B flat at the octave played by bassoons in 1947 score. This indicates that the originally conceived bass note is F played by tuba, and that the two bassoon notes were a later addition. In particular this reveals that the structural bass was conceived at the register of F given to the tuba, not the notes of the extra bassoon parts.

Reference to the analysis of the opening passages of the music reveals the origin of bassoon notes F and B flat. The sonority of the opening passage includes the F-B flat fourth in its bass, (originally played by trumpet and trombone). These notes are transposed down two octaves and used to create a further harmonic connection between the opening two passages. This serves to illustrate that the function of the notes is not specifically to provide a bass but predominantly to provide an element of motivic continuity. The function of voice-leading in the bass parts is fulfilled equally by tuba and bassoons. The tuba F and the bassoon F are both displacements by one and two octaves respectively of the bass F of the opening sonority.

The scoring of the tutti chord in the 1920 version is for all available instruments except for two flutes and the alto flute. The oboes are responsible for the upper notes of the chord and bassoons and tuba for the bass part.

The X-motive is scored for two oboes, cor anglais, three bassoons and four horns. The oboes have the upper voice of the phrase, cor anglais and horns play middle voices of harmony, and bassoons play the bass voice. The sonority of the X-motive is distinctive with clear emphasis on the double-reed instruments, of which there is a total of six. These contrast strongly with the horn parts, in terms of timbre.

We have seen that the X-motive in the 1947 version may be interpreted as a reduction of the tutti chord. This is also the case in 1920 score in which an upper voice, middle voice and lower voice (oboe, horn, bassoon) is taken from the tutti chord to be used in the X-motive. The balance of the instrumentation in the 1920 score of the four-note passage is somewhat uneven; with bassoons (rather than tuba) playing bass voices, there is no representative of the main brass group (the horns, with their softer timbre and inability to create a truly brilliant effect are considered to be a separate instrumental group. The traditional role of the horns, associated more with strings and woodwind than the larger brass group illustrates this categorisation). This imbalance is emphasised by the predominance of the double reed instruments. The 'summarising' of the tutti chord in the X-motive of the 1920 score is therefore somewhat imperfect, because of the aforementioned instrumental bias.

Scoring and part-writing

A number of minor differences between the two versions of the X-motive have been identified. These are valuable in illustrating the different approaches to the scoring of the music and to reveal the extent of the independence of the X-motive from the surrounding tutti chord

The phrasing of the X-motive in the 1947 score is clear. The 4 notes (three in the case of horn three) of the passage are given a single phrasing mark, so that they are established as a single group. This is confirmed by the breath mark that is indicated before the X-motive, and the semiquaver rest that follows it. These separate the passage from surrounding material.

The 1920 score is not marked with any particular phrasing to identify the X-motive as an independent group. In addition, there is no breathing mark before the X-motive to separate

it from the preceding material. Everything points to the fact that the details of the 1947 score help to establish the X-motive as an important phrase in its own right in order to attention to the phrase's individual characteristics. The 1920 score does not separate the X motive so clearly from the surrounding tutti chord, and so the passage is heard more as a single group.

The two versions of the phrase can also be interpreted from the standpoint of part-writing. The part-writing of the phrase in the 1947 score is not particularly unusual but is relatively sparse. The horn and tuba in the bass are exposed, and other voices are divided between instrumental group, leaving each part relatively isolated. By contrast, the part-writing of the 1920 score seems more in the tradition of harmonic writing. Oboe and cor anglais are voiced at sixths, the bassoons are at tenths. The four horns are given close harmony with the parts of horns one and two interlocking with horns three and four.

Instrumentation and motivic connections

The X-motive can be usefully compared with various other passages in the music, to highlight the effect of instrumentation on the work.

The 1947 score reveals a notable connection between the X-motive and the opening 6-bar passage of the music. The two passages share no instruments in common; in terms of instrumentation, the two passages are complementary. In the opening passage flutes, clarinets, trumpets and trombones are required; the X-motive requires oboes, cor anglais, horns and tuba. (It is notable that the only instruments used in neither of the passages are bassoons and counter bassoons.) Chapter Two argued that the opening phrases of the music ([0-1] and [1-2]) are heard as complementary and contrasting. If the X-motive is understood as a 'summary', in instrumental terms, of the tutti chord between [1-2], then the

X-motive surely highlights this complementary relationship with the opening passage between [0-1]. This is an instance of what may be termed 'timbral complementarity'. The two passages contain instrumentations of roughly equal strength but completely opposite instruments. The concept of timbral complementarity proves important throughout the whole work; however, rarely is complementarity and oppositionarity as complete as in this case.

Comparing these passages in the 1920 score again reveals an element of timbral complementarity between the X-motive and the passage at [0-1]. The contrast between the two passages is however incomplete; both passages make use of horns. The total instrumentation of the opening passage of clarinets, horns, trumpet and trombone is contrasted by oboes, cor anglais, bassoons and horns in the X-motive. Neither tuba nor flutes are included in these combinations. In summary, the 1920 version in some respects achieves similar effects as the 1947 score. The X-motive does use a reduced or condensed instrumentation of the tutti chord, but as has been illustrated this reduction is imperfect. Again when comparing the X-motive to the opening passage at [0-1], the 1920 score does make use of contrasting instrumentation, but again the effect is imperfect because of the use of horns in each passage. As shall be explained, these 'imperfections' must not be understood as faults in the music; they are imperfections in the logic of the instrumentation seen in the 1947 score, which add to the complexity and richness of the 1920 version.

The X-motive can usefully be compared with a passage near the end of the piece. The material starting two bars before [72] and ending at [74] (in the 1947 score) is instrumentally very similar to the X-motive. The instrumentation of the X-motive of the 1947 score is fully reproduced at the passage before [72], with the addition of bassoons and counter bassoons. The instrumentation in the passage starting two bars before [72] is oboe,

cor anglais, bassoons and counter bassoons, horns and tuba. The addition of bassoons and counter bassoons is a minor alteration of the instrumentation of the X-motive; it expands the already present double reed instrumental group but does not introduce any wholly new or foreign instrument to the group.

We can find further parallels between these passages. It was noted that the X-motive condensed the tutti chord by retaining key instrumental parts, particularly the upper and bass voices. Study of the passage from two bars before [72] to the end of the work reveals a similar occurrence. The smaller instrumentation, with oboe given upper voices and tuba and counter bassoons sharing the bass part, is expanded into a tutti instrumentation at [74] until the end of the work. Even in the final chord of work the oboe plays the highest voice, with tuba and counter bassoon playing a bass role, exactly as occurred in the tutti chord of [1-2]. The instrumental parallels between these passages are clearly strong.

Comparing the X-motive with the same material from the end of the 1920 score (found at [43]) reveals fewer clear parallels in the instrumentation. The passage at [43] uses the oboes, cor anglais, bassoons and horns of the X-motive but also adds considerably to them. Clarinets, counter bassoons, trumpets, trombones and tuba are all used, in a scoring of the passage which is considerably fuller in sound than the equivalent passage from the 1947 score. Additionally, the fullness of this scoring means that the parallel with 'summarising' effect of the X-motive cannot be feasibly drawn. The sense of instrumental expansion between the material of [43-45] and that of [45] to the end of the work is negligible.

Conclusions

To conclude this comparison, two further areas must be covered: the first concerns specific aspects of the passage and the second concerns the effect of the passage in general terms on the work as a whole.

Our examination of this passage drew attention to what may at first have seemed to be only a minor discrepancy. It was noted that the X-motive of the 1947 score uses the tuba as the bass instrument; with the 'thinning out' of the tutti chord, the tuba carried the bass-line. Yet, as was established, the tuba is not the actual bass of the tutti chord because both bassoons and counter bassoons are playing lower notes. Surely it would have been more logical to use these instruments which are the actual bass of the tutti chord, rather than the tuba, to summarise the instrumentation in the X-motive. This discrepancy appears to be compounded by the choice of bassoons as the bass parts of the 4-note chord in the 1920 score. However, comparison of the harmonic content of the tutti chord in both versions of the score reveals the source of the problem. The 1947 score contains two extra notes in the low bass register, B flat and F played by bassoons and counter bassoons, that are not included in the 1920 score. Both B flat and F are already notes used in the tutti chord of the 1920 score, but in the 1947 score these notes are added to the lowest part of the chord. This has various effects on the tutti chord, X-motive and instrumentation as a whole. In the 1920 score the spacing of the tutti chord keeps the pitches B flat and B natural apart, with B flat in the upper register and the B natural in the lower register. This minimises the dissonant effect of the notes. By introducing and extra B flat in the bass part of the 1947 score, the dissonance of the notes is increased. (It is worth noting that the extra B flat and F in the tutti chord establish a relationship with the open passage [0-1] of the work, in which they are also used as the bass notes.)

These extra notes in the 1947 tutti chord also explain why the bassoon and counter bassoon are not used as the bass parts of the X-motive. The B flat and F in the bass are additions to the harmony, providing a link to the opening passage; the tuba is given the original bass to the harmony of the tutti chord and thus is used as the bass part of the X-motive. In light of this instrumentation, it is revealing to consider that the material at two bars before [72] of the 1947 score makes use of bassoons and counter bassoons in addition to the instrumentation of the X-motive. The two important bass instruments, tuba and bassoon are united at this concluding section of the music. This revealing insight will be discussed at greater length in the study of instrumentation in the bass-line.

The second part of this conclusion deals with the position of the X-motive in the overall framework of instrumentation in each version of the score.

It has been illustrated that the 1947 instrumentation of the X-motive is carefully chosen to enhance the harmonic and rhythmic contrast of the opening two passages. Furthermore, the instrumentation also highlights the motivic and textural connections between the passage [1-2] and the passage from [72] to the end. In the Lerdahlian prolongational analysis of the previous chapter, we discovered that there is an important prolongational connection between these two passages. Although the main prolongational connection is to the passage [0-1], a retrospective reinterpretation identifies the motivic connections between [1-2] and [72] to the end, as is shown by the dotted line on the prolongational tree. It is this retrospective relationship, not the relationship between [0-1] and [72], that is highlighted by the instrumentation. The instrumentation is not however in conflict with the prolongational analysis. The prolongational tree identifies that there is a both a 'progression', or change to new material between [0-1] and [72], and also, retrospectively, a prolongation and continuity between [1-2] and [72]. We have discovered that the instrumentation emphasises

the element of continuity. In total, this reflects the important structural role that is played by the instrumentation in the 1947 version of *Symphonies*.

The particular instrumentation of the 1920 passage [1-2] is not immediately wholly contrasting to the 1947 version. However, as the 1920 score does not highlight the long range structural connections, it cannot be itself described as an important structural element. The instrumentation is too diverse and varied for analytical connections to be made on instrumental grounds. In this sense, the instrumentation does not affect the analysis; certainly it does not strengthen it, but there are no coherent structures in the instrumentation to contradict the analysis.

iii. **Passage at [68]**

This comparison will concentrate on the five bar passage found at [68] of the 1947 score and [41] of the 1927 score. The analysis of this passage revealed an important voice-leading function of the upper two voices, presenting an ascent that is completed only in the last chord of the work. The comparison will investigate how instrumentation, grouping structure and the part writing affect the prominence of the passage and the clarity of the presentation of the voice-leading and motives.

Instrumentation

The instrumentation of the 1947 version of the passage includes double reed instruments only; two oboes, cor anglais and two bassoons are required. The particular qualities of this double reed instrumentation contrast strongly with the material of surrounding passages. Surrounding material is written for brass and predominantly for horns. Of greatest note is the contrast of timbres; the piercing attack of double reeds stands out from the amassed horn chords. The instrumentation of the 1947 version of the passage is therefore, by contrast, of increased prominence. Furthermore motivic connections are enhanced by the use of double reeds for the passage.

The 1920 version deploys a more extensive instrumentation of three flutes and alto flute, two clarinets and alto clarinet and a bassoon. The qualities of this instrumentation again contrast with surrounding passages dominated by horns. Timbral contrast is less clearly defined than in the 1947 score; the softness of the timbre of the flute and clarinet combination is not dissimilar to the effect of the surrounding horn passages. The sharper

timbre of the double reed instruments is absent from the 1920 version of the passage, it is made less prominent than the passage of the 1947 version.

Grouping Structures

The following examples illustrate the grouping structures of the versions of the passage and the prominence of important features of phrasing and motive within the passage.

Figure 5 divides the phrase of the 1947 score into 2 plus 2 plus 1 bars at the lowest level. This division is based upon the combined effect of the oboe phrase and the bassoon phrase. Oboes have the pitches D and A for the first two bars, E and B for the following two bars and F and C for the final bar. The bassoon phrase divides into 2 plus 2 plus 1 bars because of the parallel between the descending leap of diminished fifth in the first two bars and a perfect fifth in the following two bars.

At the second tier of grouping, the phrase is divided into 2 plus 3 bars, largely on the strength of the second bassoon part. This part is an addition to the voices of the first two bars and is of considerable effect especially because it is the bass part. The final tier of grouping presents the whole five-bar phrase.

The clarity of this grouping in the 1947 passage is such that there is little within the phrase to contradict it. The only interference of note is the movement of the cor anglais which moves from a B in bar 1 to an A in bar 2 which is retained until the return to B in bar 5. This implies a possible 1 plus 3 plus 1 grouping. As the cor anglais is only a middle voice of the harmony, the effect of this interference with the grouping is limited. In summary, the grouping of the 5 bar phrase is clear, simple and largely unaffected by other features of the passage.

Grouping Structure [68]

Figure 5 (1947)

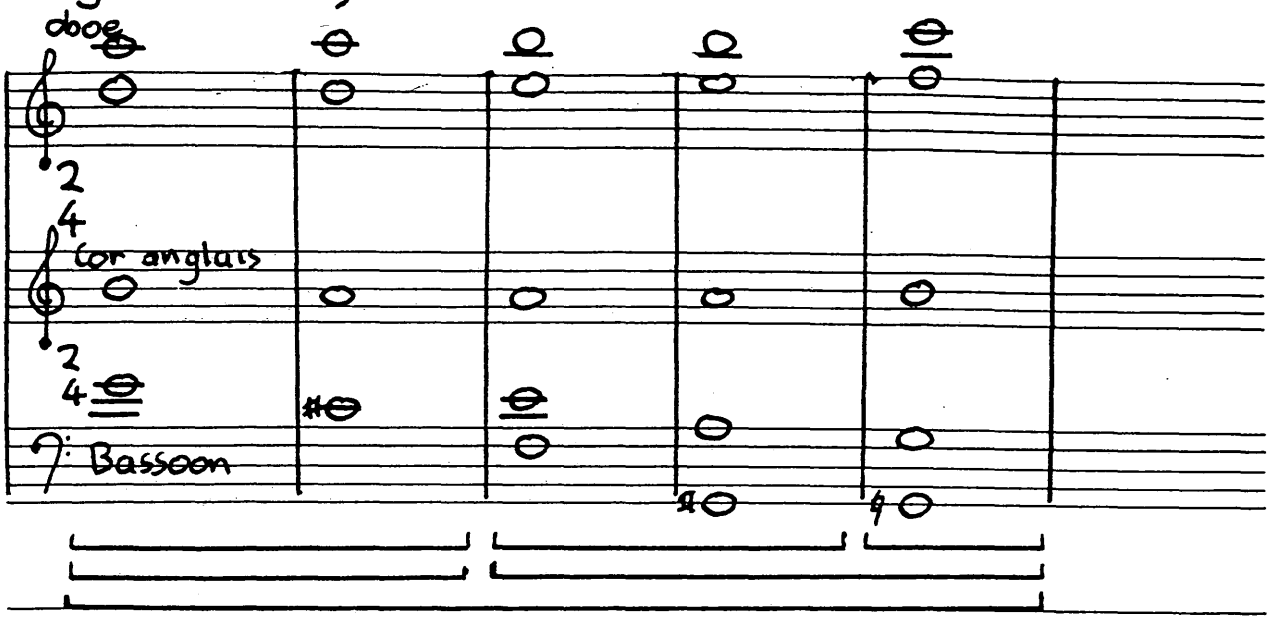
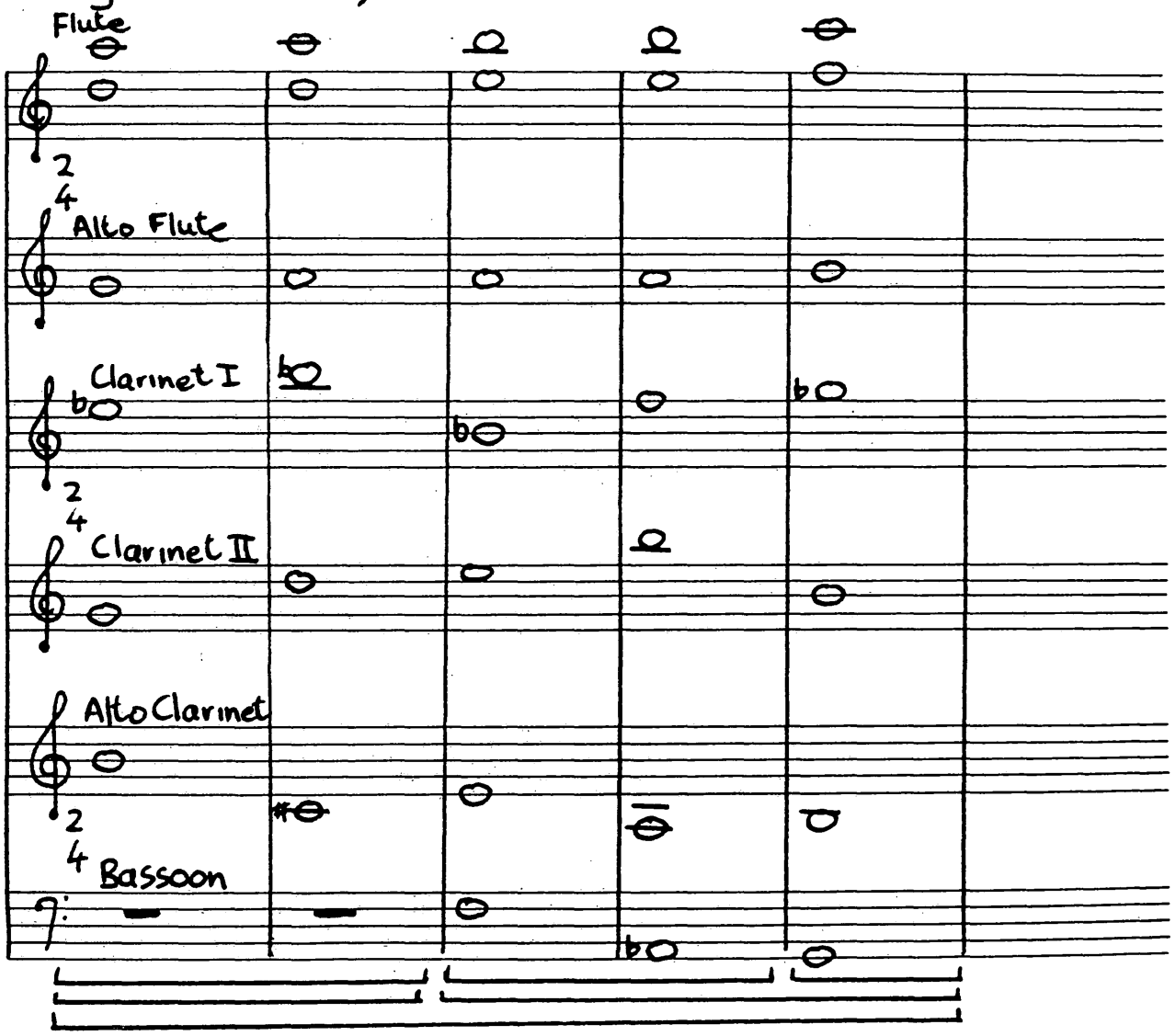


Figure 6 (1920)



The 1920 version of the passage is presented in figure 6 along with the grouping structure. It may be noted that the grouping is identical to the previous example, and for similar reasons; the effect of the stepped ascent in the flutes and the role of the bass. However, features of voice-leading and phrasing interfere with the grouping structure far more radically in the 1920 version. I will consider the effect of each of the voices in turn.

First and second flutes strengthen the 2 plus 2 plus 1 grouping with their pitches (2 bars of A, 2 of B and one of C) but the dovetailing of the parts interferes with the group. For example, there is greater emphasis on bar 2 (with flutes land 2 playing) then bar one (first flute playing alone). This creates a subdivision within the group. The phrasing of the first flute, joining the A of bar 2 to the B of bar 3 patches over the join of the first 2 bar and second 2 bar group. The pitches and phrasing of the third flute are congruent with the grouping.

The alto flute plays a role similar to that of the cor anglais of the 1947 version. Its pitches may be grouped as follows; 1 bar (of G) plus 3 bars (of A) plus one bar (of B) thus contradicting the 2 plus 2 plus 1 bar grouping. This contradiction is made more noticeable by the tie that joins the D of bars 2, 3 and 4 together. Once more this creates a connection between the first and second two bar groups.

First clarinet agrees with the grouping with parallel ascending fifths between bars one to two and three to four. Phrase markings of 2 plus 3 bars are in agreement with the second tier of the grouping structure. Second clarinet also contains a parallel motive of an ascending fifth leap in bars 1 to 2 and again in bars 3 to 4, agreeing with the 2 plus 2 plus 1 bars grouping. However the two fifth leaps of the opening four bars form a single ascending arpeggio figure joining the first two two-bar groups together. This four bar

arpeggio is further emphasised by phrasing, creating a clear 4 bar plus 1 bar grouping, a clear interference with the grouping structure of the passage.

The alto clarinet, because of a slight alteration of pitch, does not contain the same parallel motives of the bass part of the 1947 score, thus weakening its congruence with grouping structure. Phrase marking of 3 plus 2 bars contradict the grouping. The bassoon agrees with the grouping, but since it is the only double-reed instrument, this places great emphasis on the final three bars of the phrase.

In summary, the 1920 version of the passage, although possessing the same grouping structure as in the 1947 score, contains elements of motive and phrasing which confuse and weaken the clarity of the grouping.

Voice-leading and motivic clarity

The clarity of the voices within the two passages affects the analytical importance both of motives and voice-leading. In voice-leading terms, the analysis of the previous chapter identified the ascent of a minor third in parallel fifths in the treble register as particularly important. Figures 7 and 8 illustrate the individual voice-leading motives within the passage.

The voices of figure 7 areas follows:

voice 1: ascent of a minor third by step (A, B, C)

voice 2: ascent of a minor third by step (D, E, F)

voice 3: lower neighbour note (B, A, B)

voice 4: arpeggiated descent of an octave (G to G)

voice 5: arpeggiated descent of a minor seventh (F to G)

Instrumental Voice-leading [68]

Figure 7
(1917)

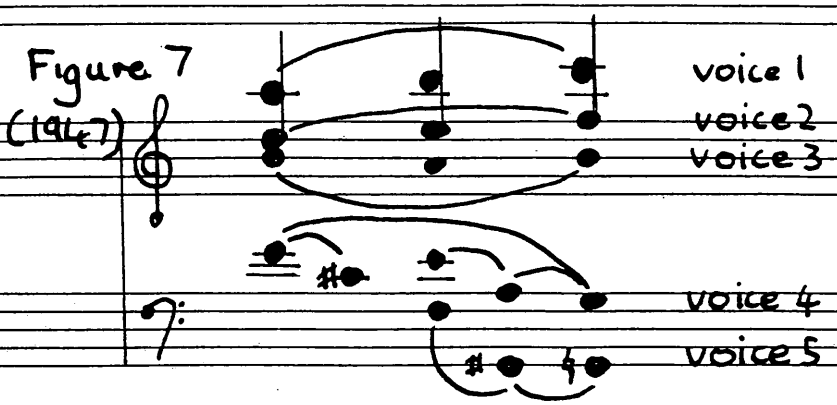
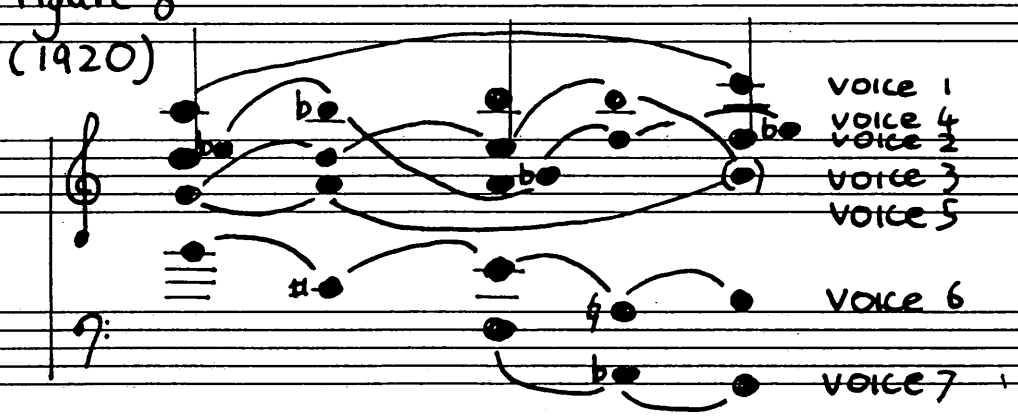


Figure 8
(1920)



This passage is notable for the clear stratification of voices. Voices do not overlap; the ascent in fifths of voices 1 and 2 is always at the top of the harmony, and is therefore clear and distinct. Similarly the function of the bass is entirely relegated to voices 4 and 5; at no point does any instrument play a note lower than a bassoon to interfere with its bass function. The marked contrary motion that occurs between the clear ascent of voices 1 and 2, and the descent of voices 4 and 5 supports this point. Furthermore, the role of each voice is clearly defined by the type of music that it plays. The two upper voices 1 and 2 move melodically, by steps of no more than a tone. The bass parts of voices 4 and 5 move by leaps of up to a perfect fifth in the case of voice 4, and a minor seventh in the case of voice 5. In summary, the voices of the 1947 passage are distinct with individual identities and clear roles.

Figure 8 indicates the following voices in the 1920 version:

voice 1: ascent of a minor third by step (A, B, C)

voice 2: ascent of a minor third by step (D, E, F)

voice 3: ascent of a major second and descent of minor seventh

voice 4: arpeggio figure

voice 5: ascending arpeggio and descent of an octave

voice 6: descending arpeggio of an octave (B to B)

voice 7: arpeggio descent of a minor seventh (F to G)

Features of this voicing include the predominant independence of voices 1 and 2 from the harmony of the 1947 score. However the independence is incomplete, unlike the 1947

passage. Both voices 4 and 5 overlap with the ascent of voices 1 and 2. The interference of voice 4 is most notable; its E flat of the first bar is a semitone above the D of voice 2, thus disrupting the clarity of the fifth of voices 1 and 2. The B flat of voice 4 in bar 2 is a semitone above the A of voice 1 creating an extra step in the voice-leading, linking A to B with a chromatic step. In the fourth and fifth bars of the passage, voice 4 once again plays a semitone above voice 2, interfering with the clarity of the upper parts. Voice 5 contributes to the complexity in bars 2, 3 and 4 of the passage by playing an arpeggiated version of the notes of voices 1 and 2. This confuses the role of the upper voices by introducing an arpeggiation into the essential melodic register.

The bass parts, voices 6 and 7 are again less clearly defined in the 1920 version than the 1947 version. Figure 4 shows that voice 6 does not actually operate as the bass of the first bar of the passage; both alto flute and clarinet 2 play lower notes. Voice 2, the bassoon, is unaffected as bass with no overlapping parts. However, as the only double reed instrument in the passage, it emphasises the bass of bars 3, 4 and 5 of the passage at the expense of the bass of bars 1 and 2.

The function of some voices in the passage in clearly defined. Voices 1 and 2 move by step with a melodic function, whereas the arpeggiation of voices 6 and 7 helps to establish their identity as a bass-line. These functions are made less clear by intrusion of the inner parts, voices 3, 4 and 5. The arpeggiation of these parts also disguises the contrary motion occurring between the outer voices. In summary, the overlapping of parts in the 1920 results in a lack of distinct identity of the roles of voices or of clear separation between them.

The total effect of the instrumentation, grouping structure voice-leading and phrasing on the 1947 version of the passage is to create clarity in a prominent passage. The instrumentation

draws attention to the passage and marks it for consciousness. The grouping structure is simple and is supported by other features of the passage. The voice-leading and phrasing of the passage presents voices clearly and distinctly. This means that the voice-leading relationship of the upper voices to the final passage of the music is strongly presented. The well-defined ascent of the upper two voices, completed in the final chord of the work, is strengthened by the clarity and prominence of its presentation.

By contrast, the instrumentation of the 1920 version of the passage does not draw such considerable attention to the passage, and therefore features of voice-leading and motive are less prominent and made less noticeable. The grouping of the passage is contradicted by elements of harmony and scoring, creating greater complexity than is seen in the 1947 score. Furthermore the interaction of the voices in the 1920 passage interferes with both the important features of voice-leading in the passage and the motives which connect the phrase to other passages in the music. Such connections of voice-leading and motive are hidden within the complexity of the passage.

iv. **Passage at [6-8]**

Sometimes, Stravinsky's revisions bear particularly upon grouping and metrical structure. To illustrate this, the following discussion compares [6-8] of the 1947 version of the score, and [4-5] of the 1920 version. The instrumentations of the versions of this passage are almost identical; the sole instrumental difference is the replacement of the alto flute of the 1920 version with a flute in the 1947 version. Harmonic analysis of this passage in the previous chapter revealed that the passage between [6-8] is the first substantial material containing a strongly diatonic element, in clear contrast to the largely octatonic material which precedes it. As the first substantial non-octatonic passage, [6-8] is a harmonic contrast. Furthermore, material prior to [6-8] is relatively clearly grouped and with a metrical structure congruent with its grouping. It must therefore be expected that the grouping and metrical structures will also contrast with earlier material. The aim of this comparison is to gauge the extent to which the passage contrasts with preceding material, thereby emphasising the harmonic content of the passage and thus articulating the harmonic structure. By contrasting the two versions of the passage at [6-8], I will identify just how complex Stravinsky's grouping and metrical structures are in this passage.

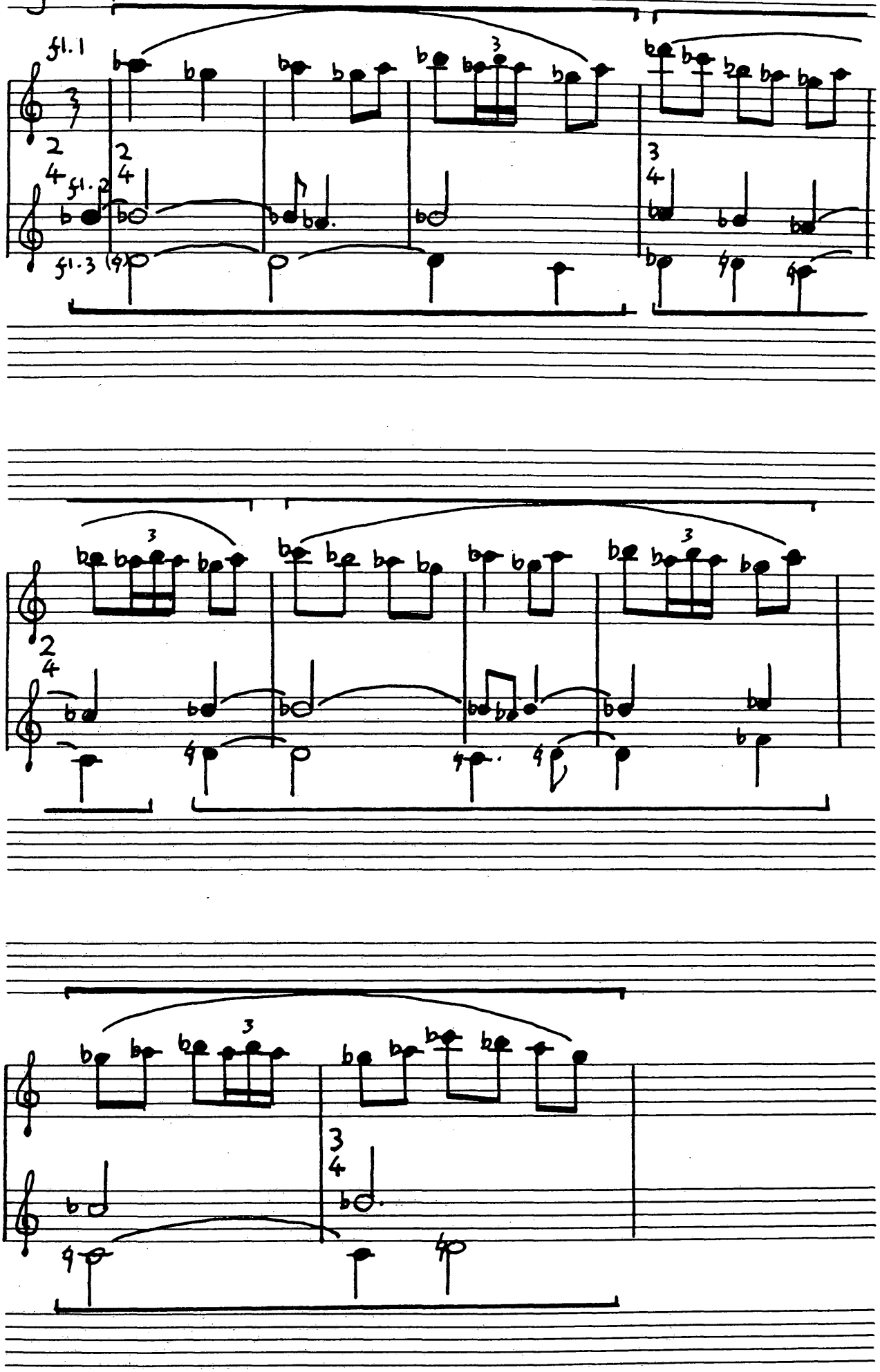
Grouping Structure in the 1947 score

Kramer's study of the 1947 version of the passage presents a cellular analysis.[7] This can be largely transferred into terms of grouping structure. His division of the first flute material into 4 'cell sequences' reflects the division of the score itself into four phrases. His cell

[7]Kramer, J. (1988), pp. 226-275

Grouping Structure [6–8] (1947)

Figure 9



sequences agree precisely with the actual marked phrasing of the score. Figure 9 illustrates the grouping structure of the flute 1 part. This grouping was selected firstly because of the phrase markings of the passage which are supported by the barring; each group begins at the start of a bar. The relative regularity of this grouping structure is surprising; groups are 6+5+6+5 crotchet beats in length respectively. The decorated melodic motive 'A' has a defining role within the grouping structure, appearing in each group. The first three flute 1 groups are concluded with motive A, the fourth group opening with this motive.

Despite Kramer's claim that the accompaniment voices (flutes 2 and 3) display a 'the lack of predictable patterns'[8], figure 9 illustrates the grouping structure of the accompanying parts. Two further points concerning the accompaniment grouping require clarification. Flute 2 and 3 parts have been grouped independently of flute 1 part and therefore are at liberty to contradict the grouping of the upper voice. Additionally, the two accompaniment voices have been treated as a single unit for grouping.

The structure of the chosen grouping in fact contains a number of features which give the accompaniment voices a degree of predictability which Kramer seemed unable to discern. The accompaniment is, like the melody, divided into four groups. This structure was reached primarily by interpreting the phrase marking of the passage. The end of each group corresponds to the points at which both accompaniment parts conclude a 'phrase' as is designated by the phrasing marks of the score. The regularity of duration of these groups is again surprising; they are 7+4+7+5 crotchet beats respectively.

This grouping is supported by the neighbour-note content of each group. The accompaniment parts of the passage begin and end on the same pitches (flute 2 on D

[8]Kramer, J. (1988), p. 237.

natural, flute 3 on D flat). Within each group the accompaniment voices share an identical number of neighbour notes around the fundamental D natural and D flat

Table 5. Neighbour notes of Flutes 2 and 3 within each group.

Accomp. group.	1	2	3	4
Flute 2 (D flat)	one (C flat)	two (E flat and C flat)	two (C flat and E flat)	one (C flat)
Flute 3 (D natural)	one (C natural)	two (D flat and C natural)	two (C natural and F flat)	one (C natural)

Comparison of the grouping structure of the two accompaniment voices with that of the flute 1 voice reveals a further element of regularity. Both melody and accompaniment parts are in 4 groups. These groups are not wholly congruent, but they are closely related in a surprisingly regular pattern. The first and third accompaniment groups precede the melodic groups by one crotchet beat; the second and fourth accompaniment groups begin at the same time as the first flute groups. There is a clear alternation between grouping that is 'shifted out of phase', and grouping 'in phase'.

Metrical Structure in the 1947 score

Only brief remarks are required concerning the metrical structure of the passage. The flute 1 voice provides only minimal indication of metrical accents; preference for binary regularity combined with the preference for strong beats at the opening of the passage leads to the simple metrical structure.

The attack points of the accompaniment reveal a contrasting non-metrical arrangement (a full metrical structure is not provided because of the irregular nature of the lower voices). This demonstrates the contrast of the metrical flute 1 voice and the non-metrical accompaniment voices.

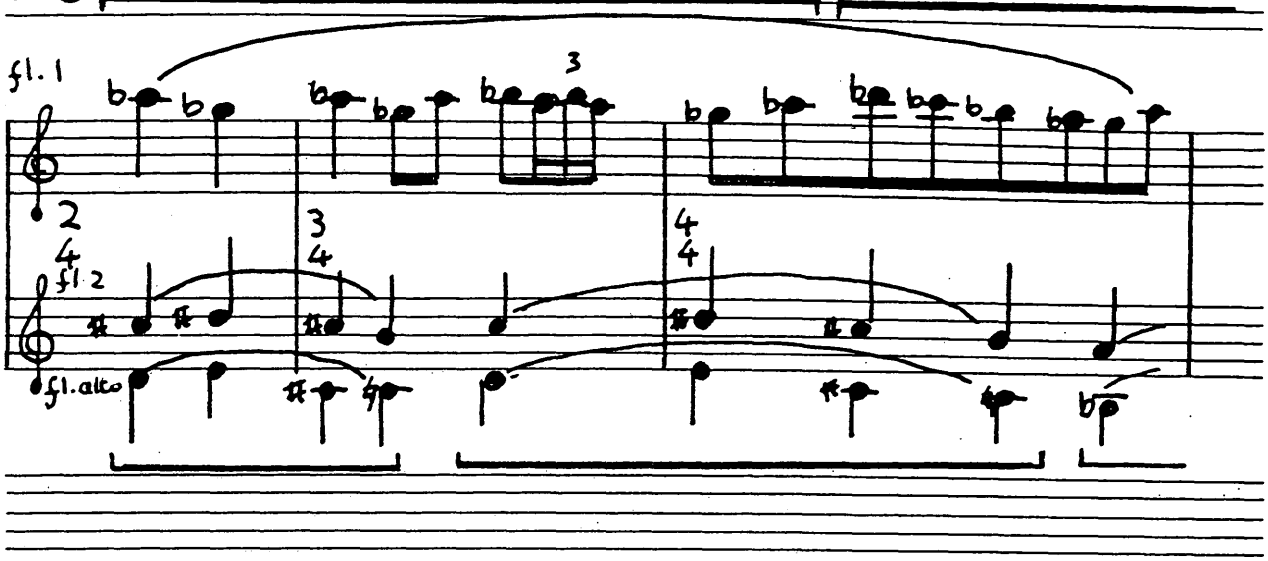
In summary, the clear grouping structure and simplicity of metrical structure of the flute 1 voice is opposed by the partially 'out of phase' grouping of the accompaniment and a non-metrical accent structure. A further point concerns the last two bars of the 1947 passage. Kramer is puzzled at this final group is barred 2/4+ 3/4 rather than the 3/4 + 2/4 pattern that fits more closely with his cellular analysis.[9] His answer can be found with reference to the 1920 version of the score in which the material of the final 3/4 bar is absent. It appears that in the 1947 revision, the extra 3/4 bar of melodic material was inserted in total as a single unit.

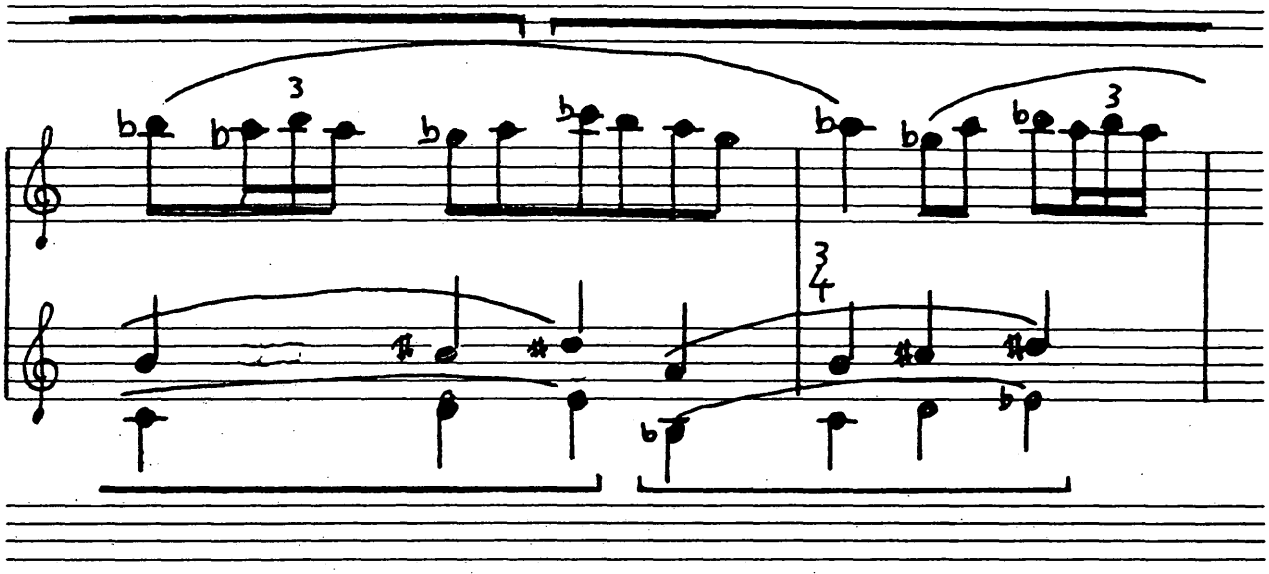
Grouping Structure in the 1920 score

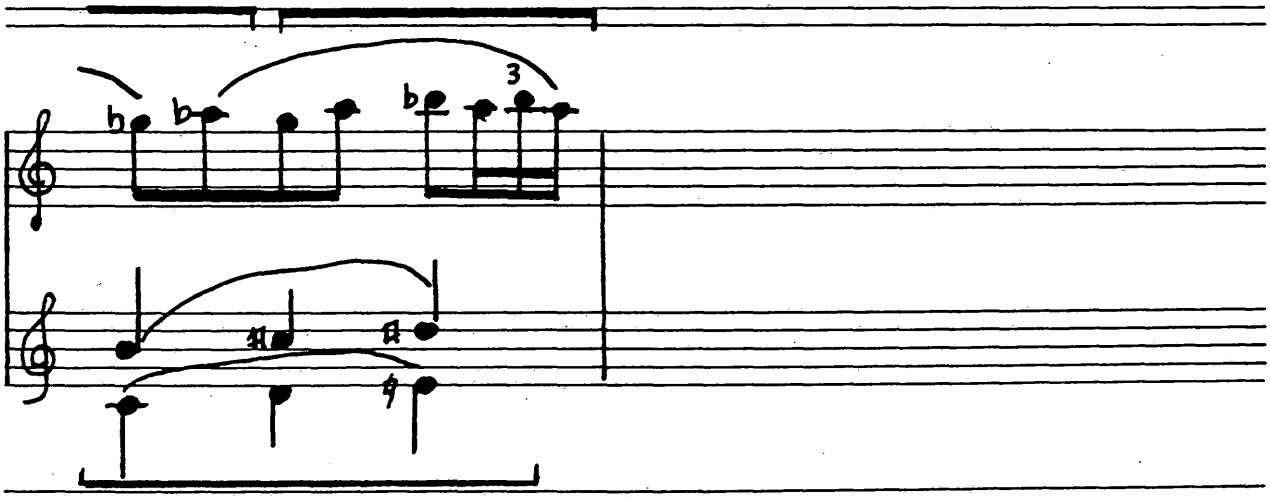
The grouping structure of the 1920 version of the passage is illustrated in figure 10. An almost identical grouping to the 1947 version has been preferred. The main alteration is caused by the absence of the final bar of material used in the 1947 version as previously discussed. The grouping structure was again selected on the strength of motivic parallels and regularity of group length. However the 6+5+6+2 crotchet beat lengths of the groups are contradicted by the phrase markings of the passage. The phrasing does not relate to any

[9]Kramer, J. (1988), p. 238. This insight raises a general issue concerning Kramer's analysis. Considering that his cellular analysis studies the structural implications of surface segmentation, it is a pity that he does not present a comparison with the 1920 score. I believe this comparative cellular analysis would be illuminating.

Figure 10 Grouping Structure [6-8] (1920)







particular features of motive, articulation, parallelism or regularity of phrase length. The grouping structure is contradicted by the phrasing of the flute 1 voice.

The grouping of the accompaniment voices in figure 10 is straightforward. The groups are 4+4+4+4+3 crotchet beats in length respectively. This grouping is supported by phrase markings of the music as well as by the obvious motivic parallels.

The apparent contrast between upper and lower voices is less marked than it may appear. The weakness of the grouping of the upper voice is dominated by the grouping of the accompaniment voices; the clear regular grouping structure of the accompaniment is supported by other textural features.

Metrical Structure in the 1920 score

As in the 1947 score, the flute 1 voice provides little indication of a metrical structure. Therefore, the simplicity of a binary pattern is inferred. The metrical structure of the accompaniment parts can hardly be clearer. The four note phrases are heard with a strong beat at the beginning creating binary accents thus creating a metrically stable bass, two feature included in the conditions of Lerdahl and Jackendoff.

In conclusion, as the first extensive non-octatonic passage, the material at [6-8] contains harmonic contrast with previous material. The 1947 score highlights this by producing a counterpoint of sorts between the rhythmic elements; groupings are out of phase with one another and a simple metrical structure in the melodic voice is contrasted with a non-metrical structure in the accompaniment. The 1920 version presents grouping and metrical structure which is dominated by the accompaniment parts. Unlike the 1947 score, the grouping and metrical structures of the 1920 score reinforce each other. This congruence seems unusual in the 1920 score, for previous examples have revealed non-congruent

structures. However in the global scheme, the congruence of the 1920 version of the passage does not reinforce the harmonic contrast of [6-8] created by its diatonic content. The simplicity of the grouping and metrical structures do not greatly contrast with earlier octatonic passages. Within the 1947 version of the passage, the complex interplay of grouping structures and metrical structures results in rhythmically 'fluid' passage, that stands out from the previous rhythmically more simple passages.

v. The Effect of Instrumentation on the Voice-leading of the Bass

The following discussion investigates the particular effect of instrumentation on the bass voices of *Symphonies*. The primary aim is to reveal the effect that instrumentation has on the voice-leading analysis presented in the previous chapter. Where necessary, references are also made to the effect of the bass instrumentation on aspects of the Lerdahlian prolongational results. It has been found that the bass of the analysed music is often not a single, distinct element, but exists in various different forms. During the final passage of the work, there is a clear bass part with a role analogous to that of the bass of tonal music. On other occasions the bass is simply the lowest element of a chord, or the lowest melodic line. In one instance that has previously been discussed (the passage between [1-2]) the true bass voice is not the registrally lowest part, because of the relative timbral strengths of the instruments in the bass.

Because of the indistinct nature of the bass part, it is difficult to present a coherent analysis of the effect of the instrumentation. In particular, the passages that consist solely of melodic material in a relatively high register without any notable bass do not contribute to, and in fact confuse, the instrumental analysis. Therefore, the discussion refers only to passages containing a clearly identifiable bass part, and especially to the material found in the higher levels of the harmonic reduction of the previous chapter.

The main feature of the analysis is an adapted voice-leading graph. This is based on the harmonic reductions of Chapter 2, and shows the major voice-leading in the bass parts of the 1947 version of *Symphonies*. No analytical sketch of the 1920 score is included. Previous comparisons of the scores have shown that the 1920 version does not show the

same degree of 'logical' instrumentation as the 1947 version, and this is again the case here. An analytical sketch detailing the instrumental parts of the 1920 score only serves to show the variety of bass instrumentation rather than any patterns to support the voice-leading analysis. References will however be made in the discussion to illuminating material from the earlier score. As the primary purpose of the graph is to show how instrumentation affects the voice-leading, there are various supplementary details imposed on the diagram. Abbreviated names indicate which instrument is playing the bass role. Arrows marked on the sketch show moves from a bass role to a melodic role or vice versa. Dotted slurs indicate a particularly noteworthy connection in the voice-leading of one instrument, even when this is not a valid connection in the original voice-leading analysis.

The main feature of the instrumental analysis of the 1947 score is the alternation and conflict between different bass instruments. These instruments each assume separate roles and identities over the course of the work. Primarily, the tuba and bassoons play the most important bass material, although the trombones have a valuable secondary role. The instrumental conflict is established at the opening of the music, as has previously been argued; between [0-1] the trombone is used as bass, but between [1-2] bassoon and tuba are heard. Interestingly, these three instruments all play the same bass note F, although at different registers. It was argued in the detailed examination of this passage that the true bass of [1-2] is the tuba. Throughout the work, the tuba remains the most powerful bass instrument, used to give stability and weight to the timbre of structurally important passages. Bassoons appear predominantly in less important passages as the opposing force to the tuba and also frequently are transformed into melodic instruments. Trombones are largely limited to the opening passage and its subsequent transpositions, although they make a vital reappearance in the final stages of the music.

The conflict between tuba and bassoon strongly reinforces the voice-leading analysis at [41] and [42]. The analysis shows that [42] is a break from the previous material and a return to G-B-D triad and octatonic sonority of the opening passages. In the bass, the sense of arrival is marked by a step from E flat down to D, which then remains as the structural bass note until the final passage of the work. The bass instrumentation enhances this effect; [41] uses the bassoon alone to play the bass note E flat, backed with a woodwind sonority. At [42] the tuba is reintroduced playing a structurally important D, and the bassoon is absent. This alternation continues at [43] with bassoon E flat, an upper neighbour-note to the tuba D of [44]. The effect of this conflict is twofold; the contrast highlights the strength of the tuba as bass, confirming the structural value of passages in which it appears. Additionally, the use of tuba foregrounds the textural connections with the passage [1-2]. The analysis revealed that [1-2] and [42] contain closely related pitch material and bear textural similarities to each another. The use of tuba as bass of both passages highlights this similarity. (By contrast, the 1920 score does not underpin the alternation of material by bass instrumentation. The tuba is used throughout the passages mentioned, creating some continuity, rather than conflict, in the bass.)

Stravinsky employs an identical version of this technique at the second turning point in the music. At [65] the music begins the harmonic movement to the final chord; [65] was identified in the prolongational analysis as the 'beginning of the end,' (and is in fact the beginning of the piano miniature that predates *Symphonies* as a whole.) Once more the tuba is used to reinforce the sonority of the important material at [65], playing the bass note D. As in the previous example, the bassoon is used immediately prior to this, at [64], playing the upper neighbour-note E flat in the bass. Again the conflict of these two bass instruments is used to highlight the structurally most important areas. (Notably there is a

strong contrast in the bass of the 1920 score at this point, between bassoon and tuba. This reinforces the identity of the final passage of the music.)

A further, and at first sight trivial, example of the alternation between tuba and bassoon in the bass is at [27-29]. This is the earliest occurrence in the music of a close juxtaposition of bassoon and tuba as individual, competing bass parts. 2 bars after [27] there is a version of the X-motive originally heard between [1-2], with bassoon and trombone providing the bass. This fragment is immediately followed by a further version of the x-motive at [28] with the tuba used as bass instrument, supported by horns in a striking instrumental reference to the original X-motive. Although this passage is not of vast significance in the overall voice-leading, it does reinforce the division between bassoon and tuba roles. It is notable that Stravinsky is careful, even in such seemingly insignificant passages, not to alter the distinctive roles laid out for the bass instruments.

It has been established that the tuba is the most important bass instrument in *Symphonies*, partly because of its timbre and partly by implication from its use in the music. The role of the bassoon as a bass instrument is further weakened by its use in melodic passages such as that at [8] or [13]. Most interesting is the use by Stravinsky of the descending motives at [26] and [37] which link together the two duties of the bassoon. In these passages, bassoons descend from a higher register to a low bass register, accompanied by the cor anglais, which is a melodic instrument throughout the music. The association with cor anglais and the higher register reflects the melodic function of the bassoon, whereas the descent to the lower register connects this to the bass function. This melodic role lessens the value of the bassoon as a bass instrument because it causes the instruments' timbre to become a more common feature in the music. When heard regularly throughout the work, the bassoon is no longer a noteworthy addition when used in the bass. Furthermore, the highly melodic

passages in which the bassoon is used are of minor structural significance; the bassoon therefore becomes associated with structurally less important music. The tuba, by contrast, is so infrequently used that its inclusion in any sonority has a significant effect. This is enhanced by the fact that the tuba appears almost only in structurally important passages.

One feature of the relationship between tuba and bassoon as yet unmentioned concerns pitch collections. It was noted in the earlier analysis of the music that passages tend to be drawn either from diatonic or octatonic pitch collections. This conflict is central to the work as a whole as the music moves from being largely octatonic to its diatonic conclusion. Bass instrumentation characterises this opposition most clearly in the second part of the work, from [42] onwards. (During the first part, it is noteworthy that trombones play the bass of the opening octatonic passage and its subsequent transpositions. They therefore become identified with the octatonic areas.) It has been shown that the tuba and bassoon alternate as bass from [42], but additionally the music alternates from octatonic with the tuba, to diatonic with the bassoon. Thus the two instruments become identified with different 'strands' of the music, according to the pitch content. This instrumental conflict underpins a central opposition of the whole work. (An exception to this trend occurs in the passage [51-56]. In fact this exception underlines the analytical importance given to the passage [51-56]. Considering that it is one of only two occasions in which the tuba and bassoon genuinely share the bass role, the passage must be considered as significant.)

The relevance of this separation into different 'instrumental strands' is revealed at the end of the work. When the bass harmony changes at [71], preparing the final diatonic sonority of the work, it is ushered in by trombones, which were the first bass instruments with octatonic material. This is analytically satisfying; the trombones, the original bass heralds of the first octatonic passage are the first to 'resolve' to the diatonic area. The following

passage reveals bassoon and tuba operating side by side as bass instruments for the first time in the work (excepting the climactic passage [51-56].) In the final 9-bar passage, bassoons, tuba and trombones all share the bass note. The analysis of Chapter 2 argued that there is a resolution of sorts occurring across the whole work, from octatonic areas to diatonic. This is directly reflected in the bass instrumentation. The instrumental conflict of the earlier part of the music is 'resolved' into instrumental co-operation, in which the bass role is shared between all three bass instruments: tuba, bassoon and trombone.

In this context, Cone's analysis of 'stratification' and 'synthesis' is revealing.[10] Although Cone does not refer to instrumentation as a factor in his analysis, his model of different musical strata becoming unified in a final synthesis is closely reflected in the bass instrumentation. To a large extent, the alternation of the bass instrumentation is in concordance with Cone's alternations of strata. The bass instruments strengthen the separate identities of the strata, highlighting their differing characteristics. The synthesis of the bass parts in the final passage reinforces the unification of strata. By contrast, Kramer's moment segmentation[11] of the work is not supported by the bass instrumentation. In particular, by aligning the octatonic passage at [42] (containing tuba as bass) with the final diatonic passage from [71] to the end (which contains all three bass instruments), he obscures the effect of instrumental resolution that occurs. A second example is 'Moment A' which contains material at both [0-1] and [1-2]. Kramer cannot therefore establish the early division between the trombone at [0-1] and the bassoon and tuba at [1-2] as rival bass instruments.

[10]Cone, E. (1989), p. 294.
[11]Kramer, J. (1988).

In summary, the bass instrumentation of the 1947 score clarifies the structural alternation of early passages and the resolution effect occurring at the end. Careful and limited use of the tuba in particular allows Stravinsky to highlight important turning points in the music, as has been seen to occur at [42] and [65]. It is also interesting that those passages not containing an obvious bass part played by tuba, bassoon or trombones tend to be structurally less significant than those which do. By utilising a wide and continually changing instrumentation, even in the bass, the 1920 score neither particularly reinforces nor weakens the analysis of *Symphonies*. Certain instances in which the instrumentation adds weight to the structural aspects of the music have been shown. Over the course of the whole work, the variation in the bass of the 1920 score causes the structure of the music to remain unclear, or at least more hidden.

Chapter 4

Analytical Conclusions

Reflecting the dual purpose of this paper, the concluding remarks necessarily divide into two areas. In Part 1, issues raised directly by the analysis of Stravinsky's *Symphonies of Wind Instruments* in Chapters 2 and 3 will be discussed. This discussion aims to present a broad overview of the insights and results of the analysis. In Part 2, comments and conclusions will be made concerning the broader issues of post-tonal music analysis, and in particular, the extent to which the selected analytical methodologies were successful in explaining and interpreting the music of *Symphonies*.

Part 1. Analysis of Symphonies of Wind Instruments

The first part of this conclusion develops arguments relating directly to *Symphonies*. Included is a discussion of the place of *Symphonies* within the broader context of Stravinsky's composition, a brief critique of the recently published analysis of the work in Taruskin's monumental two volume study of Stravinsky and finally, comments to conclude the analytical insights into *Symphonies*.

The Historical Context of Symphonies

The historical position of *Symphonies* in the context of Stravinsky's compositional output is an intriguing and controversial subject. Within the boundaries of the generally accepted descriptions 'Russian' and 'neo-classical', there is as yet no clear consensus as to the position taken by *Symphonies*. Various analysts have struggled to determine the precise nature and definitions of Stravinsky's Russian and neo-classical music.[1] The difficulty of such definitions is the fact that any compositional style, including Stravinsky's, is never static, but continually evolves and develops. Therefore, division of Stravinsky's compositions into separate phases is always artificial and open to debate. In this conclusion, I am unwilling attempt to categorise *Symphonies* in such a simplistic fashion, except to say that the music was written at a time of notable stylistic changes in Stravinsky's composition. The music therefore shows characteristics of the earlier output, but is not far removed from the neo-classical genre ahead. In this sense, there is a 'transitional' quality about *Symphonies*.

Other commentators have, however, made definitive claims about whether *Symphonies* belongs to the Russian or neo-classical genre. In a most extensive discussion of the issues relating to the changes in Stravinsky's compositional output in the early 1920's, Walsh confidently states that *Symphonies* is the 'summatory masterpiece bringing to an end an epoch in his own music',[2] and a 'pure product of Stravinsky's Russian phase'.[3] This is backed by comments describing the absence of 'any attempt at organic thematic

[1] Including Walsh, Taruskin and Druskin.
[2] Walsh, S. (1988), p. 110.
[3] Walsh, S. (1988), p. 103.

working....acheiving coherence through a purely architectonic scheme'.[4] Unfortunately, there is no substantial analytical evidence presented to support these arguments. The claim that 'organic thematic working' plays no part in the work can be largely dismissed by reference to my own analysis. Similarly, the mechanisms of coherence are more extensive than Walsh proposes. Having noted the particularly 'Russian' characteristics of *Symphonies*, Walsh argues that the music of the neo-classical 'new stage of his career'[5] contains certain new elements; periodic rhythm and tonal harmony are cited as two examples of the distinctive attributes of early neo-classical compositions, supposedly lacking from the music of *Symphonies*. Furthermore, description of the early neo-classical work *Mavra* mentions its artificiality, 'synthetic qualities' and use of irony.[6] According to Walsh, these features distinguish the neo-classical material from the earlier Russian style. However, my analysis has shown clear evidence of a number of these neo-classical traits in *Symphonies*. Elements of tonal harmony abound; there are triadic harmonies (in both the opening and closing sonorities) and the use of dominant-tonic relationships (including the dominant-tonic cadence that occurs over the course of the whole work). The hierarchy of intervallic consonance, from the relatively consonant perfect fifth to perfect fourth and the relatively less consonant diminished fifth, is closely related to the tonal genre. 'Synthetic qualities' and artificiality are distinctly vague concepts but are nevertheless identifiable in *Symphonies*. Firstly, the dominant-tonic cadence that occurs over the course of the whole work is not a powerful structural force in the music. The relationship between the G major sonority of the opening and the C major sonority of the final chord artificially refers to tonality, without relying on this tonal relationship as an important structural element.

[4]Walsh, S. (1988), p. 103.
[5]Walsh, S. (1988), p. 113.
[6]Walsh, S. (1988), p. 113.

Secondly, and more obviously, Stravinsky's insistence on creating smooth voice-leading by employing brief linking passages is a synthetic component. The essence of much of *Symphonies* is the contrast and opposition between motivic fragments, yet Stravinsky inserts link passages (such as at [3], two bars before [6], the bar before [11] and at [26]), so that voice-leading can move largely by steps. There is more than a hint of the neo-classical trait of irony in these link passages. Traditionally, transitional material is subtly designed so that the listener is unaware that the music is joining two musical areas. By contrast, Stravinsky's transitions do not 'blend in' with their surroundings; in fact they are particularly prominent. Stravinsky even has the nerve to transform the link material into a motivic area at [46-56], which is the most climactic passage of the whole work. Therefore, Walsh overstates his case by claiming that *Symphonies* is only distantly related to the later neo-classical output. In fact the work displays substantial evidence of the developing compositional style that would appear in the neo-classical works.

There is also harmonic evidence indicating that *Symphonies* is closely related to certain later works in its pitch content. Although the following examples do not necessarily prove that *Symphonies* is predominantly neo-classical in style, they do reveal exceptional consistencies of harmonic content. Two works, *Symphony of Psalms* and *Symphony in C* have been selected to illustrate the extent of this relationship.

Symphony of Psalms is unlike *Symphonies of Winds*, in that directed tonal motion plays a far greater structural role. For example, the opening E minor triad is juxtaposed with arpeggiated chords of B flat major and G major, each with an added minor seventh. These two chords emerge as the dominants of E flat and C, the two key areas that are explored later in the work. Such explicit tonal references do not occur in Symphonies of Winds. However, despite this difference, the chords of the opening passages of *Psalms* prove

similar to chords discovered in *Symphonies of Winds*. Firstly, the arpeggiated B flat and G chords of bars 2 and 3 of *Psalms* combine to form the set 6-27. This set is identical to the set formed by combining the opening two passages of *Symphonies of Winds*; furthermore the actual pitch class content is identical. Secondly, immediately after [2] in *Psalms*, a new sonority is introduced. It contains the set 5-27, the same set as the final chord of *Symphonies of Winds* and once more the exact same pitches. To summarise, *Symphony of Psalms* uses the same two pitch collections to create immediate contrast that *Symphonies of Winds* uses as referential harmonies.

The final passage of *Symphony in C* shows such extensive similarities to the final passage of *Symphonies of Winds* that it is impossible to believe that Stravinsky did not model some of *Symphony in C* on the earlier composition. Not only is the final passage (from [181] to the end) a slow chordal progression to a final cadential harmony, predominantly using wind instruments, but it also contains near identical pitch and chord structures. Most notable is the final wind chord that contains both G major and C major triads, the G triad in the treble register and the C triad in the bass exactly as occurs in the final chord of *Symphonies of Winds*. The last chord of *Symphony in C*, played by strings, contains an E minor triad in the bass and G major triad in the treble register; this is almost identical to the sonority used in the final passage of *Symphonies of Winds*, from [71] until the final resolution. That both these sonorities are used in the final passage of *Symphony in C*, as they were in *Symphonies of Winds*, cannot be coincidental.

This brief glimpse of the harmonic similarities that exist between *Symphonies of Winds* and later works such as *Symphony of Psalms* and *Symphony in C* neither confirms nor denies its status as a predominantly Russian or neo-classical work. It does however reveal that *Symphonies of Winds* contained elements of a musical language that Stravinsky would

continue to draw upon during later periods of composition. Bearing in mind that both *Symphony of Psalms* and *Symphony in C* were designed as popular concert pieces rather than groundbreaking works of art, it is perhaps less of a surprise that Stravinsky was willing to draw so overtly upon the extensive musical resources within *Symphonies of Winds*.[7]

Taruskin's Analysis

Amongst the wealth of historical and contextual information provided by Taruskin in his overview of Stravinsky's early creative output is a concise and original analysis of *Symphonies*.[8] The focus of this analysis is the melodic motives in the work; 'the essential structure inheres in its melodic dimension'.[9] Having noted some of the referential harmonies of *Symphonies*, similar to those discussed in my own analysis, Taruskin proposes that the octatonic collection from which various harmonies are derived is the primary organisational element of 'tonal space'.[10] He argues that not only do important harmonies refer to this octatonic collection, but that diatonic sets are derived from the collection. By partitioning the referential octatonic collection into four tetrachords and extending these tetrachords downwards, four derivative diatonic sets are created. Taruskin argues that most of the material of *Symphonies* can be traced back to these four diatonic scales. This is illustrated with a brief analysis showing that the derivative diatonic scales are linked together in what is described as a 'grand pandiatonic matrix'.[10] This analysis is valuable in that it reveals consistent harmonic derivations of much of the melodic material, all of which

[7]I cannot help noticing that these three works, which undeniably show a great deal of harmonic similarity, also share similar titles of *Symphony* or *Symphonies*. Whether this connection is a deliberate arrangement by Stravinsky, or a product of my imagination, I am unable to determine.
[8]Taruskin, R. (1996), pp. 1493-1499.
[9]Taruskin, R. (1996), p. 1499.
[10]Taruskin, R. (1996), p. 1496.

neatly refer to an original octatonic collection. This is most interesting in that it proposes a strong link between the octatonic and diatonic harmonies, which previously have been interpreted largely as opposing elements of the work. This relationship, in which the diatonic collections are derived from the fundamental octatonic collection, also appears to be in conflict with my analysis. The Lerdahlian prolongational analysis of Chapter 2 selected the final diatonic passage as the prolongational head; Taruskin suggests that the harmonic origins of *Symphonies* are actually in the octatonic collection. However, this conflict is minimal, as Taruskin's structure of harmonic organisation does not attempt to directly reflect the surface of the music, but to reveal the possible origins of harmonic material in the compositional process. In fact, this precise point is made by Taruskin who believes that Stravinsky may indeed have worked from a matrix such as the one described. Circumstantial evidence from the music of *Symphonies* is given to defend this claim. This claim perhaps extends Taruskin's already abstract 'matrix theory' too far. The greatest danger in his assertions that the composition of *Symphonies* made use of a complex and distinctly mathematical series of derived scales, is that it reveals little about the actual music that is heard. Taruskin is, in reality, presenting a contextual analysis of the work, rather than a penetrating analysis of the musical surface.

One further point must be mentioned concerning Taruskin's analysis of *Symphonies*. Having predominantly discussed the harmonic content of melodic material, other harmonic elements (referring particularly to the vertical harmonic doubling and accompaniment of melodies) are dismissed as being just 'colors' and 'harmonic non-essentials'.[11] A distinction must be made between harmonic coloration and non-essential extra harmonies. In *Symphonies*, Stravinsky frequently 'colours' diatonic melodies with harmonic doublings,

[11]Taruskin, R. (1996), p. 1499.

often at the interval of a major seventh (the passage [6-8] is a simple example of this.) However, these colours do not 'behave promiscuously'[12] as Taruskin believes. Certain characteristic harmonies are used with sufficient frequency to be described as part of the coherent musical grammar of the work. More important is the careful and restrained use of harmonic colours; my analysis refers to the harmonic 'cleanliness' of important passages, in that they rarely contain any extra pitches other than those of the collection to which they refer. Examples of this are the passages at [0], [1] and [42], which contain only pitches drawn from the referential octatonic collection, and the final chord of the work, which is drawn from a diatonic collection with no additional notes. Colouring harmonies are not indiscriminately added to enhance the richness of the music, but strengthen the contrast between less important, harmonically decorated passages and structurally important passages that contain only pitches of the appropriate referential collection. In summary, Taruskin creates a coherent argument in favour of a formal organisation of the harmonic content of *Symphonies*, but does not analyse the broader structure of the music and avoids some of the more searching analytical questions.

Coherence in *Symphonies*

It appears that the central thread running through each analysis of *Symphonies* is the issue of musical coherence. Both Cone and Kramer searched for the forces that unify a piece of music that, at first sight, seems to be discontinuous and fragmented. This question is all the more frustrating for the analyst because, upon hearing the music, there is an overwhelming intuitive sense of unity. Kramer sought first for this structural unity in voice-leading, having concluded that the cellular content of the music is a discontinuous force. Dissatisfied with this, Kramer argues that the balance of durations of separate passages is an

additional element to give the work coherence. Cone searches for more obvious features. In addition to voice-leading, his synthesis of the separate strata seeks to reveal the gradual motivic and harmonic amalgamation that occurs towards the end of the work. The truth is that both Kramer and Cone have identified some unifying elements within *Symphonies*; unfortunately, they both limit the scope of their analysis to revealing only a few of these elements. An important conclusion of my own analysis is that there is a wide range of structural forces operating in *Symphonies*. This means that a pluralistic approach to analysis is required to effectively reveal the coherence of the music. Notably my analysis has revealed clear voice-leading at various levels of harmonic reduction, consistent use of a limited amount of motivic material (as illustrated both by Cone's stratification into motivic layers and Kramer's cellular analysis), clear thematic intervals such as the third relationships, consistent reference to specific pitch collections and reference to tonal structures, notably dominant-tonic relationships. In total, these features create hierarchies of pitch and sonority and hierarchies of interval that together form a distinct musical grammar in the work. Where my comments criticising the analytical results of Cone, and particularly Kramer, appear harsh, these must be understood in context; both analysts undertake a prodigious task when analysing *Symphonies*. Each successfully identifies forces of coherence in the music, in original and inventive analysis.

As a final remark concerning the analytical insight into *Symphonies*, it is perhaps a fitting tribute to the music that neither Kramer, Cone, nor myself come near to representing the full extent of the unifying factors that exist within the work. My own continued interest in the music is evidence that I believe that there are many more analytical features in *Symphonies* that have, as yet, escaped detection.

Part 2. Analytical Methodologies

The second part of this conclusion will assess the analytical methodologies and techniques used in the study of *Symphonies*. In particular, weaknesses in the techniques, revealed by the attempted analysis, will be discussed. The aim will be to draw conclusions about the general ability of analytical methods to successfully expose the construction of complex, post-tonal music. The three main elements of the analysis, the prolongational analysis, the voice-leading analysis and the instrumental analysis, will be individually discussed. The bulk of this discussion is targeted at the Lerdahlian approach, as this is the only formal analytical approach used. Discussion of the voice-leading and instrumental analysis, both of which are based on ad hoc methodologies, is limited to their relative value in the analysis of *Symphonies* and their role as analytical tools.

Lerdahlian Analysis

The Lerdahlian approach to the music, involving the prolongational tree diagrams, proved valuable from two angles. The methodology is to attempt 'bottom up' analysis; in other words, to start with the evidence found in the musical foreground. In the Lerdahlian approach, the musical surface is analysed in terms of its rhythm (in grouping and metrical structures) and then its texture, instrumentation and motivic content (in the reduction according to salience conditions). Finally, the role of pitch is involved at the late stage of prolongational reduction and the construction of the prolongational tree. The value of this approach in the analysis of *Symphonies* is that it takes account of the variety of structural influences, whilst being flexible enough not to prescribe the precise balance of influence

each element must have in the analysis. The 'bottom-up' style of analysis proved flexible in two ways. Most obviously, there is no fundamental structure that must dominate the analysis, so the information of the musical surface can be viewed objectively. The results of the analysis therefore grow from the foreground of the music. A second and more subtle advantage is that there is no absolute hierarchy amongst the elements of the analysis. For instance, the relative importance of the textural, instrumental and motivic information (found in the salience conditions in the timespan reduction) in comparison with the pitch information (used in prolongational reduction) is not precisely specified. When the analyst believes one set of factors must override the other, the methodology is flexible enough to accept this. A clear example of this flexibility is in the first part of the prolongational analysis of *Symphonies*. The most important prolongation of the opening time span is the time span at [42]. This decision was taken on the strength of clear grouping division ([42] is at the opening of a major grouping boundary) and considerable pitch connections ([42] contains all but one of the pitches of the opening time span and also refers to the same octatonic collection). These factors were considered substantial enough to give time span 42 a prolongationally important position. By contrast, timespan 9 is given a position of relative importance without reference to pitch connections. In actual fact, timespan 9 shows absolutely minimal pitch connections to its branch connected timespan at [26] or to the opening timespan. However, timespan 9 reveals strong motivic connections, being a transposed reiteration of the opening timespan. In this case the motivic connections are considered so important that the timespan is given an important prolongational position despite its lack of 'structural' pitches. In summary, in these two analytical decisions, the analytical factors are given different weightings depending on circumstances, and are therefore more or less influential on the prolongational analysis. The flexibility of the

analytical methodology to allow this variability of influence stems from the 'bottom-up' approach and is beneficial to the final analysis.

It may appear surprising that an analytical approach that is so careful to retain strong links with the foreground of the music, is nevertheless most successful at revealing the background structure. This, however, is indeed the case with the Lerdahlian prolongational tree diagram. I will be established later that there are a number of difficulties involved in revealing the effect of the lower levels of the prolongational tree. In the upper levels of prolongation, it is concluded that the Lerdahlian tree diagrams are the most successful tool of presentation. This is because the diagrams clearly reveal the two vital pieces of information that are required to understand the prolongational structure of *Symphonies*; the diagrams show hierarchy of the timespans (illustrated in their relative branch levels) and the extent of relationships between timespans (illustrated by the types of branch connection). The balance of revealing these two elements of structural analysis has not been so elegantly struck by other analytical approaches. Although there is not sufficient space to discuss the matter extensively, it is interesting to briefly compare the success of Lerdahlian diagrams in this area with the results that are achieved using the pseudo-Schenkerian approach in the voice-leading graphs of Chapter 2. Schenkerian-style voice-leading graphs are relatively successful at showing certain pitch connections between the background structures, however they do not at any point establish an absolute hierarchy amongst the background harmonic progression. Although certain pitches may be selected as of high prolongational importance, the hierarchical order between these background pitches is never explicitly established. Therefore, the clarity of the Lerdahlian diagram is not achieved.

The success of the Lerdahlian prolongational analysis lies in the analytical balance of foreground information and clearly expressed hierarchical structures. The following

advantage (for the analyst at least) may be added; the Lerdahlian tree diagram does not specify or imply exactly what is meant by prolongation. As was revealed in the opening chapter, the question of non-tonal prolongation remains disputed. The Lerdahlian tree analysis allows the analyst to express those prolongations that are intuitively understood, but are not yet fully explained.

The analysis of prolongational structure was not, however, without failings. The analysis of *Symphonies* confirmed a problem in the application of the Lerdahlian methodology that was described in the opening chapter; this involves the difficulties found in following the formal process of analysis envisaged by Lerdahl. A second difficulty in the analytical results will also be illuminated, in reference to the lack of linear consideration in the prolongational analysis.

When the methodological weaknesses with Lerdahl's approach were discussed in the opening chapter, it was established that musical intuition remained a significant factor in the analytical process. Intuition, in terms of individual assessment, is required in discerning grouping structure and time span segmentation, application of salience conditions for timespan reduction and the transformation of this information into prolongational reduction. Additionally, it was shown that certain information is used repetitively in the Lerdahlian process to discern different features; for example, parallelism is a factor used to discern grouping therefore influencing time span segmentation, a salience condition used to create time span reduction, and an influential element of prolongational reduction. The analytical process can therefore be described, to some extent, as collapsible. It consists of a series of intuitively based decisions, each relying on similar information. These decisions are arranged by Lerdahl in a scientific-looking sequence, whereas they are in fact closely interrelated and reliant upon one another. The truth of this is even inherent in the original

methodological conditions; the final specified grouping rule is to prefer a grouping structure that successfully reveals more stable prolongational structures. This runs contrary to the claim that the method is a 'bottom-up' approach, in which each analytical step builds upon the foundations of the last.

The validity of these criticisms, that the Lerdahlian methodology requires substantial intuitive input and is not a clear logical and sequential process, is highlighted by the problems encountered in analysing *Symphonies*. Difficulties occurred at various steps of the analytical process. It proved impossible to discern a grouping structure except at the highest structural levels, because of the fragmentation of the motivic areas and an irregular ordering of those fragments. This rendered almost useless both the important preference rules of parallelism and intensification of lower level textural contrasts. The only remaining preference rule has been already mentioned; it requires a grouping structure that complies with the needs of the prolongational reduction. The Lerdahlian method is not prepared for this particular situation; theoretically, without the foundation of the grouping structure and time span segmentation, (and thus each of the following stages), the analytical method comes to a halt. Although within the analysis of Chapter 2, I managed to proceed successfully with an adaptation of the Lerdahlian approach, this is methodologically unsatisfactory. One of the features for which the approach originally was praised was its flexibility, but this has proved insufficient to analyse *Symphonies* without substantial alteration. Accepting that *Symphonies* is a highly original work containing unusual features, an analytical methodology must surely be expected to take account of the variety of music that exists.

The approach that was finally used in the Lerdahlian analysis remained within the general perameters of the approach. Essentially, without the clear layers of grouping structure, it is

impossible to develop the time span segmentation. Consequently, it is not possible to progress to the time span reduction and eventually the prolongational reduction. Therefore, it became necessary to 'collapse' the analytical process into a single step. In methodological terms, this is an unappealing alteration to the process, not least because it leaves most of the decision making with the intuitive understanding of the analyst. Although unappealing, it is however a feasible alteration to the Ledahlian approach because of the general collapsibility that has previously been explained. This single analytical step thus performed several closely related functions. It discerned the relative salience of the time spans at global as well as local levels. The lack of segmentation made the reductions difficult to realise, so the analysis stepped immediately to the prolongational tree diagram. Based on the results of the salience conditions, the most important prolongational material was arranged at the head of the tree, and lower material branched progressively away from it. Certain prolongational decisions were made on the basis of the rules of construction for the tree diagram. For example, if salience conditions implied a connection that leads to crossing branches, this was necessarily altered. An instance of this problem occurred in relation to the passage [1-2] which is both relatively salient and is prolonged by the material at time span 42. It cannot be prolonged in the analysis because of the problem of crossing branches. Also, the value of showing strong prolongations in the tree diagram, rather than progressions, influenced certain analytical choices. In particular this influenced the decisions of the second part of the music. Here the analytical diagram shows the strong prolongations of time span 42 as the dominant structural force other music. The importance of revealing these strong prolongations overrides the individual salience of passages such as [46], which are necessarily relegated to lower prolongational levels.

In summary, the single analytical step that compressed various tasks into one relied both on the musical surface, in terms of salience and limited use of grouping structures, and also on 'top-down' considerations, giving priority to the upper levels of the prolongational structure. This compromise is relatively successful, giving a balanced impression of the prolongational structure of *Symphonies*.

In addition to this methodological failing, the Lerdahlian approach can be criticised for its limitations in revealing linear harmonic relationships. I conclude that the Lerdahlian prolongational method is, in this respect, a blunt tool of analysis. This is manifested firstly in the comparative absence of pitch information. (The only notable exception to this is the consideration of pitch content when selecting prolongational type (such as strong prolongation or progression) in the tree analysis.) The use of the 'pitch event' (meaning any group of pitches with a simultaneous attack point) as the basic analytical component obscures certain pitch information. The 'pitch event' is an essentially 'vertical' concept; it refers to a single point in time. The successive timespan and prolongational reduction compare the relative merits of each individual point in time, finally deciding which is of supreme prolongational importance. Lacking from this approach is any consideration of the effects of voice-leading, and more simply, any substantial analysis of the relationship between the pitches of separate pitch events. This complete absence of such information is alarming. Although it is accepted that voice-leading in non-tonal music does not have the same harmonic implications as in traditional tonal music, this is not grounds for its total abandonment. In *Symphonies*, voice-leading affects the prolongational structure. The final chord of the work, which is also the prolongational head of the whole work, is an illuminating example of this. At a local level, the final chord is approached by a clear harmonic progression, with outer parts notably moving to the chord in steps of contrary

motion. The strength of this voice-leading leaves little doubt that the conclusion of the work has been reached, and reinforces the position of the final chord. This information is unfortunately not available through any of the analytical channels of the Lerdahlian approach.

Associated with this difficulty is the inability of the 'atonal' prolongational analysis to simultaneously reveal any tonal references in *Symphonies*. The voice-leading analysis of Chapter 2 illustrated that by referring to dominant-tonic relationships, the effect of local resolution in the music is enhanced. According to the Lerdahlian methodology, prolongations are determined according to the salience conditions and prolongational rules. These do not include the possibility of influential tonal structures. Prolongational decisions must therefore made on the basis that *Symphonies* is a wholly 'atonal' work. The root of this problem may be discovered in Lerdahl's preliminary analysis that illustrate his fledgling 'atonal' prolongational theory. The works he analyses are all from Schoenberg's atonal output; the music contains no notable tonal structures whatsoever. This bias in favour of atonal music is inherent in the analytical procedure, especially the salience conditions, and it fails to incorporate the possibility of a tonal element. This failure is a serious disappointment; the opening discussion of various methodologies had pointed to Lerdahl's approach as one may have been able to incorporate both tonal and atonal music within the analysis. In summary, the Lerdahlian approach does not satisfactorily reveal the linear relationships that may exist between pitches in *Symphonies*, and the insight of the prolongational analysis is therefore less substantial.

Voice-leading Analysis

Having identified the predominant gap in the results of the prolongational analysis, namely linear voice-leading connections, I concluded that, as a supplement, a second graphic analysis would be used. The details of the methodology of a 'pseudo-Schenkerian' (although there is nothing particularly Schenkerian about the underlying theory) approach do not require further discussion; the failings have already been noted. It may be added that I accept that the methodology of my harmonic reductions is imperfect; the analysis was designed solely for the purposes of analysing *Symphonies*, and not as a generally applicable method. In particular, the relationship between retaining texturally prominent passages in the final reductive layers, and revealing meaningful voice-leading connections at all levels of the analysis, is unclear. As an example, the passage at [46-56] is, in textural terms, highly prominent. It appears in the final level of harmonic reduction, although its voice-leading role is uncertain. By contrast, material at [71] is not at all prominent, but is also included in the final layer of harmonic analysis because it contains vital voice-leading connections in the bass register. Both of these factors influenced the decisions leading to the harmonic reductions; however, it was intuitive response, rather than any formal method, that led the decision making process.

Despite some methodological questions, this analytical tool proved remarkably valuable. In part, this is because *Symphonies* contains clear tiers of voice-leading, and consistently used musical elements of construction. The two most prevalent elements described in the analysis were the predominantly linear, melodic interval of a third and the largely vertical, harmonic use of fifths, fourths and tritones. The first level of harmonic reduction shows that the musical foreground is saturated with these two intervals, and they are consistently used for particular purposes. Third progressions are used to create harmonic motion. The

successive transpositions of the opening passage move away from the opening sonority by a third; the final bass descent of a third brings the music to the closing sonority. Fifths, fourths and tritones operate in a hierarchy of relative harmonic consonance. The higher levels of reduction also reveal the consistent saturation with these two features. These two elements may therefore be described as part of a clear grammar in *Symphonies*. In turn, this grammatical consistency, combined with the clarity of voice-leading connections makes *Symphonies* particularly suited to the voice-leading of analytical approach. In summary, the language of *Symphonies* involves certain clear traits of harmony and voice-leading. The quasi-Schenkerian approach is ideally suited to reveal these features.

One further detail of the harmonic reduction analysis was the ability of the graphs to include references to the tonal sonorities that influence the music. The addition of this information, in the form of numerals reflecting chord relationships, adds a further possible interpretation to the analysis without altering the essential details of the graph. In other words, it is not necessary to attempt to 'fix' the graphic analysis to fit the tonal interpretation; there are notable occasions in the analysis of *Symphonies* in which tonal structures are indicated, whilst the details of the voice-leading indicate octatonic or other non-tonal factors are dominant. Thus the addition of a referential tonal interpretation of certain passages adds a new analytical angle, but still allows other, possibly more influential, features to be revealed.

In conclusion, the harmonic reductions were devised to complete the analytical tasks left undone by the Lerdahlian analysis. The methodology was constructed on an ad hoc basis, and therefore cannot be understood as a generally applicable analytical system. However, this part of the analysis proved particularly rewarding, revealing a number of original insights into the musical construction of *Symphonies*.

Analysis of Instrumentation

The comparative instrumentations of *Symphonies* drew attention to various issues affecting the analysis. They illustrated the powerful effect that instrumentation and other 'textural' details can have on the structure, and hence the analysis, of a piece of music. Of particular note, instrumentation is able to highlight long range motivic connections. The finest illustration of this is the 1947 instrumentation of the original 'X-motive', which reinforces the connection of the passage [1-2] with passages at [42] and [71]. This is an important change of emphasis in the structure of the work. Additionally, the study of bass instrumentation revealed that the tuba, in particular, draws attention to certain voice-leading connections.

Secondly, the comparative analysis demonstrates the lack of a systematic approach to the study of instrumentation. In the analysis of post-tonal music, this is a particularly worrying methodological shortage. It has been previously mentioned, and is generally accepted, that non-tonal music relies more heavily on textural features such as instrumentation, than traditional tonal works. Lacking the structures on which tonal music generally depends, non-tonal music is defined by a combination of pitch, rhythm and textural factors. The increased role of elements such as instrumentation make the absence of an accepted, feasible method of their study even more bemusing.

Although the comparative analysis of Chapter 3 was successful in revealing valuable insights into the music of *Symphonies*, it had two notable shortcomings. The first was that it proved a long-winded approach; without the benefit of any formalised graphic or illustrative techniques, it was necessary to explain every insight literally. A major advantage of graphic analytical methods such as the Lerdahlian prolongational tree and

voice-leading reductions is that extensive analytical detail that can be incorporated into a single diagram. Without a suitable analytical system available for the instrumental study, each comment must be individually argued. Because of the long-winded nature of this method, the comparative analysis was limited to studying brief, selected passages. Secondly, the lack of a suitable approach on which to base the analysis meant that various different techniques were used. Certain familiar methods, such as the Lerdahl's grouping structure techniques were used. Others, such as the tabulation of 'attack-accents' within the opening passage, and the graphic analysis of the bass instrumentation were largely original techniques. This is disadvantageous not only because of the time and space such methods take to devise and explain, but also because they create an extra level of complexity in the explanation of the music.

Future Developments in Analytical Methods

To conclude this paper, it is valuable to discuss the directions in which analytical methodology may advance, in the light of the survey of post-tonal analytical approaches and the analysis of Stravinsky's *Symphonies of Wind Instruments*. It is far beyond the scope of this paper to propose or formulate any new methodology; however the areas of success and failure in the analysis of *Symphonies* give clear indications of some possible future directions in the development of post-tonal analysis.

The problematic and lengthy comparison of the instrumentation and textural features of *Symphonies* illustrates the need for a systematic approach to this aspect of analysis. It has previously been explained that Lerdahl's method includes certain details of non-pitch information, such as the grouping and metrical structures, and certain of the salience conditions. However, as has also been argued, these only take account of a limited range of

textural elements. The study of Chapter 3 shows that more substantial textural features exist within the music; these must be revealed by an analytical technique and the information used as an aspect of the total analysis.

Related to this above development is the need for method with considerably wider technical scope. The prolongational tree analysis, despite many valuable qualities, ultimately proved disappointing because it largely failed to absorb a broad enough range of information. Above all, voice-leading relationships were not involved ; consequently, the prolongational tree cannot be considered a conclusive analysis. Similarly, for all its virtues, the voice-leading analysis fails to give, for instance, sufficient prolongational details, relying instead on the crude division into four layers of reduction. Neither approach makes sufficient use of the textural information revealed in Chapter 3. The difficulty that arises is that each methodology expects analytical decisions to be made but it provides too limited a supply of information. Therefore, throughout each of these analysis, a substantial proportion of the analytical decisions were made on the basis of intuitive understanding, rather than on understanding gained within a particular analytical process. The solution to this difficulty is to involve a wide range of analytical angles of approach within a single system. The Lerdahlian approach has previously been praised for its broadness and flexibility; in the light of the analysis of Symphonies, an even more flexible methodology is now required.

Lastly, the discussion returns to one of the first located problems with the analysis of early post-tonal music. Theoreticians such as Baker and Pople encountered particular difficulties in analysing music that is essentially non-tonal, yet contains significant tonal structures. It was argued that Straus' 'black and white' separation into prolongational tonal music and non-prolongational, non-tonal music fails to adequately explain such post-tonal music. Even the broadness of the Lerdahlian approach proved unable to reveal the extent of tonal

relationships in a non-tonal work. The solution to this problem is clearly complex. Ideally, an analytical method is required which can incorporate both tonal and non-tonal genres. This would mean that a work containing both tonal and non-tonal structures, such as *Symphonies*, could be analysed in a single procedure, avoiding an artificial separation into tonal and non-tonal elements.

Above all else, this paper has established that present analytical methodologies are severely tested by post-tonal music, as has been amply illustrated by Stravinsky's *Symphonies of Wind Instruments*. By highlighting these methodological shortcomings, it is possible to advance techniques of musical analysis. In time, methodologies and techniques of analysis will be developed that allow music such as *Symphonies* to be more coherently and elegantly analysed; I eagerly await them.

References

Antokoletz, E. *The Music of Bela Bartok* (Berkeley, Los Angeles and London: University of California Press, 1984).

Asafyev, B., (trans. R. French). *A Book about Stravinsky* (Michigan: UMI Research Press, 1982).

Baker, J. 'Schenkerian analysis and post-tonal music', in D. Beach, ed., *Aspects of Scenkerian Theory* (New Haven: Yale University Press, 1983), pp. 153-86.

Baker, J. 'Voice leading in post-tonal music: suggestions for extending Schenker's theory', *Music Analysis*, **9/2** (1990), pp. 177-200 .

Berry, W. *Structural Functions in Music* (Englewood Cliffs, New Jersey: Prentice-Hall, 1976).

Cogan, R. *New Images of Musical Sound* (London: Harvard University Press, 1984).

Cone, E. Stravinsky: 'The Progress of a Method', in R. Morgan, ed., *Music: a View from Delft* (Chicago and London: University of Chicago Press, 1989).

Cooper, G. & Meyer, L. *The Rhythmic Structure of Music* (Chicago: University of Chicago Press, 1960).

Druskin, M, (trans. M. Cooper). *Igor Stravinsky* (Cambridge: Cambridge University Press, 1979).

Dunsby, J, ed. *Models of Musical Analysis* (Oxford: Alden Press, 1993).

Hasty, C. 'On the problem of succession and continuity in twentieth-century music', *Music Theory Spectrum*, **8** (1986), pp. 58-74.

Kielian-Gilbert, M. 'Stravinsky's contrasts: contradiction and discontinuity in his neoclassic music', *Journal of Musicology*, **9** (1991), pp 448-80.

Kramer, J. *The Time of Music* (New York: Macmillan, 1988).

Lerdahl, F. 'Atonal prolongational structure', *Contemporary Music Review*, **4** (1988), pp. 65-87.

Lerdahl, F. & Jackendoff, R. *A Generative Theory of Tonal Music* (Cambridge: The MIT Press, 1983).

Lerdahl, F. 'Cognitive constraints on compositional systems', in J. Sloboda, ed., Generative Processes in music: *The Psychology of Performance, Improvisation and Composition* (Oxford: Clarendon Press, 1988), pp. 231-59.

Parks, R. *The Music of Claude Debussy* (New Haven and London: Yale University Press, 1989).

Straus, J. 'A principle of voice leading in the music of Stravinsky', *Music Theory Spectrum*, 4 (1982), pp. 106-24.

Straus, J. 'Stravinsky's tonal axis', *Journal of Music Theory*, **26/2** (1982), pp. 261-90.

Straus, J. *Remaking the Past: Musical Modernism and the Influence of the Tonal Tradition* (Cambridge, Massachusetts and London: Harvard University Press, 1990).

Straus, J. 'The problem of prolongation in post-tonal music', *Journal of Music Theory*, **31** (1987), pp. 1-21.

Straus, J. 'Voice leading in atonal music', in J. Baker, D. beach & J. Bernard, eds., *Music Theory in Concept and Practice* (Rochester NY: University of Rochester press, 1997).

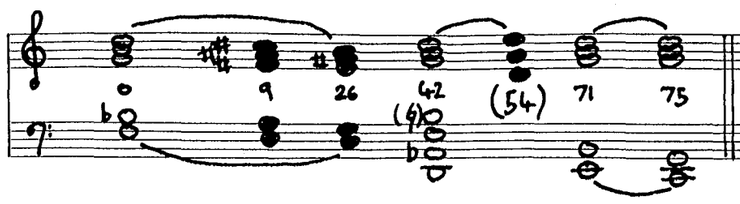
Taruskin, R. *Stravinsky And The Russian Traditions* (California and Oxford: University of California Press, 1996).

Van den Toorn, P. *The music of Igor Stravinsky* (New Haven and London: Yale University Press, 1983).

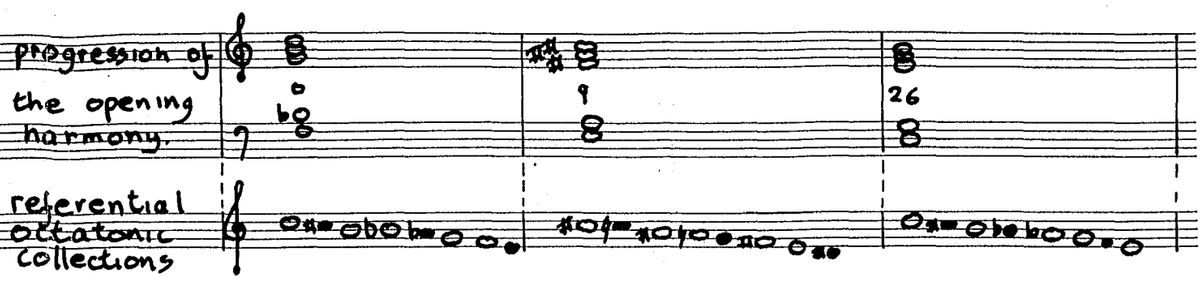
Walsh, S. 'Stravinsky's Symphonies: accident or design?', in C. Ayrey & M. Everist, eds., *Analytical strategies and Musical Interpretations* (Cambridge: Cambridge University Press, 1996), pp. 35-71.

Walsh, S. *The Music of Stravinsky* (London and New York: Routledge, 1988).

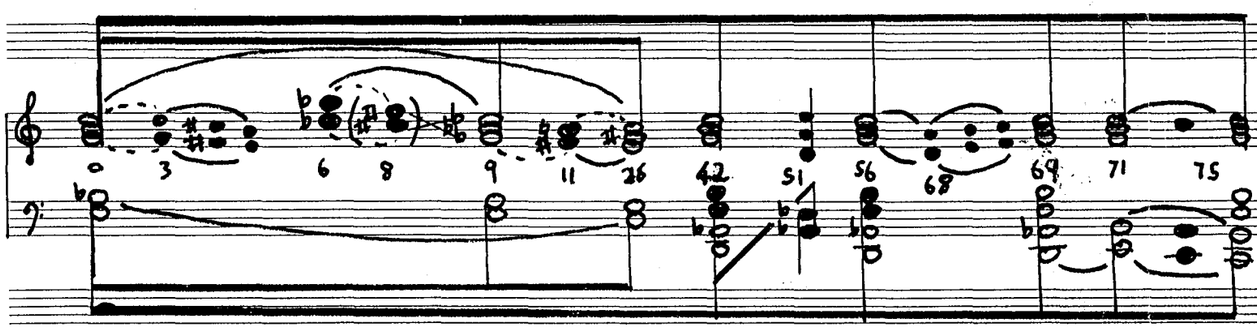
Fourth Level of Harmonic Reduction

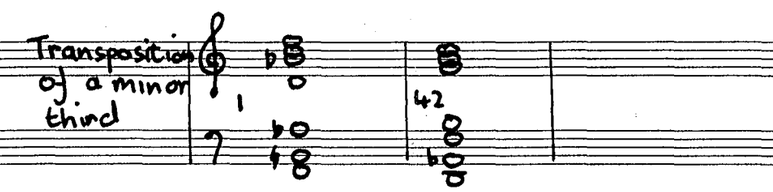


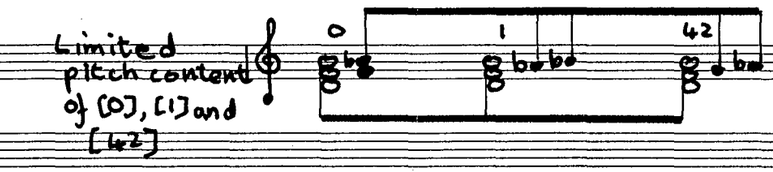
Referential Harmonic Connections



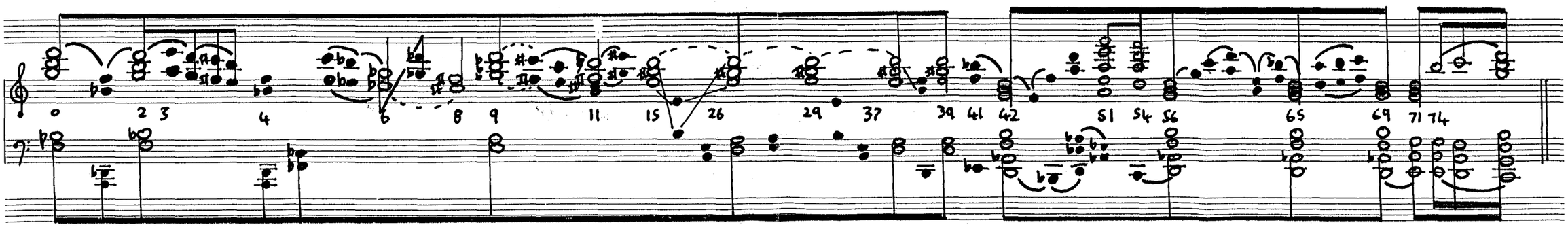
Third Level of Harmonic Reduction





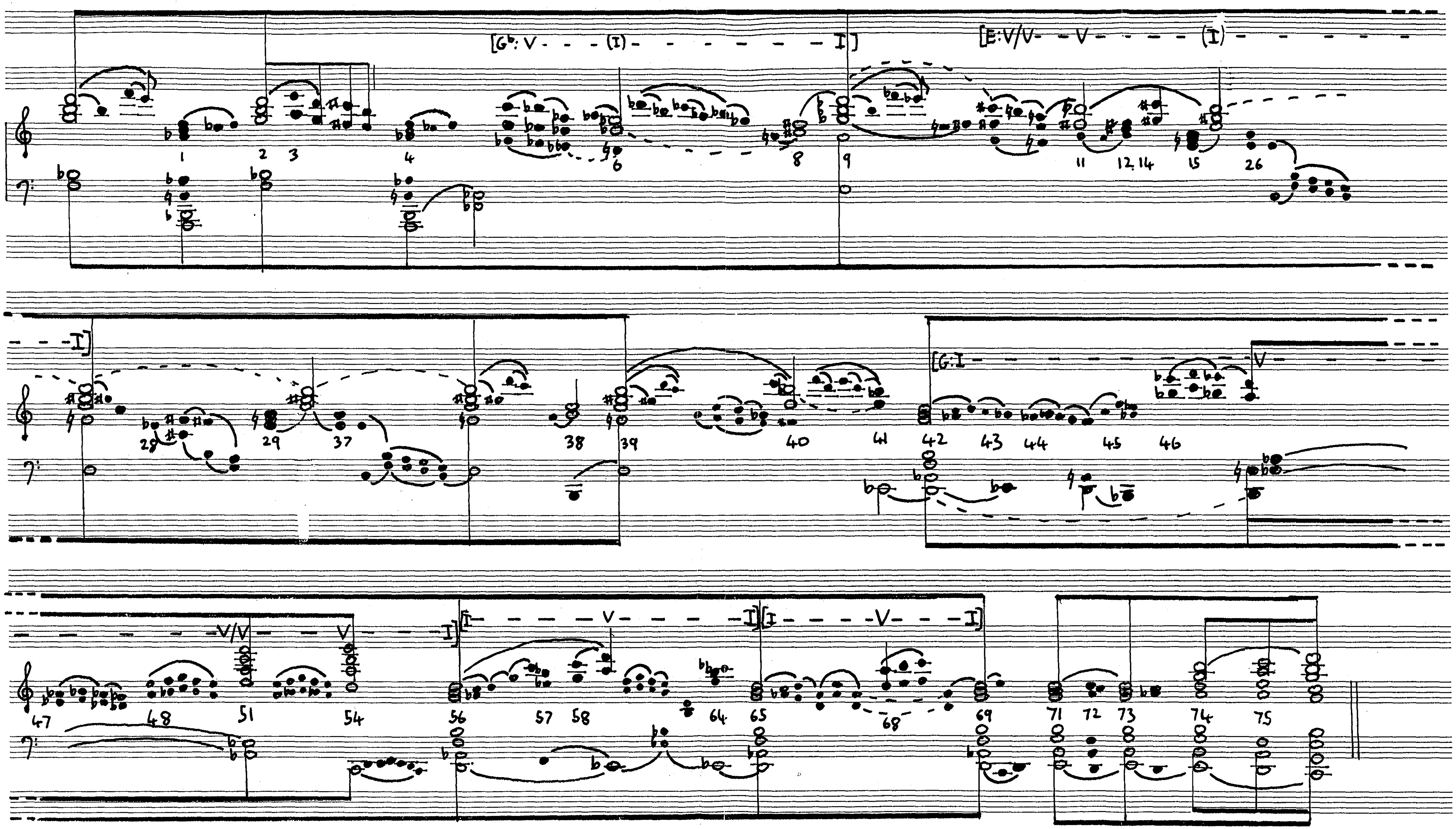


Second Level of Harmonic Reduction



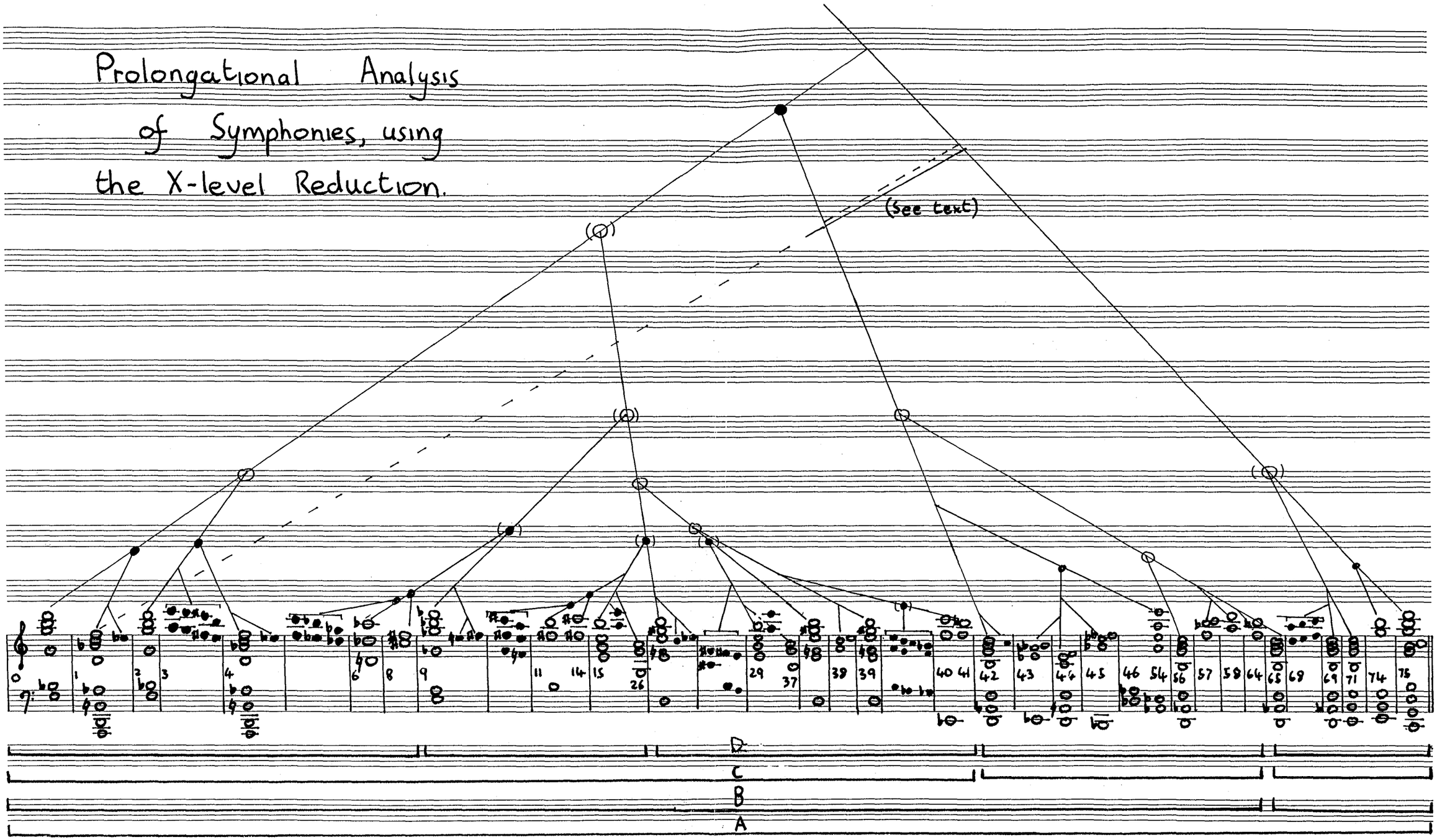
JEREMY MATTHEWS

First Level of Harmonic Reduction



JEREMY MATTHEWS

Prolongational Analysis of Symphonies, using the X-level Reduction.

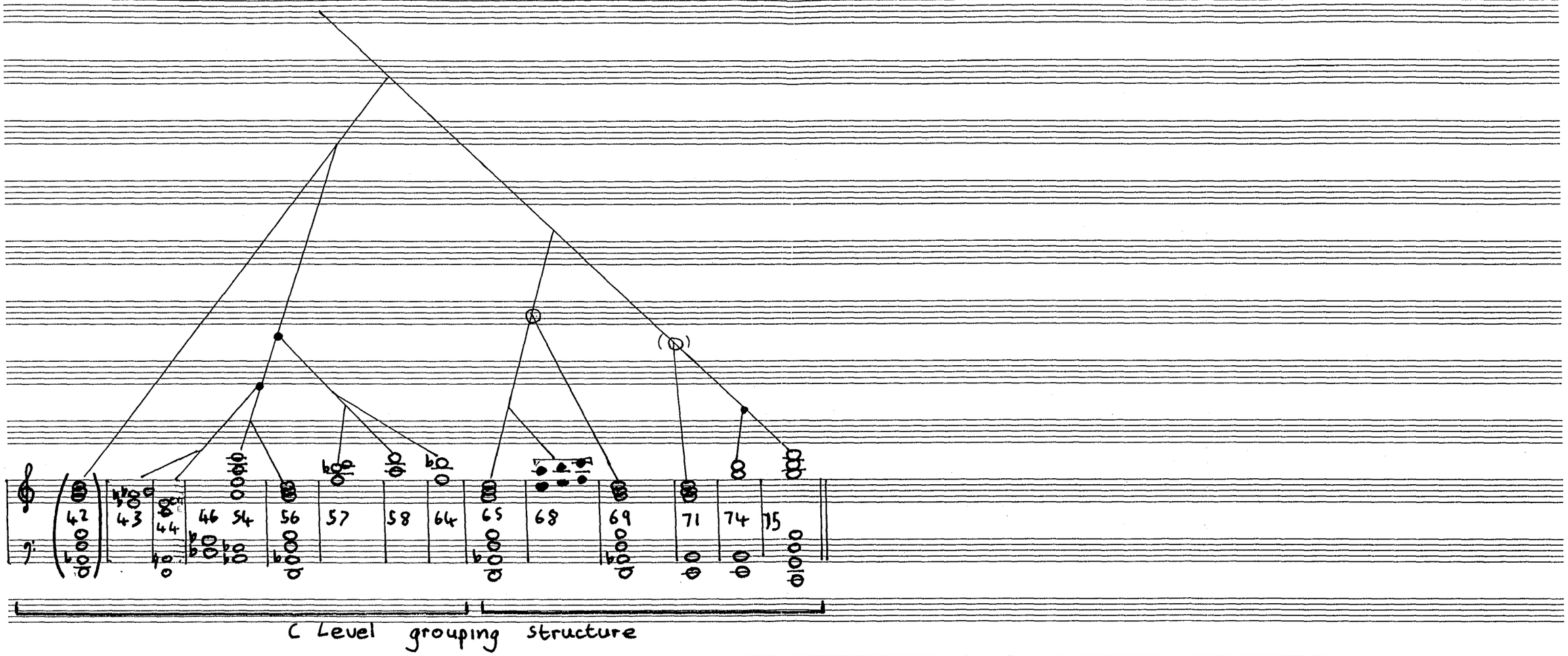


(Grouping Structure)

JEREMY MATTHEWS

Alternative Prolongational

Analysis of [42] to the end.



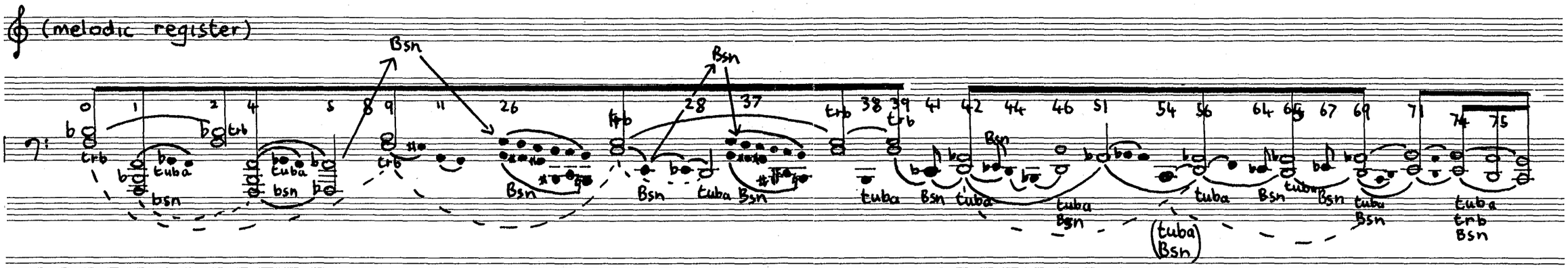
C Level grouping structure

JEREMY MATTHEWS

PAN-A3 18 STAVE

Instrumentation in the Bass

of Symphonies of Wind Instruments.



JEREMY MATTHEWS